10th Annual Research Symposium

Abstracts

WEDNESDAY, FEBRUARY 21, 2024

ROSEMAN UNIVERSITY
OF HEALTH SCIENCES

Roseman University of Health Sciences Nevada Abstracts

#1: Analysis of Adolescent Malnutrition on Oral Health: A Systematic Review

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Purpose

This review aimed to explore the relationship between malnutrition and oral health in adolescents.

Methods

A literature search in PubMed, Dentistry & Oral Sciences Source, Scopus, and Web of Science was conducted on September 13th, 2023. Peer-reviewed articles written in English and published from 2013 containing information on the negative impact of adolescent malnutrition on oral health were considered eligible for review. From the 594 studies obtained from the literature search, 88 studies were included.

Results

There is a high correlation between malnutrition, and oral health and development. Children that are under or overweight, stunted, and or vitamin deficient are at high risk to experience oral health complications. Oral health complications can include recurrent aphthous stomatitis (RAS), ulcers, oral pain, impaired oral quality of life (QoL), delayed eruption, periodontal disease, and most importantly, early childhood caries (ECCs). Specifically, vitamin D, which is responsible for stimulating calcium and phosphorus absorption, is essential for proper growth, eruption of dentition, and enamel development in adolescents. Vitamin deficiencies are associated with stunting, wasting, and general malnutrition. Manifestations of nutritional deficiencies in the oral cavity can result in various dental and oral conditions. Most notably, early childhood caries (ECC) is a consequence seen in an overwhelming number of studies on childhood malnutrition. This is a large concern as caries in primary teeth spread more quickly, and ECCs are a risk factor for further undernutrition, creating a cycle of these conditions.

Conclusions

This review is one of the first to explore the relationship between malnutrition, oral health, and development in adolescents. There is a strong correlation that suggests nutritional deficiencies are associated with sub-optimal oral health in adolescents. While there are many risk factors for nutritional deficiencies in adolescents, educating mothers and increasing access to more nutritious foods is paramount to combat malnutrition-related oral health issues.

#2: **Masticatory efficiency improvement after Class III orthognathic surgery: Scoping Review**

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Purpose

Orthognathic surgery (OS) aims to resolve esthetic and functional concerns with the restoration of the maxillomandibular anatomical balance, which results in improved facial proportions and biodynamics. While surgical treatment results in predictable skeletal and soft tissue corrections, improvement in oral function is not always guaranteed. The objective of this study is to review and summarize the existing literature regarding the impact of orthognathic surgery on the masticatory performance of patients with Class III skeletal malocclusion. This information will be useful to clinicians involved in the care of OS patients, as well as in the design of future related research studies.

Methods

A thorough review of the literature was conducted. Six databases were searched for peer-reviewed human studies, including information about Class III orthognathic surgery and masticatory efficiency. Article screening was performed independently by two reviewers with the use of predefined inclusion/exclusion criteria. Data extraction was performed independently by two reviewers with the use of a data extraction tool. Information about article type, study design, participants' characteristics, interventions, and outcomes were extracted, summarized, and synthesized.

Results

34 studies met the review criteria: 17 cross-sectional, 12 case-control, 5 cohort studies. 19 studies with single jaw surgery (17 mandibular, 2 maxillary), 11 with double jaw surgery, and 4 non-specified procedures. The masticatory efficiency assessments varied between studies, including the number and/or area of occlusal contacts, masticatory muscle function, bite force measures, recordings of the chewing cycle, and chewing gum tests. The latest post-operative assessment timepoints ranged from 1-5 years. Most studies (28) concluded that there is a positive direct or indirect impact of OS on masticatory function, although it did not always reach the control group levels, even 3-years post-operatively.

Conclusions

Masticatory efficiency improves in most cases after Class III OS.

#3: Orthodontic Treatment Modifications in Patients with Turner Syndrome: Optimal Treatment Planning and Timing

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Purpose

Overview: Turner Syndrome (TS), affecting 1 in 2,500 female births, presents unique dental challenges due to the absence of one X chromosome. This research reviews orthodontic implications of TS, focusing on its distinct dental and craniofacial features.Key Findings: TS patients often exhibit specific characteristics like malocclusion, increased overjet, overbite, and tooth morphology anomalies. Our analysis of literature, including studies on TS's dental and craniofacial aspects, emphasizes the importance of customized orthodontic care.Aim: To provide orthodontists with essential insights for effective treatment strategies in managing Turner Syndrome patients.

Methods

This literature review addresses Turner Syndrome (TS) and its impact on dentistry and orthodontics, aiming to improve patient care. We conducted a thorough search using PubMed and Google Scholar, focusing on recent, relevant studies using keywords like "Turner Syndrome" and "Orthodontics". Inclusion criteria were studies offering clinical insights into TS, while those not recent, lacking full text, or irrelevant were excluded. Data extraction focused on publication details, study design, key findings, and orthodontic recommendations, particularly concerning craniofacial deformities. The synthesis of data involved categorizing key themes to provide an overview of TS's dental implications, aiding professionals in effective treatment planning.

Results

This literature review is on going and our results and conclusion sections of the literature review remain incomplete. We will continue our research and add to this poster as we continue down the path. We are expecting results that align with current research on dental and orthodontic presentations on children with Turner Syndrome. Thus, Turner Syndrome (TS) in children often presents with distinctive dental and orthodontic challenges. Commonly, these patients exhibit malocclusion, characterized by misalignment of teeth and bite issues. An increased overjet and overbite are frequently observed, where the upper teeth significantly overlap the lower. Additionally, anomalies in tooth morphology, such as altered shape and size of teeth, are prevalent. These dental irregularities may be coupled with delayed tooth eruption and a higher likelihood of missing teeth. Craniofacial features in TS can include a shorter lower jaw and a high-arched palate, which necessitate a tailored approach in orthodontic treatment to ensure effective care and optimal oral health outcomes for these children.As we proceed on with research, we aim to provide a review on the most successful dental and orthodontic protocols for dental treatment on kids with TS. This will include discussion into the best time for intervention and which approaches will likely yield the greatest results.

Conclusions

The conclusion of this research will be beneficial to the treatment of turner syndrome both in dentistry and in orthodontics. Though TS does not present clinically often, it is important to understand best treatment options. Conclusion for this lit review will be coming soon

#4: **Evaluating the Chemotherapeutic Effects of Ondansetron on Triple Negative Breast Cancer Cells**

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Purpose

Currently, it is unclear how the ondansetron could itself affect the cancer cells within a chemotherapeutic treatment. Studying this potential relationship between ondansetron, a very common drug prescribed to chemotherapy patients for nausea and vomiting, and breast cancertreatments can possibly aid in the development of new therapeutic strategies against cancer.This study analyzes cancer cell growth and death after treatment with the TAC regimen(Paclitaxel or docetaxel / doxorubicin/ cyclophosphamide) combined, or not, with high and lowconcentrations of ondansetron to examine the effects ondansetron may have on cell recovery and colony formation post TAC treatment.

Methods

The triple negative breast cancer cell line MDA MB 231 was utilized and treated with the TAC regimen. Recovery and colony formation was assessed post TAC treatment when high and low concentrations of ondansetron were added. Recovery and cell death was assessed 72 hours or 1 week after initial TAC treatment. Colony formation was assessed 2 weeks after initial TAC treatment. Data was collected and analyzed by graphpad prism.

Results

The addition of ondansetron showed some synergistic effects with the TAC regimen. For example, even though ondansetron did not, on its own, have any effect on cell death unless added at very high concentrations, ondansetron added post TAC treatment did reduce recovery of cell lines significantly compared to no ondansetron treatment.

Conclusions

In this study, ondansetron was added to the TAC regimen to kill triple negative MDA MB 231breast cancer cells. This study showed that the addition of ondansetron did have some effect combined with the TAC regimen. In particular, the addition of ondansetron did reduce cell recovery post 72 hours TAC treatment. This may mean that ondansetron, through inhibition of aserotonin receptor, or through inhibition of an off-target receptor, may affect resistance to chemotherapeutic regimens.

#5: Testing Potential Fast-acting Antidepressants Against Monoamine Transporters

Zechariah De Silva;[1] Jacob Newby;[1] Danielle Valls;[1] Courtney Dawes;[1] Julius Janson;[1] Visanou Klaharn;[1] Tatiana Erives;[1] Christen Caine;[1] Angela Terosian;[1] Christopher So;[1] Jeffrey Talbot;[1] David Rawlins[1]

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Purpose

Major depressive disorder (MDD) is a debilitating disease that is associated with a reduced quality of life and increases the risk of suicide 20-fold. Treatment of MDD is traditionally through medications that modulate monoamine neurotransmitter signaling. However, the response to these medications is often delayed and therefore insufficient in patients experiencing an acute crisis. The goal of this study is to develop potential fast-acting antidepressants using the scaffold of MI-4 (Ro-25-6981), a compound with antagonist activity at the NMDA receptor and produces a rapid and sustained antidepressant activity in animal models.

Methods

Stable serotonin transporter (SERT), dopamine transporter (DAT) and norepinephrine transporter (NET) HEK 293 cell lines were developed and used to assess the activity of various compounds derived from MI-4 to modulate neurotransmitter uptake activity. Neurotransmitter uptake was measured using the neurotransmitter uptake sample kit from Molecular Devices according to manufacturer's specifications. Maximum signals were identified from a plate reader and expressed as percent inhibition compared to vehicle control (Hanks' Balanced Salt Solution (HBSS) alone).

Results

In previous studies using the tail suspension test for antidepressant activity, six analogs of MI-4 (TR-2, TR-4, TR-5, TR-6, TR-13, and TR-17) exhibited antidepressant-like activity. Two of these, TR-5 and TR-17, demonstrated antidepressant effects despite lacking functional antagonist activity at the NMDA receptor. These analogs were tested in the various neurotransmitter uptake activity assays in HEK 293 cell models. TR-17 showed an increase in the ability to inhibit SERT transporter activity versus MI-4 whereas TR-5 showed a decrease in ability to inhibit the same transporter in relation to MI-4.

Conclusions

In this study, we sought to test potential compounds derived from the fast-acting antidepressant MI-4 for their ability to inhibit monoamine transporters. By modifying the structure of MI-4, we were able to increase or decrease the uptake activity of neurotransmitter transporters and are using the structure-activity relationships to identify the best profile for antidepressant activity. Further study of the pharmacodynamic effects of these compounds is needed such as their ability to target the NMDA receptor.

#6: Exploring the Effects of G Protein Coupled Receptor Kinase 2 and Beta Arrestin 2 on the Effectiveness of the TAC Regimen- Recovery and Colony Formation

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Purpose

Even with recent advances, medications to target breast cancer are still limited. In particular,protein expression may be able to predict the effectiveness of chemotherapeutic regimens like TAC(paclitaxel/docetaxel, doxorubicin and cyclophosphamide.) This is because aberrant protein functionand expression may contribute to cancer cell chemotherapeutic resistance. In this study, we are usingTAC to treat the triple negative breast cancer cells MDA MB 231 and measuring their response in colonyformation and recovery. Looking at all these components of cellular response will give us insight on theeffectiveness of TAC and the results of the treatment.

Methods

Herein, we studied the effects of TAC (paclitaxel or docetaxel, doxorubin andcyclophosphamide) on cells stably transfected with shRNA encoding for scrambled sequence (control),GRK2 or Beta arrestin 2. Control, GRK2 or beta arrestin 2 cells were treated with TAC at different times(0-72 hours) and their cell death were assessed by trypan blue exclusion. Furthermore, for recovery andcolony formation experiments, cells were treated for 24 hours, then washed and replated. Cells wererecounted after 72 hours or 1 week for assessing recovery. For colony formation, cells treated for 24hours were replated and allowed to grow for an additional 2 weeks in drug- free growth media. Statisticswere performed by t-test using graphpad prism.

Results

Recovery and colony formation varied between cells with or without GRK2 or betaarrestin 2. After 24 hour treatment with TAC, MDA MB231 cells lacking beta arrestin 2expression showed significant reduction in recovery after 1 week and in colony formation after 2weeks.

Conclusions

The effectiveness of the TAC regimen was explored in cells lacking GRK2 and beta arrestin. Weobserved that cells lacking beta arrestin 2 did not recovery well post treatment. This study,therefor shows that beta arrestin 2 may be a marker that, if expressed at low levels in cancercells, can indicate that the cell is more sensitivity TAC regimen. This may allow for a betterchoice in treatment regimen and, thus, a better choice could be made regarding patienttreatments.

#7: Take it slow: Exploring slow-binding behaviors of a pharmacophore against glycogen synthase kinase

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Purpose

Drug discovery in eukaryotic infectious disease is challenging, because homologies of target proteins are higher in these pathogens, compared to bacteria and viruses. However, inhibition of enzymes from eukaryotic pathogens is feasible, if the inhibitor has kinetic selectivity- that is, the molecule resides in the pathogen enzyme- over human homologs. To explore such inhibitory behavior, we took a small library of 1,2,4-thiadiazolinediones (TDZDs), a pharmacophore with slow-binding against human GSK, and screened them against GSK homologs from Leishmania donovani (LdGSK) and Aspergillus fumigatus (AfGSK), etiological agents of leishmaniasis and aspergillosis.

Methods

ADP-Glo (Promega) assay kits were used. Enzyme assays were run in the presence of TDZDs or DMSO vehicle at low (0.5x Km) or high (5x Km) concentrations of ATP. Assays were run with an incubation period of GSK and TDZD/DMSO before adding substrate for enzymatic reaction (preincubated) or without preincubation. TDZDs were purchased from AOBIUS, ThermoScientific, and Sigma Aldrich. Alignment was performed with the UniProt alignment tool.

Results

At 100 nM TDZD, some inhibited GSK-catalyzed reaction entirely, and for all molecules with less than 100% inhibition, preincubation increased inhibitor potency. In general, bioactivity of TDZDs was greater against LdGSK than AfGSK, though two compounds, TUN-0014 and TUN-0016, were particularly inhibitory for both GSKs. High concentrations of ATP decreased the activity of TDZDs, indicating substrate competition. However, for some compounds, preincubation partially helped to overcome ATP-competition, restoring TDZD-activity.

Conclusions

TDZDs have varying activity against pathogenic GSKs, which could be exploited to design parasite-specific inhibitors. More detailed dose-response data is warranted, and future steps will include expanding the TDZD library, pursuing crystal structures of TDZD-bound GSKs, and screening potent compounds in microbiological assays.

#8: Reduction of Tumor growth using mathematical cancer models

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Purpose

Chaos is a type of motion found in mathematical systems that is highly sensitive to initial conditions. While many biological systems described in literature have been analyzed for the presence of chaotic dynamics, there are still many that are yet to be discovered. The goal of this project is to reassess Itik and Banks' discovery of chaotic behavior in their population dynamics model of cancer growth. Once chaotic behavior is confirmed, we want to investigate how chaos could possibly be controlled to minimize tumor growth and discover novel treatments for cancer patients.

Methods

The strategy adopted here is based on the Shimada-Benettin algorithm to numerically calculate the Lyapunov exponent (LE) spectrum of ODE models; which is then coupled with a numerical optimization algorithm to search for regions in parameter space that have positive LEs, indicating that they contain strange attractors. The open-source software COPASI allows us to couple the Shimada-Benettin algorithm to several optimization algorithms, such as Hooke and Jeeves, SRES, genetic algorithm, particle swarm, and many others. The parameters can be optimized to both maximize chaos as well as minimize the tumor cell population. Using the Particle Swarm algorithm, the parameters were optimized to maximize chaos by using the following optimization objective functions: F1: Maximize L1 F2: Maximize L1 – 2|L2| , where L1 and L2 are the first two Lyapunov exponents. The agent based modeling software, NetLogo was also utilized to create new visualizations of the chaotic growth and analyses on its impact on the population.

Results

Our investigation confirmed that Itik and Banks' cancer model displays chaos (Lyapunov exponent > 0).

Conclusions

After confirming the presence of chaos in the model, the next steps are to investigate it further. It could be possible that the chaotic behavior is beneficial to the host and effector cells, helping the body to fight tumors. In the future, research can be done on ways to translate optimization of these parameters to a clinical setting, whether through utilizing pharmaceuticals or other treatments.

#9: **Targeting CYP51 in the treatment of Acanthamoeba keratitis**

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Purpose

Acanthamoeba castellanii causes a rare but serious ocular infection called Acanthamoeba keratitis. Risk factors for infection include contact with contaminated water and poor hygiene of contact lenses. The first-line treatment is comprised of a months-long schedule of antibiotics. However, in cases where pharmacological interventions fail to address the infection, surgery may be necessary, with the continued risk of potential vision loss. Consequently, new treatments are needed, whether new pharmacological agents or new combination therapies with current agents. As an aerobic parasite, Acanthamoeba synthesizes ergosterol as a cell membrane insert, and ergosterol biosynthesis inhibitors (EBIs), common in antifungal pharmaceuticals, could potentially fill that gap. The most common EBIs are of the azole drug class, which inhibit CYP51 (sterol 14α-demethylase). This study reviews the clinical usage of azole inhibitors of CYP51 in the management of Acanthamoeba keratitis.

Methods

Joanna Briggs Institute (JBI) practices for scoping reviews are being used. PCC framework will include patients with Acanthamoeba keratitis and CYP51 azole drug treatment. The pharmacological intervention considered will be both azole treatment alone and azole treatment in combination therapy. Subgroup analyses of each azole molecule and subgroup analyses of azole combination therapies will be conducted as relevant. Clinical trials, case studies, and other reports will be included, and databases searched will include MEDLINE (PubMed), Embase (Elsevier), Scopus (Elsevier), and CINAHL (EBSCO). MedNar (Deep Web Technologies) and Dissertations and Theses Global (ProQuest) will be searched for gray literature.

Results

NA

Conclusions

NA

#10: **Chemical Markers of Microbiome Ecology in Neurodevelopmental Disease**

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Purpose

The significance of the gut-brain axis has come to light in recent years. Diversity, or lack thereof, in microflora has been linked to not just GI disease, but neurodevelopmental disorders, including autism spectrum disorder. Some bacterial genera have been correlated with affected patients, but genetically testing fecal cultures as risk factors or biomarkers is time-consuming and costly. Instead, metabolomic profiling shows promise to be both a cheaper and faster alternative biomarker method. Diagnostic compounds found from these microbiota must be identified, known as xenometabolites. These xenometabolomic markers can be isolated from a range of body fluids such as blood, urine, and stool. This study aims to review clinical and animal model reports of xenometabolomic markers of autism spectrum disorder and other neurodevelopmental disease.

Methods

This scoping review follows methods recommended by the Joanna Briggs Institute (JBI). Searches will be conducted over a number of databases: Embase (Elsevier), CINAHL (EBSCO), Scopus (Elsevier), and MEDLINE (PubMed). We will consider both clinical and nonclinical reports, to include clinical trials, case studies, experimental papers, and theses and dissertations searched through ProQuest. The PCC scoping review framework is used, searching terms to encompass microbiota, metabolomics, and neurodevelopmental disorder.

Results

NA

Conclusions

NA

#11: Exploring the Effects of G Protein Coupled Receptor Kinase 2 and Beta Arrestin 2 on the Effectiveness of the TAC Regimen- Characterization of Cell Death

Daniel Ghebreigziabher;[1] Yinping Cui;[1] Stephanie Ngan;[1] Shyla Ann Mariano;[1] Tyson Stokes;[1] Christopher So[1]

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Purpose

Breast cancer cell is the second most common cancer in female population, and about 10-15% are triple negative breast cancer cells, which tend to grow and spread quickly. Currently, chemotherapy is the 1st line treatment of 4th stage breast cancer, and TAC regimen (paclitaxel or docetaxel/doxorubicin/cyclophosphamide) is one of the common treatment combinations. Having a better understanding of the effects of these chemotherapeutic agent combinations can lead to better outcomes in drug efficacy. In this study, we are using TAC to treat the triple negative breast cancer cells MDA MB 231 and characterizing their cell death.

Methods

Herein, we studied the effects of TAC (paclitaxel or docetaxel, doxorubin and cyclophosphamide) on cells stably transfected with shRNA encoding for scrambled sequence (control), GRK2 or Beta arrestin 2 to reduce corresponding protein expression levels. Control, GRK2 or beta arrestin 2 shRNA cells were treated with TAC at different times (0-72 hours) and their cell death were assessed by trypan blue exclusion. Times, concentrations and ratios of drug within TAC were varied.

Results

The cell death in the MDA MB 231 cells upon TAC exposure varied depending on the ratio of TAC and if the cell expresses GRK2 shRNA or beta arrestin 2. GRK2 shRNA cells showed reduced TAC sensitivity whereas beta arrestin 2 shRNA cells showed increased TAC sensitivity. However, this was dependent on the amount of paclitaxel or doxorubicin in the regimen. Cell death occurred time-dependently, increasing from 24 to 72 hours treatment.

Conclusions

In this study, cell death was characterized in MDA MB 231 triple negative breast cancer cells upon TAC exposure. This study showed that this cell death was time dependent, but the extent varies in cells lacking either GRK2 or beta arrestin 2. Furthermore, the differences in cell death by TAC treatment varied if doxorubicin or paclitaxel ratios within the TAC regimen was changed. This suggests that potentially the ratio of paclitaxel, doxorubicin or cyclophosphamide within the clinically used TAC regimen may be important in determining cancer cell resistance especially if the levels of GRK2 or beta arrestin 2 were altered in the triple negative breast cancer cell lines.

#12: Evaluation of Novel Therapeutic Agents for the Treatment of Chronic Dry Eyes

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Purpose

Dry eye disease (DED) is a multifactorial ocular condition, where disrupted tear film stability and ocular surface inflammation affected between 5% to 34% of the worldwide population in 2015 and posed a challenge to conventional ophthalmic treatments. Recent advances have led to potential novel therapeutics aiming to alleviate symptoms and improve patient outcomes.

Methods

A database search using PubMed was performed using keywords to target dry eyes from conventional to novel, and pharmacologic to nonpharmacologic treatment types. A total of six journal articles from 2000 to 2023 encompass various mechanisms involved in the novel therapeutics of DED pathophysiology, including tear film stability, inflammation, and neurosensory abnormalities. A comparison of current pharmacological (rebamipide, diquafosol, lifitegrast, and cyclosporine A) and non-pharmacological (intense pulse light) will be discussed. The efficacies of each treatment were generally reviewed based on corneal staining, tear breakup times (TBUT), Schirmer's scores, and symptom improvements.

Results

Novel mucin secretagogues, such as rebamipide and diquafosol (Diquas), have provided the potential to increase mucin production and stabilize the tear film, while anti-inflammatory agents, lifitegrast (Xiidra), mitigate ocular surface inflammation and alleviate DED symptoms. The systematic reviews provided evidence of the improvement of overall evaluations. The TBUT score and a Fluorescein Corneal Staining (FCS) demonstrated improvement ($p<0.0001$) with rebamipide at 12 weeks, while diquafosol presented treatment superiority compared to placebo with higher Schirmer scores ($p < 0.030$) at the 6-week primary efficacy time point. Both lifitegrast and cyclosporine A (CsA) displayed subjective relief from ocular discomfort as their primary endpoints, with $p < 0.0001$ and < 0.001, respectively. Non-pharmacological approaches consisting of neurostimulation therapies, such as intense pulsed light (IPL), help to alleviate discomfort and improve corneal sensitivity. Although not a conventional method, a review illustrated significant improvement of TBUT and Schirmer scores of both eyes after an IPL treatment on day seven compared to baseline analysis.

Conclusions

Recent pharmacological advancements in understanding the complexity of DED have emphasized the potential of novel therapeutic interventions. Emerging strategies targeting tear film stability, inflammation, and the neurosensory components of DED offer improvement in patient care and quality of life.

#13: A Trypanosoma brucei MAP kinase and potential for repurposing kinase inhibitors

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Purpose

Human African trypanosomiasis (HAT, also called sleeping sickness) is caused by the parasite Trypanosoma brucei. HAT is one of three diseases caused by kinetoplastid protozoa (the others being Chagas disease (Trypanosoma cruzi) and leishmaniasis (Leishmania spp.)) and there is little funding for discovery and development of new drugs. One strategy to streamline drug discovery is to repurpose known compounds, if they target parasite growth and have minimal side effects. To this end, we have taken an essential MAP kinase from T. brucei, TbMAPK6 or TbK5140, developed in vitro assays, and screened a small library of known inhibitors of human kinases.

Methods

TbMAPK6 was produced by Biozilla (Dallas TX), and inhibitors were purchased from commercial sources. Enzyme assays, in the presence or absence of inhibitor, were run in 0.65 mL microcentrifuge tubes at 37°C and stopped with heat. Completed enzymatic reactions were transferred to 384-well plates, and end-point reaction progression was monitored with ADP-Glo assay kits (Promega, Madison WI). Enzymatic and inhibition data was analyzed with GraphPad Prism (New York, NY), and protein alignments were conducted with UniProt.

Results

TbMAPK6 was found to catalyze phosphotransfer reaction to myelin basic protein (MBP) with a Km of 7.7 µM. Michaelis-Menten constant for ATP was 47 µM. TbMAPK6-catalyzed reaction was linear with respect to both time and enzyme concentration, and we developed an assay for screening inhibitors against this protein kinase in 384-well plate format. Inhibitors tested, including the pan-kinase inhibitor staurosporine, had variable activity and dose-dependent effects. TbMAPK6 aligns with human ERK7/8 with 43.5 percent identity and to several other putative pathogenic MAP kinases at varying identities.

Conclusions

Varying inhibition with different known human protein kinase inhibitors shows promise towards repurposing known molecules for neglected disease drug discovery. Identities of TbMAPK6 with MAP kinases from other parasites underscores additional potential of repurposing for other neglected diseases with a higher epidemiological burden than HAT. Next steps will be to expand the inhibitor library of TbMAPK6 and expand screening to other pathogenic MAP kinases.

#14: Evidence of Prostate Cancer Progression in Transgender Women After Hormone Replacement Therapy - Scoping Review Protocol

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Purpose

This scoping review aims to determine the extent and quality of evidence regarding prostate cancer progression outcomes in transgender women who have undergone hormone replacement therapy. Notably, transgender females undergoing hormone replacement therapy as a component of the gender affirmation treatment commonly have their prostate, rendering them vulnerable to developing prostate cancer. There is no current agreement about the likelihood of transgender women developing prostate cancer or the impact of hormone replacement therapy on oncogenic molecular pathways. Unfortunately, due to a lack of scientific data and inadequate trust and awareness in the medical community, transgender women are often not provided with the essential information needed to make informed decisions regarding their prostate health. This puts them at risk for a delayed diagnosis. Understanding PC development in transgender women is critical, and addressing this gap in scientific knowledge necessitates highlighting this issue.

Methods

This scoping review will consider experimental, quasi-experimental, observational studies, and systematic reviews that meet our inclusion criteria. From these sources, this scoping review will extract data on the gender affirming treatment received (age, treatment duration, types of hormone replacement therapy), the methodology used for prostate cancer detection and treatment, rates of prostate cancer in transgender females, molecular pathways altered by hormone replacement therapy and any key findings relevant to our objective and review question.

Results

NA

Conclusions

NA

#15: **A Systematic Review of Mirror Neurons in Schizophrenic Cases**

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Purpose

Schizophrenia is a mental disorder characterized by continuous or relapsing episodes of psychosis. With recent data suggesting 3.7 million Americans and 24 million worldwide live with this condition, it is imperative now more than ever to investigate the internal neurological effects of this condition on an individual. The causes of the condition are attributed to a combination of genetic and environmental factors. Symptoms of the disorder are categorized into “flat effects”--absences of emotional reactivity–and “positive effects”--surpluses of mental experiences. The purpose of this work is to delve into the components of the effects of schizophrenia, how they connect to mirror neurons and discuss the possibility of treatment plans for schizophrenic patients based on these findings.

Methods

12 studies from the National Institute of Health, and PubMed were examined. Inclusion criteria consisted of publication between 2010-2023, credibility, and study design. Exclusion criteria were studies that focused on cases of autism or mental health disorders.

Results

The results of this analysis were that schizophrenia’s “flat” and “positive” effects manifest through changing the mirror neuron system (MNS) within the brain. Mirror neurons are brain cells that are activated both when performing an action and when observing another individual perform that same action. The MNS is the internal wiring within the brain that allows humans to interact. Patients with schizophrenia identified with an abnormally functioning MNS. Moreover, patients who experienced “flat” effects showed decreased MNS activity when compared to their neurotypical counterparts; this abnormality indicating “delayed socio-emotional functioning”. Considering this, new treatment options are on the horizon for patients; an urgency as nearly 31% of patients globally do not receive care as of 2023. One instance is the clubhouse model, a community psychosocial rehabilitation program that facilitates mental health recovery. The model when combined with medication could prove to be highly effective for patients.

Conclusions

In summary, mirror neurons have played a pivotal role in the identification, diagnosis, and ultimately treatment of neurological disorders. Now that a link has been established between the effects of this disorder and their real-world-manifestations, options for treatment plans are in the future.

#16: Exploring the Effects of G Protein Coupled Receptor Kinase 2 and Beta Arrestin 2 on the Effectiveness ofthe TAC Regimen- Migration and Invasion

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Purpose

It is difficult to determine a patient specific antineoplastic treatment that can limit breast cancermetastasis. Protein expression may be able to predict the ability of chemotherapeutic regimens like TAC(paclitaxel/docetaxel, doxorubicin and cyclophosphamide) in inhibiting metastasis. This is becauseaberrant protein function and expression may contribute to cancer cell chemotherapeutic resistanceand, thus, increase the likelihood of metastasis occurring. In this study, we are using TAC to treat thetriple negative breast cancer cells MDA MB 231 and measuring their ability to migrate and invade tissue-like surfaces.

Methods

Herein, we studied the effects of TAC (paclitaxel or docetaxel, doxorubin andcyclophosphamide) on cells stably transfected with shRNA encoding for scrambled sequence (control),GRK2 or Beta arrestin 2. Control, GRK2 or beta arrestin 2 cells were treated with TAC at different times(0-72 hours) and their cell death were assessed by trypan blue exclusion. For the migration assays, cellswere treated for 24 hours, then were re-plated onto boyden chambers, and allowed to migrate for 48hours towards the lower chamber containing 20% growth serum. For the invasion assays, the boydenchamber were coated with vitrogel 1 hour prior to use. The cells from the chambers were thencollected, fixed and stained. The number of cells that migrated were subsequently counted andexpressed as that of untreated cells.

Results

Migration post drug treatment varied between cells with or without GRK2 or beta arrestin 2.After 24-hour treatment with TAC, MDA MB231 cells lacking beta arrestin 2 expression showed asignificantly reduced ability to migrate.

Conclusions

The effectiveness of the TAC regimen was explored in cells lacking GRK2 and beta arrestin. Weobserved that cells lacking beta arrestin 2 or GRK2 did not migrate well post treatment. This study,therefore, shows that both proteins may be a marker that, if expressed at low levels in cancer cells, canindicate that the cell is more sensitive to TAC regimen and may metastasize less. This may allow for abetter choice in antineoplastic treatment and therefore better decisions could be made regardingpatient treatments.

#17: Exploring the developmental effects of antidepressants in Caenorhabditis elegans

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Purpose

It is so important to explore the potential side effects of antidepressants especially if these side effects could lead to a future detriment to an individual's financial and social well-being. A better understanding of these side effects in regards to human developmental issues is imperative considering issues related to mental health and depression affect a large percentage of the population. In this study, we tested if Caenorhabditis (C.) elegans could be a potential model organism to predict possible side effects associated with select antidepressants. Their developmental problems potentially encountered upon drug treatment may be encountered in humans.

Methods

We treated C. elegans with different selective serotonin reuptake inhibitors (SSRIs) and serotonin norepinephrine reuptake inhibitors (SNRIs). For our development studies, we treated the nematodes at different developmental stages in their life cycles, L1-L2 stage, and assessed how they matured by observing their size and egg laying.

Results

By testing different antidepressants on developing C. elegans, we found a variety of different outcomes. While the majority of medications tested did not affect development significantly, we found that paroxetine significantly hindered development of the L1 staged animal. Smaller sized nematodes were observed compared to the untreated animal.

Conclusions

In this study, we used C. elegans to examine the developmental effects of SSRIs and SNRIs. Our results show that some of these drugs are detrimental with respect to the developmental parameter tested. What we saw in these nematodes could be predictive for humans. For example, since paroxetine stunts nematode development, this could correlate with early fetal development defects seen in human studies when paroxetine is taken in the first trimester of pregnancy. Therefore, because these drugs at high concentrations cause adverse effects in C. elegans, caution may need to be employed when prescribing to pregnant women, in particular.

#18: Exploring the Influence of Atypical and Typical Antipsychotics Using Caenorhabditiselegans as an Experimental Model

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Purpose

Currently, it is unclear as what typical and atypical antipsychotics could be best used for certainmental disorders, especially when their effects can be influenced by a variety of factors in these diseasessuch as increases or decreases in protein expression. This is important to figure out since, in order toimprove lifestyle and outcomes of people with cognitive diseases, we must get a better understandingof how certain drugs effect the central nervous system in these disorders. We may be able to do thisusing Caenorhabditis (C.) elegans as an experimental model. By observing their drug- related behaviors,we can possibly relate this to what may happen in the more complex human system. In this study, wequeried the effects of G protein coupled receptor kinases (GRKs) in modulating the effects of atypicaland typical antipsychotics on C. elegans.

Methods

In this study, we investigated the effects of a typical (haloperidol) and atypical (aripiprazole)antipsychotic on wild-type, GRK1, and GRK2 knockout Caenorhabditis (C.) elegans. From each animal, 3to 4 C. elegans were selected and subjected to drug treatments across a range of concentrations andtimes. After the prespecified exposure time, we quantified egg-laying and locomotion by swim tests.Data acquired during experimentation underwent analysis using GraphPad Prism, enabling us to drawmeaningful insights from the results.

Results

In this study, haloperidol and aripiprazole effects varied depending on the animal. In swim tests,haloperidol treatment increased wild type movement significantly compared to aripiprazole. However,this was not observed in either GRK1 or GRK2 knockout animals. Of interest, GRK1 knockout animalsshowed reduced movement upon aripiprazole treatment, unlike other animals tested. Within 30minutes of drug testing, increased egg laying in response to haloperidol was observed for both GRKknockouts. The drug effects for all animals regarding increasing egg laying were no longer observed aftertreatment overnight.

Conclusions

This study demonstrates different effects of haloperidol and aripiprazole on C. elegans behaviordepending on the expression of the G protein coupled receptor kinases. Notably, GRK1 knockoutanimals displayed different responses to haloperidol, with haloperidol increasing egg laying but notmovement, unlike that seen in the N2 wild type animals. This suggests that GRKs may be able to biasmoderating antipsychotic effects.

#19: Identifying Mutations of Members of the GRK2- like Family in Skin Cancer- Mutations and PotentialClinical Significance

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Purpose

Understanding protein mutations in cancer may lead to the discovery of valuable information onprevention, treatment, and/or improvement of current treatment methods. This may be particularlyimportant in skin cancer, which is one of the most common forms of cancer in U.S. This study seeks toidentify somatic mutations in skin cancer in hopes of identifying the role played by members of the GProtein Coupled Receptor Kinase 2 (GRK2) subclass, GRK2 and GRK3, in skin cancer development andpatient prognosis.

Methods

In this study, we used COSMIC to identify somatic mutations in skin cancer. We assessed thetypes of mutations found in skin cancer patients in GRK2 and GRK3 and compared them to that foundfor all cancers. We also looked at particular patients who had particular mutations, noting peculiarcharacteristics and outcomes.

Results

GRK2 and GRK3 mutations were found in skin cancer, with, by percentage, more GRK3 missensemutations compared to those of GRK2. Of note, missense mutations associated with GRK2 and GRK3 inskin cancer is more associated with male patients versus female patients, with 73% (GRK2) and 77%(GRK3) of samples with known gender associated with male patients.

Conclusions

We utilized COSMIC to identify mutations within skin cancer involving GRK2 and GRK3. This studyshowed different characteristics associated with GRK2 and GRK3 mutations in skin cancer, with moreGRK3 missense mutations by percentage compared to GRK2. Albeit a small sample size, GRK2 and GRK3missense mutations is associated more with male patients, suggesting the occurrence of this type ofmutation may be more found in males. Further investigation is needed to query the importance of thisobservation to help determine why this is occurring and what is its function in males.

#20: Detection and Relative Quantitation of Changes in Gene Expression of Matrix Metalloproteases (MMPs) in Doxorubicin-Exposed Human Cells by RT-qPCR

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Purpose

Tissue Matrix Metalloproteases (MMPs) are a group of endopeptidases that are commonly involved in the maintenance of homeostasis and tissue repair. They are also involved in the metastasis of cancers, and in the development of drug resistance against chemotherapeutic agents. Doxorubicin is a commonly utilized chemotherapy agent with multiple activities insusceptible cancer cells. How MMP mRNA expression is affected by doxorubicin remains relatively unestablished. The purposes of this study are to determine what subgroups of MMPs are present in an in vitro cell line, and to determine the relative changes of MMP mRNA expression between doxorubicin-treated and control cells.

Methods

Doxorubicin (100 nm) and matching vehicle were applied to the cell culture medium for 24 hours and total RNA from the cells were harvested. An in vitro cell line, HeLa cells, were selected as the model and were maintained in stand cell culture conditions. The quantity and the quality of the isolated total RNA were determined using standard UV spectrophotometry andabsorbance at 260 nm and 280 nm. One nanogram (1 ng) of total RNA was then used to undergo the reverse-transcription and real-time PCR procedures. The PCR primers were selected based on previously published literature. Quantitation of the amplified PCR products were performed using SYBR Green dye and a real-time PCR thermocycler. Quantification of the amplified PCR product and the melt curve analysis were performed using the computer software supplied by the thermocycler manufacturer. The data generated was repeated at least twice.

Results

Sufficient amounts of total RNA were isolated from both doxorubicin- and vehicle-treated cells. The isolated RNA was of good quality, as determined by A260 and A280 using UV spectrophotometry. MMP1, MMP2, MMP9, and MMP14 mRNA were detected in both groups of cells. The quantification of mRNA was normalized against the housekeeping gene GAPDH.Melt-Curve analysis revealed the amplification of a single product, suggesting the specificity ofthe PCR process. The MMP1 mRNA was increased by 125% +/- 20%. The MMP2 mRNA was increased by 213% +/- 18%. The MMP9 mRNA was increased by 161% +/- 58%. Lastly, MMP14 mRNA was increased by 298% +/- 52%.

Conclusions

Specific MMP mRNAs, but not all MMP mRNAs, were detected by the experimental system here using RT-qPCR with SYBR Green dye. Under the condition that the HeLa was exposed to doxorubicin, slight increases in MMP1 and MMP9 mRNA expression were noted, but the increases were not as large in magnitude as the increases in MMP2 and MMP14 expression. The increase in these MMP mRNA was somewhat unexpected and will require further validation in the MMP protein and MMP activities. The significance of these changes will require further work to be determined.

#21: Evaluating G Protein Coupled Receptor Kinase 4 Family Mutations in Stomach Cancer- Types and Clinical Significance

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Purpose

Identifying the potential prevalent causes of stomach cancer, such as the activity of key mutations of various proteins, may be important since understanding the mechanisms by which stomach cancer develops could allow us to improve the treatment of this type of cancer, potentially with less harm and invasion to the patient. This is important since stomach cancer continues to be one of the most prevalent cancers worldwide. This study seeks to identify somatic GRK4- like family mutants in stomach cancer.

Methods

In this study, we used COSMIC to identify somatic mutations in stomach cancer. We assessed the types of mutations found in stomach cancer patients in GRK4, GRK5 and GRK6 and compared them to that found for all cancers. We also looked at particular patients who had particular mutations, noting peculiar characteristics and outcomes.

Results

GRK4, GRK5 and GRK6 mutations were found in stomach cancer but notable differences were observed. For example, a higher percentage of GRK6 mutations were missense mutations compared to GRK4 mutations. At the DNA level, the majority of GRK6 mutants are C>T substitutions- a trend not observed for the other GRK4-like family mutants. In regard to the gender of respective patient populations, preliminarily, more male patients seem to have GRK4 and GRK6 mutants whereas no such trend is observed for patients with GRK5 mutations.

Conclusions

We utilized COSMIC to identify GRK4, GRK5 and GRK6 mutants within the stomach. This study showed different characteristics associated with GRK4-like family mutants in stomach cancer. Notably, albeit a small sample size, GRK4 and GRK6 missense mutations are associated more with male patients, suggesting the occurrence of this type of mutation may be more found in males. Further investigation is needed to query the importance of this observation to help determine why this is occurring and what is its function in males.

#22: **Evaluating Beta Arrestin Mutations in Prostate Cancer- Types and Clinical Significance**

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Purpose

There is a need to better understand cell signaling processes within prostate cancer cells. This is important to help improve its diagnosis and develop drugs that treat this deadly form of cancer. This study seeks to identify somatic mutations in prostate cancer in hopes of identifying the role of beta arrestins in cancer development and patient prognosis.

Methods

In this study, we used COSMIC to identify somatic mutations in prostate cancer. We assessed the types of mutations found in prostate cancer patients in beta arrestin 1 and beta arrestin 2 and compared them to that found for all cancers. We also looked at particular patients who had specific mutations, noting peculiar characteristics and outcomes.

Results

Beta arrestin mutations were found in prostate cancer but notable differences were observed. For example, a lower percentage of beta arrestin 1 mutants were found in prostate cancer compared that found in all cancers compared to beta arrestin 2 mutants. At the DNA level, the majority of beta arrestin 1 mutations are C>T substitutions- a trend not observed for beta arrestin 2. Notably, the T99P beta arrestin 2 mutation is also found in patients with brain or lung cancer.

Conclusions

We utilized COSMIC to identify beta arrestin mutants within the prostate. This study showed different characteristics associated with the beta arrestin family mutants in prostate cancer. Notably, the T99P beta arrestin 2 mutant is also found in samples from patients with brain and lung cancer. Further investigation is needed to query the importance of this mutant and how it may contribute to cancer development.

#23: Identifying Mutations of Members of the GRK1-like Family in Pancreatic Cancer- Mutations and Significance

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Purpose

Studying pancreatic cancer gives us ways to develop effective methods to prevent, diagnose, and discover more effective treatments for it. This is important because pancreatic cancer is difficult to detect early, and thus treatment is typically started at advanced stages with a higher chance of mortality and/or lower success rate. Mutations is what drives evolution of cancers by creating variability in human genes. Therefore, of particular importance then is identifying common repeating mutations in pancreatic cancer which should be researched more. This study seeks to identify somatic mutations in pancreatic cancer in hopes of identifying the role of members of the G Protein Coupled Receptor Kinase 1 (GRK1) subclass, GRK1 and GRK7, in pancreatic cancer development and patient prognosis.

Methods

In this study, we used COSMIC to identify somatic mutations in pancreatic cancer. We assessed the types of mutations found in pancreatic cancer patients in GRK1 and GRK7 and compared them to that found for all cancers. We also looked at particular patients who had particular mutations, noting particular characteristics and outcomes.

Results

In total, GRK1 and GRK7 mutations were found in pancreatic cancer, with more GRK7 missense mutations found in pancreatic cancer, a trend similar to that to all cancers with GRK7 mutations. However, many of the GRK1 mutations are within their introns. Querying the GRK7 mutation samples, of those missense mutations with identified gender (8 in total), 6 of them were from male samples.

Conclusions

We utilized COSMIC to identify mutations within pancreatic cancer involving GRK1 and GRK7. This study showed different characteristics associated with GRK1 and GRK7 mutations, with many GRK1 mutations found on introns. Albeit a small sample size, many GRK7 missense mutation samples were from male patients. Further investigation is needed to query the importance of missense mutations in the GRK1 and GRK7 proteins to help determine what function these mutations affect.

#24: Utilizing Antibiotic Chewing Gum as an Agent to Reduce Specific Harmful Bacteria and Increase Oral Health.

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Purpose

Modern studies on dental and oral health (specifically on oral microbiomes) have indicated a correlation between proper eubiosis in the mouth and more serious conditions such as oral or thoracic cancer (Burhenne, 2015). A limiting factor in modern dental hygiene is the perception that dental care can only occur either in the dentist's office or a restroom, thus limiting a person's ability to properly care for their oral hygiene. In this project a proposed solution to the presented issue is chewing gum containing antibacterial components. The antibacterial components used in the gum are common ingredients found in generic mouthwash. The purpose of these ingredients is to kill and prevent the growth of harmful bacteria (Nagata et.al, 2008; Tunver et.al, 2014).

Methods

In a hypothetical experimental scenario, the data would consist of oral swabs of various parts of the mouth before and after use of the gum. The bacteria from the swabs are grown on petri dishes to observe the changes in the production of harmful bacteria. The expected results would demonstrate a decrease in growth of harmful bacteria, as the reagents would kill the bacteria in a comparable manner to an antibacterial mouthwash. Data collected will help determine the effectiveness of the proposed product compared to similar antibacterial products. An antibacterial chewing gum could prove to be an accessible, beneficial, and desirable addition to good oral health, especially for those who struggle with proper maintenance due to medical conditions or extraneous circumstances.

Results

NA

Conclusions

NA

#25: Educational intervention for delirium assessment in intensive care units using the Confusion Assessment Method

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Purpose

Delirium frequently occurs in severely ill adults, leading to worse outcomes and increased duration of intensive care unit (ICU) and hospital stays, along with higher associated expenses. The 2018 clinical practice guidelines for Pain, Agitation, Delirium, Immobility, and Sleep Disruption (PADIS) recommend that all adult ICU patients be regularly assessed for delirium. At Valley Hospital Medical Center, the utilization of Confusion Assessment Method for the ICU (CAM-ICU) for monitoring delirium is infrequent, typically taking place either after the adjustment of sedatives or in response to nursing reports of positive neurologic assessments indicating signs of delirium.

Methods

This is a descriptive study and the initial stage of this project will involve retrospective collection of data on CAM-ICU usage in both the medical ICU (MICU) and surgical ICU (SICU) during the month of February 2023. During December 2023 and January 2024, educational in-services will be offered along with pocket-sized CAM-ICU guides to nursing staff and education leadership in both the MICU and SICU. Post-education data will be collected on CAM-ICU utilization for both departments for the month of February 2024. Data analysis will compare CAM-ICU usage before and after educational intervention. Patients will be included in this study if they were admitted to either ICU unit for ≥48 hours and require sedation while in these units. Patients will be excluded from data collection if they have scheduled antipsychotic medications prior to admissions, pre-existing psychosis, or have a documented positive CAM-ICU at the time of ICU admission.

Results

NA

Conclusions

NA

#26: A Novel Protocol for Triaging Patients before Thrombectomy: A Review of Outcomes at a Comprehensive Stroke Center

Alana Whittaker;[1] Kaylee Putney;[1] Evan Williams;[1] Paul Janda;[2] Rajneesh Agrawal;[2] Aroucha Vickers;[2] Taylor Campbell;[2] Trusha Mehta;[2] McKenzie Merritt;[2] Cory Nichols;[2] Sannah Vasaya;[2] Aric Felton[2]

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Purpose

Patients who have a thrombotic stroke are screened to determine if they are candidates for thrombectomy secondary to a Code White/Large Vessel Occlusion (CW/LVO) and/or thrombolytic therapy. If patients are candidates for thrombectomy, then there are two viable options when triaging these patients in the emergency setting. Patients could be taken directly to the Interventional Radiology (IR) suite after being intubated by the Emergency Room (ER) physician and given conscious sedation or anesthesiology can be consulted to intubate the patient. Most hospitals do the latter, which could be more time-consuming. VHMC has instituted a protocol where ER physicians immediately intubate patients designated for thrombectomy and send them to the IR suite. This study seeks to determine if this practice has a positive impact on patient outcomes.

Methods

This is IRB approved secondary research utilizing electronic medical records for data collection. Inclusion criteria: ≥ 18 years, candidate for thrombectomy secondary to CW/LVO and intubated in the ER by the ER physician and exclusion criteria: intubated by anesthesiologist and used conscious sedation. Demographics and other information such as etiology and location of stroke, door to puncture time, National Institutes of Health Stroke Scale (NIHSS), tPA used and hemorrhagic conversion will be collected. The objectives of this study are to compare the door to puncture time, reduction in NIHSS from pre-thrombectomy to 24 hours post-thrombectomy with national data. Statistical analysis such as one-sample t-tests and chi-squared tests will be conducted. Statistical analyses will be conducted using SPSS v28.

Results

Data has been collected on 88 patients so far with a median age of 69.7 years old and RACE score of 6. The median NIHSS at baseline is 17 and the NIHSS at 24 hours decreases to 14. The median highest and lowest systolic/diastolic blood pressures before thrombectomy are 198/108 and 131/72 mmHg and 24 hours after thrombectomy is 131/67 mmHg respectively. 38 patients also received a fibrinolytic. There were 19 non symptomatic and 7 symptomatic patients which showed some type of bleeding on the CT 24 hours after thrombectomy.

Conclusions

Improvement was seen with this technique with not much symptomatic bleeding.

#27: Implementation of best practice when collecting blood cultures in the emergency department (ED)

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Purpose

The purpose of this study is to compare blood culture contamination rates in the ED before and after educational in-services on best practice.

Methods

Educational in-services on best practice will be provided to ED nurses throughout January 2024. Data will be collected for the 3 months before and 3 months after education. This will include:Personnel collecting samples, number of vancomycin orders prescribed for contaminated samples, culture and susceptibility data, and contaminant type.

Results

As research is ongoing, results are not able to be garnered; however, the following data will be collected via ED reports:Vancomycin prescribed, contaminated samples, all blood culture samples.

Conclusions

This research will provide data on the impact of improper technique and blood culture contamination. If education is provided to nurses, it is anticipated there will be less vancomycin overutilization, fewer ADRs, and more cost savings.

#28: Improving Chemical VTE Prophylaxis Administration Rates Lowered DVT and PE Rates

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Purpose

Over a 5-year period, our ACS-verified Level 2 trauma center increased the chemical VTE prophylaxis administration rate from 42% to 78%. This retrospective analysis sought to determine if the increase in VTE prophylaxis administration reduced the incidence of DVT and PE events.

Methods

The semi-annual TQIP benchmark reports were reviewed for chemical VTE prophylaxis administration rates at the facility from 2018 to 2022. The VTE prophylaxis administration rates were compared from 2013-2017 and examined if the DVT/PE rates were affected from 2018-2022. Admitted patients over 18 years old and were candidates for VTE prophylaxis were included in the review. A total of 17,827 patients were analyzed between 2013 and 2022 for DVT/PE occurrences. A Chi-Square test was performed to determine whether the proportion of DVT/PE complication rate was reduced after an increase in VTE prophylaxis administration rates as compared from 2013-2017 to 2018-2022.

Results

Of the 17,827 patients identified, there was a total of 91 DVT/PE rates during this 10-year period. The DVT/PE rate event from 2013-2017 was 0.8% and the DVT/PE rate event from 2018-2022 was 0.4%. There was a statistically significant relationship between the decreased rate of DVT/PE and the increased rate of DVT prophylaxis administration, $\chi 2 = 8.53$ (1), $p = 0.004$. Similarly, the protective effect of increased VTE prophylaxis administration was observed with an odds ratio of 1.84 (95% CI, 1.21-2.79).

Conclusions

Increasing the rate of VTE prophylaxis over this 5-year period demonstrated a statistically significant decrease in the DVT/PE rate among trauma patients.

#29: **Ctl+Heal: a scoping review on therapeutic alliance and technology**

Vineet Sadarangani;[1] Plaiphon Noni Vaidyanuvatti;[1] Maxwell Geiger;[1] Emily Nelson;[1] Megan DeArmond;[1] Sherli Koshy-Chenthittayil;[1] Cheryl Vanier[2]

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Purpose

A strong therapeutic alliance between a healthcare provider and patient is built upon a strong bond, trust, and open communication, all essential for successful healthcare outcomes. Establishing a robust therapeutic alliance relies significantly on non-verbal behaviors, including tone, facial expression, and eye contact. Traditionally, expert feedback was essential for addressing undesirable non-verbal behaviors and cultivating desirable ones; however, technological advancements have introduced the concept of technology-assisted feedback. This would eliminate the immediate need for experts, thus allowing the clinician more time to focus on their clinical skills; however, these methods are scattered across various fields of medical education, technology and engineering, and social sciences. The purpose of this scoping review is to identify and summarize technology-assisted methods used to assess non-verbal behaviors of current and prospective healthcare providers in clinical, research, and educational settings that enhance the quality of the therapeutic alliance between provider and patient.

Methods

This review includes studies conducted in various healthcare settings without geographical limits, adhering to criteria set by the peer-reviewed and published protocol titled Technology-assisted Methods to Assess the Quality of the Therapeutic Alliance Between Health Care Providers and Patients: A scoping review protocol. Patient encounters, whether actual, VR, SIM-based, or actor-based, were considered. Using standard systematic review methodology, two screeners assessed the studies for those meeting the inclusion criteria, with a third reviewer involved in cases of conflict. Data such as population, concept, context, and provider or patient outcomes when available, was extracted from studies meeting inclusion criteria.

Results

Analysis is ongoing; initial findings based on thirteen articles suggest that there is widespread interest in using technology to help providers improve nonverbal communication. The majority of studies utilized audio and video recording methods, with gaze being the most common behavior studied. A more complete narrative summary will be provided, incorporating anticipated uses of artificial intelligence and machine learning to analyze non-verbal behaviors.

Conclusions

Future directions of this research will be to refine and implement the most efficient technology and conduct experiments to validate its use in undergraduate medical education, graduate medical education, and continuing medical education.

#30: Effectiveness of OMT on Cardiovascular function: a Systematic Review

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Purpose

Vascular disease is responsible for the top two causes of death worldwide. Osteopathic manipulative treatment (OMT) is currently utilized mostly for alleviating musculoskeletal symptoms, but it has shown promise as a non-invasive approach to improve cardiovascular function. There is currently no consensus that OMT can have short-term or long-term effects on cardiovascular function. The utility of OMT in maintaining cardiovascular system health is an emerging area of practice. The purpose of this systematic review project is to investigate the short-term and long-term effects of OMT on cardiovascular function and its regulators in the nervous and endocrine systems.

Methods

This review will consider randomized controlled trials, non-randomized controlled trials, and crossover studies. Participants must have received OMT intervention. The included papers had passive or active controls. Cardiovascular, nervous, or endocrine-system outcome variables must be measured in the papers at least once after treatment. Evidence will be summarized using standard techniques with subgroup analyses providing more insight into particular OMT techniques, time frame of the treatment, and duration of effects, and adverse effects.

Results

The protocol has been published. After conducting searches in multiple databases, over 9,000 entries were considered for title abstract screening. Over 130 articles were chosen for full-text screening according to our inclusion criteria. In the data extraction stage, some of the outcome measures that will be extracted are blood pressure, cardiac output, heart rate, stroke volume, hydrocortisone, epinephrine, catecholamine receptors, angiotensin, skin temperature, skin conductance, and nitric oxide. Adverse effects from treatment will also be quantified. Preliminary results suggest that most studies include either healthy participants or those who have existing cardiovascular disease. When specified, the OMT techniques most commonly used include High-Velocity Low-Amplitude Thrust, Cranial techniques, and rib raising. Outcomes related to the nervous system, such as heart rate variability and skin conductance, and cardiovascular system, such as blood pressure, were common. In contrast, outcomes related to the endocrine system were rare.

Conclusions

We predict that treatments that utilize osteopathic manipulative treatment, in adjunct to standard treatments for cardiovascular disease, will show improvements in measurements considered following manipulation. A full summary of results based on meta-analysis will be presented.

#31: Targeting CYP51 in the treatment of Chagas disease

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Purpose

Chagas disease, also called American trypanosomiasis, affects millions of people every year. The disease is caused by the protozoan parasite Trypanosoma cruzi, which is transmitted by triatomine insects, or “kissing bugs”. The disease is known to manifest in two phases: acute phase, which occurs with mild-to-no symptoms, and chronic phase, which can be accompanied by cardiomegaly or megacolon. If diagnosed in the acute phase, first-line antiparasitics are often effective. However, treatment of chronic infections has a worse prognosis, and new treatments are needed. Combination therapies including azole drugs, which inhibit CYP51 (sterol 14α-demethylase), have shown promise. This study reviews clinical usage of azole inhibitors of CYP51, alone or in combination, in the management of Chagas disease.

Methods

This study employs methodology recommended by the Joanna Briggs Institute (JBI), using PCC framework of patients with Chagas disease and CYP51 azole drug treatment. Both azole monotherapies and combination therapies which include azoles will be included in this review. We will plan to include reports treating acute and chronic disease, but expect the majority to fall in the latter category. All CYP51 azole inhibitors will be considered, including itraconazole, posaconazole, fluconazole, and others; subgroup analysis thereof will be conducted for each pharmacological agent as appropriate. Clinical trials, case studies, and other reports will be included, and databases searched will include Scopus (Elsevier), MEDLINE (PubMed), Embase (Elsevier), and CINAHL (EBSCO). Gray literature will be searched with MedNar (Deep Web Technologies) and Dissertations and Theses Global (ProQuest).

Results

NA

Conclusions

NA

#32: Alvimopan Use for Postoperative Ileus

Mehri Eli Dolati;[1] Janna Lee;[1] Dung Ngo;[1] Mickayla Clark;[1] Clay Fogle[2]

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Purpose

This was a retrospective medication use evaluation (MUE) that aimed to assess the appropriate utilization and safe administration of alvimopan, a peripherally acting mu-opioid receptor antagonist, utilized for postoperative ileus. This evaluation seeks to identify potential areas of improvement in the prescribing, monitoring, and overall management of alvimopan to ensure appropriate use and optimize patient outcomes as well as enhance medication safety.

Methods

A retrospective analysis was conducted by reviewing electronic medical records for surgical patients who received alvimopan from 4/1/2023 through 7/13/2023. A total of 176 orders for 99 patients were evaluated. Data collected included patient demographics, indication(s) for surgery, pre-operative opioid utilization patterns, alvimopan dosing regimens, and documented instances of bowel movements. The data collected was used to assess adherence to the criteria for use policy outlined by our institution. The criteria for use are as follows:Alvimopan will only be administered post-operatively if the patient received a pre-operative dose of 12 mg orally once 30 minutes prior to the surgery.Alvimopan must be ordered post-operatively in order for therapy to continue after surgery.The first dose of alvimopan should not be given until the nasogastric (NG) tube is removed, if present.Alvimopan will be discontinued after the first occurrence of a post-operative bowel movement, subject to the approval of the provider.

Results

Preliminary findings indicate that alvimopan was predominantly prescribed for patients undergoing major abdominal surgeries, where postoperative ileus risk was higher. Most patients received alvimopan in accordance with the criteria for use policy, however, minor discrepancies were observed in both pre-operative and post-operative medication administration. In regards to the pre-operative dose administration, 86% of patients met the criteria for the use of alvimopan by receiving a dose, while 14% did not. Additionally, 79% of patients received the pre-operative dose at least 30 minutes before surgery, meeting the criteria, whereas 21% did not. In the postoperative phase, 88% of cases had alvimopan therapy ordered to continue, while discontinuation was observed in 12% of cases. No patients received alvimopan when a nasogastric tube was present. Notably, only 56% of patients had appropriate discontinuation after the first bowel movement while 44% remained on alvimopan despite having a bowel movement. It was observed that patients who did not have alvimopan discontinued after their first documented bowel movement often had an ostomy bag. These observations highlight the nuances of alvimopan administration, emphasizing the need for adherence to the criteria for use and tailored decision-making in patient specific scenarios.

Conclusions

This MUE has helped to identify areas that may help improve the optimal usage of alvimopan at our institution. While alvimopan demonstrates potential benefits in postoperative ileus prevention, attention must be given to adherence to prescribing protocols, considering contraindications and patient-specific factors. Defining specific discontinuation parameters in patients with ostomy bags in the policy would be beneficial to minimize medication overuse. Moreover, close collaboration between surgical teams, nurses, and clinical pharmacists is essential to ensure appropriate initiation and discontinuation of alvimopan. Implementation of targeted interventions, such as educational initiatives, could further enhance the appropriate use of alvimopan in our institution.

#33: Exploring the Effects of G Protein Coupled Receptor Kinase 2 and Beta-Arrestin 2 on the Effectiveness of the TAC Regimen- Cancer Cell Adhesion and Spreading

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Purpose

Breast cancer accounts for 1 in 4 cancer cases and 1 in 6 cancer deaths in women. Doxorubicin is used as chemotherapy in many breast cancer treatments and is combined often with paclitaxel or docetaxel and cyclophosphamide to constitute the TAC regimen. In previous studies, changes in the sensitivity to doxorubicin in beta-arrestin 2-and G protein coupled receptor kinase 2 (GRK2) RNA- silenced triple negative MDA MB 231 breast cancer cells were observed when cell death was assessed. It is unclear, however, if we see any effects of GRK2 and beta-arrestin 2 on cancer cells regarding cancer cell adhesion and spreading after TAC treatment. In this study, the triple negative breast cancer cells MDA MB 231 were treated with TAC and their effects on cancer cell adhesion and spreading was observed.

Methods

We studied the effects of TAC (paclitaxel or docetaxel, doxorubicin and cyclophosphamide) on cells stably transfected with shRNA encoding for scrambled sequence (control), GRK2 or beta-arrestin 2. For cell adhesion, cells were treated for 24 hours with TAC and collected. Then the cells were plated from 0-40 minutes at 5-minute intervals on fibronectin-coated plates. Adhered cells were then fixed, stained and absorbance assessed by spectrometer. For spreading, sizes of fixed and stained cells were quantified using ImageJ and normalized to that of the untreated.

Results

24-hour TAC regimen treatment affected adhesion and spreading in the cell lines tested. For adhesion, significant increase in treated cell adhesion is observed at 40 minutes for all three lines tested, with the GRK2 and beta-arrestin 2 shRNA cells demonstrating the most adhesion at this time, with increased adhesion is observed for GRK2 shRNA cells at 35 minutes. More spreading, in terms of cell size, was observed for the treated GRK2 and beta-arrestin 2 shRNA cells compared to untreated.

Conclusions

In this study, spreading and adhesion behavior after TAC treatment depended on if GRK2 or beta-arrestin 2 was present. This study showed that if either of them are absent, increased adhesion and cell spreading was observed, suggesting that GRK2 and beta-arrestin 2 could be mediators of both cancer cell properties post TAC treatment. This may mean that GRK2 and beta-arrestin 2 levels could be prognostic indicators of the effectiveness of the TAC regimen.

#34: Detection and Relative Quantitation of Changes in Gene Expression of HIPPO Proteins in Doxorubicin-Exposed Human Cells by RT-qPCR

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Purpose

The HIPPO signaling pathway plays a key role in cell proliferation and tumor suppression. It consists of serine/threonine kinase cascades, including MST1/2, LATS1/2, YAP, and TAZ. When the HIPPO pathway is activated, gene expression is altered. Dysfunction of the activity of this cascade may contribute to cancer development and chemoresistance. FAT4 is an intracellular protein that may regulate the HIPPO signaling. The purpose of this study is to determine the relative changes of mRNA of the HIPPO pathway members and FAT4 in doxorubicin-treated and vehicle-treated in vitro cell lines.

Methods

Doxorubicin (100 nm) and matching vehicle were applied to the cell culture medium for 24 hours, and total RNA from the cells were harvested. An in vitro cell line, HeLa cells, were selected as the model and were maintained in stand cell culture conditions. The quantity and quality of the isolated total RNA were determined using standard UV spectrophotometry and absorbance at 260 nm and 280 nm. One nanogram (1 ng) of total RNA was then used to undergo the reverse-transcription and real-time PCR procedures. The PCR primers were selected based on previously published literature. Quantitation of the amplified PCR products were performed using SYBR Green dye and a real-time PCR tempcycler. Quantification of the amplified PCR product and was normalized against the housekeeping gene GAPDH. The melt curve analysis were performed using the computer software supplied by the tempcycler manufacturer. The data generated were repeated at least twice.

Results

Sufficient quantity and quality of total RNA was isolated from the cells, as determined by UV spectrophotometry. MST2, LATS1, and LAT2 mRNA were not detected using the current methodology. The mRNA of FAT 4, MST1, YAP and TAZ were amplified and quantified, and the melt curve analysis revealing specificity of each of the amplified RT-qPCR product of each of the detected mRNA. The expression of the mRNA of FAT4 increased by 78% (± 4%). The expression of the HIPPO pathway members MST1 increased by 20% (± 29%), but YAP decreased by 19% (± 24%), and TAZ also decreased by 11% (± 51%).

Conclusions

Total RNA of doxorubicin-treated and vehicle-treated cells were successfully isolated and quantified. Using RT-qPCR and SYBR green, only some HIPPO signaling pathway members' mRNA was detected. Changes in mRNA expression of MST1, YAP, TAZ, and FAT4 were detected in response to doxorubicin treatment, but the significance of the magnitude of changes requires further elucidation. The different changes of mRNA expression of the individual HIPPO pathway members may be due to influence from additional regulatory components. Future work could include investigation of other regulatory mechanisms of the HIPPO pathway as well as the quantification and determination of HIPPO protein activity.

#35: New Frontiers in the Treatment of Glioblastoma

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Purpose

Glioblastoma Multiforme (GBM) is one of the most aggressive and rapidly growing brain tumors. This grade IV astrocytoma generally does not spread to distant organs and can be commonly found in the supratentorial region. GBM has an incidence rate in the United States of 3.19 per 100,000 persons, with a survival rate of 5 years following diagnosis. Presently, the treatment regimen is surgical removal of the tumor, followed by radiation adjunct with Temozolomide, maintenance Temozolomide and/or oral chemotherapy. Tumors generally reoccur, resulting in no cure following diagnosis. The objective of this work is to review published clinical trials that increase not only the patients survival rate, but also improve their quality of life.

Methods

The current work involves: a) analyzing the past/current treatment methods of GBM focusing on their success rates, b) a systematic review of published clinical trials and their success rates, and c) the predicted future of GBM treatment. The inclusion criteria included studies/clinical trials conducted within 20 years, with/without, the use of temozolomide. The exclusion criteria included metastasized glioblastoma, age less than18, and a life expectancy greater than 3 months. Data were collected from reviewing PubMed, ClinicalTrials.gov, and the National Cancer Institute.

Results

Our preliminary results were analyzed using 25 articles towards advancement of the medical treatment provided to patients living with GBM. As compared prior to 2005, Temozolomide provided statistically significant data to prolong life expectancy. Currently, the treatment is relying solely on clinical trials on top of the first line-temozolomide, radiation, surgery and, depending on the disease state condition, chemotherapy could be suggested. Through the research, there has been advancement, however when compared to quality of life, the disease ultimately is more progressive. The study is still ongoing and will disclose all final conclusions upon completion.

Conclusions

In conclusion, the results of this study will compare retrospective vs. prospective treatment methods for GBM that will help to enhance patient life expectancy and quality of life.

#36: **Evaluating hypoglycemic events in patients with diabetes on long-acting insulin in an acute care hospital.**

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Purpose

The American Diabetes Association (ADA) recommends that the majority of patients with diabetes achieve a blood glucose of 140-180 mg/dL while inpatient. Patients with diabetes who are insulin-dependent are often restarted on home anti-hyperglycemic regimens. This may increase the risk for hypoglycemic episodes when accounting for hospital-specific risk factors like critical illness, feed status, diet type, and new drug-drug interactions. There is an association between inpatient hypoglycemia and longer length of stay and greater in-hospital mortality. As a majority of hypoglycemic episodes are preventable, pharmacists, nurses, physicians should be vigilant in identifying, assessing, and treating hypo- and hyperglycemic events and adjusting pharmacotherapy regimens to prevent future occurrences and reduce poor health-related outcomes. This medication use evaluation is to identify trends in pharmacist interventions to hypoglycemic events in patients receiving long-acting insulin and subsequent prevention of these events.

Methods

This was a retrospective chart review of admitted diabetic patients that experienced one or more hypoglycemic event(s), which was defined as a point-of-care (POC) blood glucose reading less than 60 mg/dL. Included patients had a concurrent active long-acting insulin order on their electronic medication administration record (eMAR) from July 1, 2023, to October 1, 2023. No exclusion criteria were identified. Demographic data including age, sex, type of diabetes mellitus, home long-acting insulin name and dose (if applicable), and hemoglobin A1c was collected using the electronic health records (EHR) system and data regarding pharmacist interventions were collected on the Clinical Pharmacy Workflow (CPW) web-based program. Outcome data to be evaluated includes appropriateness of initial long-acting insulin, insulin adjustments after the hypoglycemic event, pharmacist recommendations and recommendation acceptance by the provider, steroid use, change in discharge insulin dose, and D50W utilization.

Results

To be presented at the 10th Annual Roseman University Research Symposium.

Conclusions

To be presented at the 10th Annual Roseman University Research Symposium.

#37: **Evaluation of intravenous to oral route change of metronidazole at an acute care hospital**

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Purpose

Utilization of antibiotics by the appropriate route is an important consideration for pharmacists, and can improve patient outcomes by reducing the risk of cannula-related infections and thrombophlebitis. Metronidazole is used for anaerobic bacterial and protozoal infections and has complete bioavailability. The purpose of this medication use evaluation is to identify barriers to the conversion of intravenous (IV) to oral (PO) metronidazole at our institution, as less than 50% of our metronidazole administrations are oral.

Methods

This prospective chart review was conducted at a 425-bed acute-care hospital in Las Vegas, Nevada. Adult patients with an active order for IV metronidazole from September to November 2023 were assessed. Patients with a one-time IV order for pre-operative prophylaxis were excluded. If a patient met specified criteria during their stay, in accordance with the institution's policy, a pharmacist could change the route from IV to PO. These criteria excluded patients with nothing by mouth (NPO) orders, deep-seated infections, absorption concerns, inability to tolerate PO medications, and others. The route could also be changed at the provider's discretion or through a pharmacist's conversation with the provider.

Results

In total, 255 patients were reviewed and 13 were excluded. Intra-abdominal infection was the most frequent indication, accounting for 163/242 orders (67.4%). Among the 242 cases, 85 patients (35.1%) were able to convert to PO. The most common method was through pharmacist intervention via the policy. The route was changed by day three in 60/85 cases (70.6%). The primary reason for not being able to change the route of administration was strict NPO status for all three days. Another frequent cause of non-conversion was the pharmacist's uncertainty regarding the patient's ability to tolerate PO through chart review.

Conclusions

The route of metronidazole was changed in less than half of the reviewed patients, but the majority of patients who remained on IV therapy warranted it. Improved communication between pharmacy, nursing, and providers regarding the patient's ability to take oral medications may facilitate changes in route. To emphasize the importance of this, an in-service educational session for nursing and pharmacy staff regarding the benefits of route change will be performed.

#39: **Optimizing Anticoagulation Therapy: A Comprehensive Exploration of Weight-Based Strategies**

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Purpose

The management of anticoagulation therapy represents a critical aspect to healthcare, particularly for the management of atrial fibrillation, deep vein thrombosis, pulmonary embolism, and acute coronary syndrome. Recognizing the impact of using an accurate weight for weight-based dosing has emerged as a pivotal consideration in achieving therapeutic levels and reducing side effects. The purpose of this study is to evaluate the appropriate dosing for the weight-based anticoagulants and how it relates to activated partial thromboplastin time (aPTT), anti-Xa, adverse events, and the use of reversal agents.

Methods

This retrospective chart review medication use evaluation was conducted at a single-center, tertiary acute care hospital in Las Vegas. Clinical surveillance support software was used to identify patients who received either argatroban, enoxaparin, or heparin in August 2023. Patients that received at least one dose were included in the study. Pediatric patients, patients that did not have measurements of aPTT, and patients that received prophylactic dosing were excluded from the study. The following information was collected via the electronic health record and clinical surveillance support software about each patient: stated/estimated weight, measured weight, anticoagulant used, dose or dosing protocol, time of anticoagulant administration, baseline aPTT, first aPTT recorded post-administration of the anticoagulant, time of the first aPTT, anti-Xa, use of a reversal agent, occurrence of adverse effect(s). Adverse effects were defined by a clinical diagnosis of bleeding, drop in hemoglobin ≥ 2 g/dL, drop in platelets ≥ 50%, or discontinuation of the anticoagulant associated with the risk of bleeding.

Results

NA

Conclusions

NA

#40: Detection and Relative Quantitation of mRNA of Tissue Inhibitors of Matrix Metalloproteases (TIMPs) after Exposure to Doxorubicin in In Vitro Cell Cultures

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Purpose

Tissue Matrix Metalloproteases (MMPs) are a group of endopeptidases that are commonly involved in the maintenance of homeostasis and tissue repair. They are also involved in the metastasis of cancers, and in the development of drug resistance against chemotherapeutic agents that can result in treatment failure. MMP activities are regulated by the tissue-specific inhibitors of MMP (TIMPs). Doxorubicin is a commonly utilized chemotherapy agent with multiple activities in susceptible cancer cells. Our goal here is to detect and quantify the changes in mRNA expression of TIMP 1,2,3 in a doxorubicin-treated in-vitro cell line.

Methods

Doxorubicin (100 nm) and a matching vehicle were applied to the cell culture medium for 24 hours and total RNA from the cells was harvested. An in vitro cell line, HeLa cells, were selected as the model and were maintained in stand cell culture conditions. The quantity and the quality of the isolated total RNA were determined using standard UV spectrophotometry and absorbance at 260 nm and 280 nm. One nanogram (1 ng) of total RNA was then used to undergo the reverse transcription and real-time qPCR procedures. The PCR primers were selected based on previously published literature. Quantitation of the amplified PCR products was performed using SYBR Green dye and a real-time PCR temp cycle. Quantification of the amplified PCR product and the melt curve analysis were performed using the computer software supplied by the tempcycler manufacturer. The data generated were repeated at least twice.

Results

Sufficient amounts of total RNA were isolated from both doxorubicin- and vehicle-treated cells. The isolated RNA was of good quality, as determined by A260 and A280 using spectrophotometry. TIMPs 1, 2, and 3 mRNA were detected in both groups of cells. The relative quantification was normalized against GAPDH. Melt-curve analysis revealed the amplification of a single product, suggesting the specificity of the PCR process. The TIMP1 mRNA was increased/decreased by 398% ±72%. The TIMP2 mRNA was increased/decreased by 156% ± 21%. Lastly, the TIMP3 mRNA was increased/decreased by 117% ± 41%.

Conclusions

Total RNA of doxorubicin-treated and vehicle-treated cells were isolated and quantified. The total RNA was of good quality to proceed with the subsequent work. Using RT-qPCR and SYBR green, the changes in TIMP mRNA expression in doxorubicin-treated and vehicle-treated cells were detected, but the importance of the changes remains to be determined. Future work could include the investigation of other regulatory mechanisms of TIMPs, as well as the quantification and determination of TIMP protein activity.

#41: **How Advancement in Biomedical Instruments Has Changed the Quality of Dental Care (in Marginalized) Patient Populations?**

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Purpose

This study aims to assess the significance of biomedical instruments in dental care during the 21st century. Specifically, it focuses on understanding the impact of these instruments on dental practices in certain communities and the significance of them in the modern times.

Methods

This study primarily utilized meta-analysis of literature search and thorough review of the published articles in PubMed, Scopus and other databases for medical instruments within dental practices.

Results

The findings suggest that advancement of biomedical devices is essential in current dental care. For example, 85.3% of modern-day dentists use biomedical instruments that have evolved over time. However, only about 42.6% of clinics and clinical areas have fully acknowledged digital workflows and optimized care. Digital radiography for example has emerged demonstrating its usefulness in improving diagnostic capabilities while lowering potential hazards.

Conclusions

Our study aims to emphasize the significant need for continued research into biological instruments in the dental field. When used correctly, these technological advancements provide benefits with promoting research, getting accurate diagnoses, and supporting effective treatment solutions. This ongoing research would examine aspects of improvement in dental care practices and the challenges that arise with it particularly focusing on marginalized patient population.

#42: **To evaluate the efficacy of caries removal using Papacarie and Polymer bur to the conventional method: An In-vitro study**

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Purpose

As a paradigm shift from extension for prevention to minimal intervention approach.Concept of conservative healthy tooth cavity preparation is popular nowadays. Advances in cariology have reinforced the minimal intervention techniques for treatment of dental caries for sustainable oral healthcare.To assess and compare the efficacy of Polymer bur and Papacarie (as a representative of CMCR agents) in comparison to the conventional mechanical method clinically (efficacy and time) and microscopically.

Methods

Thirty recently extracted primary molars with carious lesions were divided randomly in three equal groups and bisected through the middle of the lesion mesio-distally and excavated by two methods on each tooth. After caries excavation bacterial remnants were observed under microscope.

Results

Statistically significant difference was present among three methods with respect to time between the 3 comparison groups. Bacterial remnant was observed higher with Polymer bur.

Conclusions

Minimally invasive techniques of caries control in the future as an alternative to the conventional method is more widely accepted and comfortable for patients, reducing pain, anxiety, and the requirement for a local anesthetic.

#43: Parental Anxiety Associated With Children Undergoing Dental Treatment- Pulpectomy Procedure Under Local Anesthesia

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Purpose

The aim of this study was to evaluate the anxiety felt by parents of children undergoing dental treatment-pulpectomy procedure under LA

Methods

A study was conducted among 60 mothers of children who areundergoing pulpectomy procedure . The sample size is 60 . Stress among parents was assessedsubjectively using the Modified Dental Anxiety Stress (MDAS) questionnaire and objectivelyusing a pulse oximeter to record the heart rate, Before and after treatmentThe sample comprised of 60 parents of children aged between 4and 8years.Statistical analysiswill be done using SPSS software 20

Results

Almost 70% parent were between the age group of 20-30 years . MDAS analysis shows 51% of them are moderately anxious,20% of them are highly anxious. The heart rate showed lower value before treatment , highest during the treatment and lowest after treatment

Conclusions

The present study led to the conclusion that anxiety of parent during dental procedure to their children is high

#44: **Assessment and management of acquired mandibular skeletal asymmetry**

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Purpose

To summarize the current evidence regarding the available diagnostic methods for acquired skeletal mandibular asymmetry, as well as the recommended treatment modalities for its correction.

Methods

A thorough review of the literature on six large databases was conducted in a systematic way with the use of the PRISMA guidelines Article screening and data extraction were performed independently by two reviewers with the use of predefined inclusion/exclusion criteria and a customized data extraction tool.Information about article type, study design, participants' characteristics, interventions, and outcomes were extracted, summarized, and synthesized.

Results

47 studies met the review criteria (Fig. 1). The study characteristics and pertinent outcome summaries have been extracted in a customized data extraction table.

Conclusions

TBD

#45: **Did the pandemic change future treatment choices amongst orthodontists?**

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Purpose

The COVID-19 pandemic has presented orthodontists with several obstacles, as well as a shift in perspective on approaches to treatment planning and treatment. Due to the practice limitations imposed by the spread of the virus, many orthodontic offices turned to tele-orthodontics and greater use of clear aligner treatment. This study will survey orthodontists to determine whether adopters have found both tele-orthodontics and an increase in clear aligner treatment to be positive additions to their practice and a treatment modality that is effective and efficient for patient care and that they intend to continue. If not, why.

Methods

This research will consist of an exploratory study, assessed through a 19-question survey. The survey will have a cover letter discussing the aims of the study and will be distributed through the American Association of Orthodontists to approximately 6600 members, with the intention of recruiting a minimum of 50 respondents. The survey is composed of 19 questions, but some respondents will answer fewer questions depending on their response to earlier questions. The planned statistical analysis will be descriptive information analyzed in the form of percentage of categorical responses. This data will be compared according to various demographic information such as gender, years of practice, type of practice, etc. The survey questions were designed to: 1) establish demographics, 2) determine whether tele-orthodontics and clear aligners are used by the orthodontists in their practices 3) Assess whether or not the usage of clear aligners and tele-orthodontics has changed due to the Covid-19 pandemic. This study has been approved by the Roseman University of Health Sciences Institutional Review Board [#2021-025]. Data collected will be analyzed with IBM® SPSS® version 26 (Armonk, NY). Descriptive statistics will be calculated using Chisquare tests.

Results

It is anticipated that 20% of orthodontists that incorporated tele-orthodontics into their practice will continue to offer this service into the future. It is also anticipated that there will be an increase in the use of clear aligners by 10%

Conclusions

N/A

#46: Orthodontic treatment modalities, do the finished smiles differ?

Dafjola Bejleraj;[1] Mehtab Warrya;[1] Kimberly Jones-Rudolph[1]

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Purpose

This project will evaluate the level ofaccuracy of orthodontists at determining thetreatment mechanism used to treat a caseby examining only smile esthetic and frontalocclusion. There have been studies thathave looked at esthetic indicators and howthey impact both the orthodontist and thelayperson's assessment of the case.However, this study is unique in that it willexplore orthodontist bias against certaintreatment mechanisms and how that biasmay impact their accuracy in assessingtreatment mechanisms given smile estheticand frontal occlusal outcomes

Methods

This research utilizes a cross-sectionalstudy which will be assessed by use of asurvey. The survey will consist of two mainquestions across multiple outcomephotographs and ten additional demographicand treatment preference questions. The survey will be distributed onlineto 4400 orthodontists through the AAO.There will be a compilation of smile andfrontal occlusion photos (one frontalocclusion and one smile for each case) withtwo accompanying questions for each. Onequestion asks the orthodontists to rate thephotos esthetically based on the smile andocclusion and the other asks them toidentify the treatment mechanism provided.The photo combination will consist of 20finished cases who have already beentreated with different orthodontic treatmentmechanisms including Invisalign, traditionalbraces, in-house-aligners, andteleorthodontic approaches. The cases willthen be divided into 4 groups consisting of 5subjects for each orthodontic treatmentapproach from a sample size of 20 subjects.

Results

This research project is still in progress.

Conclusions

Hypothesis: Evaluating the outcome of acase based solely on the smile and frontalocclusion, orthodontists will not be able toaccurately determine the treatmentmechanism used. But their biases withregards to which treatment they believe tobe most effective and capable of creatingthe best outcome will become obviousbased on how they evaluate the estheticresult and which treatment category theychoose.

#47: Orthodontic Mini-implant

Ambrose Ha;[1] Jacob Gardner;[1] Caden Probert;[1] Gabriel Eisenhuth;[1] Benjamin Mennell;[1] Man Hung[1]

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Purpose

Literature review aiming to focus on the general use of TADS and factors affect success rate.

Methods

Database search through PubMed, Dentistry & Oral Sciences Source, Ovid, Scopus, and Web of Science. Inclusion criteria: research articles in the past 10 years, peer-reviewed articles and human based studies only. Exclusion criteria: review articles, full text not available, non-english.

Results

In progress

Conclusions

In progress

#48: **Achondroplasia, Sleep Apnea, and Orthodontic Interventions: A Comprehensive Literature Review**

Hayden Mckay;[1] Joe Cheever[1]

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Purpose

Achondroplasia has a primary adverse health effect, mainly sleep apnea, as individuals with achondroplasia often exhibit structural abnormalities in their craniofacial and upper airway regions, predisposing them to this sleep-related breathing disorder. Orthodontic therapies can often help those with sleep apnea like the cases seen in patients with achondroplasia. Consequently, the review investigates the intricate relationship between achondroplasia and sleep apnea and the potential role of orthodontic interventions in mitigating these complications. This comprehensive analysis aims to shed light on the current state of knowledge, identify research gaps, and offer insights into potential therapeutic strategies to enhance the quality of life for individuals living with achondroplasia.

Methods

Through an in-depth examination of relevant studies, the plan is to uncover the physiological and anatomical factors that predispose individuals with achondroplasia to sleep-disordered breathing. Furthermore, we will explore the role of orthodontic treatments, such as mandibular advancement devices, palatal expanders, and orthognathic surgery, in improving airway patency and reducing sleep apnea symptoms in patients with achondroplasia.This review seeks not only to consolidate existing evidence but also to identify gaps in our understanding that merit further investigation. Ultimately, a more profound comprehension of this relationship holds the potential to inform targeted therapeutic interventions and preventive strategies, improving health and well-being for individuals with achondroplasia. We hope that this study will shine greater light on the future path of skeletal remedies for sleep apnea and people with achondroplasia.

Results

Research is incomplete, and results have not been fully compiled. The following is a general outline of information as it currently stands Sleep apnea is characterized by repeated interruptions in breathing during sleep, leading to a wide range of adverse health outcomes. The relationship between achondroplasia and sleep apnea hasn't been studied in depth until more recent times. Understanding this intricate relationship is crucial not only for enhancing the quality of life for individuals with achondroplasia but also for advancing our understanding of the broader genetic and anatomical factors contributing to sleep apnea in the general population. It will also allow us to better treat these patients in a hospital and dental clinic setting.Of particular note in recent studies is the potential for orthodontic interventions to improve sleep apnea in patients with achondroplasia. Orthodontics offers various techniques and appliances that can address anatomical and structural issues associated with both achondroplasia and sleep apnea.

Conclusions

No conclusions have been made yet. Research is incomplete at this current time

#49: **The Significance of Cone Beam Computed Tomography (CBCT) in Orthodontics: A Comprehensive Evaluation of Accuracy and Integration in Invisalign Treatment Planning and Recommendations for Future Research**

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Purpose

Understand the accuracy and limitations of CBCT when integrated in ClinCheck software.Understand ClinCheck predictability and the movements that are likely to cause dehiscence and fenestrations.

Methods

A search was conducted on the databases "PubMed" and "Google Scholar" from January 2010 to March 2023 to find studies related to CBCT and ClinCheck in orthodontics. The search used mesh terms such as "CBCT Accuracy,“, “CBCT Predictibilty”, "ClinCheck Predictability," “Clincheck Accuracy”, “alveolar Buccal defects”, “CBCT” and "Dehiscence and Fenestrations." Initially, 389 articles were identified as potentially relevant. After reviewing the summaries and full texts of these articles, only 12 were deemed suitable for inclusion in the literature review.

Results

Only 12 articles were included in the literature review

Conclusions

There is a significant need for a rigorous Study on CBCT Accuracy.ClinCheck predictability is showing promising outcomesCBCT tends to overestimate dehiscence and fenestrations when compared to direct clinical measurements

#50: **Dentofacial Effects of Radiotherapy on Pediatric Population with Retinoblastoma**

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Purpose

This literature review investigates the dentofacial consequences of radiotherapy in young patients with retinoblastoma by referencing current research. In addition, the management and rehabilitation of the dentofacial abnormalities, highlighting orthodontic, surgical, and prosthetic approaches, is examined. By understanding the changes of dentofacial development due to retinoblastoma treatment, effective management techniques can be implemented to resolve significant issues, relating to dental and skeletal relationship and facial appearance.

Methods

A literature search was conducted to identify peer-reviewed English language articles pertaining to the dentofacial effects of radiotherapy in retinoblastoma patients, with a particular focus on the pediatric population. The search was conducted in PubMed to retrieve articles published from January 2003 to December 2023.

Results

A noteworthy aspect of the management and rehabilitation process was the emphasis on interdisciplinary collaboration. The complexity of dentofacial abnormalities in retinoblastoma patients necessitated seamless coordination between orthodontists, oral surgeons, and prosthetic specialists1. Regular consultations and case conferences facilitated comprehensive treatment planning, ensuring that each aspect of the dentofacial abnormalities was addressed synergistically. Furthermore, long-term monitoring and follow-up were underscored as essential components of the management strategy. Given the persistent nature of dentofacial effects resulting from radiotherapy, Khan et al. (2014) emphasized the need for ongoing assessments and adjustments to the treatment plan as the patient's growth and development continued4. Regular evaluations allowed for timely interventions, ensuring that any emerging issues were addressed promptly.

Conclusions

The management and rehabilitation approaches for dentofacial abnormalities in retinoblastoma patients treated with radiotherapy were comprehensive and patient-tailored. The synergy between orthodontic, surgical, and prosthetic interventions, coupled with interdisciplinary collaboration, was critical in achieving optimal outcomes. Long-term monitoring further ensured the sustainability of results and addressed evolving needs as patients continued to grow and develop.

#51: **Hidden Pathologies: The diagnostic benefits of a CBCT on craniofacial diagnosis**

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Purpose

The Purpose of this case study is to analyze 6 separate patients, all who present with pathology visible through CBCT imagery.

Methods

Find 6 patients that have been treated or are currently being treated at Roseman University Orthodontics who have radiographic anomalies present in their CBCT imaging. Present each patient in a case report type format with multiple radiographs including; a standard 2D lateral cephalographic view and imaging obtained from CBCT imaging.-Compare the standard 2D lateral cephalography to the other CBCT imaging obtained-Explain the relevance of why this matters to orthodontics and dentistry in general

Results

Results are the images of the 6 patients and their pathology.

Conclusions

With it's introduction, 2-D imaging allowed for diagnostic capabilities that greatly enhanced patient treatment effectiveness making the importance of traditional 2-D imaging undeniable as an instrumental part of orthodontics and health care in general. These case reports elucidate that while pertinent information is obtained from 2-D radiographs, 3-D radiographs can more fully capture underlying pathology, more accurately show where teeth are within the maxilla and mandible, and illuminate respiratory pathways, all in an effort to improve the patient's diagnosis, treatment, and quality of life.

#52: Microsporidiosis: Reviewing clinical presentation and treatment strategies

Julienne Zhou;[1] Belinda Liu;[1] Megan De Armond;[1] David B. Banach;[2] Brad A. Haubrich[1]

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Purpose

Microsporidiosis is an opportunistic infection caused by obligate intracellular pathogens within the taxon Microsporidia. Infection is zoonotic and has been associated with patients experiencing immunodeficiency, though incidence is increasing among other populations. Most commonly, the disease is gastrointestinal, typically by Enterocytozoon bieneusi and less commonly by Encephalitozoon intestinalis. Symptoms present with diarrhea and vomiting, and severe cases can lead to wasting and mortality. While the incorporation of anti-retroviral therapy for HIV patients has significantly decreased mortality in a subset of the vulnerable populations, treatment for microsporidiosis is still not standardized or well explored. Resistance to first-line treatment albendazole is increasing, and another antiparasitic fumagillin is not approved as a systemic treatment in the US. Given that microsporidiosis is an emerging disease that affects the global population, there is an increasing need to educate clinicians about clinical presentation and to review treatment strategies and opportunities.

Methods

Using Joanna Briggs Institute (JBI) standards, this review will be conducted with the databases MEDLINE (PubMed), Embase (Elsevier), CINAHL (EBSCO), Scopus (Elsevier). Gray literature searches will use MedNar (Deep Web Technologies) and Dissertations and Theses Global (ProQuest). Studies included in the search will be case studies and review articles. Preliminary search on PubMed using terms microsporidia, enterocytozoon, and encephalitozoon yielded 4515, 1042, and 1289 results, respectively. Twenty-seven systematic reviews were found, comprised of a few recent reports regarding veterinary cases, epidemiology, and risk factors.

Results

N/A

Conclusions

N/A

#53: **Pharmacognosy and trichomoniasis: A scoping review protocol**

Claire Hartwell;[1] Melanie Arslanian;[1] Brad Haubrich[1]

Author Affiliations

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Purpose

Trichomoniasis, also called “trich”, is the most common non-viral sexually transmitted infection (STI). Its etiological agent is the protozoan parasite Trichomonas vaginalis, against which first-line antiparasitics usually work. However, resistance is on the rise. Trich has traditionally been considered a nuisance infection, with many (particularly AMAB patients) being asymptomatic. But research in recent years has begun to unravel correlations of trichomonal infections with a myriad of comorbitidies, including infertility, cancers, the pathogenesis of AIDS, and pelvic inflammatory disease (PID). Between the rise of drug resistance and the incidence of these comorbidities, new treatments are needed. In this work, we are reviewing clinical and preclinical reports of essential oils in the treatment of trich or in the inhibition of Trichomonas growth.

Methods

This scoping review follows Joanna Briggs Institute (JBI) methodology and uses PCC framework. Databases used include MEDLINE (PubMed), Embase (Elsevier), Scopus (Elsevier), and CINAHL (EBSCO). MedNar (Deep Web Technologies) and Dissertations and Theses Global (ProQuest) will be searched for gray literature. Both clinical and scientific papers are being reviewed, comprising of clinical trials, case studies, experimental papers, conference proceedings, and others.

Results

N/A

Conclusions

N/A

#54: Piriformis syndrome with a variant presentation

Roberto Chuapoco III;[1] Ryan Linford[1]

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Purpose

Piriformis syndrome has long been a diagnostic quandary due to its tendency to present as other nerve-related conditions. Its constellation of symptoms, including radiating pain down the thigh, can easily be mistaken for lumbosacral radiculopathy. This case report aims to address the misdiagnosis of piriformis syndrome which has prolonged pain for many patients and increased the cost of medical care.

Methods

Our case report demonstrates a 76-year-old female with left buttock pain radiating down the posterior thigh and lateral leg. The pain was worse with prolonged ambulation and unchanged with sitting. MRI showed stenosis of the right L4-L5 lateral recess and bilateral foraminal stenosis. Objective examination yielded a positive straight-leg raise test and a positive FAIR test. The left piriformis muscle was injected with a diagnostic solution of 2cc lidocaine and 1cc triamcinolone 40mg/ml.

Results

Near-complete resolution of pain was achieved following intramuscular piriformis injection. This confirmed our original diagnosis of piriformis syndrome over lumbar radiculopathy.

Conclusions

The study demonstrated a case of piriformis syndrome that presented very similarly to lumbar radiculopathy. Lumbar radiculopathy could not be disqualified due to the dermatomal presentation of the pain, MRI findings, and exacerbation by prolonged ambulation. This study highlights the diagnostic difficulties between the two disorders and can be used as a guide to help improve care for lower radicular-pain patients.

#55: Management of Pain Following Enterocutaneous Fistula Formation: A Case Report

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Purpose

Fistulizing Crohn's disease is associated with significant mortality and morbidity, and requires simultaneous care from an array of medical specialties. Enterocutaneous fistulas, while rare, often occur following laparotomy, diverticulitis, and Crohn's disease. Leakage from this fistula can cause considerable skin pain and discomfort around the surrounding area, though management of this pain is often under discussed in the medical community. The purpose of this case report is to broaden the discussion about the different sources of pain from enterocutaneous fistula leakage and ultimately improve its management.

Methods

In this report, we introduce a case of a 60-year-old female with a history of fistulizing Crohn's disease and recent laparoscopic surgery. The patient complained of localized burning abdominal skin pain following enterocutaneous fistula leakage. She had been prescribed NSAIDs and opioids, but achieved little relief. After further investigation to characterize the pain, the patient was started on a trial of pregabalin.

Results

The patient had considerable pain relief after starting pregabalin. This confirmed our suspicion that the patient's pain was neuropathic in nature.

Conclusions

Our study demonstrates that cutaneous neuralgia can be an uncommon source of pain from enterocutaneous fistula leakage and should be considered in the differential diagnoses when caring for these patients.

#56: Euglycemic diabetic ketoacidosis secondary to Sodium Glucose 2 Transport Inhibitor: a case report

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Purpose

The purpose of this case report is to highlight the emergence of a rare adverse drug reaction (ADR), euglycemic diabetic ketoacidosis (EDKA), associated with the use of sodium glucose transport 2 (SGLT2) inhibitors.EDKA is a rare and often misdiagnosed condition, due to the absence of hyperglycemia, but represents a life-threatening emergency. We present a unique case of a 35-year-old female patient with a past medical history of diabetes and recent diagnosis of Hashimoto's thyroiditis. The primary objective is to provide valuable insights and education to the medical community regarding this infrequent yet significant complication. Ultimately, the goal is to enhance future patient care by improving awareness and promoting informed decision-making in EDKA cases involving SGLT2 inhibitors.

Methods

NA

Results

NA

Conclusions

This report offers a comprehensive analysis of the diagnosis, management, and treatment of EDKA secondary to the use of SGLT2 inhibitors. This ADR has growing significance following the recent updates in the KDIGO and AHA/ACC/HFSA guidelines. SGLT2 inhibitors are now indicated for the management of heart failure and chronic kidney disease.

#57: **A comprehensive analysis of biological and therapeutic targets of Osteosarcoma**

Harshita Sharma;[1] Claudia Visca;[1] Megan Godfrey;[1] Korey Smith[1]

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Purpose

Osteosarcoma, also known as osteogenic sarcoma can be defined as the most common, malignant bone tumor primarily affecting children and young adults. Osteosarcoma has several cellular subtypes such as osteoblastic, chondroblastic, fibroblastic, etc. Approximately 20% of patients diagnosed with this form of cancer do not present with metastasis and will have fatal outcomes. This research serves to advance the understanding of current and novel biomarkers which would address a significant unmet need in the management of this disease.

Methods

The current work consisted of reviewing a) Randomized Controlled Trials, and b) Clinical Trials that studied the location of the biological markers within a malignant bone tumor. Mechanism of actions and their therapeutic targets were evaluated to determine an increase in life expectancy in patients with osteosarcoma. These studies reviewed repetitive biomarkers to show their significance in helping with the diagnosis. A total of 23 studies were sourced from using Pubmed, Google Scholar, American Cancer Society, ScienceDirect and ClinicalTrials.gov.

Results

Our preliminary results show that the biomarkers are clinically relevant in helping to diagnose patients with osteosarcoma. Knowing what markers are affected will help clinicians know whether standard therapy or chemotherapeutic alternatives are appropriate for each patient case. At the moment Osteopontin (OPN), a multifunctional secreted protein, and PDL-1 are emerging as key markers for diagnosing and treating osteosarcoma. The detection of ctDNA has been associated with inferior survival with patients diagnosed with Osteosarcoma. The study is currently in progress and results will be reported once a comprehensive investigation is complete.

Conclusions

In conclusion, the results of the clinical and randomized controlled trials will provide insightful information on the biomarkers and their therapeutic targets to help better understand and identify the causes of this bone tumor. This will help aid in the development of novel therapeutic interventions. Finally, the insights from these studies help improve the prognosis and quality of life for patients with osteosarcoma.

#58: **A Systematic Review of Adverse Effects Associated with the GLP-1 Class of Diabetic Medications**

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Purpose

Glucagon-like peptide 1 receptor (GLP-1) agonists are a class of medications that are known for the management of Type 2 diabetes. They are emerging as an important therapy to consider for patients who are overweight or obese due to their satiety effect and reduction in weight. According to Kaiser Family Foundation, an independent source for health policy research, medications indicated for weight loss increased over 600% from 2019 to 2022. These medications have an increased risk of gastrointestinal adverse events including pancreatitis, gastroparesis, and bowel obstruction. The objective of this work is to identify and compare the side effects in each GLP-1 agonist in relation to their prevalence by analyzing data available from federal sources.

Methods

The current work involves: (1) market research to show increased usage and popularity in Medicaid patients, (2) measure adverse drug reaction prevalence, (3) comparing all drug formulations, usage instructions, patient population and dosing in relation to said side effect. Data were collected using the 2023 AACE Obesity Guidelines, Kaiser Family Foundation, PubMed, Google Scholar, and other federal sources.

Results

Our preliminary results from 46 studies indicate that GLP-1 agonists' side effects are most frequently reported as gastrointestinal (nausea, vomiting, diarrhea). Several published data has stated semaglutide as being the most prevalent drug on the market within the United States according to Medicaid Data. This study is currently ongoing and final results will be published upon completion.

Conclusions

In summary, this research will review the adverse side effects reported with GLP-1 agonists and their prevalence within the United States based on federal sources. Future studies would be to conduct a meta-analysis of adverse events on GLP-1 agonists on the market based on trials.

#59: Mental health first aid training: effects on mental health literacy and wellbeing in pharmacystudents

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Purpose

Mental health problems contribute to disease burden worldwide. Pharmacistsand pharmacy students are not immune to this burden. Poor mental health literacy has been associatedwith higher rates of mental health problems and increased mental health literacy can help to developskills necessary for wellbeing. Mental Health First Aid (MHFA) is an evidence-based interventiondesigned to increase mental health literacy, and therefore can potentially improve mental wellbeing.This study aims to evaluate the degree to which MHFA training can improve pharmacy students' mentalhealth literacy and wellbeing.

Methods

Pharmacy students voluntarily elect to participate in the MHFA training program. The MentalHealth Literacy Scale (MHLS), a 35-question survey, and the Warwick-Edinburgh Mental Wellbeing Scale(WEMWBS) will be utilized to assess mental health literacy and mental wellbeing, respectively, of thepharmacy students both before and after the completion of the 8-hour MHFA training program. For theMHLS and WEMWBS, all pre-intervention questionnaire results will be utilized to measure the MHL andwellbeing of the group, respectively, but only the participants with completed post-intervention surveyswill be used to calculate change. Qualitative data will also be collected and analyzed.

Results

Forty-five students participated in the pre-MHFA course survey, 35 students attended the 8-hour virtual course, and 19 students completed the post-MHFA course survey. Of the 45 students whocompleted the pre-course survey, 5 are P1s, 23 are P2s, and 17 are P3s. Of the 19 who completed thecourse and both surveys, 1 is a P1, 11 are P2s, and 7 are P3s. The MHLS pre-intervention median scorewas 122 (98-144), and post-intervention median score was 132 (99-150) with a p-value of 0.01. TheWEMWBS pre-intervention median was 49, and the post-intervention median was 52 ($p<0.017$).

Conclusions

The MHFA training improved both mental health literacy and wellbeing in pharmacystudents.

#60: Trichomonas vaginalis Infection in Emergency Department Patients

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Purpose

Trichomonas vaginalis (TV) is a common sexually transmitted infection (STI) that affects around 2.3 million women and 1.4 million men in the United States. TV infection in females can cause vaginal discharge, dysuria and abdominal pain and can be complicated by pelvic inflammatory disease, infertility, cervical neoplasia and increased transmission rates of other STIs. In males, TV can cause urethral discharge and dysuria, but is often asymptomatic and therefore not often studied. We seek to determine the rates of TV infection among male and female patients presenting to EDs for STI evaluation in the Las Vegas metropolitan area, and compare infection incidence in communities of different socioeconomic status (SES).

Methods

We performed retrospective chart analysis of ED patients tested for TV, Chlamydia trachomatis, and Neisseria gonorrhoeae during routine care in ten EDs throughout the Las Vegas Valley. Urine or endocervical samples were analyzed using nucleic acid amplification. Hospitals' SES were compared using zip code with American Community Survey results from the U.S. Census Bureau.

Results

346 patients (173 males, 173 females) were included in this study. Overall, 36 patients (10.4%) were found positive for TV, with 5.8% (10) of males and 15.0% (26) of females testing positive. Comparatively, rates of CT and GC were 15.0% (26) and 18.5% (32) in males and 8.1% (14) and 5.8% (10) in females, respectively. There existed a large discordance between hospitals in areas of low and high SES. Patients presenting to hospitals in areas of low SES had TV infection rates of 8.2% and 21.2% in males and females respectively, while patients presenting to hospitals in areas of high SES had TV infection rates of 3.4% and 9.1% in males and females respectively.

Conclusions

Trichomoniasis is a common STI and was the most prevalent STI in women presenting to all EDs. TV infection rates, including in male patients, have been shown to be a significant etiology for ED presentation. Many male patients who were positive for TV and negative for other STIs presented with symptoms such as dysuria or discharge. Although local infection rates will vary, empiric treatment for Trichomoniasis appears an appropriate consideration for ED patients.

#61: Appropriate Child Motor Vehicle Restraint Use Increases with Education

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Purpose

Motor vehicle collisions are consistently one of the leading causes of pediatric injury-related death in the United States. The child fatality rate in motor vehicle collisions nearly doubles for unrestrained children. Recent legislation and recommendations published by leading pediatric organizations promote optimal safety for children in motor vehicles. Children are routinely unrestrained or improperly restrained in motor vehicles. This pre-post study aimed to conduct usage assessments of car seats, booster seats, and seatbelts by occupants of motor vehicles, provide individual education (intervention), and evaluate the effectiveness of the education by carrying out post-intervention assessments.

Methods

This pre-post interventional study was performed at six elementary schools in the Las Vegas metropolitan area. Data was collected via one-on-one assessments with occupants of motor vehicles arriving at elementary schools during the early morning drop-off times. Participants were provided one-on-one education regarding child passenger safety guidelines and laws. Comparison assessments were conducted one to three weeks later at the same schools using the same methods.

Results

The findings observed that appropriate restraint adherence improved post-intervention from 42.3% to 56.1%, which shows a 32.6% increase.

Conclusions

Appropriately restrained children have a significantly lower risk of mortality in the event of a motor vehicle collision. Recent laws have attempted to assist parents and children in reducing these risks by being correctly restrained while in a motor vehicle. The study results demonstrate that one-on-one education for parents and children increases proper motor vehicle restraint use.

#62: Evaluating the Impact and Utility of Medicare Assistance Program (MAP) Training among Roseman University of Health Science Graduates

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Purpose

Medicare Assistance Program (MAP) is a federally-funded initiative in Nevada that provides 1-on-1 counseling to Medicare beneficiaries. In 2016, Roseman University of Health Sciences partnered with MAP to establish an on-campus Medicare Call Center, offering unbiased counseling to beneficiaries. Health sciences students and professionals have an opportunity to attend the 2-day training to become certified MAP counselors. This study aims to investigate the long-term impact of MAP training on the professional practices and careers of Roseman University of Health Sciences (RUHS) graduates.

Methods

An electronic survey, approved by the Institutional Review Board (IRB), was distributed to RUHS graduates who obtained MAP counselor certification as student pharmacists. The survey remained open for two weeks, from September 18, 2023, to October 2, 2023. The collected survey data underwent both descriptive and inferential statistical analyses for a comprehensive assessment.

Results

The survey was sent to 64 out of 75 Roseman Alumni who completed the MAP Certificate Training, and 19 responses (25% response rate) were recorded at the end of the two-week window. About 53% of respondents frequently apply their MAP knowledge at their practice sites, particularly at community settings where pharmacists have increased patient interactions. Twenty-nine percent of respondents reported working in a hospital setting, and a smaller percentage work in other areas, suggesting that MAP knowledge can also be useful in various non-community settings. Most participants believe MAP training is essential for pharmacy students and beneficial to students from other health professions. Notably, many participants did not maintain active counselor certification post-graduation, due to either not knowing how to keep it active (35%) or not feeling necessary (29%).

Conclusions

Regardless of the practice settings, MAP training may be a beneficial addition to students' professional knowledge. The acquired skills from MAP training continue to prove useful in pharmacy practices even after certification has expired. As a publicly available program in all states, other colleges of pharmacy or health profession schools may consider working collaboratively with their state SHIP/MAP office to provide their students training.

#63: The Association between an Augmented Antibiotic Regimen and Post-Prostate-Biopsy Sepsis

Eric Baghdasaryan;[1] Andrew Chen;[2] Kian Asanad;[2] Jeffrey Lin;[2] Eli Thompson;[2] Leo Doumanian;[2] Jamal Nabhani[2]

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Purpose

Post-prostate biopsy sepsis is a rare but serious complication that has been increasing due to the rise of fluoroquinoloneresistant E.coli. Augmented antibiotic prophylaxis, stringent sterilization procedures, and transperineal biopsy are the most common strategies for decreasing postbiopsy sepsis. Due to increasing fluoroquinolone resistance in our local antibiogram, we switched to an augmented antibiotic regimen. In this study, we evaluted the change in post-biopsy UTI and sepsis after changing from standard oral Levaquin 500 mg oral prophylaxis to intramuscular gentamicin 160 mg and 1 tab of double strength trimethoprim/sulfamethoxazole.

Methods

We conducted a retrospective review of a prospectively collected prostate biopsy database of 144 consecutive double sextant prostate biopsies which represented 72 biopsies prior to and after the change in antibiotic regimen. We used logistic regression to control for patient factors and biopsy characteristics in assessing whether the change in antibiotic regimens affected UTI and sepsis rates.

Results

Patient characteristics and biopsy results were similar between groups, although more Gleason grade 5 disease was diagnosed in the augmented biopsy group. The overall rate of symptomatic UTI was 7% and the rate of sepsis was 4.2%. When changing from the standard to augmented antibiotic regimen, UTI rates decreased from 9.7% to 4.2% and sepsis rates decreased from 6.9% to 1.4%. All available cultures reviewed demonstrated E.coli resistant to fluoroquinolones. Logistic regression models controlling for diabetes, age, smoking status, prior biopsy, and pathologic diagnosis demonstrated that active smoking status was associated with post-biopsy UTI (OR 2.2, 95% CI 0.19 – 4.28). Otherwise, antibiotic regimen was not associated with lower odds of developing a post-biopsy UTI or sepsis.

Conclusions

While underpowered, our study demonstrates a trend toward lower UTI and sepsis rates when changing from standard fluoroquinolone prophylaxis to an augmented regimen of gentamicin and trimethoprim/ sulfamethoxazole. All available cultures reviewed demonstrated E.coli resistant to be fluoroquinolones. This study highlights the importance of locally monitoring, adapting, and measuring efforts to decrease post-prostate-biopsy complications.

#64: Referral Patterns of Neonatal Healthcare Professionals for Cleft Lip and Palate Patients

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Purpose

Cleft Lip and Palate patients are some of the most vulnerable and complex orthodontic patients. They face a myriad of health challenges including psychological, nutritional, auditory, speech, airway, skeletal, and dental. Ideal comprehensive treatment for CLP patients is provided via multidisciplinary teams of healthcare providers. However, there is currently limited access to proper multidisciplinary care for CLP patients in the US, partly due to lack of education regarding available resources. For the most effective treatment and optimal outcomes, it is essential that coordinated care starts at birth and that parental education begins as soon as CLP is detected in utero. This research aims to improve CLP care by raising awareness amongst healthcare professionals regarding craniofacial orthodontic care for these patients, proper treatment sequencing, and local resources available.

Methods

1. Data collection initiated after IRB approval2. Appropriate subjects identified and conferences selected in Las Vegas, NV3. Pre-survey questionnaire administered to all subjects in attendance4. Educational program delivered5. Post-survey questionnaire administered to same subject group as in Step 36. Statistical analysis performed to correlate pre- and post-survey data

Results

None yet since we are still in the educational pilot stage.

Conclusions

None yet since we are still in the educational pilot stage.

#65: Interdisciplinary education, models: incorporating oral health education into the nursing curriculum

Edgar Tilley;[1] Kimberly Jones-Rudolph[1]

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Purpose

The connection between systemic health and oral health has been well established in the literature and the relationship continues to be discovered and researched. Often systemic issues have been found to be compounded by poor oral health. To better care for patients, health care providers need to collaborate so that providers of all health care sectors can identify underlying oral issues and ensure patients receive adequate care. Often patients will seek medical care for systemic issues but fail to address underlying oral issues. To address oral issues more effectively, there is benefit in equipping medical personnel to assess oral health and either treat or refer accordingly as a part of their treatment for their systemic conditions.

Methods

Thorough literature search of any existing interdisciplinary programs outlined in the literature was completed using these search terms:(("Interprofessional Education"[Mesh]) OR ("Interprofessional Relations"[Mesh])) AND ("Models, Educational"[Mesh])(("Interprofessional Education"[Mesh]) OR ("Interprofessional Relations"[Mesh])) AND ("Models, Educational"[Mesh]) AND (Dental) AND (Nursing)

Results

Multiple universities have incorporated interdisciplinary education. These schools' programs range from CE courses, to a few hours a day, to multiple courses spread out over weeks. The programs with the best results included less time in the classroom and more time hands on with patients in the dental clinic. After the course at UCSF, 83% of practitioners reported that they were now actively incorporating oral health services into their well-child visits. Initially 45% of nursing students surveyed had a negative attitude towards learning about oral health and incorporating it into curriculum. After the curriculum, surveys show that 25% of nursing students recognized the impact oral health has with systemic health and feel more confident about incorporating it into their visits. Our proposed curriculum will mimic aspects of other programs that have shown the greatest impact in oral health education for nurses.

Conclusions

Interdisciplinary education plays a vital role in bridging the gap between different practitioners. Nurses, in particular, interact with patients across various healthcare settings and with a more comprehensive view of the patient's health to include an understanding of oral health could greatly improve patient health outcomes.

#66: East Meets West: Utilization of a Health Survey Template for Community Outreach

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Purpose

The purpose of this study is to: a) Describe the utilization of a health survey template; b) Identify the prevalent medical conditions of people in the local communities; c) Determine the impact of health education in medical mission trips and role of the nursing students; d) Compare the health survey results with local clinical sites to foreign clinical sites.

Methods

Nursing students, local community partners and volunteers assisted with completion of the health surveys during medical mission in the Philippines. A total of 423 health surveys were reviewed and analyzed. This is a descriptive analysis of the characteristics of the people of Binangonan, Rizal in the Philippines including: age, gender, barangay or village, primary care providers, prescription drug maintenance, medical diagnoses, and other health concerns. The same health survey template was utilized by nursing students during pop-up vaccine clinics in Southern Nevada.

Results

During Uganda Medical Mission 2019 and Philippines Medical Mission 2023, participants were willing to complete the health surveys. Approximately 50-60% more female than male participated. The most prevalent diseases in Binangonan, Rizal were dengue fever, pneumonia, HIV and TB. Dehydration, Malaria, STD, and HIV were highest prevalent in Uganda, Africa communities. Most of the participants who completed the health surveys disclosed not having a permanent primary care provider while taking maintenance prescription drugs. The local clinical sites target population are mostly seniors (55+ adults) who received free vaccinations (flu, pneumonia, tetanus, and RSV vaccines).

Conclusions

Utilization of a health survey template may assist healthcare providers in identifying the realistic needs of the local communities served. Inclusion of health education during medical clinics was beneficial in increasing awareness among the community with prevention of the rising prevalent diseases. The provision of free medical clinics in foreign third world countries may serve as additional healthcare resources and opportunity for nursing students in the U.S. to create partnerships with community health care organizations in foreign countries through established yearly medical mission trips.

#67: **Philippines Medical Mission: Lived Experience of Undergraduate Nursing Students**

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Purpose

The purpose of this study is to: a) Determine the impact of international clinical immersion on the growth and learning of undergraduate nursing students; b) Describe how clinical nursing rotations in a foreign country may enhance critical thinking, clinical decision-making, and cultural competencies among nursing students.

Methods

Roseman University College of Nursing students and faculty embarked on an international medical mission to the Philippines. These nursing students completed the clinical hours for Community Health Nursing while in the medical mission. The group provided health assessment, health survey and health education to the people of Binangonan, Rizal. The student participants were asked to complete a pre-trip, during trip and post-trip individual reflections. Individual reflections were guided by five specific questions related to personal and professional development. The reflections were reviewed and analyzed to determine collective themes identified by all the participants. The essay reflections helped determine if there are any changes in perspective about the medical mission that could contribute to development and improvement to the growth and learning process.

Results

A person's lived experience is significant because it will impact a person's attachment to a place and will alter their level of engagement in that place. Some of the common themes shared by the students about their experiences were centered on the people, foods, culture, and setting of the people of Binangonan and resonates in all reflections. One mentioned an indescribable beautiful complexity of the different "Barangays". The significant differences in the standard of nursing practice and consideration of the scarce resources, equipment and supplies were "an eye opening" experience for these students. Increase in cultural competence, preparing for the unexpected, or unforeseen situations and embracing the challenges were among the shared reflections. Some students reflected on their attitudes and character, "staying rooted" in the lessons learned from the mission trip.

Conclusions

Lived experience research offers a wealth of rich information that can shape and enhance the quality and relevance of scientific reviews (NIH, 2021). The sharing of valuable lived experiences creates purpose, cultivates a sense of gratitude, facilitates personal growth and simply "paying it forward".

#68: The Power of Collaboration: Philippines Medical Mission Trip 2023

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Purpose

Collaboration is functioning effectively as part of the interdisciplinary team, cultivating open communication, mutual respect, and shared decision-making to achieve quality patient care. The power of collaboration resulted in the feasibility and fruition of a medical mission to the Philippines for Roseman University College of Nursing team. The purpose of this study is to: a) Describe the power of collaboration in planning, coordination, and implementation of an international medical mission; b) Summarize the outcomes for Community Health Nursing Experiential component; c) Discuss the feasibility of an interdisciplinary team collaboration for a yearly international mission.

Methods

Planning and collaboration between nursing faculty, students and community partners began after the formation of the final team. Zoom meetings were held at least twice a month for on-going planning of activities and venues. Collaboration with the Population Nurse and Medical Officer is vital to ensure safety and feasibility of the medical clinics. A medical clinic template was utilized at the medical mission for all the six clinical sites served by the team and community partners. Sections were subdivided by service: Registration, Health Assessment, Health Survey, Consultations, Health Education and Prescription Medications.

Results

The team provided free flu and pneumonia vaccinations for 200 seniors and Oversees Filipino Workers (OFWs) with co-morbidities with a single-use one time aspiration needle to minimize medication errors. The no-gloves and administration techniques brought ethical dilemma among the students and faculty members. A rare opportunity for nursing students was to assist in the insertion of Progestin Subdermal Implants by sterile technique preparation of the site, measurement of the site, and dressing post-insertion.

Conclusions

Understanding the healthcare culture when planning a medical mission trip is vital. Significant differences in healthcare standards of practice exist and may create misunderstandings between the mission team and community healthcare team members. Collaboration includes open communication and mutual respect. Allowing the local health care nurses to train and mentor nursing students while nursing faculty observe the learning and interaction is a demonstration of true collaboration in international medical mission trips. Nursing students were given an in-depth understanding and true meaning of clinical immersion in a foreign country.

#69: Confidence of Touro University Medical Students in Identifying Dermatologic Conditions on Different Fitzpatrick Skin Types

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Purpose

Racial health disparities are apparent in the field of dermatology across the United States. Certain dermatologic conditions are more likely to go undiagnosed in people with skin of color (SOC), leading to increased morbidity and mortality. It is believed that underrepresentation of darker skin tones in medical education is a contributing factor. This study explores the ability and confidence of medical students at Touro University Nevada College of Osteopathic Medicine (TUNCOM) to recognize dermatological conditions on various skin tones to identify potential gaps in education.

Methods

A 23 question survey was given to 173 second year TUNCOM students to examine their ability and confidence in identifying dermatologic conditions on non-SOC (Fitzpatrick I-III) and SOC (Fitzpatrick IV-VI). Students were presented with images of common skin disorders on different skin types and asked to provide the diagnosis and their level of confidence in their answer. Skin disorders included atopic dermatitis, basal cell carcinoma, melanoma, psoriasis, and tinea versicolor. The survey also assessed whether students felt they had adequate exposure to dermatologic conditions on SOC in their dermatology curriculum and study resources.

Results

51% of students reported adequate exposure to dermatologic conditions in their medical training. For all dermatologic conditions presented, the proportion of correct SOC identifications was less than the proportion of correct non-SOC identifications (p-values <0.02 - <<< 0.05). Levels of confidence in determining the correct diagnosis on SOC was lower than non-SOC, excluding atopic dermatitis and melanoma. 66% of students felt they had adequate exposure to conditions on SOC in their dermatology course. 32% of students felt that outside resources had adequate numbers of images of dermatological conditions on SOC.

Conclusions

Our study demonstrates that students exhibit a lower level of accuracy and confidence in diagnosing dermatologic conditions on SOC. Addressing this proficiency gap is imperative in achieving equitable healthcare outcomes.

#70: Establishing optimal tools for an anatomy laboratory based on the Six-Point Mastery Learning Model

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Purpose

Roseman University of Health Sciences (RU) is establishing a new College of Medicine in Southern Nevada with the goal of transforming Medical Education and Healthcare delivery. To this end, facilities and resources for an integrated anatomy education need to be established, considering best practices for anatomy education.

Methods

Dissection and prosected specimens are the traditional methodologies giving students a 3-dimentional understanding of anatomical relationships. However, with the advent of computer-based educational tools, given the time constraints due to the explosion of medical knowledge over the past 2 decades, health and safety issues and the cost of providing and storing body donations, the RU Office of Medical Education has tasked the Anatomy Working Group of its Curriculum Committee to evaluate multiple other educational tools and methods according to established best practices to design an anatomy laboratory allowing an integrated interactive anatomy education in accordance with the RU six-point Mastery Learning Model.

Results

After evaluating the educational benefits of all available instructional methods for anatomy education, we decided to procure an array of plastinated specimens capturing the highest quality of anatomy dissection. The lab sessions will be augmented by plastic models, allowing for a hands-on experiential learning. After an extensive comparative analysis of available computer-based tools, Sectra tables were selected because they allow for integration of multiple disciplines, including small group interactive learning (active and collaborative learning). They incorporate virtual dissection, histology, medical imaging, pathology and the option of on-demand learning modules. Augmented reality was chosen over virtual reality in consideration of student safety in the laboratory. Additionally, Complete Anatomy, a 3-D anatomy platform, will be provided to all students. Furthermore, living anatomy and ultrasound will be included in the teaching.The anatomy laboratory was designed to accommodate students with visual, hearing, visual-spatial processing and mobility disabilities providing access to anatomy education without hindrance or limitations, e.g., table heights and adjustability, access to sectra tables and reasonable adaptations.

Conclusions

This combination of educational tools within our block curriculum will provide an innovative and inclusive competency-based anatomy education.

#71: **Evaluation of the landscape of US allopathic medical school preclinical grading schemes.**

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Purpose

The Roseman College of Medicine (RUCOM) is in the process of developing a novel medical school curriculum. Critical to curriculum development are considerations regarding assessment. Assessments must be an integrated part of the curriculum that are purposefully designed to support the curriculum and student learning. In recent years, there has been a tendency in moving away from a grading scheme in the preclinical courses to a pass/fail grading scheme that quantifies student achievement of established learning objectives, with an institution-defined threshold for a passing grade. Proponents championing pass/fail grading schemes postulate that this leads to reduced student stress and anxiety and promotes supportive and collaborative learning. As we develop the medical school curriculum and assessments, we wanted to provide an up-to-date picture on current grading schemes adopted across US allopathic medical schools to guide discussions on what scheme to implement at RUCOM.

Methods

A list of allopathic schools was obtained in September 2023 from (https://premedplug.com/md-medical-schools/) and for each school, handbooks and publicly available university policies were used to deduce the grading scheme for the preclinical courses. Results were tabulated and stratified based on the type of grading scheme.

Results

In terms of different grading schemes three major categories were identified: pass/fail or satisfactory/unsatisfactory, pass/fail with honors, and lettering/numerical grades. Of the 156 US allopathic schools, data was not publicly available for 20 schools (12.8%). For the 136 remaining schools, 121 (89%) utilized some type of pass/fail grading schemes. Of these, 102 schools (84.3%) use a straight pass/fail grading scheme and 19 schools (15.7%) use a pass/fail grading system with an honors classification. The remaining 15 schools (11%) use numerical or lettering grading schemes.

Conclusions

Our research confirms that a pass/fail grading system is the predominant grading scheme adopted across US allopathic medical schools. This information is being used to make curricular decisions regarding grading schemes to be adopted at RUCOM.

#72: Quantifying community-based pharmacy student operational and clinical rotation (IPPE) activities.

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Purpose

The purpose of this study is to identify and describe trends in the quantity and proportion of operational and clinical activities performed by students on introductory (IPPE) rotations.

Methods

Retrospective analysis of data from a 19-question electronic form submitted by first- and second-year pharmacy students, and confirmed by preceptors, at the end of each community rotation day from 2019 to 2022. Activities were categorized as either operational or clinical. Averages were calculated based off the activities reported divided by the number of days that the students were at the rotation site.

Results

Data was collected from 15,798 community IPPE visits with each visit being eight hours long (126,384 total hours). From 2019 to 2022, the quantity of operational tasks increased by 0.3%. The quantity of clinical tasks increased by 50.4% during the same timeframe. The relative proportion of clinical tasks increased from 18.5% in 2019 to 25.3% in 2022. The largest changes to individual tasks were observed in “filling and labeling a prescription” (operational, 13.3% decrease) and “administering a vaccination” (clinical, 89.3% increase).

Conclusions

Implications: Determining the types of activities performed by students on community pharmacy rotations can inform pharmacy schools on curricular priorities. Additionally, if the same trends are observed with pharmacists and technicians, pharmacy leaders should consider the implications on safety, morale, and burnout from increased clinical services without a corollary decrease in operational tasks.

#73: **Expanding Healthcare Professional Student Learning Surrounding Substance Use Disorders**

Krystal Riccio;[1] Alana Whittaker[1]

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Purpose

The purpose of this study is to evaluate the effect of a SUD-focused IPE education by measuring healthcare professional student comfort levels regarding overdose prevention and SUD treatment.

Methods

An anonymous cross-sectional study was conducted using pre- and post-IPE surveys in Qualtrics. In 2022 and 2023, IPE students from 4 healthcare programs (PharmD, Nursing, PA, and DO) were invited to complete surveys rating their comfort level with counseling on naloxone, initiating critical conversations, and familiarity with community resources (Likert scale 1-5). Pre- and post-IPE results were compared from year to year and by program, using SPSS v29, with an alpha of 0.05 for superiority.

Results

Each year, over 245 healthcare professional students participated in the SUD-focused IPE event. All survey response rates were over 50%. Over 60% of respondents were female, and about one-third were from PharmD. In both years, the biggest improvement was seen in familiarity with community resources for SUD (1.03, CI 0.81-1.25) and comfort in naloxone counseling(0.8, CI 0.59-1.01). Increased comfort levels were also seen in initiating conversations with high-risk patients (0.58, CI 0.39-0.75) and patients with OD (0.56, CI 0.37-0.75). Significant increases were observed across all programs ($p < 0.05$).

Conclusions

IPE continues to be an excellent opportunity to impact future health professionals' comfort levels in initiating critical conversations surrounding substance use, providing overdose prevention counseling, and increasing awareness of community resources.

#74: **Reducing stigma toward substance use disorders among future healthcare professionals**

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Purpose

The opioid crisis remains a significant public health concern in the United States despite effective treatment and recovery care options. Negative perceptions of healthcare professionals toward patients with substance use disorders (SUD) are common and well-documented to correlate with reduced quality and care access. To improve health equity, RUCOP and TU faculty designed and facilitated an Interprofessional Education (IPE) event using an interdisciplinary team to care for individuals with SUD.The purpose of this study was to assess the level of stigma reduction surrounding an SUD-focussed IPE, measured with the Medical Condition Regard Scale (MCRS), where higher scores indicate lower stigma.

Methods

This is an anonymous cross-sectional study. PRE- and POST-IPE surveys, including the 11 MCRS items, were completed with Qualtrics. Using a 6-point Likert scale for each question, scores were compared PRE- and POST-IPE training and by program, using SPSS v29 (alpha set to 0.05).

Results

In 2023, 257 healthcare students attended the IPE, with 184 (71.6%) completing the PRE- and 172 (66.9%) completing the POST-IPE survey. The mean age was 28 years; 60% were female; and 38% were pharmacy, 33%physician assistant (PA), 15% nursing (BSN), and 14% doctor of osteopathic medicine (DO) students.The mean MCRS overall was 48.3 PRE-IPE compared to 52.2 POST-IPE (mean difference 3.87; 95% CI, 2.14 – 5.61; $p < 0.01$). At baseline, pharmacy students reported higher MCRS (51.5) than both BSN (45.7) and PA (46.8)students, but there was no difference with DO (47.4) students. For POST-IPE results, MCRS continued to remain highest in pharmacy students (54.4)than in other programs (BSN 51.6, PA 50.3, DO 50.9); however, this was not statistically significant ($p = 0.053$).

Conclusions

Overall, the IPE successfully reduced stigma, as demonstrated by increased MCRS scores from baseline. Pharmacy students show the lowest level of stigma both before and after IPE training, supporting their inclusion in an interdisciplinary team to reduce stigma and improve patient-centered care.

#75: Evaluation of the Roseman Basics Leveling Course – Comparing Survey Results from February 2022 and 2023

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Purpose

In Roseman University's accelerated PharmD program, everything is very fast paced. Therefore, assessing the effectiveness of the leveling course given to incoming P1 students is critical. Roseman's Basics course is essential in further developing a solid foundation that can help students thrive in the program. The continual improvement of this course for the incoming P1 class should help in the transition from undergrad to Roseman to prepare students for the upcoming material. By collecting information from students who have previously taken the course, we are able to evaluate and analyze key concepts that students find useful. In this study, we convey some of the survey results attained from the 2021-2022 and 2022-2023 Roseman Basics student surveys.

Methods

The survey was given to P1 students on both campuses February 2022 and February 2023, asking questions concerning the Roseman Basics course each class had been exposed to. In this survey we asked questions such as, "Do students find it helpful?" and, "Which sections did the P1 class find the most beneficial and which did they find the least helpful?"

Results

In our survey, the students' opinions provided subjective information which has enabled us to further evaluate the basics course to better prepare future students. Negative and positive feedback varied. According to the surveys, student opinions on some topics remained the same whereas some became more positive while some were more negative year to year. For example, although P1 students did appear to like the organization of Roseman Basics, the response to the statement of, "The Roseman Basics course was well organized," showed a more negative trend in 2023 versus in 2022.

Conclusions

This study details feedback from students concerning the 2021 and 2022 versions of Roseman Basics administered to the incoming P1 class of 2021 and 2022. These survey results are important because ultimately Roseman basics is for the incoming P1 students, and if it is not doing any good for the students why have it. For future course development, focus group results should be compared between the incoming P1 classes to ensure that proper improvements have been made. Tracking of the survey results will also continue.

Roseman University of Health Sciences Utah Abstracts

#1: **Exploring the Interconnected Role of the Oral Microbiome and Periodontal Disease in the Development and Progression of Oral Squamous Cell Carcinoma: A Comprehensive Review**

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Purpose

This comprehensive review explores the complex linkage among the oral microbiome, periodontal disease, and the onset and progression of oral squamous cell carcinoma (OSCC).

Methods

Literature was searched electronically from PubMed and ScienceDirect published between 2018 and 2023 using the keywords “oral microbiota,” “oral cancer,” and “OSCC.” The titles and abstracts of the located papers were thoroughly examined to determine their eligibility for inclusion or exclusion in the review.

Results

The review identified significant associations between the oral microbiome, periodontal disease, and the development of oral squamous cell carcinoma (OSCC).

Conclusions

Overall, this review contributes to our understanding of the complex relationships within the oral microbiome and their impact on cancer, paving the way for further research and clinical applications.

#2: **Doxorubicin-induced endothelial cytotoxicity is prevented by Semaglutide.**

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Purpose

Anthracycline drugs such as Doxorubicin (Dox) and daunorubicin are used to treat various cancers, but their efficacy in treating some of the advanced cancers and unwanted side effects are significant concerns. Several studies have shown that Dox is cardiotoxic, and potential adjuvant therapies are required to increase its efficiency and reduce side effects. Glucagon-like peptide-1 receptor antagonist, Semaglutide, is in the market to treat type-2 diabetes. The role of Semaglutide on vascular toxicity has yet to be well known. Therefore, we planned to examine the effect of Semaglutide in preventing Dox-induced endothelial cell toxicity.

Methods

Human umbilical vein endothelial cells (HUVEC) were grown in DMEN media and treated with Dox in the absence and presence of Semaglutide. Cell viability was determined by MTT assay. Apoptosis was determined by apoptosis assay and live-dead cell assay kits. Expression of various apoptotic, survival, and inflammatory markers was determined by antibody arrays.

Results

Our results suggest Dox-caused endothelial cell death and treatment of Semaglutide inhibited it in a dose-dependent manner. Further, Semaglutide prevented the Dox-induced apoptosis of HUVECs by inhibiting the caspase-3 activation. Semaglutide also regulated the expression of various apoptotic, survival, and inflammatory markers in Dox-treated cells.

Conclusions

Semaglutide inhibits dox-induced endothelial cell death and suggests that it could be further investigated for its cardioprotective properties.

#3: **LSTM-based Recurrent Neural Network Predicts Influenza-like-illness in Variable Climate Zones**

Alfred Amendolara;[1] Christopher Gowens;[1] Joshua Barton;[3] David Sant;[1] Andrew Payne[1]

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Purpose

Influenza virus is responsible for a recurrent, yearly epidemic in most temperate regions of the world. For the 2021-2022 season the CDC reports 5000 deaths and 100,000 hospitalizations, a significant number despite the confounding presence of SARS-CoV-2. The mechanisms behind seasonal variance in flu burden are not well understood. Based on a previously validated model, this study seeks to expand understanding of the impact of variable climate regions on seasonal flu trends. To that end, three climate regions have been selected. Each region represents a different ecological region and provides different weather patterns showing how the climate variables impact flu transmission in different regions.

Methods

An LSTM-Based recurrent neural network was used to predict influenza-like-illness trends for three separate locations: Hawaii, Vermont, and Nevada. Flu data were gathered from the CDC as weekly influenza-like-illness (ILI) percent. Weather data were collected from Visual Crossing and included temperature, UV index, solar radiation, precipitation, and humidity. These weather data sets were chosen based on previous work results and a literature search. Data were prepared and the model trained as described previously.

Results

All three regions showed strong seasonality of flu trends with Hawaii having the largest absolute ILI values. Temperature showed a moderate negative correlation with ILI in all three regions (Vermont = -54, Nevada = -0.56, Hawaii = -0.44). Humidity was moderately correlated in Nevada (0.47) and weakly correlated with ILI in Hawaii (0.22). Vermont ILI did not correlate with humidity. Precipitation and wind speed were weakly correlated in all three regions. Solar radiation and UV index showed moderate correlation in Vermont (-0.33, -0.36) and Nevada (-0.5263, -0.55) however only weak correlation in Hawaii (-0.15, -0.18). When trained on the complete data set model performance at +1 week was comparable to the previously validated model.

Conclusions

Preliminary results indicate that temperature is a moderate predictor of ILI rates. Additionally, humidity, solar radiation, and UV index present promising prediction variables. Initial modeling attempts revealed acceptable performance in all regions. While seasonality appeared similar in each region, differences in correlation with weather variables may reveal variability in the driving forces behind ILI rates.

#4: DNA Extraction Method Development for Ocular Tissues

Conrad Ashby;[1] Michael Trapnell;[1] Walker Kay;[1] Jonathon Reynolds;[1] Noah Schultz;[1] Brandon Burger;[1] Christina Small;[1] John Kriak;[1] Kyle Bills;[1] David Sant[1]

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Purpose

DNA extraction kits are traditionally developed to work with liquid tissues such as blood, saliva, and swabs, but some have been proposed to work with solid tissues. Somatic variation in cancers can be important for tumor subtyping and treatment guidance, including ocular tumors. Additionally, epigenetic marks such as 5-methylcytosine (5mC) and 5-hydroxymethylcytosine (5hmC) are tissue-specific and change in disease states, particularly evident in diabetic retinopathy and age-related macular degeneration. Commercial DNA extraction kits are available from several vendors, but the various kits have different strengths and weaknesses, and the removal of PCR inhibitors will vary with each kit. This project investigates the yield and purity of DNA from ocular tissues using commercial DNA extraction kits.

Methods

Cornea, neural retina, RPE/choroid layer, optic nerve, and capsular bag were collected and aliquoted into 15 mg aliquots. Extractions were performed using the following kits: DNEasy Blood and Tissue Kit (Qiagen;), GeneJET Genomic DNA Purification Kit (ThermoFisher Scientific), Monarch HMW DNA Extraction Kit for Tissue (New England Biosciences), and genomicPrep Mini Spin Kit (Cytiva). DNA was quantified using the Qubit Fluorometer and molecular weight was checked by agarose gel. Several more kits are currently being tested.

Results

All four kits yielded high molecular weight DNA (above 20 kbp). The Monarch HMW kit yielded DNA with significantly higher molecular weights. The DNA yields per milligram of tissue were highest using the DNEasy Blood and Tissue Kit for optic nerve, neural retina, and RPE/choroid. The yield was highest for the cornea using the genomicPrep Mini Spin Kit. Only the genomicPrep Mini Spin Kit yielded sufficient DNA for quantification from the capsular bag, and total yields were minimal (600 ng or less). Additional kits are currently being tested, but initial results indicate that several commercial kits will be sufficient for DNA extraction of ocular tissues. Further work is needed to purify epithelial cells and stem cells from the intraocular lens.

Conclusions

Of the kits tested, all are sufficient to obtain significant amounts of DNA from all ocular tissues aside from the capsular bag. The Monarch HMW yielded the highest molecular weight, but significantly lower quantities of DNA than the other kits, indicating that it may not be ideal for most purposes. Protocol development for the capsular bag is still underway.

#5: **Dissecting the Impact of Medicinal Plant Compounds on Systemic Diseases**

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Purpose

This literature review aims to analyze the contribution of various medicinal plant compounds, encompassing polysaccharides, flavonoids, alkaloids, and lignans, on systemic diseases such as diabetes, cancer, and Alzheimer's. Specifically, it delves into the affirmative effects and minimal risks associated with these compounds, laying the groundwork for forthcoming trials.

Methods

For this literature review, a range of databases were used such as Google Search, PubMed, and Web of Science (mentioned all the ones you used). The search strategy used was a combination of terms such as "medicinal plant compounds," "plant polysaccharides on metabolic diseases," "effects of berberine on diabetes mellitus," " and "effects of medicinal plants on Alzheimer's." Articles chosen for review were published between 2020 and 2022, and only studies in the English language were considered. The majority of the selected studies were devised to observe and analyze the effects of medicinal plant compounds on various systemic diseases.

Results

A total of 20 articles were incorporated into this literature review. Through the analysis of these articles, several pivotal themes emerged. The impacts of medicinal plant compounds, such as flavonoids, alkaloids, lignans, and polysaccharides, on diabetes, cancer, and Alzheimer's were salient, with Berberine, an alkaloid inherent in specific plants, showcasing affirmative effects in mitigating symptoms of type 2 diabetes patients.

Conclusions

Medicinal plants have showcased promising outcomes in palliating systemic diseases with fewer side effects in comparison to traditional medicine. The observed beneficial impacts, particularly with compounds like Berberine, indicate the potential for further exploration and clinical trials in formulating alternative therapeutic approaches for diseases such as type 2 diabetes, cancer, or Alzheimer’s.

#6: Awareness of the 20-20-20 Rule Amongst Students, Faculty and Staff at a Medical School Utilizing Pre-recorded Video Lectures

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Purpose

In the past several years, medical schools have increased utilization of recorded lectures and electronic devices: computers, smartphones, and tablets. Increased screen exposure hours where students, faculty, and staff may acquire eye strain. Many are not aware of the 20-20-20 rule: for every 20 minutes of screen time, it is recommended to look at something 20 feet away for 20 seconds; a reminder to take frequent breaks to help prevent eye strain. We want to share reports from our institution regarding student, faculty and staff digital device usage and awareness of the 20-20-20 rule.

Methods

An anonymous online survey was created comprised of 21 questions related to eye conditions, use of digital devices, symptoms of computer vision syndrome, an open-ended comment section, and a demographics section. Faculty, staff, and students (Classes of 2025, 2026, and 2027) were invited to participate. P-values were calculated using a chi-squared test.

Results

We received 114 responses: 23 faculty (20%), 30 staff (26%), and 61 students (54%) from Classes of 2025 (N=31; 51%), 2026 (N=23; 38%), and 2027 (N=7;11%); Females 56%; males 44%. Smartphones, desktops and laptops were the most common devices. Students used devices during the daytime (46%) or both day and night (48%) while faculty used devices mainly during the day (72%). Majority of students and faculty used devices for >1 month, where 98% (60/61) of students noticed visual fatigue compared to 55% (29/53) of faculty. Regarding the 20-20-20 rule, 70% (43/61) students and 72% (38/53) faculty were not aware. Of those who were aware, 72% (13/18) and 60% (9/15) of students and faculty, respectively, never or rarely implement the 20-20-20 rule. Students were more likely to report increased visual fatigue (p-value <0.001). There were no significant differences between faculty and students regarding use of digital devices >1 month, and no relationship between noticing visual fatigue and scheduling breaks.

Conclusions

We present a cross-section of device usage and awareness of the 20-20-20 rule amongst our students, faculty, and staff. Most students and faculty were not aware of the 20-20-20 rule which highlights the importance of implementing visual health awareness within the medical school environment.

#7: **Association of sleep quality with academic performance among undergraduatedental students: a systematic reviewRunning title: Sleep quality affects GPA**

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Purpose

This systematic review aimed to assess the association between sleepquality and academic performance among undergraduate dental studentsMethods: Electronic databases of Scopus, Embase, Medline, and Web of Sciencewere searched for relevant papers published in the English language in May 2023.Study selection, data extraction and quality assessment were performed in duplicatewith JBI Institute's Critical Appraisal Checklist used to quality assessment. GRADEwas used to assess certainty of evidence.

Methods

Sleep quality plays a critical role in various aspects of studentfunctioning, including cognitive performance and academic achievement. Poorquality of sleep can affect the health, cause burnout and increased stress levels instudents.

Results

A total of seven studies examining 2738 students were included in thereview. A majority of the studies showed a high risk of bias. The studies useddifferent methodologies to assess sleep quality, including questionnaires such as thePittsburgh Sleep Quality Index (PSQI) and the Dental Environmental Stress (DES)questionnaire. Academic performance was generally evaluated through self-reportedgrade point averages (GPA). The findings consistently demonstrated a significantrelationship between sleep quality and academic performance. Students with bettersleep quality exhibited higher academic performance, including improved cognitiveabilities. Specific sleep quality indicators, such as sleep duration, sleep disturbances,stimulant drinks and sleep efficiency, were found to be associated with academicperformance outcomes.

Conclusions

The results of this systematic review suggest that inadequate sleepquality significantly impacts the academic performance of undergraduate dentalstudents. The findings underscore the importance of promoting healthy sleep habitsand addressing sleep-related issues to optimize academic success and overall well-being in this specific population. Future research should focus on developinginterventions and strategies to improve sleep quality and enhance academicperformance among undergraduate dental students

#8: Exploration of the Effects of Suboccipital Release Osteopathic Manipulative Treatment on Sleep Quality and EEG Patterns in Medical Students: A Pilot Study

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Purpose

This research delves into the impact of suboccipital release Osteopathic Manipulative Treatment (OMT) on sleep quality and electroencephalogram (EEG) patterns in medical students during napping periods. Much of the current literature has dealt with OMT effects on insomnia or nocturnal sleeping rather than daytime napping. Since there is a gap in the knowledge of suboccipital release and daytime sleep, this study will provide insight in this field in hopes of utilizing OMT to improve sleep and nap quality in medical students who are known to have poor sleep quality.

Methods

A randomized controlled trial will be conducted, whereby osteopathic medical students will be separated into two groups: one receiving suboccipital release OMT, and the other will function as a control with no treatment. The treatment will be administered prior to the designated nap period, EEG electrodes will be utilized for continuous monitoring during a 90-minute nap, along with a pulse oximeter. The study will be carried out over a span of four weeks, with participants undergoing the OMT technique or control conditions once a week. Following each recorded nap session, the participants will complete a survey assessing their perceived sleep quality. At the end of the four weeks, a final survey will be administered one week after the last treatment session to evaluate any lasting changes in sleep quality overnight or during a nap.

Results

No data is available at this time, but we will have this project up and running within the next coming months. This research aims to contribute valuable insights into the potential benefits of suboccipital release OMT on both subjective and objective measures of sleep quality in a medical student population. We predict that we will see a difference in the brain wave frequencies in the OMT group versus the control, as well as differences in the respiratory and heart rate due to increased parasympathetic tone from the suboccipital release.

Conclusions

Further conclusions will be made following the course of the study, although, the measurements and repeated assessments will provide insight into the effects of suboccipital release on nap sleep quality of medical students.

#9: **Exercise Blocks Ethanol-Induced sensitization of Kappa Opioid Receptors in Nucleus Accumbens and Ventral Tegmental Area.**

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Purpose

Exercise has been increasingly used as an adjunctive therapy in the treatment of alcohol use disorder (AUD). Despite this, the mechanism by which it influences the mesolimbic circuitry changes underlying alcohol addiction is not well understood. Previous studies have shown alcohol dependence to lead to upregulation of the Dynorphin-Kappa Opioid Receptor (KOR) system, making it a potential target for therapeutics. Thus, gaining a better understanding of these pathways will help develop evidence-based guidelines for integrating exercise into therapies for the treatment of AUD.

Methods

Mice were divided into four cohorts: Ethanol injections with access to a running wheel, ethanol injections without access to a running wheel, saline injections with access to a running wheel, and saline injections without access to a running wheel. Following 14 days of the respective protocols, mice were anesthetized, and slices of the striatum were prepared for either fast scan cyclic voltammetry (FSCV) or immunohistochemical (IHC) analysis of KOR expression. FSCV was performed at baseline, followed by bath application of either U-50488 (a KOR agonist) at 0.3 uM or 1 uM, followed by a reversal dose of 1 uM nor-BNI (a KOR antagonist). IHC was performed to evaluate the expression of KORs in both the nucleus accumbens (NAc) and the ventral tegmental area (VTA).

Results

IHC revealed that voluntary exercise decreased the expression of KORs in the NAc and the VTA in both ethanol-dependent and non-dependent mice. In addition, in ethanol-dependent mice, voluntary exercise blunted the hypersensitization of KORs and altered evoked dopamine release in the nucleus accumbens. Exercise was also found to desensitize KORs in ethanol non-dependent mice and alter evoked dopamine release in the nucleus accumbens.

Conclusions

A regimen of voluntary exercise competitively altered the changes in KOR expression seen in ethanol dependent mice. These findings provide insight into a potential mechanism by which exercise contributes to the treatment of AUD. However, further research is needed to fully understand the role of exercise in altering the expression and sensitivity of KORs and other opioid receptors that influence the mesolimbic circuitry.

#10: **Exploring the resilience of Two commercial suturing materials subjected to Thermocycling and Chlorhexidine immersion: An In Vitro Study**

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Purpose

To evaluate the durability of two commercially available suture materials (non absorbable Black Braided Silk and absorbable polyglactin 910) subjected to thermocycling after immersing in Chlorhexidine mouthwash.

Methods

Tensile strengths of the suture specimens after being subjected to the thermocycling procedure were subjected to test at particular time periods: before immersion on 0 day and then immersed in Chlorhexidine mouthwash on 7, and 14 days. Tensile strength evaluation was performed employing the microtensile tester.

Results

In the current study , polyglactin 910 showed an increase in tensile strength when compared with Black Braided Silk and the results were statistically significant(p-value<0.001).

Conclusions

Our findings suggest the tensile strength of polyglactin 910 sutures significantly increased in chlorhexidine. Hence, polyglactin 910 can be preferred for the periodontal surgeries due to its retention properties for longer periods compared to Black Braided Silk as it has less tensile strength.

#11: **Pathological effects of electronic cigarette exposure in mouse pregnancies**

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Purpose

Use of electronic Cigarettes (eCig) has increased worldwide in the last several years. Its use has been reported to be an effective smoking cessation tool and for being healthier than normal cigarette use. Although these reports exist, they lack supportive scientific evidence. Little is known about eCig effects during pregnancy. In the present study, we wanted to determine the effects of eCig exposure at two different important gestational points during mouse pregnancy in order to determine eCig exposure effects during pregnancy.

Methods

C57/Bl6 mice were exposed to eCig via a nose-only delivery system (Scireq) for 4 days (from 14.5 gestational day (dGA) to 17.5 dGA) or for 6 days (from 12.5 dGA to 17.5 dGA). At the time of necropsy (18.5 dGA) placental and fetal weights were recorded. Maternal blood pressure was determined with a tail occlusion cuff (Kent Scientific) and proteinuria was detrained with the dip stick method. Markers for placental apoptosis were also determined.

Results

Treatment with eCig showed: 1) a significant decrease in placental weight and fetal weight ($p<0.05$) following 4 and 6 days of exposure, 2) higher systolic ($p<0.02$) and diastolic ($p<0.02$) blood pressure following 6 days of exposure, 3) increased proteinuria after 6 days of exposure, and 4) differential expression apoptosis markers in the placenta after 4 and 6 days of exposures. We conclude that detrimental effects of eCig coincides with the length of maternal exposure. We confirmed that 4 days of exposure resulted in metrics common to IUGR while 6 days of exposure more closely resembled PE/IUGR pathology.

Conclusions

These results could be beneficial in understanding the long-term effects of eCig exposure and the development of placental diseases.

#12: Sulforaphane Pre-treatment Improves Alveolar Macrophage Killing after Alcohol-Induced Dysfunction in Human and Murine Cells in vitro

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Purpose

Alcohol is associated with increased mortality and morbidity globally. Pulmonary infections with opportunistic pathogens can occur in healthy humans; however, binge alcohol intoxication (≥ 0.08% BAC) is a major risk factor. We have previously shown that a single dose of alcohol comparable to binge alcohol intoxication increases infection by reducing alveolar macrophage function in vivo. The aim of this study was to 1) test the therapeutic potential of the phytonutrient sulforaphane (SFN) given as a pre-treatment, and 2) test the alcohol-induced effects on phagocytic function in murine and human macrophages in vitro.

Methods

The primary readout was intracellular phagocytic killing via colony forming units (CFU), and a secondary outcome was cytokine expression via ELISA.

Results

Dose response curves indicated that SFN concentrations less than 20 µM were not cytotoxic in both MH-S (murine) and THP-1 (human) cells and that the TD50 in THP-1 cells was 90 µM. Live infection assay results showed MH-S and THP-1 cells pre-treated with SFN (5 µM) and challenged with 0.2% (v/v) alcohol for 3 or 8 hours prior to live B. thailandensis or S. epidermidis infection improved intracellular pathogen killing approximately 15- and 10-fold respectively, compared to macrophages treated with alcohol alone. Furthermore, MH-S cells pre-treated with SFN and challenged with 0.2% (v/v) alcohol for 3 or 8 hours increased protein expression of Nrf2, a cellular oxidant regulator, ~ 3.5-fold compared to cells treated with alcohol alone. ELISA analysis indicated that SFN significantly reduced levels of TNF-α expression at 3 and 8 hours compared to controls and alcohol-treated THP-1 cells.

Conclusions

Taken together, SFN-induced cytoprotection was extended beyond murine cells to include human cells, and different opportunistic pathogens that include gram-negative and positive organisms were tested. These data demonstrate that SFN may be an effective pre-treatment option to prevent alcohol-mediated innate immune dysfunction and restore alveolar macrophage phagocytic killing during opportunistic pulmonary infections.

#13: **FetalGroEX: a reliably sourced, cost-effective alternative to fetal bovine serum in cell culture growth**

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Purpose

Fetal bovine serum (FBS) has long been used as a cell culture supplement in laboratory studies across the world. Although its constituents are not well-defined, it is estimated to house more than one thousand components. Its plentiful source of carbohydrates, proteins, growth factors, etc. contribute to an optimal environment in which many cell lines flourish. However, FBS is a byproduct of the meat industry, making its availability unpredictable. Consequently, this drives up prices to acquire FBS. To combat this issue, new sera have been developed from alternative sources in hopes of improving reliability and saving costs. Studies are ongoing to investigate human platelet lysate (HPL), umbilical cord serum (UCS), serum-free media, and other bovine products on cell culture development. FetalGroEX, a new serum to enter the market, is much cheaper than typical FBS products and is more reliably sourced. In-house studies performed by Rocky Mountain Biologicals with a handful of cell lines have indicated that media containing FetalGroEX supply growth rates equal or superior to media with FBS. Here we investigate its effectiveness in promoting cell growth and doubling-time in several cell lines compared to FBS.

Methods

Various cell lines will be cultured with predetermined percentages of FBS and FetalGroEX in separate experimental groups. A series of passages will be completed for each cell line. Cells will be counted along the duration of the experiment to determine doubling-time. Protein expressions in specific cell lines will be measured and compared. In addition, cell viability assays will be conducted. Lastly, image samples will be taken to demonstrate the morphologic characteristics of each group.

Results

N/A

Conclusions

N/A

#14: Exploring the Link of Orthodontic Treatments and Temporomandibular Disorders

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Purpose

The ongoing debate in dentistry focuses on the link between orthodontic treatments and temporomandibular disorders (TMD), complex conditions affecting the TMJ and oral functions. TMD's diverse etiologies, from genetics to malocclusions, highlight the necessity of understanding its interplay with orthodontic procedures. This study investigated TMD prevalence in orthodontic cases, the malocclusion-TMD dynamic, and orthodontic efficacy in managing TMD symptoms, aiming to bolster clinical decision-making and patient care standards.

Methods

This was a scoping review conducted following the PRISMA guidelines. An electronic search of articles was conducted using PubMed, Scopus, and the Web of Science published between the years 2018 and 2023. The key search terms were: “orthodontics”, “TMJ”, “TMD”, “Temporomandibular joint” and “Temporomandibular joint dysfunction”. Each retrieved article was divided among team members for initial screening, with each member independently evaluating a portion of total articles, followed by a review of each other’s work.

Results

The search identified 899 articles, and after duplicates were removed, 727 articles were screened via title and abstract. 51 articles were initially considered for full-text evaluation and data extraction. Ultimately, 17 articles met the inclusion criteria. The analyzed studies comprised of case reports (35.3%), cross-sectional (23.5%), cohort (17.6%), retrospective (11.8%), and other study types (11.8%). TMD types included myofascial pain, internal derangement, degenerative joint disease, or a combination (52.9%). Diagnosis methods included clinical examination (58.8%), questionnaires (23.5%), or both (17.6%). Orthodontic treatment typically showed no effect, or a reduction in TMD symptoms.

Conclusions

By systematically examining available evidence, this review endeavors to illuminate the complex interplay between orthodontic therapies and TMD, providing evidence-based insights crucial for informed clinical decision-making and enhancing the quality of care for orthodontic patients.

#15: **Exosomes: A Scoping Review of Applications in Precision Medicine and Dental Precision Medicine**

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Purpose

Extracellular vesicles and their subpopulation have become a recent area of focus in scientific research and possess the capability to advance precision medicine. Exosomes are a subpopulation of extracellular vesicles that will be analyzed through this literature review. In this review the capabilities of exomes to diagnose and treat a multitude of traumas will be analyzed and the potential use of exosomes in the dental field will be analyzed.

Methods

A data search was conducted of five databases. The search began with 412 articles. After articles were analyzed through multiple screenings for exclusion criteria and study focus, 14 articles were included in the study.

Results

Through this scoping literature review on the topic of the potential of exosomes capability to be utilized for diagnostic and regenerative purposes, it has been determined that exosomes both safely and with efficacy accomplish these objectives.

Conclusions

Exosomes have the potential to be utilized in precision medicine. More studies must be accomplished to determine the long term capability and longevity of exosome facilitated tissue. Through this study it is hypothesized that cohort studies over a long period of time will demonstrate positive results.

#16: Ethanol Effects on KCC2 Expression and Function

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Purpose

Excessive alcohol use is estimated to claim more than 140,000 lives every year in the United States, making it one of the leading causes of preventable death. Despite the devastating statistics it is responsible for, there is still much that is unknown of ethanol's (EtOH) effects on a cellular level and subsequently how those cellular mechanisms lead to substance abuse. However, evidence suggests drugs of abuse affect expression of a K-Cl cotransporter found predominantly in neurons called KCC2. By elucidating EtOH's effects on KCC2 expression and function, we aim to better understand the cellular mechanisms involved in alcohol abuse.

Methods

Our study will focus on monitoring KCC2 expression and function in the presence of EtOH in HEK-293 Cell lines. Since HEK-293 cells do not express KCC2 natively, we will use a HEK-293 cell line that has been stably transfected with KCC2 and a non-transfected HEK-293 line for control. Evaluation of KCC2 expression will be made using immunohistochemistry (IHC), and the chloride content in the cell will be monitored through the chloride sensitive fluorophore Clomeleon. These will be measured following incubation in 0 mM, 5 mM, 10 mM, 20 mM, 40 mM, 80 mM, and 100 mM EtOH to assess alteration of KCC2 function and expression. We hypothesize that ethanol exposure will significantly alter the expression and activity of KCC2 in HEK-293 Cells when compared to cells not exposed to EtOH.

Results

NA

Conclusions

NA

#17: The Immunomodulating Effects of Delta-9 Tetrahydrocannabinol (THC) and Cannabidiol (CBD) Ratios in the Context of Inflammation and Infection

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Purpose

Delta-9 tetrahydrocannabinol (THC) and cannabidiol (CBD) demonstrate diverse therapeutic applications. The use of “ultrapotent” cannabis with significantly larger concentrations of THC compared to CBD is rising, increasing the need for further investigation. The immunomodulating effects of varying CBD to THC (CBD:THC) ratios is less well understood. The purpose of the current study is to 1) test varying CBD:THC ratios in a dose dependent manner, and 2) test the immunomodulating effects of varying CBD:THC ratios in the context of infection and inflammation

Methods

Dose-response curves of CBD and THC alone were generated to determine equivalent doses. The cytotoxic effects of CBD:THC ratios were tested by measuring lactose dehydrogenase (LDH). RAW 264.7 macrophages were pre-treated with saline, vehicle, or media supplemented with CBD:THC ratios (1:1, 1:2, 2:1, 1:5, 5:1, 5:5) for 2 hours. Macrophages were rinsed, and media supplemented with live Escherichia coli (E. coli) was administered for 6 hours. Extracellular bacteria were eliminated, macrophage cells lysed, and intracellular bacteria quantified. Lipopolysaccharide (LPS) was used to test the anti-inflammatory properties of CBD:THC ratios. TNF-α, IFN-γ, and IL-10 were measured by ELISA.

Results

Alone, THC increases cytotoxicity in a dose-dependent manner, whereas, CBD demonstrates an inverted U-shape dose-response. CBD:THC ratios increase cytotoxicity in a dose-dependent manner; however, ratios 5:1 and 5:5 (CBD:THC) significantly decrease cytotoxicity. Ratios 5:1 and 5:5 significantly increased phagocytosis and ratios 1:1, 1:2, 2:1, and 1:5 decreased phagocytosis compared to control. Live E.coli or LPS-induced inflammation was significantly reduced by ratios 5:1, 5:5 compared to control.

Conclusions

CBD may mitigate the harmful effects observed with large doses of THC, and may be a critical consideration in decisions about its regulation or the definition of cannabis containing “ultrapotent” THC. The data are also relevant to the safety of licensed medicines that contain THC and CBD, as they suggest that the presence of CBD may reduce the risk of adverse effects from the THC. Cannabis users may reduce harms when using a higher CBD:THC ratio. Further studies are needed to determine if large doses of CBD and THC alone or in ratios have the same effect in peripheral and central tissues.

#18: Investigating the Impact of Ozempic Treatment on Alcohol Consumption in Individuals with Class 1 and Class 2 Obesity

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Purpose

The purpose of this experiment is to see if there is a correlation between Ozempic (semaglutide) treatment for weight loss and alcohol consumption. Ozempic is a glucagon-like peptide-1 (GLP-1) agonist that lowers blood sugar and appetite as it mimics the effects of GLP-1. In previous studies involving rodents, it has been shown that GLP-1 agonists can also be used to reduce addictive substance intake. We hypothesize that subjects who receive Ozempic treatment will exhibit reduced consumption of alcohol over the span of a month compared to subjects who do not receive Ozempic treatment.

Methods

All participants from the study will have a BMI of 30.0-39.0 kg/m2 upon intake, falling into the categories of Class 1 and Class 2 obesity. Through an intake survey given at the weight loss clinic, participants will also be selected based on their alcohol intake in reference to the CDC's criteria for binge drinking. The control group for this experiment will include participants who are receiving dietary counseling at a weight loss clinic, without any other medications or treatments. The experimental group will receive one weekly subcutaneous dose of Ozempic. For 30 days, participants will be given a portable, digital breathalyzer. Participants will receive a random notification three times a day between the morning, afternoon, and evening hours, asking them to do a breathalyzer test as well as complete a brief survey after to confirm the amount of alcohol they have consumed within the past four hours. The breathalyzer device connects with a phone application which will record the history of the participant's estimated blood alcohol levels. Only data from participants who have a minimum of 80% compliance will be used.

Results

NA

Conclusions

NA

#19: Investigating the Interplay between Glucose Regulation, Neural Activity, and Motivation Utilizing Heterodyned Whole-body Vibration.

Blake Harris;[1] Tanner Brain;[1] James Barber;[1] Maisie Rivera;[1] Tiffany Nguyen;[1] Amar Paul;[1] Bridger Gunter;[1] Matt Jennings;[1] John Dougherty;[1] Christina Small;[1] David Sant;[1] John Kriak;[1] Kyle Bills[1]

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Purpose

This research explores the intricate relationship between glucose regulation, neural activity, and motivation in key brain regions, including the hypothalamus, basal ganglia, ventral tegmental area (VTA), and nucleus accumbens (NA). We aim to unravel the potential relationship of these factors on dopamine (DA) release and the broader implications for mental health, glucose regulation, well-being, and overall health. Our innovative approach involves using a chair that causes heterodyned whole-body vibration designed to stimulate DA release from the VTA and NA, areas associated with motivation and rewards.

Methods

To investigate the physiological effects of this intervention, patients were equipped with continuous glucose monitors and subjected to a controlled diet for five days to establish a control. Followed by five days of sitting on the vibrating chair two times per day for 15 minutes at a time, while maintaining the same controlled diet. The study examines the correlation between glucose levels and neural responses, seeking to elucidate any links between glucose regulation in response to the vibrations and subsequent stimulation of the VTA.

Results

Preliminary data showed a slight decrease in blood glucose levels following vibration; this could potentially mean that vibratory stimulation of the VTA activates GLUT transporters.

Conclusions

Literature review and research data suggest a notable interplay between glucose homeostasis and neural activity in various brain regions due to glucose transporters contributing to our understanding of the intricate mechanisms underlying motivation, dopamine release, and anxiety modulation. However, there is little understanding and research of glucose, glucose transporters, and their connections to dopamine within the VTA and NA. The potential implications of these findings extend beyond the scope of the study, opening doors for further exploration in the realms of neurobiology, mental health interventions, addiction medicine, and glucose-mediated neural regulation.

#20: Lipid soluble thiamine derivatives prevent pancreatic adenocarcinoma

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Purpose

Pancreatic cancer is one of the most lethal types of cancer with limited therapeutic options. Pancreatic adenocarcinoma is the most common type of pancreatic cancer, as 9 out of 10 individuals have this form that can lead to metastatic Pancreatic Adenocarcinoma. This patient population is often diagnosed with unresectable diseases that have a median overall survival of between 8 to 11 months and up to 18 months, depending on the pathology of the disease. Both environmental and hereditary factors have been shown to contribute to the increased risk for pancreatic cancer. Early detection and screening via genetic testing are vital in monitoring and managing disease onset, treatment options, and better surgical outcomes. Current first-line chemotherapy treatment options are not curative but instead, manage the rate of disease progression. Benfotiamine and fursultamine are lipid-soluble derivatives of thiamine with better intestinal absorption and retention rates when compared to thiamine. However, the role of these compounds in preventing pancreatic cancer is unknown. We hypothesize that benfotiamine and fursultiamine could prevent pancreatic cancer growth with their potent anti-oxidative and anti-inflammatory actions.

Methods

Pancreatic adenocarcinoma (MIA PaCa-2) and metastatic pancreatic adenocarcinoma (BxPC-3) cell lines were incubated for 24 hours in complete media with varying concentrations (0-100 uM) of benfotiamine and fursultiamine. Cell viability was determined by MTT assay in a time – and dose-dependent manner. Further assays will be performed to determine the presence of apoptotic factors, inflammatory markers, cytokines, and transcription factors to examine the efficacy and mechanism of action of vitamin B1 derivatives. Next, we plan to conduct nude mice xenograft studies to explore in vivo chemopreventive actions of vitamin B1 derivatives.

Results

Our results indicate a concentration of 50uM of benfotiamine and 75uM of fursultiamine reduced pancreatic adenocarcinoma and metastatic pancreatic adenocarcinoma cell growth in culture. Additional experiments are being conducted, and results are pending.

Conclusions

Preliminary results indicate benfotiamine and fursultiamine as being effective treatments against pancreatic cancer cells in culture and suggest that administration of either benfotiamine or fursultiamine may be an effective chemopreventive treatment option for the pancreatic adenocarcinoma.

#21: Dietary and Nutritional Changes in Parkinson's Disease Patients with Anosmia: A Comprehensive Literature Review

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Purpose

Parkinson's disease (PD) is a neurodegenerative disorder characterized by motor symptoms such as tremors, stiffness, and slowness of movement. In addition to these motor symptoms, PD is also associated with a range of non-motor symptoms, including anosmia (loss of sense of smell). Anosmia can potentially alter a PD patient's nutritional status, eating habits, and make them prone to health problems due to an impaired ability to detect odors associated with spoiled or potentially harmful foods. The primary purpose of this literature review is to systematically examine and synthesize existing research on how dietary patterns, food selection, and nutrient intake changed with anosmia in PD patients. Furthermore, this review aims to explore how interventions can be introduced to increase nutritional diversity, and challenges that these interventions would face with different care providers of these patients.

Methods

This literature review will follow a systematic approach to identify and analyze relevant studies that have investigated the relationship between Parkinson's disease and anosmia, specifically focusing on the impact of anosmia on dietary patterns and nutrient intake in PD patients. Databases will be searched for peer-reviewed studies published between 2010 and 2024, using keywords related to Parkinson's disease, anosmia, dietary patterns, food selection, nutrient intake. Data extraction will involve gathering information on study design, participant characteristics, dietary and nutritional assessments, and key findings. A thematic synthesis approach will be used to analyze and summarize the data, identifying common themes and notable variations across the studies.

Results

The results of the literature review will provide an overview of the current understanding of the relationship between Parkinson's disease and anosmia, particularly in relation to dietary patterns and nutrient intake.

Conclusions

An understanding of the link between Parkinson's disease and olfactory dysfunction, and how it impacts dietary patterns and nutrition status can inform healthcare providers and caregivers in developing targeted interventions and support strategies for PD patients with anosmia. Moreover, it can shed light on the importance of early detection and management of anosmia in order to promote better nutritional outcomes and overall well-being for individuals with Parkinson.

#22: Understanding the Impact of Ichthyosis on Skin-Related Quality of Life

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Purpose

Ichthyosis, a group of genetic skin disorders characterized by dry, thickened, scaly skin. The word "ichthyosis" is derived from the Greek word "ichthys," meaning fish, which refers to the fish-scale-like appearance of the skin seen in many forms of this condition. Mild cases of ichthyosis appear with minor scales but severe cases can manifest with thick and hard scales that cover the entire body surface. The distinct appearance of ichthyosis can have a significant impact on the individuals who live with this condition, both physically and psychologically. The purpose of this study is to comprehensively assess the impact of ichthyosis on skin-related quality of life (QoL). The focus is on evaluating the extent of discomfort, the burden of social embarrassment, and the daily inconveniences that individuals with ichthyosis face due to their skin condition. By quantifying these aspects, the study seeks to provide a deeper understanding of the challenges posed by ichthyosis and to inform more targeted and effective management strategies.

Methods

The study will employ a cross-sectional design, recruiting participants with diagnosed cases of ichthyosis, with different degrees of severity. Participants will be assessed using a comprehensive questionnaire that evaluates various aspects of their daily life, including discomfort, social embarrassment, and daily inconveniences related to their condition. The questionnaire will be derived from validated instruments such as the Dermatology Life Quality Index (DLQI). The study will employ a cross-sectional design to analyze the data across different types of ichthyosis, varying severities, and demographic factors like age and gender. Statistical analysis will be conducted to identify any significant associations between the severity of ichthyosis and its impact on quality of life.

Results

The results of the study will provide valuable insights into the psychological impact of visible skin conditions, specifically ichthyosis.

Conclusions

The study will provide insight on the psychological impact of visible skin conditions, specifically ichthyosis, on the quality of life and psychological well-being of patients. The data can be used to improve patient care and support by developing targeted interventions to address the specific challenges faced by individuals with ichthyosis.

#23: Semaglutide prevents hyperglycemia-induced endothelial cell dysfunction

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Purpose

Endothelial cell dysfunction is a significant risk factor for cardiovascular complications. Hyperglycemia is well known to increase intracellular reactive oxygen species (ROS), subsequently inducing apoptotic cell death, inflammation, and injury in endothelial cells. Although several anti-diabetic drugs have been shown to prevent endothelial dysfunction, the role of glucagon-like peptide-1 analogue (GLP-1A), Semaglutide, on hyperglycemia-induced endothelial dysfunction is not known. We hypothesize that Semaglutide induces cytoprotective effects by preventing G-protein coupled receptor signaling pathways, thereby mitigating hyperglycemia-induced endothelial dysfunction.

Methods

Human umbilical vein endothelial cells (HUVECs) were treated with high glucose in the absence and presence of various concentrations of Semaglutide for 24 and 48 hours. Cell viability was determined by MTT assay. Expression of various anti- and pro-apoptotic factors was determined by the Proteome Profiler Array Human Apoptosis kit. Caspase-3 activity was measured by using a specific caspase-3 activity assay kit. The degree of monocyte adhesion to HUVECs treated with glucose in the presence and absence of Semaglutide will be determined via monocyte adhesion assay.

Results

Our results indicate that treatment of HUVECs with high glucose induces endothelial cell death, and Semaglutide prevents hyperglycemia-induced cell death in a time and dose-dependent manner. Further, Semaglutide regulated high glucose-induced expression of various pro-apoptotic and anti-apoptotic proteins. Further, Semaglutide prevents high glucose-induced caspase-3 activity in endothelial cells. Further experiments are being undertaken to examine the effect of Semaglutide on high glucose-induced monocyte adhesion, eNOS expression, and nitric oxide production.

Conclusions

Our studies demonstrate that Semaglutide ameliorates hyperglycemia-induced endothelial dysfunction and suggests its potential use in preventing cardiovascular complications.

#24: Deciphering Psilocybin: Cytotoxicity, Anti-inflammatory Effects, and Mechanistic Insights

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Purpose

A decade of clinical research indicates psilocybin's effectiveness in treating various neuropsychiatric disorders, such as depression and substance abuse. The correlation between increased pro-inflammatory cytokines and the severity of neuropsychiatric symptoms, along with the known anti-inflammatory potential of some psychedelics, suggests an immunomodulatory role for psilocybin. This study aims to understand psilocybin's mechanism of action by investigating the cytotoxic and immunomodulatory effects of psilocybin and psilocin on both resting and LPS-activated RAW 264.7 murine macrophages.

Methods

The study evaluated the cytotoxicity of psilocybin and psilocin using an LDH assay across various doses. It also assessed their impact on cytokine production in RAW 264.7 cells, measuring cytokine expression via ELISA. Different doses, including those above and below the LC50, were used in both pre-treatment and post-treatment approaches.

Results

The LDH assay revealed that psilocybin is almost twice as cytotoxic as psilocin, with an LC50 of 12 ng/ml and 28 ng/ml, respectively. In resting macrophages, both psilocybin and psilocin triggered significant release of TNF- α after 4 hours, with the lowest doses inducing higher levels of the cytokine than the highest doses. IL-10 expression in resting cells was triggered only by the highest dose of psilocin in the 4-hour incubation group. In LPS-stimulated cells, psilocin reduced TNF- α levels more than psilocybin in pre-treatment and post-treatment, with no significant effects on IL-10 in pre-treatment. Psilocin, but not psilocybin, induced a significant increase of IL-10 in post-treatment.

Conclusions

Our results suggest that psilocybin, particularly via psilocin, exhibits anti-inflammatory effects. In LPS-activated macrophages, a significant decrease in TNF-α and an increase in IL-10 were noted post-treatment with psilocybin and/or psilocin. This, coupled with lesser effects in pretreatment, suggests that post-activation processes are key to psilocin's anti-inflammatory action. We've identified two pathways necessitating macrophage pre-activation. The first hypothesized pathway involves psilocin's interaction with the 5HT7 receptor, while the second entails binding intracellular AhR receptors. Previous studies have noted psilocin’s affinity for the 5-HT7 receptor, but its interaction with the Aryl Hydrocarbon Receptor remains unexplored. Future experiments will test these hypotheses to determine if they individually or synergistically mediate psilocin’s anti-inflammatory action.

#25: **An edible Chinese mushroom product, Vialinin A, prevents colon cancer growth.**

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Purpose

Colorectal cancer (CRC) is the third leading cause of cancer deaths in the US. In addition to genetic predisposition, increased oxidative stress and inflammation could also contribute to the development of CRC. Although current treatment options such as chemotherapy, immunotherapies, bowel resection, or partial colectomy have shown decline in CRC related deaths some of these procedures have unwanted side effects. Some of the chemotherapy drugs such as anthracyclines do not work well in advanced cancers and have cardiotoxic effects. Therefore, better chemopreventive therapies are required to control and reoccurrence of CRC. Vialinin A is a compound isolated comes from the Chinese mushroom Thelephora vialis. Few studies indicate its potential antioxidative and anti-inflammatory properties; however, its anti-carcinogenic role is not well investigated. In this study we proposed that Vialinin-A could prevent CRC growth by inducing apoptotic cell death of colon cancer cells.

Methods

We will use two distinct colon cancer cell lines, SW480 and CaCO2, to investigate the potential inhibitory effects of Vialinin A. MTT assay will be used to measure the cell viability, Annexin-V staining will be used to measure apoptosis. Multiplex arrays will be used to identify specific oncogenic, inflammatory and apoptotic markers. Caspase-3 and reactive oxygen species will be measure using specific kits. Finally, we will use nude mice xenografts to examine the chemopreventive role of Vialinin A in vivo.

Results

So far, our preliminary data indicates that Vialinin A prevents CRC cells growth in a dose-dependent manner. Further experiments are in progress to understand the molecular mechanisms through which this compound prevents CRC growth.

Conclusions

Based on our current results, we expect that Vialinin A could prevent CRC growth and therefore could be developed as chemopreventive agent.

#26: Analyzing the Relationship Between Adolescent Malnutrition and Oral Health: A Systematic Review

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Purpose

Adolescents undergo significant physical development and nutritional needs, with malnutrition potentially leading to severe, long-lasting oral health issues. The aim of this review was to explore the relationship between malnutrition and oral health in adolescents. This research is crucial for early intervention, informing public health strategies, and fostering lifelong habits that support both comprehensive health and well-being.

Methods

A comprehensive electronic literature search following the PRISMA guidelines was performed in four databases: PubMed, Dentistry & Oral Sciences Source, Scopus, and Web of Science. Peer-reviewed articles written in English and published from 2013 containing information on the impact of adolescent malnutrition on oral health were eligible for review. Each retrieved article underwent an initial screening and a data extraction by four independent reviewers.

Results

From 594 articles sourced, 81 qualified for our review, comprising 61 Cross-Sectional, 6 Cohort, 6Longitudinal, 2 Case-Control Studies, 2 Case Reports, 2 Randomized Clinical Trials, and 2 RetrospectiveStudies. The majority highlighted a strong link between malnutrition and compromised oral health inadolescents. Underweight, overweight, or stunted children, or those with vitamin deficiencies, especially invitamin D (crucial for calcium absorption, tooth eruption, and enamel development), faced higher oral healthrisks. These adolescents often experienced ulcers, oral pain, diminished quality of life, delayed tooth eruption,periodontal diseases, and notably, early childhood caries (ECC), a frequent issue in malnourished youth.

Conclusions

This review highlights the strong link between adolescent malnutrition and oral health issues, especially ECC.Caries in primary teeth spread more quickly and perpetuate undernutrition, emphasizing the need for parental education and better access to nutritious foods.

#27: **In-Silico Testing of the Taste Type 2 Receptors Associated with Caffeine Bitterness.**

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Purpose

An examination of using computational protein binding to model the bitter taste receptors that are activated by caffeine. The model will also identify which of the bitter taste receptors most strongly interacts with caffeine.

Methods

A series of different computer software programs are used to create a model of the protein, convert the model into a useable format, and bind the computer model to a group of several potential ligands. The model will create a estimated binding affinity for each of the given ligands. Moving forward the ligands will be tested in vitro in order to verify the binding affinity that was shown by the computer model.

Results

It was found that the bitter taste receptor, TAS2R4 was the receptor based on the computer model that had the greatest interactions with caffeine. It was also found that many of the ligands that had been modeled had binding affinity as strong or stronger than caffeine. This would indicate that in the case of using a ligand that is not in itself bitter, it could potentially act in a way to alter the bitter profile of caffeine.

Conclusions

Using a computer model for protein binding, it was possible to examine the interactions of caffeine with the bitter taste receptors in the human mouth. It was also possible to review several different ligands to see if potential modulators of the caffeine taste profile could be identified. Future work will be done in order to verify the results of the computational method.

#28: **Xylazine's Cytotoxic Effects on Central and Peripheral Tissues—Deciphering a Biphasic Expression**

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Purpose

Xylazine, an α2-adrenoceptor agonist, is a compound conventionally used as an anesthetic in veterinary medicine. Sharp exacerbations of the U.S. opioid overdose crisis are linked to the polysubstance use of synthetic xylazine. Although xylazine is well-documented in veterinary medicine, the pharmacological features associated with substance abuse are less understood. The purpose of the current study was to 1) test the cytotoxic effects of xylazine in a dose-specific manner and 2) test the effects of xylazine in brain and peripheral tissues.

Methods

The primary readout was lactate dehydrogenase (LDH) in RAW264.7 macrophages and SIM-A9 microglial cells. Xylazine was serial diluted from 2 mg/mL to 1 pg in saline.

Results

Contrary to conventional linear dose-response relationships, our findings revealed that xylazine's cytotoxicity exhibited a biphasic pattern, with heightened toxicity observed at both the extremes of a U-shaped curve. The LC30 is greater in microglial cells compared to RAW264.7 macrophages, suggesting an increase in potency in the brain compared to the periphery. Xylazine presents in a biphasic, U dose-response curve in both tissue types. The shared biphasic response suggests a common underlying mechanism and signaling pathways in xylazine-induced cytotoxicity. These data provide a framework to better understand the cytotoxic effects of xylazine in two different tissue types.

Conclusions

Understanding the pharmacology of xylazine is crucial for refining dosage recommendations and enhancing the safety profile. To better understand xylazine’s signaling pathways, our future directions include 1) evaluating the cytokine inflammatory responses at cytotoxic and noncytotoxic doses, and 2) extending the study beyond xylazine to include a morphine base compound to test interaction in the context of infection and inflammation. Harm reduction-informed public health guidelines and programs are urgently needed to prevent and respond to xylazine-involved overdoses more effectively.

#29: Computational Approach of Antiviral Peptide Docking Against Herpes Simplex Virus Type 1 targeting ICP0 and ICP4 in Herpetic Gingivostomatitis

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Purpose

Herpetic gingivostomatitis, caused by the Herpes Simplex Virus type 1 (HSV-1), is a common oral infection. This research aims to explore the potential of antiviral peptides in inhibiting the key viral proteins that contribute to HSV-1 replication and development of the disease.

Methods

Utilizing an integrated approach, the viral target protein structure was retrieved from the Protein Data Bank (PDB). Next, the Viral host interaction protein network was constructed to analyze the interaction patterns between the viral protein and the host. Meanwhile, Pathway enrichment analyses have been performed. Simultaneously, antiviral peptides were collected from the databases and subjected to molecular docking and dynamics simulation was carried out for the target protein and antiviral peptide complex.

Results

In our study, ICP0 and ICP4 were identified as the target viral proteins of HSV1 through an extensive review of the literature. The existing literature reported the significant role of these target proteins in virus lifecycle particularly in the context of viral replication and the progression of herpetic gingivostomatitis. The viral proteins, ICP0 and ICP4, were found to be central players in these pathways, such as nucleotide metabolism, cell cycle regulation, and modulation of immune response signaling cascades. The ADME-screened antiviral peptides were subjected to docking, and the top compound with the best glide score was selected as a drug candidate that exhibits a good binding affinity. Subsequently, molecular dynamics simulations between target protein-peptide complexes of about 100ns showed favorable conformational stability.

Conclusions

In conclusion, This present study suggests that these identified antiviral peptide molecules might inhibit the target protein of HSV1. With the increasing resistance to existing antiviral drugs, it is crucial to find new and effective antiviral treatments. Antiviral peptides (AVPs) show promise as therapeutic agents because of their potential pharmacokinetic properties for the development of herpetic gingivostomatitis.

#30: **A Computational Framework for Identifying Salivary Exosomal MicroRNAs as Potential Predictors of Malignancy in Oral Lichen Planus**

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Purpose

Oral lichen planus (OLP) is a chronic inflammatory condition affecting the oral mucosa, known for its potential to progress into malignancy. Factors such as ulceration, tongue location, and being female heighten the risk of malignant transformation. Despite its benign nature, OLP can progress into oral squamous cell carcinoma (OSCC). MicroRNAs have emerged as key players in the immunopathogenesis of OLP, holding promise for predicting its malignant transformation. This study aims to uncover potential salivary exosomal microRNA biomarkers in OLP patients, providing insights into its progression and prognosis.

Methods

We screened the Gene Expression Omnibus (GEO) dataset to identify the differentially expressed microRNAs (DEMs) between OLP patients and healthy individuals. Subsequently, we utilized GSE68408 and GSE2130 to conduct differential gene expression (DGE) analysis. Following this, we identified and validated the targeted genes influenced by these DEMs. Additionally, we performed protein network analysis, gene ontology (GO), and pathway enrichment analyses for these target genes.

Results

Our expression analysis resulted in significant upregulation of miR-4728, miR-4484, miR-5196, and miR-4738 in OLP patients compared to controls. The DEM-targeted genes overlapping from three databases (miRDB, miRTarBase and Targetscan) were then retrieved. The identified target genes were validated with down regulated genes obtained from GSE2130. The protein-protein interaction network of these DEM-targeted genes discovered crucial interactions, with TP53 showing a notably high node degree in the network according to CytoHubba analysis. Subsequent GO and Pathway analyses unveiled significant and essential pathways influenced by these DEM-targeted genes, shedding light on their potential protective roles.

Conclusions

Considering the increased expression levels of miR-4728, miR-4484, miR-5196, and miR-4738 within OLP suggest their potential as biomarkers. Yet, additional investigations are necessary to validate their reliability.

#31: Rapid Detection of IgE-Specific Food Allergy Using Click Chemistry

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Purpose

Allergic diseases due to food and environmental allergen exposure are on the rise world-wide. Traditional diagnosis of allergy via in vivo skin test or in vitro IgE detection is expensive and not readily available at home. The objective of this research is to develop an accurate, cost-effective, and easy-to-use rapid detection kit for allergy diagnosis.

Methods

We would utilize cutting-edge azide click chemistry to detect allergen-specific IgE antibody complexed with the allergen utilizing hydrophilic polymer-coated microfluidic channel. A drop of blood sample guided through microchannel will be subjected to membrane separation of IgE-anti-IgE complex. The separated complex then flows into the allergen chamber where allergen IgE would bind to the allergen. Afterward, the complex enters a supramolecule chamber where calixarenes form a carcerand that undergoes self-functionalization of azide group via click reaction with a distinctive color formation in the dye chamber. In samples from non-allergic individuals calixeranes do not form carcerands, ensuring accurate discrimination between allergic and non-allergic samples.

Results

Research in progress. Initial phase of this research is being conducted in silico to test the capture of allergen-specific IgE by anti-IgE antibody, membrane separation, and development of microfluidic channel to move the separated macromolecules to the chemistry chamber for the formation of azide group via click chemistry.

Conclusions

Our proposed research will advance knowledge in the development of affordable and rapid point-of-care allergy diagnosis kit.

#32: **The Effectiveness of Artificial Intelligence (AI) in the Early Detection of Oral Cancer**

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Purpose

This literature review aims to explore the possibility of using Artificial Intelligence (AI) as a non-invasive and accurate screening method for the early detection of oral cancer.

Methods

A literature search was conducted on three databases: PubMed, Scopus and ScienceDirect using the search words “Oral Cancer”, “Artificial Intelligence”, “Early Diagnosis” and “Machine learning”. Studies were reviewed and analyzed for their relevance to the topic, methodologies, and findings, based on a well-defined inclusion/exclusion criterion. Only English-language articles were considered published between 2013 and 2023.

Results

Although AI have shown significant advancements in diagnostic accuracy in medicine, only limited studies have been used in oral cancer. The results demonstrate that AI approaches can improve oral cancer outcomes through accurate detection and early diagnosis. Based on the findings, deep convolution neural network has been more effective in accurately detecting Oral Cancer as compared to other Machine Learning models.

Conclusions

Further research is needed on the application and effectiveness of AI on the early detection of Oral Cancer. AI has to the potential to improve the precision and timeliness of oral cancer diagnoses, thereby positively impacting both clinical practice and patient well-being.

#33: In silico identification of small molecule agonist binding sites on KCC2

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Purpose

Potassium-Chloride Cotransporter 2 (KCC2) is a neuronal membrane protein specific to the central nervous system. It is responsible for removing Cl- ions from the intracellular space, maintaining a normal Cl- gradient essential for proper function at inhibitory synapses. Dysregulation causes an upward shift in the Cl- reversal potential resulting in a hyperexcitable state of the postsynaptic neuron. Existing literature indicates that KCC2 may be involved in the addiction pathway of a variety of drugs of abuse, including opioids and alcohol. This makes KCC2 an attractive potential drug target when treating substance use disorders. A novel direct KCC2 agonist, VU0500469, was recently identified experimentally; however, no binding sites were identified or characterized. The goal of this project is to identify likely binding sites of this protein-ligand pair via computer simulation.

Methods

A 3D model of human KCC2 was obtained from RCSB Protein Databank. VU0500469 was reconstructed manually. Using the PrankWeb interface, a structural binding pocket identification was performed with P2Rank. Blind, semi-flexible docking of the ligand, VU0500469, and KCC2 was performed using QVina-W and GNINA. Results from P2Rank, GNINA, and QVINA-W were manually overlayed using PyMol to visualize overlapping conformations and/or pockets. Sites with at least two overlapping results were selected as probable binding sites for further investigation. Inputs for the molecular dynamics simulation were generated using CHARMM-GUI and passed to CHARMM.

Results

Results between simulations were then compared, and several possible VU0500469 binding pocket sites were successfully identified. Geometric, template-free binding site prediction with P2Rank revealed 27 potential binding sites. GNINA was set to produce nine outputs, resulting in 18 total conformations. QVINA-W was set to produce 20 outputs. To aggregate these simulation results and determine likely binding sites, outputs from all three simulations were overlayed in PyMol. Only one site was identified by all three simulations. This was identified as the most promising binding site.

Conclusions

The binding sites identified may represent targets for the development of additional KCC2 agonists. Future plans are focused on drug discovery, screening, and potential therapeutic applications.

#34: Amelioration of anxiety with heterodyned whole body vibration in persons with opioid use disorder

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Purpose

Opioid use disorder (OUD)-associated overdose deaths have reached epidemic proportions worldwide over the past two decades. An important driving force for relapse is anxiety associated with opioid withdrawal. We present results from an NIH-sponsored Phase I clinical trial. We hypothesized that our new technology, termed heterodyned whole-body vibration (HWBV) would ameliorate anxiety associated with opioid use disorder.

Methods

Using a randomized, placebo (sham)-controlled, double-blind study design, we evaluated male and female participants diagnosed with OUD that were undergoing treatment at pain and rehabilitation clinics. We utilized the Clinical Opiate Withdrawal Scale (COWS), daily anxiety ratings with a simple Likert Scale, and weekly anxiety ratings with the Hamilton Anxiety Scale (HAM-A). Subjects were treated for 10 min 4 times/wk for 4 weeks with either sham vibration (no interferential beat or harmonics) or HWBV from actuators mounted orthogonally beneath a split-seat, saddle chair. The participants also participated in a neuropsychological test battery at intake and extake. 52 participants were assigned the HWBV treatment group and 34 in the sham vibration group. Overall, 26 female and 60 male participants started the study.

Results

There was significant improvement in COWS scores in the HWBV group compared to the sham treatment group ($p<0.01$). There was a significant improvement in daily anxiety scores in the HWBV group compared to the sham treatment group ($p<0.001$). HAM-A scores in OUD participants at intake showed moderate levels of anxiety in OUD participants (HWBV group: 15.9 ± 17.8; Sham group: 17.8 ± 1.7) and significantly improved in HWBV subjects at wk 1 ($p<0.01$), and progressively improved over the 4 weeks of HWBV treatment. Furthermore, three indices of neuropsychological testing (mental rotations, spatial planning, and response inhibition) were significantly improved by HWBV vs sham treatment at extake compared to intake.

Conclusions

Taken together, these findings support HWBV as a novel, non-invasive, non-pharmacological treatment for anxiety associated with OUD. Work is ongoing at Noorda College of Osteopathic Medicine to incorporate monitoring of physiological variables associated with generalized anxiety and biomarkers of brain dopamine in anticipation of a Phase II trial in subjects with OUD.

#35: **The effect of minocycline administration on ethanol and nicotine-induced microglial BDNF secretion and subsequent cellular responses**

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Purpose

Microglia are activated by drugs of abuse leading to increased brain derived neurotrophic factor (BDNF) secretion in central nervous system (CNS) reward pathways. Classical activation of microglia results in the production of proinflammatory chemokines, cytokines, and reactive oxygen species that mediate neuroinflammation. These proinflammatory factors include BDNF, IL-1β, IL-6, and Nitric Oxide. This mechanism has been implicated in contributing to development and maintenance of addiction to drugs of abuse. The ability to regulate the production of microglial-derived BDNF has potential use in the treatment of addiction to drugs of abuse such as alcohol, nicotine, and various stimulants. Minocycline, a tetracycline antibiotic, is known to inhibit microglial activation and thus attenuate the release of proinflammatory cytokines associated with microglial proliferation. Consequently, we hypothesize that minocycline can be used to reduce drug-induced BDNF secretion and the subsequent neuroinflammation, as well as improve cellular dependence phenotypes.

Methods

Cultured microglia cells will be divided into three experimental groups. A first group will be exposed to multiple doses of minocycline, a second will be exposed to several doses of ethanol (EtOH) ranging from 0 mM to 100 mM, nicotine, or EtOH and nicotine, and a third group will be exposed to minocycline in addition to the same doses of EtOH and nicotine. ELISA will be used to measure mature BDNF expression. Western blot and qRTPCR will be used to measure a microglia activation marker such as Iba1. Patch clamp electrophysiology will be utilized to measure changes in electrical activity. Microglia will also be co-cultured with cell lines that can be differentiated into a neuron-like cell such as Neuro 2a, PC12, or SH-SY5Y in order to measure paracrine impacts of BDNF secretion on cells with a neuronal phenotype. The time course of BDNF secretion is also of interest to determine the duration of any drug-induced modifications in microglia activity, so measurements will be taken at various time points following EtOH and/or nicotine incubation. An ELISA will be used to measure BDNF and microglial activation markers like Iba1, CD68, CD206, and CD45. Patch clamp electrophysiology will also be performed to monitor microglial cell activity. Through this methodology, we aim to better understand if the administration of minocycline allows for reductions in the addiction response to EtOH and nicotine on a cellular level.

Results

NA

Conclusions

NA

#36: **Breast cancer prevention by vitamin B1 derivatives, benfotiamine and fursultiamine.**

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Purpose

Breast cancer is the most diagnosed cancer after skin cancer worldwide and is the leading cause of cancer mortality in women in the US. Although genetic mutations are the most common cause of breast cancers, increased oxidative stress and inflammation could also be major contributing factors for the cancer progression. Several vitamins have been shown to be potent anti-inflammatory, anti-oxidative, and anti-carcinogenic. However, the role of specific lipid-soluble vitamin B1 derivatives in preventing breast cancer is not well known. Therefore, we hypothesize that with their potent anti-oxidative and anti-inflammatory properties, lipid-soluble benfotiamine and fursultiamine could prevent breast cancer growth.

Methods

Human breast cancer cells such as MCF-7 and T-4D1 obtained from ATCC were treated with vitamin B1 derivatives and examined for cancer cell growth in culture. Apoptosis will be determined by specific assay kits. Regulation of various apoptotic, survival, and inflammatory markers will be determined by specific antibody arrays. The generation of reactive oxygen species, activation of caspase 3, and cleavage of PARP will be determined. Nude mice xenografts will be performed to understand the chemopreventive role of these compounds in vivo.

Results

Our results indicate that treatment of various breast cancer cells with benfotiamine and fursultiamine prevents the proliferation of cancer cells in a dose-dependent manner. Further experiments are in progress to understand the mechanism of action of these agents.

Conclusions

Our in vitro results suggest that vitamin B1 derivatives, benfotiamine and fursultiamine, could promote apoptotic pathways and prevent breast cancer cell growth in the culture.

#37: **Prevention of colorectal cancer by lipophilic vitamin B1 derivative.**

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Purpose

Colorectal cancer (CRC) is the third leading cause of cancer deaths in the US. In addition to genetic alterations, increased oxidative stress and inflammatory response could also contribute to the development of CRC. Although several chemotherapy drugs have been developed to treat CRC, drugs such as anthracyclines have some significant side effects, and they are effective in treating advanced cancers. Therefore, potential adjuvant therapies are required to control and prevent CRC. High doses of thiamine, a water-soluble vitamin B1, have been shown to prevent cancer growth. However, the role of lipid-soluble derivatives of thiamine, such as fursultiamine, in the prevention of cancer is not known. Therefore, we hypothesize that with its better absorption and retention rate, fursultiamine could prevent CRC growth.

Methods

Human colorectal adenocarcinoma (SW480) cell lines obtained from ATCC were treated with fursultiamine. The cell viability was examined by MTT assay. Apoptosis was examined by Annexin- V staining and live and death cell assay. The production of reactive oxygen species and caspase-3 activation was examined by specific assay kits. The expression of anti-apoptotic, pro-apoptotic, and pro-inflammatory factors was analyzed using antibody arrays.

Results

Fursultiamine prevents the SW480 cells growth in a concentration- and time-dependent manner. Our results also demonstrate that fursultiamine prevents CRC cell growth by inducing apoptosis. Further, fursultiamine increased the expression of pro-apoptotic factors and tumor suppressor genes.

Conclusions

Our studies indicate that fursultiamine prevents CRC cell growth in culture and suggest it could be further developed as a chemopreventive agent.

#38: DNA Extraction Method Development from Solid Tissues

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Purpose

Although germline variation testing is traditionally performed using DNA obtained from blood or other liquid samples, determining somatic variation in cancer samples requires DNA extraction directly from tissues. Additionally, epigenetic markers, such as 5-methylcytosine (5mC) and 5-hydroxymethylcytosine (5hmC) are tissue-specific and change in selected disease states. However, several substances present in tissues are known to inhibit downstream reactions, including polymerase chain reaction PCR). For this project, we are assessing the quantity and quality of DNA obtained from extractions of various vital organs using 30 different commercially available DNA extraction kits to determine optimal kits for each tissue.

Methods

Samples from several vital organs have been collected and homogenized using a hand-held homogenizer. Samples were aliquoted into tubes at the maximum recommended sample size for each DNA extraction kit. Extractions were performed using the following kits: DNEasy Blood and Tissue Kit (Qiagen), GeneJET Genomic DNA Purification Kit (ThermoFisher Scientific). Quantity has been tested using a Qubit Fluorometer (Thermo Fisher Scientific) and average molecular weight has been checked by agarose gel electrophoresis. Several more kits are currently being tested. Extracted DNA will be tested for inhibitors using quantitative polymerase chain reaction (qPCR).

Results

Extractions have been performed for several tissues across a few kits. Using fresh tissue rather than frozen tissue greatly improved both yield and average molecular weight of DNA extracted. Although all kits yielded high molecular weight DNA (>20,000 bp) from fresh tissue, the Monarch HMW kit yielded DNA with significantly higher molecular weights. On average, the DNA yields per milligram of tissue were highest using the DNEasy Blood and Tissue Kit and the genomicPrep Mini Spin Kit. The GeneJET Genomic DNA Purification Kit was predicted to have minimal yields, but actual yields were greater than 75% that of competing kits, and the average molecular weight appears to be higher by agarose gel electrophoresis.

Conclusions

Only a few extraction kits have been tested to date, but all gave high yields and high molecular weight DNA. The results of this study will allow us to identify the most suitable kits for DNA extraction from various tissues.

#39: **In Silico Identification of Multi-Target Phytochemicals from Traditional Medicinal Plants for Periodontitis: A Molecular Docking Study**

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Purpose

Periodontitis is a chronic inflammatory disease of the periodontal tissues, causing periodontal attachment loss and destruction of the alveolar bone, which leads to mobility and the loss of teeth. Several pathogens were reported to be the causes of periodontitis. Most of these pathogens produce a variety of virulence factors that facilitate the colonization, invasion, and destruction of the periodontal tissues. This study aimed to screen the potential phytochemicals of traditionally used plants for the treatment of dental infections against the most frequently reported protein targets of periodontitis.

Methods

Through literature mining, the most frequently reported protein targets for periodontitis were selected, and their three-dimensional structures were retrieved from the protein structure database. Meanwhile, the phytochemicals of traditional medicinal plants such as Syzygium aromaticum (Clove), Allium sativum (Garlic), Curcuma longa (Turmeric), Azadirachta indica (Neem), Thymus vulgaris (Thyme), and Mentha piperita (Mint) were collected from the literature, and their chemical structure was obtained from the structure repositories. The structures of protein targets and phytochemicals were optimized and virtual-screened through the docking tool. Based on the binding energy, the top three phytochemicals inhibiting all the targets were selected and subjected to molecular dynamics simulation to confirm their binding stability.

Results

Extensive literature mining suggests hemophore-like protein (HmuY) from Porphyromonas gingivalis, InterpainA (INPA) proteinase from Prevotella intermedia, and FadA from Fusobacterium nucleatum are potential drug targets for the treatment of periodontitis. Simultaneously, a total of 323 reported phytochemicals were collected from six traditional plants. Through molecular docking, 2-furancarboxamide, camphor, and 4-ethylbenzamide exhibited the lowest binding energies towards most of the HMUY, INPA, and FADA targets, respectively. Additionally, the molecular dynamic simulation suggests all three compounds showed stable confirmation concerning their targets.

Conclusions

With these computational screening, the identified compounds may effectively inhibit the drug targets and thereby diminish the incidence and benefit of periodontitis.

#40: Prevention of lung cancer growth by an edible mushroom-derived p-terphenyl antioxidant, Vialinin-A

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Purpose

Lung cancer is the leading cause of cancer death in the United States; its death toll exceeds that of colon-, breast-, and prostate- cancer combined. Approximately 238,340 people received a diagnosis of lung cancer in 2023, and the numbers are anticipated to increase in 2024. A history of smoking, both firsthand and secondhand, as well as the use of other combustible tobacco products and hereditary risk factors, have been strongly associated with lung cancer. Environmental exposures to radon, asbestos, arsenic, air pollution, and other occupational exposures exacerbate the likelihood of developing the disease. Currently, surgery, radiotherapy, chemotherapy, and immunotherapy constitute the primary treatment modalities. However, there is a need for additional treatments to improve outcomes in lung cancer prognosis. Vialinin-A, a ubiquitin-specific peptidase inhibitor derived from Chinese edible mushrooms T. terrestris and T. vialis, is understood to play an antioxidant and anti-inflammatory role. Although, its anti-carcinogenic effect is not known. Therefore, we hypothesize that Vialinin-A, with its potent anti-oxidative and anti-inflammatory effects, could prevent lung cancer growth.

Methods

We will use human non-small cell lung cancer cell lines (A549) to investigate the potential chemopreventive role of Vialinin-A on lung cancer. The cells will be incubated in F12 media in the presence and absence of varying concentrations of Vialinin-A. MTT assay will be conducted to evaluate cell viability and Annexin-V staining will be used to assess apoptotic cells. Cell death will be observed using a live and death assay. The presence of pro- and anti-inflammatory proteins and apoptotic proteins will be determined via antibody arrays. Additionally, the presence of transcription factors and reactive oxygen species (ROS) will also be determined to better understand the mechanism of Vialinin-A. Nude mice xenograft models will be used to explore how Vialinin-A prevents lung cancer growth in vivo.

Results

Preliminary MTT cell viability data indicate that Vialinin-A may prevent lung cancer growth in a dose- and time-dependent manner. Additional studies are undergoing to examine the mechanism through which Vialinin-A prevents lung cancer growth.

Conclusions

So far, our results suggest that Vialinin-A could prevent lung cancer cells growth in culture and further work is in progress.

#41: **In-vitro Evaluation of Curcumin Permeability in an Oil-based formulation**

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Purpose

Turmeric has been used for centuries to treat various inflammatory conditions and other diseases. The biological effects of turmeric is attributed to its curcumin content.(1) It has been observed in controlled human studies that curcumin has poor absorption after oral administration.(2) To more closely mimic the historically prepared form of turmeric, a novel oil-based formulation was designed. The purpose of this study was to compare the in-vitro intestinal permeability of the oil-based formulation to the unmodified curcumin extract powder. To model the curcumin absorption across a cell membrane in-vivo, the Caco-2 intestinal cell line was selected.

Methods

The curcumin extract powder was micronized and suspended in sunflower oil. Caco-2 cells were cultured according to best practices(3). The cultured cells were seeded on the membrane inserts of two 12-well Corning transwell plates. One plate for the curcumin extract study and the other plate for the curcumin softgel study. These plates were incubated for 21 days. Two curcumin solutions were made: one containing the extract, and the other containing the oil-based formulation. A 1% DMSO, 50 umol curcumin solution was created using each curcumin formulation. The 1% DMSO solution was applied to the monolayers. At the end of each hour, for three hours, a sample was taken from the basolateral chamber of the transwells. These samples were analyzed to obtain the concentration of curcumin that had passed through the Caco-2 monolayer. The resulting concentrations were used in conjunction with the formula for apparent permeability, Papp=dQ/dt x 1/(A x C_0), to find that rate at which the curcumin diffused in cm/s.

Results

The permeability values of the unmodified curcumin extract and the oil-based curcumin formulation were found. The permeability of the curcumin extract at 1 hour was 3.2 x10-7 cm/s and the permeability of the soft gel solution at 1 hour was 2.02 x10-7 cm/s.

Conclusions

It was seen that the Caco-2 monolayer model was suitable for studying the in-vivo permeability of intestinally absorbed curcumin. It was observed that the oil-based curcumin formulation did not result in better permeability than the unmodified curcumin extract powder.

#42: Assessing the Prevalence of Computer Vision Syndrome at an Osteopathic Medical School with an Electronic Content Delivery Model

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Purpose

To determine the overall prevalence of computer vision syndrome (CVS) among students, faculty, and staff while promoting awareness. CVS is caused by extended screen exposure that can lead to eye discomfort and vision changes which can affect quality of life and educational performance. Our institution is a new Osteopathic medical school that aims to create an innovative approach to medical education delivery via employment of modern technology that is already prevalent. Implementation of pre-recorded lecture materials in the curriculum requires 4-6 additional electronic screen exposure hours. Members of our institution are potentially at increased risk for CVS stemming from the curriculum delivery style and the accelerated use of technology.

Methods

In this study, we disseminated an anonymous online survey, comprised of 21 questions related to eye conditions, use of digital devices, symptoms of computer vision syndrome, an open-end comment section, and a demographics section. Information on CVS symptoms and prevention was provided for participants to download. Faculty, staff, and students were invited to participate. P-values were calculated using a chi-squared test. Presence of CVS was defined at 6 or more symptoms related to CVS and symptoms

Results

114 responses were received: 23 faculty (20%), 30 staff (26%), and 61 students (54%) from Classes of 2025 (N=31; 51%), 2026 (N=23; 38%), and 2026 (N=7; 11%) 56% of respondents were female and 44% were male. 99% (N=113) of our respondents reported using the device to study or work for greater than 1 month. From those respondents who reported 6 or more symptoms, there was no significant difference between gender (Male (63%), Female (37%; p-value = 0.2364), age (20-29 (67%), 30-39 (48%), 40-49 (67%), 50-59 (86%), >60 (57%); p-value = 0.7508) or role (Student (51%), Faculty (16%), Staff (32%); p-value = 0.4288).

Conclusions

This study highlights the prevalence of CVS at our institution, which may help identify individuals at high risk of CVS. This can lead to increased awareness and resources that can help reduce the negative effects of CVS. A larger participant pool may be necessary to confidently make associations and more accurately identify factors that can be used to predict CVS risk.

#43: Molecular Docking Studies on Novel Acetylcholine Release Inhibitory Peptides from Bovine Milk for Sialorrhea Therapy

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Purpose

Parkinson's disease (PD), a prevalent neurodegenerative condition associated with ageing, primarily affects motor functions. Alongside familiar motor symptoms like tremors, rigidity, bradykinesia, and postural instability, a spectrum of autonomic manifestations such as sialorrhea, known as excessive salivation or drooling, is found in approximately 50–70% of PD cases. Botulinum toxin A or botox (BTX-A) is commonly employed neurotoxin to alleviate the symptoms via inhibiting SNAP-25 (Synaptosomal-Associated Protein, 25kDa) which regulates acetylcholine release into the neuromuscular junction. Despite its widespread application, the use of BTX-A remains controversial. Recently, there has been growing attention towards milk-derived peptides, driven by their enhanced stability, bioactivity, and potential therapeutic applications in various disorders. Hence, the present study aimed to identify the neurotransmitter release inhibitory peptides derived from bovine milk for mitigating sialorrhea condition.

Methods

We employed a systematic computational workflow to explore the inhibitory potential of peptides derived from bovine milk. Our investigation encompassed toxicity prediction, allergenicity analysis, assessment of blood-brain barrier and cell penetration, hemolytic activity and protein-peptide docking studies.

Results

A total of 8,559 bovine milk-derived peptides were initially sourced from the PeptideAtlas database. Following this, 8,499 peptides were identified as non-toxic through ToxinPred, and subsequently, screened for allergenicity using the AllerCatPro 2.0 server, resulting in 7,749 peptides confirmed as non-allergenic. BBPpredict tool highlighted 911 peptides capable of penetrating the blood-brain barrier. Furthermore, through the C2Pred web server, 175 peptides exhibited potent cell-penetrating capabilities. Among these, 20 peptides, identified by the HAPPENN tool, demonstrated non-hemolytic activity. The selected peptides underwent analysis using the ProtParam tool for their physicochemical properties, and their binding affinities were determined through the HPEPDOCK 2.0 server, employing 100 conformations for each peptide during molecular docking analyses. Notably, the CVILPEIQKPER peptide exhibited significant binding affinity (-173.48 kcal/mol) against SNAP-25.

Conclusions

Overall our study recommends bovine milk derived peptides as effective inhibitors of acetylcholine release for treating sialorrhea in PD individuals. Further in vitro and in vivo testing is needed to confirm the efficacy of these peptides.

#44: Investigating the Genetics of Chronic Intractable Migraine with Reactive Hypoglycemia

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Purpose

Migraines affect roughly 1-in-6 males and 1-in-5 females in the United States. Of these, approximately 5-30% experience intractable migraines, or migraines resistant to abortive treatments. Despite this large population, relatively little is known about intractable migraines compared to other types of migraines. Our recent work indicates that reactive hypoglycemia is common among these individuals. Additionally, empirical evidence suggests that individuals in families with chronic intractable migraines are more likely to have the same condition than people of the general population, suggesting a possible genetic link between both migraines and metabolic abnormalities. Previous Genome Wide Association Studies (GWAS) have found several genetic markers for migraines, but the studies have not differentiated groups by important factors including severity and frequency of migraines or treatment response. Furthermore, GWA studies investigate only common variation. Despite these limitations, a variant in the LEPR gene (rs751167), the leptin receptor gene was found to be significantly associated with migraines. Variants in the LEPR gene are associated with weight gain and metabolic syndrome, indicating a link between metabolism and migraines. In the present study, we aim to broaden the scope, investigating chronic intractable migraine with reactive hypoglycemia specifically, and using all variant types including small insertions/deletions, rare variants, and copy number variants. To investigate heritability, we will take pedigrees of individuals that fit this phenotype.

Methods

Pedigrees are being taken from individuals with chronic intractable migraine and reactive hypoglycemia who are being treated at the Migraine and Neurological Rehab Center. Whole genome sequencing will be used to detect all variant classes.

Results

Four individuals presenting with intractable migraines at least 20 days per month have given pedigrees. Of the four individuals, three have at least one first-degree relative with migraines of similar severity.

Conclusions

No sequencing has yet been performed, but the prevalence of chronic intractable migraines appears to be significantly higher in families of migraineurs than among the general population. Metabolic symptoms are suggested to be common among family members, but further testing is required to confirm this finding. Additionally, emotional abnormalities including anxiety, depression, bipolar disorder, and obsessive-compulsive disorder appear to be in high frequencies in these families.

#45: **Investigating the phytochemicals in Sargassum (Brown algae) against the therapeutic targets of Oral Squamous Cell Carcinoma Metastasized from Breast: An Approach Utilizing Network Pharmacology**

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Purpose

Oral metastases are relatively rare. In women, the most common oral metastases originate from breast cancer, the most diagnosed malignancy, and the second leading cause of death. Sargassum is a genus of brown algae which exhibits its natural therapeutic potential with anticancer properties. This study aimed to identify a therapeutic target for OSCC metastasized from breast cancer through network pharmacology and to evaluate potent phytochemicals against the identified target.

Methods

DEGs associated with OSCC and breast cancer were obtained from the Gene Expression Omnibus. The upregulated DEGs were then intersected to identify common targets between OSCC and BC. Simultaneously, compounds from Sargassum were collected from the CMNPD database, and their targets were predicted using the databases. Subsequently, networks illustrating compound–target and target–disease interactions, as well as protein-protein interactions (PPI) among targets, were constructed. MCODE analysis, gene ontology (GO), and Kyoto Encyclopedia of Genes and Genomes (KEGG) pathway enrichment were carried out. Further screening of phytochemicals from Sargassum sp of brown algae involved ADME, molecular docking, molecular dynamics (MD) simulation, MM-GBSA, and quantum mechanics against the identified targets.

Results

A total of 5172 significant common upregulated DEGs were identified from datasets related to OSCC and breast cancer in geo databases. These findings suggest promising core targets identified through a protein-protein interaction network. Enrichment analysis of GO and KEGG pathways revealed potential involvement in inflammation, MyD88-independent, death receptor signaling, PIP3 activating, AKT signaling, and MAPK1/MAPK3 signaling pathways. Molecular docking and dynamics simulations further indicated strong binding affinity between active compounds and these potential core targets.

Conclusions

In the field of medicine, it's crucial to find effective cancer treatments. This study focused on identifying natural phytochemicals in Sargassum (brown algae) for potential use against OSCC metastasized from breast cancer. The preference for these natural compounds over synthetic drugs is emphasized. Further research on animal models may validate these findings, offering a promising approach for addressing OSCC metastasized breast cancer in translational medicine.

#46: **Gas Station Heroin: Tianeptine's Cytotoxic Effects on Central and Peripheral Tissues in vitro**

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Purpose

Tianeptine is a tricyclic antidepressant, mainly acting on mu-opioid receptors, approved for the treatment of major depressive disorders in many countries, not including the United States. Also known as 'gas station heroin', tianeptine has the potential for abuse in both inpatient and illicit settings due to its euphoric effects and rapid tolerance. Currently, tianeptine's immunomodulatory effects are relatively under-researched. The purpose of the current study was to 1) test the cytotoxic effects of tianeptine in a dose-specific manner and 2) test the effects of tianeptine in brain and peripheral tissues.

Methods

The primary readout was lactate dehydrogenase (LDH) in RAW264.7 macrophages and SIM-A9 microglial cells. Tianeptine was administered in media supplemented with doses titering (10 mcg/ml -0.01953 mcg/ml) and then incubated for 2 hours. Cytotoxicity of tianeptine was then determined based on levels of Formazan in solution.

Results

Unlike conventional linear dose-response relationships, our findings revealed that tianeptine's cytotoxicity exhibited a biphasic pattern, with heightened toxicity observed on the left arm of a U-shaped curve. The findings indicate a U-shaped dose-dependent increase in cytotoxicity for both peripheral and brain-derived macrophages. At doses greater than 0.3125 mcg/ml, the cytotoxic effect is approximately 3-fold greater in RAW264.7 macrophages compared to microglial cells. At doses greater than 0.3125 mcg/ml, cytotoxicity decreases for both cells; the lowest cytotoxicity was observed in microglial cells.

Conclusions

Understanding the pharmacology of tianeptine is crucial for combating the opioid epidemic and enhancing its safety profile. Misuse of tianeptine can lead to euphoric, opioid-like highs with the potential for chronic users to develop dependence and tolerance. Overdose and use in suicide attempts have also been documented. To better understand tianeptine's signaling pathways, future directions include 1) evaluating the cytokine inflammatory responses at cytotoxic and noncytotoxic doses, and 2) testing the effects of poly-use that include tianeptine and other opioid agonists.

#47: Role of Amyloid Precursor Protein (APP695) and its Swedish Mutant in Inducing Inflammasome-Mediated Inflammatory Response in the Brain.

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Purpose

Alzheimer's disease (AD) is a progressive neurodegenerative condition that has become an increasing burden to the healthcare industry among the aging population. In the United States, an estimated 6.7 million Americans over the age of 65 are living with AD with advanced age being the greatest risk factor for developing the disease. The pathology is associated with the accumulation of extracellular amyloid-beta (Aβ) plaques and intracellular Tau tangles in the brain which is exacerbated by neuroinflammation. We hypothesize that the NLRP3 inflammasome pathway induced by excessive Aβ-production plays a significant role in the development of AD pathology, especially Swedish mutant APP695 isoform. The inflammasome is a multiprotein complex that promotes activation of caspase-1 and secretion of interleukin 1β (IL-1β) and IL-18, which leads to neuronal apoptosis and in turn neurocognitive impairments.

Methods

To prove our hypothesis, SH-SY5Y neuroblastoma cells, APP695 isoform overexpressing SH-SY5Y cells (SHAPP695), and SH-SY5Y cells overexpressing Swedish Mutant of APP695 isoform (SHAPP695SW) were co-cultured with primary microglial cells. The Swedish mutation of amyloid precursor protein (APP695SW) is known to increase aberrant cleavage of amyloid precursor protein which can cause elevated levels of Aβ and Tau tangles. The cells and supernatants were collected and analyzed for the expression of APP, Caspase-1, mature IL-1β, and IL-18 proteins by western blot assay and ELISA.

Results

This project is ongoing, and results are pending.

Conclusions

This project is ongoing, and results are pending.

#48: **Real-time and microbiological stability of extemporaneously compounded amiloride nasal spray**

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Purpose

Due in part to its antagonism of acid-sensing ion channels, it is thought that amiloride may exhibit rapid anxiolytic activity. Amiloride is FDA-approved for use as a diuretic but can be extemporaneously prepared as a sterile liquid for intranasal administration. Before clinical trials can begin the chemical and microbiological stability of compounded amiloride nasal spray solution must be assessed. This has been accomplished in the short-term with one study validating such over one week (1). A follow-up study estimating stability over 1 year under accelerated conditions was also completed. This study reports the real-time long-term chemical and microbiological stability of extemporaneously compounded 2 mg/ml Amiloride nasal spray.

Methods

The amiloride solution was prepared under aseptic conditions. Bacteriostatic water containing 0.9% benzyl alcohol was used as the diluent. One batch of solution was stored at 20° C and the other was stored at 4° C. Samples were tested for sterility at 0, 50, 60, and 90 days. Samples were tested for chemical stability at 0, 50, and 90 days. Sterility testing was conducted in compliance with USP chapter 71 requirements. Chemical stability analysis was performed utilizing a validated, stability indicating HPLC method.

Results

Sterility testing resulted in no observable microbial growth after 14 days at each of the time points tested with no difference between stored temperatures. The chemical stability analysis revealed that for both the refrigerated and room temperature stored solutions the percent labeled content remained within 90%-110%. There were no significant changes in color or turbidity observed. It was found that the pH decreased over time, likely due to the exposure of the solution to the high temperature.

Conclusions

Real time stability analysis at two temperature storage conditions was performed on extemporaneously compounded 2 mg/ml amiloride nasal spray. Amiloride retained its chemical integrity over the time period tested in both storage conditions. Additionally, the microbiological stability was demonstrated over the period tested with no difference seen in the different temperature groups. The compounded preparation was shown to have sufficient chemical and microbiological stability for use in clinical settings.

#49: Development of a protocol for obtaining biological samples for genetic testing from remote individuals

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Purpose

Pharmacogenomic sequencing allows individuals to learn more about how they will respond to certain medications but requires shipping of a biological sample. One complication of sending biological samples to remote laboratories is stability. Blood generally yields sufficient quantities of high-quality DNA but requires a clinic visit. Saliva and buccal swabs are routinely used for DNA extractions, but the DNA quality is notoriously low due to the presence of bacteria in the mouth. Additionally, elderly individuals have difficulty producing enough saliva for testing, and the tubes contain several milliliters of liquid and shipping requires special considerations. Dried blood spot cards, which serve as an alternative to saliva and buccal swabs, yield high-quality DNA and ship easily, but may produce a lower yield. This project aims to determine which biological sample methods can reasonably be obtained from remote individuals

Methods

Swab and saliva kits from Mauwi, Zymo, Gentueri, and DNA Genotek have been purchased for testing. Filter paper for DBS collections has been purchased from Qiagen and Cytiva. Forty different DNA extraction kits from various companies have been obtained. Extractions up to this point were performed using the Beckman Coulter GenFind V3 kit.

Results

Completion of dried blood spot cards required more lancet punctures than anticipated, with a median of 3 punctures (range 2-11) per card. Out of 17 completed cards, only 3 of them required more than 4 punctures. Yields per tissue were as follows: 400 µl of buffy coat - 5.6-24 µg; 200 µl from Mawi swab kits – 2.5-3.7 µg; 400 µl from DNA Genotek swab kits – 2.4-4.4 µg; 400 µl from DNA Genotek saliva kits – 1.9-2.1 µg; One square inch Qiagen FTA transfer card – 350-400 ng; One square inch Cytiva Whatman filter paper – 600 ng.

Conclusions

Preliminary results indicate that the yield from swabs are greater than from saliva, but not as high as buffy coat. Yields from dried blood spots were significantly lower than from other tissues. Sample size and purity have not yet been evaluated.

#50: Comparative Analysis of Denture Cleanser Effects on Surface Roughness:Traditional vs. 3D-Printed Resin Bases – A Systematic Review

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Purpose

This systematic review aimed to assess the effect of denture cleansers onthe surface roughness of 3D-printed denture base resins in comparison toconventionally manufactured counterparts.

Methods

Pubmed, Scopus, and Web of Science databases weresearched following specific inclusion and exclusion criteria. No date restrictions wereapplied and only English language papers were selected. Data collection andevaluation were independently executed by two reviewers, with arbitration from athird reviewer when necessary.

Results

Out of 629 initially identified articles, five studies were selected. Qualityassessment based on OHAT found a high risk of bias in a majority of studies due tomethodological inadequacies. A majority of the studies observed an increase insurface roughness of 3D-printed denture base resins after immersion in denturecleansers. Two studies highlighted the most pronounced alteration in the surfacetopography of additively manufactured denture base resins compared to their heat-polymerized counterparts. Additionally, the increase in surface roughness wascontingent upon immersion duration.

Conclusions

Based on the limited evidence available, the application of denturecleansers on 3D-printed denture bases significantly augmented surface roughnesscompared to conventional denture bases. Heterogeneous methodologies and highrisk of bias preclude definitive conclusions. Further investigations with standardizedmethodologies are warranted.

#51: Interplay between Sleep, Western Diet, and Cognitive Performance in Osteopathic Medical Students

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Purpose

This study aims to unravel the intricate interplay between sleep quality, dietary habits, and cognitive performance among osteopathic medical students. Recognizing the unique challenges faced by this student population, we seek to contribute valuable insights into the lifestyle factors influencing their academic success and overall well-being. The purpose is to bridge the gap in the literature by investigating how sleep patterns and dietary choices collectively impact cognitive outcomes in the context of osteopathic medical education.

Methods

Conducted as a cross-sectional study, we will recruit 20 osteopathic medical students representing diverse backgrounds and academic levels. Participants will undergo comprehensive assessments, including Garmin Smartwatches for sleep quality, self-reported surveys or digital food diaries for dietary habits, and standardized neuropsychological tests for cognitive performance. Statistical analyses, including correlation, multiple regression, and mediation/moderation, will be employed to explore relationships and unveil potential mediating or moderating effects of the Western diet on the sleep-cognition relationship.

Results

Anticipated outcomes include a nuanced understanding of how sleep, dietary habits, and the Western diet collectively influence cognitive performance in osteopathic medical students. We expect to identify patterns and interactions unique to this demographic, shedding light on potential interventions to enhance holistic well-being. The results are poised to contribute to the growing body of knowledge addressing the specific challenges faced by osteopathic medical students and inform targeted support mechanisms tailored to their needs.

Conclusions

This research holds promise for uncovering crucial links between lifestyle factors and cognitive performance among osteopathic medical students. By examining the complex interplay between sleep, dietary habits, and cognitive outcomes, we aspire to equip future osteopathic physicians with a profound understanding of the factors influencing their academic success and patient care capabilities. The study's conclusions are expected to pave the way for transformative approaches to medical education, emphasizing the holistic well-being of osteopathic medical students and, by extension, enhancing patient outcomes in the broader healthcare system.

#52: FDA-Approved Drugs Derived from Natural Products

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Purpose

This project endeavors to present a comprehensive overview of FDA-approved drugs derivedfrom natural products, with a focus on understanding their utilization as pharmaceuticals and identifyingkey characteristics that render natural products suitable for drug development.

Methods

A systematic approach was used to generate a list of FDA-approved natural product drugs fromthe scientific literature and FDA databases. Exclusion criteria were established, eliminatingmacromolecules, essential human micronutrients, human biomolecules, and drugs with non-natural,synthetic modifications. Extensive literature searches were conducted on the eligible drugs to trace theirsource organisms, initial years of FDA approval or market entry, available dosage forms, administrationroutes, approved indications, chemical classes, marketing statuses, mechanisms of action, and occurrenceon a list of top 200 pharmaceuticals by prescription. An equivalent number of non-natural drugs wasrandomly selected as a comparison sample.

Results

A total of 93 medications were identified as unmodified, natural, small-molecule drugs. Morethan half of these belonged to either the alkaloid/pseudoalkaloid or polyketide/macrolide chemicalclasses. Nearly 90% were sourced from bacteria or plants. Antibacterials were the most common drugcategory and inhibition of protein synthesis the most common mechanism of action. Compared to arandom sample of non-natural drugs, the natural drugs were less likely to be among the top 200 mostprescribed medicines (11% vs. 2%) and were more likely to be administered by non-oral routes (23% and10% vs. 43% and 21% for injection and topical routes, respectively), but were no more likely to have adiscontinued marketing status (18% vs. 22%). Notably, FDA approval or market entry of natural drugspeaked prior to 1942 and steadily declined in the ensuing decades, while non-natural drugs demonstratedan inverse trend.

Conclusions

This study provided a survey of unmodified, natural small molecules that have beenapproved as drugs by the FDA and identified many of their key attributes, including the most commonstructural classes, natural sources, mechanisms of action, therapeutic categories, and routes of delivery.These results cast light on the roles natural drugs have historically played in pharmacotherapy andprovide insight into what niches they might be best poised to fill in the future.

#53: Dopamine D2 Receptors as a Peripheral Biomarker for Brain Dopamine Levels

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Purpose

The ability to objectively index dopamine (DA) levels in the brain has the potential to revolutionize the field of neuropsychopharmacology, as having a peripheral biomarker of brain DA would enable the objective monitoring of the progression of Parkinson's disease (PD) and other DA-dependent psychiatric states. Of particular relevance to commercialization, it would provide an objective measure of treatment efficacy.

Methods

We used a DA-depletion approach to determine if peripheral D2Rs are a biomarker for brain DA; mainly, the 1-methyl-4-phenyl-1,2,3,6-tetrahydropyridine (MPTP) neurotoxin model and PD subjects, which are well-known models of DA depletion in the midbrain of rodents and humans, respectively.

Results

Dopamine depletion in the substantia nigra resulted a significant change to DA and norepinephrine (NE) levels in the plasma. Interestingly, these changes could be tracked as a time course from baseline to 15 days after injection with MPTP. Also, the proportion of D2R expressing leukocytes steadily increased (specifically B cells and T cells) during this same time of DA depletion. In two cohorts of studies comparing subjects with PD vs controls, we found that Parkinson's subjects displayed significantly decreased D2R expression in all populations except for (natural killer) NK cells, CD16+ monocytes, and cytotoxic T cells. We also found that subjects with PD show increased levels in epinephrine (EPI) and DA as compared to control subjects. We did not, however, find any statistically significant correlations between the recorded leukocytic D2R downregulation in PD patients and their elevated DA and EPI plasma levels.

Conclusions

The results of this study did not provide a clear indication of how brain DA levels are being represented in the periphery. Regardless, the modulation of peripheral D2Rs in PD and MPTP seen in this study do show that substantia nigra DA depletion in humans and rodents do manifest in the periphery. Although our study didn't result in a clear narrative of how nigral and peripheral DA system mirror each other, our result provide more evidence D2Rs may be both biomarkers and important substrates for treatment of DA-dependent disorders. Our results give a foundation from which future studies can investigate this connection further.

#54: Machine Learning for Child Oral Health: A Systematic Review

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Purpose

Machine Learning (ML) has great potential to assist dental professionals with diagnosing and predicting outcomes of oral health. Tooth decay in children is the most common chronic childhood disease and it can be prevented by early detection. We aimed to provide a map of the current evidence on machine learning (ML) in child oral health and provide insight for future research.

Methods

A scoping review was conducted by using Medline, Web of Science, EBSCO Dentistry & Oral Science Source, the Cochrane Library, and Scopus. Articles in which an ML model was assessed for the diagnoses, prediction, or management of any condition in children (0- 9 years old) in any year were included. Data were extracted for year of publication, geographical location, age, number of subjects, disease condition, type of study, and ML algorithms

Results

This review included 31 studies, with dental specialities such as pediatric dentistry and dental public health having the most publication in this area. Among the 31 studies, 12 were cross-sectional, 5 were case–control, 9 were cohort studies, 4 were clinical trials, and 1 was a descriptive survey. Majority of the studies were from high-income (71%; n = 22) and upper middle-income countries (25.8%; n = 8), whereas only 3.2% (n = 1) were from low middle-income countries. Prediction and diagnosis of oral health were the most common uses of ML algorithms. Over the years, decision trees were tested most frequently, while deep learning and clustering have emerged in recent years.

Conclusions

ML algorithms hold great importance to the dental field potentially assisting dental providers to complete their diagnosing and predicting of oral health manifestations with high accuracy. Dental professionals, such as pediatric and general dentists, can use these models to increase their proficiency and decrease clinical errors.

#55: Comparing persister cells generated by peroxide and antioxidant stress

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Purpose

Antibiotics have arguably been among the greatest medical discoveries; however, bacteria have continued to evolve ways to survive and evade their destructive effects. Strains of bacteria which were once easily treated have become resistant and dangerous. Currently Medicare's non-reimbursement policy penalizes hospitals approximately 350$ million per year for not preventing hospital acquired infection, resulting in increased patient costs and mortality. Antibiotic resistance is well described and the possibility of using either ROS or antioxidants as adjuvants to boost the log kill of an antibiotic is an active area of research. However, these additives may counterproductively increase the persister population. The purpose of the current study is to 1) test the role and formation of persister cells on antibiotic resistance, and 2) compare persister populations formed under peroxide and Vitamin C stress – an ROS and antioxidant, respectively.

Methods

S. epidermidis was treated with 3% (household concentration) of H2O2 for varying lengths of time to induce persister growth; then biofilm formation, membrane potential, and antibiotic resistance to penicillin, and gentamicin are measured. Additionally a Vitamin C treatment, and Vitamin C pretreatment was administered to compare persister cell populations and knock out the effects of ROS.

Results

Bacterial populations are stunted and shift towards the persister cell phenotype when under attack from peroxide. Vitamin C on its own had slight antibiotic effects but when used as a pretreatment it reduced the peroxide induced shift towards the persister phenotype.

Conclusions

These results support the proposal that ROS are an adequate stressor to mechanistically induce persister cells. Although some studies show that ROS can be successful antibacterial adjuvants by increasing the log kill they counterproductively increase persister cell populations. Instead, we propose that antioxidants may be a preferred adjuvant if avoiding the persister cell phenotype is deemed more important.

#56: **Unveiling the Dynamics: Analyzing Drug Release and Cell Viability between Simvastatin loaded Advanced-Platelet Rich Fibrin (A-PRF) and Titanium prepared Platelet rich Fibrin (T-PRF)- An in-vitro study**

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Purpose

Autologous Platelet rich fibrin (PRF) has gained clinical significance in recent years for regeneration procedures. Advanced approaches, including the combination of PRF with drugs (simvastatin) that up regulate intrinsic bone growth factors that improve periodontal regeneration are of great interest. The aim of the study was to compare the drug release kinetics & cell viability analysis of simvastatin loaded A-PRF versus T-PRF and which one can be used as a potential carrier for simvastatin in terms of sustained release.

Methods

A-PRF and T-PRF preparations were done using standardized protocol. Simvastatin solution is prepared by crushing 5 commercially available 20 mg Simvastatin tablets in 5 ml Phosphate buffer solution and 75 µl of this solution is added to the A-PRF and T-PRF samples. The samples were compared for drug release kinetics using UV-visible Spectrophotometry. Cell viability was assessed with MTT ASSAY using dental pulp stem cells.

Results

Drug release kinetics showed no statistically significant difference at 3 hour burst release from A-PRF and T-PRF but there was statistically significant difference between both groups at 6 hours and 24 hours. Cell viability analysis showed both T-PRF and A-PRF loaded simvastatin were compatible with dental pulp stem cells.

Conclusions

The study concludes that T-PRF was better in terms of sustained release of simvastatin compared to A-PRF and can be used as a potential carrier of simvastatin in periodontal regeneration.

#57: The Fast Food Fast Track: A Review on the Effects of the Western Diet on the Pathogenesis of Alzheimer's Disease

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Purpose

Alzheimer's Disease (AD) has been a widely researched neurological disorder due to its complex and enigmatic nature. It is well accepted that the neurological symptoms are due to elevated levels of beta-amyloid plaques, hyperphosphorylated Tau protein, and neurofibrillary tangles leading to the neuroinflammation induced symptoms. The exact pathogenesis that results in the deposition of these proteins is still up for debate, but research suggests that the etiology of AD is multifactorial. A combination of genetics, other nonmodifiable factors, and environmental factors seem to all contribute individually or collectively, depending on the case. One such modifiable factor that has been associated with neurological disorders such as: AD, Parkinson's Disease, and depression is dysbiosis of the gut microbiome. Potential implications of the gut-brain axis include increased β-oxidation of fatty acids, increased pro-inflammatory cytokines, and increased permeability of the gut. We aim to explore the potential link between the high-fat Western diet, gut microbiome dysbiosis, and the progression of the neuroinflammation seen in AD.

Methods

To achieve our objective, we will search the current literature in medical and scientific databases, focusing on research completed within the last 20 years and using subject terms such as "Western diet" "Alzheimer's Disease", "Brain-gut axis", "Micro-biome" to guide our search. This methodological approach will allow us to identify and synthesize relevant studies exploring the impact of the Western diet on the composition of the gut microbiome and its potential implications for AD.

Results

NA

Conclusions

Because the connection between AD and dysbiosis is a relatively recent development, we expect to find current literature to describe the connection while still finding ample gaps in the understanding. These gaps not only underscore the evolving nature of this connection but serve as launching points for future research.

#58: Fursultiamine prevents VEGF-induced neovascularization

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Purpose

Neovascularization plays a pivotal role in the survival, growth, and metastasis of various cancers, facilitating the supply of oxygen and nutrients crucial for the development of solid tumors. Recent investigations indicate the potential of the thiamine tetrahydrofurfuryl disulfide derivative, fursultiamine, as a robust antioxidant and anti-inflammatory agent. However, its role as an anti-angiogenic and anti-carcinogenic agent needs to be explored. In this study, we examined the anti-angiogenic properties of fursultiamine using human umbilical vein endothelial cells.

Methods

The endothelial cells were subjected to treatment with vascular endothelial growth factor (VEGF) in the presence of fursultiamine. Cell viability was determined by MTT assay, in vitro tube formation assay was carried out to examine neovascularization. Various angiogenic and anti-angiogenic and inflammatory factors were determined by antibody arrays. Monocyte adhesion and nitric oxide production were determined by standard methods.

Results

Our findings reveal that fursultiamine effectively impedes VEGF-induced endothelial cell growth. Moreover, it hinders in vitro tube formation, as evidenced by tube formation assays. Notably, fursultiamine exerts a regulatory influence on the VEGF-induced expression of various angiogenic and inflammatory markers. Fursultiamine also prevented the VEGF-induced nitric oxide and adhesion of monocytes to endothelial cells.

Conclusions

Collectively, our data demonstrate that fursultiamine prevents VEGF-induced neovascularization. This leads us to propose that fursultiamine holds promise as a potent anti-angiogenic agent, opening avenues for further exploration in anti-cancer therapeutic strategies.

#59: **Interplay of periodontal bacterial metabolites in the progression of coronary artery disease: A system biological approach**

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Purpose

The purpose of this study is to investigate the intricate relationship between periodontal disease (PD) and coronary artery disease (CAD), as evidenced by epidemiological associations. Metalloproteinase inhibitor (TIMP1) plays a pivotal role in cellular signaling, differentiation, cell death, and migration by binding to target metalloproteinases, forming complexes with other molecules (collagenases) to inactivate them. However, the expression of TIMP1 is reduced in both PD and CAD, leading to an upregulation of other metalloproteinases. This research explores the hypothesis that metabolites released from (Porphyromonas gingivalis), a prevalent bacterium in atherosclerotic patients, may inhibit TIMP1, thereby influencing CAD progression.

Methods

This research utilized a series of computational techniques, encompassing data mining, protein network analysis, molecular modeling, molecular docking, and molecular dynamics simulation. In the initial phase, metabolites from Porphyromonas gingivalis were retrieved from the Virtual Metabolic Human (VMH) database. The proteins associated with the TIMP1 were identified through the construction of a protein interaction network in Cytoscape. Subsequently, the TIMP1 underwent modeling using the Swiss-Model web server and was docked with bacterial metabolites. Furthermore, the structural stability of both the protein and metabolite was evaluated over a 100 ns simulation period.

Results

In total, 370 metabolites from Porphyromonas gingivalis were obtained from the database. Notably, the network analysis revealed that MMP1, MMP9, and MMP14 were closely associated with TIMP1. Molecular docking outcomes demonstrated that Malonyl CoA displayed a binding affinity of -8.82 kcal/mol at the active sites of TIMP1. Additionally, a stable complex between TIMP1 and Malonyl CoA was observed throughout the simulation period, potentially influencing the activity of TIMP1.

Conclusions

This investigation underscores the potential implications of Porphyromonas gingivalis metabolites as a risk factor in the development of CAD. The computational analysis suggests that these metabolites may disrupt the function of TIMP1, thereby contributing to the elevated levels of metalloproteinases observed in CAD patients. This emphasizes the critical need for further research to delve into the intricate mechanisms and exploring potential therapeutic interventions.

#60: Availability of receptors for advanced glycation end-products (RAGE) influences differential transcriptome expression in mice exposed to chronic secondhand smoke

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Purpose

The receptor for advanced glycation end-products (RAGE) has a central function in orchestrating inflammatory responses in multiple disease states. RAGE is a transmembrane pattern recognition receptor with particular interest in lung disease due to its naturally abundant pulmonary expression. Our previous research demonstrated an inflammatory role for RAGE following acute exposure to secondhand smoke (SHS). However, chronic inflammatory mechanisms associated with RAGE remain unclear.

Methods

In this study, we assessed transcriptional outcomes in mice exposed to chronic smoke in the context of RAGE expression. RAGE knockout (RKO) and wild type (WT) mice were exposed to SHS five times weekly via a nose-only delivery system (Scireq Scientific, Montreal, Canada) for six months and compared to mice exposed to room air (RA) only. Total lung RNA was isolated using the Direct-zol RNA MiniPrep kit (Zymo Research, Irvine, CA) and mRNA was purified using poly-T oligo-attached magnetic beads. Synthesis of cDNA, library construction, and sequencing was performed using standard approaches. We specifically compared the phenotypic and environmental conditions from WT+RA, WT+SHS, and RKO+SHS mice.

Results

Preprocessing and analysis of RNA-sequencing gene expression data included read trimming, mapping and quantifying the reads to transcripts, and calculating significant differentially expressed genes. The results of these analyses were summarized and compared via Venn diagrams, volcano plots, and functional gene cluster enrichment analysis. Notable gene clusters were specific to cytoskeletal elements, inflammatory signaling, and ciliogenesis. Finally, gene ontologies (GO) demonstrated significant biological pathways that were differentially impacted by the presence of RAGE.

Conclusions

These data collectively identify several opportunities to further dissect RAGE signaling in the context of SHS exposure and foreshadow possible therapeutic modalities.

#61: Alcohol Exposure: A Stress Cue for Bacterial Persister Cell Development

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Purpose

Persister cells have been strongly implicated in the recalcitrance and recurrence of chronic bacterial infection. The complex biochemical events that lead to the formation of persister cells are not completely understood; however, this phenotypic conversion can also be induced by environmental cues indicative of imminent threats for the bacteria. In response to alcohol as a stress cue, bacteria undergo many changes, which include fatty acid composition, loss of ions due to membrane leakage, and an increase in membrane fluidity. The purpose of the current study was to 1) test the effect of alcohol in a dose-dependent manner on Gram-positive and Gram-negative bacteria growth, and 2) test alcohol as a cue for the persister cell phenotype. In addition, bacterial membrane potential and biofilm formation were utilized as the readout for the persister cell phenotype.

Methods

Escherichia coli (E. coli) and Staphylococcus epidermidis (S. epidermidis), were grown in Luria Bertani (LB) broth supplemented with 0%, 0.08%, 1%, 1.5%, 2%, 2.5%, 3%, 3.5%, 4%, 4.5% and 5% alcohol (ethanol v/v), or 2.5% bleach for approximately 16 hours until the plateau of a standard bacterial growth phase. Membrane potential was measured qualitatively using the ThermoFisher Attune NxT Blue Red Laser Flow Cytometer and the ThermoFisher Invitrogen BacLight™ Bacterial Membrane Potential Kit. Bacterial biofilm was grown overnight, fixed, stained, washed, and then solubilized in acetic acid for analysis (OD 530).

Results

S. epidermidis, not E. coli, tolerates large 3 % alcohol concentration exposure during a 16-hour growth period. No significant difference was observed among the bacterial strains at alcohol doses less than 1%. Alcohol (0.5 - 5%) decreased the membrane potential (increase in negativity) of S. epidermidis in a dose-dependent manner. S. epidermidis biofilm formation increased from media supplemented with alcohol doses at 3-5% first, followed by alcohol removal and biofilm formation. Biofilm remained increased compared to control at alcohol doses 6-10%.

Conclusions

Taken together, this dataset represents a comprehensive and quantitative analysis of alcohol-induced persister cell formation. The presence of persister cells, despite their presence in low numbers increase the probability of hospital acquired infection in patients with alcohol use disorder. In addition, general antiseptic and sterilization techniques must be re-evaluated in the context of persister cells. The current study aims to understand the prevention of persister cell formation and improve the therapeutic treatment strategies in clinical practice.

#62: The Impact of Navigation Genre on LDI

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Purpose

The hippocampus is an integral part of human learning and memory, and the mnemonic similarity task (MST) is a cognitive test used to measure hippocampal function. It is a modified object recognition task, the principal metric of which is the lure discrimination index (LDI). MST testing includes identification of “old”, “new”, and “similar” or “lure” items shown to the participant after an encoding phase where participants are shown a variety of images. LDI assesses the probability that a participant can identify a “lure” image correctly. LDI is an important metric that is affected by several disease processes, including schizophrenia, depression, and healthy aging. Although it has been shown that navigation of an enriched environment requires hippocampal function and can improve LDI, it is unclear which type of navigation would have the most significant effect. It is also unclear whether this effect is clinically relevant. This project seeks to measure the effects that three different types of navigation behaviors, foraging, dead-reckoning, and objective-based navigation, have on LDI. Foraging uses navigation to find objects, dead-reckoning is keeping a constant sense of direction while navigating, and object-based navigation is navigating to a fixed landmark. This will lay the groundwork for future work to determine whether LDI targeted therapies could improve outcomes in some conditions.

Methods

75 participants will be recruited and administered a preliminary MST assessment. Participants will then be randomly assigned to one of three navigation groups, each with a different navigation task to be performed in 10 sessions in a virtual navigation program. After all 10 sessions are completed, participants will complete an additional MST assessment. Score changes across the three groups will be assessed to determine group differences with an ANOVA test.

Results

The three different navigation tasks are expected to have significantly different effects on LDI.

Conclusions

Not all navigation tasks are created equal. In order to build on research showing that navigating enriched environments can improve hippocampal function, we need to know more about what conditions allow LDI to be impacted, and this project will help us to understand the differences between navigation tasks.

#63: Investigating Optimal Laboratory Growth Conditions of Gracilibacillus halotolerans in Media Supplemented with Salt

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Purpose

As interest continues to grow in the field of persister cells and their morphology, there arises an ever-evolving desire to further understand specific strains of bacteria that exemplify the qualities of seemingly anomalous survival regardless of anti-bacterial treatment. In the case of the Gracilibacillus halotolerans, a halotolerant extremophile extracted from the Great Salt Lake with known persistent characteristics, uncovering its optimal growth conditions was essential for future investigations. Identifying the optimal salinity for the growth of G. halotolerans will allow us to standardize our growth methods, uncover several mechanisms of saline tolerance, and add to future investigations of persistence with this bacterium.

Methods

To test the optimal growth conditions of G. halotolerans under standard laboratory conditions, the concentration of NaCl was varied by supplementing Luria-Bertani (LB) broth media solution (LB Broth Base, Lennox Cat. 12780052) to various concentrations (0 – 25% v/v). LB broth contains approximately 0.05% NaCl, which was considered negligible for equipment level of volumetric precision. A calibrated analytical scale (Mettler Toledo Advanced MT-T Analytical Balance; readability 0.1 mg) was used to measure varying amounts of NaCl; the NaCl was transferred to 6 individual and sterile 50mL test tubes (Nunc Conical Sterile Polypropylene Centrifuge tubes, Cat. 339653).To each test tube, LB broth media was added to the corresponding percent salinity. The tubes were gently warmed for 10 minutes to create a homogenous NaCl/broth mixture. Once fully dissolved, equal volumes of G. halotolerans culture was inoculated via micropipette to each test tube. The tubes were placed into the shaking incubator (MaxQ 6000 Incubated/Refrigerated Shaker, Cat. SHKE6000) for 72 hours and optical density (OD 600) measurements were taken periodically by spectrophotometer (Barnstead International Turner SP-830, SM110215). No G. halotolerans growth was observed in media supplemented with NaCl greater than 15%.

Results

Previous published data seemingly diverges on the optimal growth medium and salinity of the genus Gracilibacillus. In the current study, the maximal laboratory growth for G. halotolerans clearly occurs in LB broth media supplemented with 5% NaCl. Although the south arm of the Great Salt Lake maintains approximately 9% salinity, less total salinity in the sediment where microorganisms thrive is likely; therefore, it is plausible that in the laboratory, utilizing a medium of simple broth, G. halotolerans would thrive in a solution that mimics its natural environment. Furthermore, bacterial growth in media supplemented with 10% NaCl was delayed yet grew to an optical density comparable to 5% conditions by 72 hours. G. halotolerans grown in 0 or 15% NaCl exhibited similar growth patterns.

Conclusions

Identifying the optimal saline environment for G. halotolerans growth is valuable because it not only increases laboratory efficiency and simplicity of bacterial inoculation but also expands on the understanding of how haloarchaea species of bacteria mechanistically operate in their respective saline environment. Taken together, a more extensive understanding of G. Halotolerans growth trends may not only lead to decreased cost and enhanced efficiency in the lab when working with halotolerant species but would additionally help to elucidate trends in bacterial growth for practical use in the medical environment. Recognizing optimal bacterial growth conditions may allow for the improvement of treatment strategies against antibiotic resistance and the eradication of biofilm formation on surfaces in the clinical setting. Lastly, an understanding of growth optimization of G. Halotolerans may provide insight into the numerous possible mechanisms and growth patterns of persistent bacteria, how to target and combat persistent bacterial characteristics, and ultimately may expedite the synthesis of a comprehensive and efficacious patient treatment.

#64: Chromatin pattern quantification in differentiation of white blood cells

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Purpose

Nuclear chromatin patterns have been used historically to morphologically distinguish between different developmental stages and lineages of white blood cells. While it is common to characterize cells based on arbitrary 'open' or 'closed' chromatin patterns, quantification of chromatin data is lacking.

Methods

By extracting nuclei from a database of white blood cells and running fractal analyses using TWOMBLI, we were able to produce meaningful data quantifying chromatin patterns. Our data were put through a random forest algorithm which grouped each point based on relationship probability. The algorithm compared immature and mature cell types as well as cells of similar maturity and differing lineage (i.e. mature monocytes, lymphocytes, neutrophils, etc.). The data were organized into tables in order to visualize the relationship between chromatin pattern, stage of maturity, and cell lineage.

Results

The random forest algorithm was able to distinguish immature cells (blasts) from mature cells with a success rate of 93.9%. It was able to distinguish mature cells from immature cells with a success rate of 96.9%. Promyelocytes were found to be the most unique among those in the blast category as they were correctly identified 99.1% of the time. Monocytes and neutrophils were the most unique in the mature category, being correctly identified 90.9% and 92.0% of the time, respectively. Most patterns were not accurately categorized when comparing cells of different lineages at equivalent stages of maturity. Cells from myeloid and lymphoid lineages did not show chromatin patterns unique enough to accurately distinguish between them.

Conclusions

The data have shown that quantified chromatin patterns alone can be used to distinguish between immature and mature white blood cells with a high level of accuracy. Cells from myeloid and lymphoid lineages did not show chromatin patterns unique enough to accurately distinguish between them. This suggests that more research should be performed to determine other quantifiable factors that can be used to differentiate cells based on lineage.

#65: **Lipophilic vitamin B1 derivatives, benfotiamine and fursultiamine, prevent melanoma growth and invasion.**

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Purpose

Melanoma is the second leading invasive cancer with a greater capacity to invade and metastasize. Increased oxidative stress is involved in melanoma growth and spread. Several antioxidants, vitamins, and other phytochemicals have been shown to prevent melanoma cancer growth. However, the chemopreventive efficacy of benfotiamine and fursultiamine, lipid-soluble vitamin B1 derivatives, on cancer growth and invasion is not unknown. We, therefore, hypothesized that with their potent anti-oxidative and anti-inflammatory actions, benfotiamine and fursultiamine could prevent melanoma cell growth and invasion.

Methods

B16-F10 melanoma cells were treated without or with various concentrations of benfotiamine and fursultiamine. The cell viability will be determined by MTT assay and apoptosis by annexin-V staining. Expression of various anti- and pro-apoptotic factors will be determined by antibody arrays. Caspase-3 activation and reactive oxygen species generation will be determined by specific assay kits. Finally, the chemopreventive effect of vitamin B1 derivatives will be examined in a mouse model.

Results

Our preliminary results suggest that benfotiamine and fursultiamine prevented melanoma cell growth dose-dependently. Further studies are in progress to explore the mechanism through which these compounds prevent melanoma cell growth in vitro and in vivo.

Conclusions

So far, our results suggest that benfotiamine and fursultiamine could act as chemopreventive agents in treating melanoma. Further work is in progress.

#66: Comparing the Efficacy of Various Diagnostic Techniques for Acute Compartment Syndrome

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Purpose

Determine best practices for diagnosing acute compartment syndrome in the lower limb by comparing the sensitivity and specificity of commonly use techniques.

Methods

A comprehensive literature review was performed using PubMed as the primary database. A series of MeSH searches were conducted such as “Compartment Syndromes” with “Compartment Syndromes w/ Diagnosis,” “Ultrasoundography”, and “Therapy.” Keyword searches of Acute Compartment Syndrome were also conducted. An emphasis on finding all meta-analyses, clinical trials, books and documents, randomized controlled trials, and systematic reviews was placed for these searches. Articles spanned from the years 1990 to 2023.

Results

Acute compartment syndrome of the lower limb is most often diagnosed using the clinical signs and symptoms of the patient. The use of indwelling catheters to measure the pressure of the muscle compartment have been used to verify the diagnosis before proceeding to surgical intervention. Other common methods include the use of ultrasound, near infrared spectroscopy, intramuscular pH, and manual palpitation. However, clinical signs and symptoms have a very low sensitivity for the syndrome, increasing the likelihood for a false negative diagnosis. The most effective method is the continuous use of indwelling pressure monitors, having the highest sensitivity and specificity of all of the methods researched.

Conclusions

Although clinical signs and symptoms is the most often used diagnostic technique, it is unreliable due to its low sensitivity for the disease. Clinical signs and symptoms is best used in conjunction with indwelling catheters measuring pressure, confirming in the decision of surgical intervention. Continuous pressure monitoring from indwelling catheters was the most effective method with the highest sensitivity and specificity for acute compartment syndrome in the lower limb.

#67: **Double-Blinded Randomized Control Trial Investigating the Efficacy of Probiotic Mouth Rinse in Enhancing Oral Health.**

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Purpose

Probiotics are living microorganisms, such as bacteria, that closely resemble or mirror those naturally present in the human body and may confer health benefits. Contemporary research indicates that preserving a balance between beneficial and pathogenic bacteria is crucial for maintaining optimal oral health. Nevertheless, the existing body of knowledge regarding the specific probiotic mechanisms within the oral cavity remains limited. The present study evaluated clinically the efficacy of a probiotic and chlorhexidine mouth rinses on plaque and gingival accumulation in children.

Methods

The study employs a double-blind randomized controlled trial spanning a 2-week duration. It comprises a comparative assessment involving a probiotic mouth rinse, a chlorhexidine mouth rinse, and a control group. The study population consists of 15 healthy children aged between 12 to 15 years in each group, totaling 45 participants (n=45). Evaluations are conducted using the Plaque Index (PI) developed by Turesky et al. in 1970 and the Gingival Index (GI) established by Loe and Silness in 1963.

Results

The Probiotic and Chlorhexidine groups exhibited lower plaque accumulations compared to the Control group after the 2-week period. Significantly, the Gingival Index demonstrated a notable difference between the Probiotic and Chlorhexidine groups, with the Probiotic group outperforming the Chlorhexidine group.

Conclusions

The findings indicate that the Probiotic mouth rinse effectively reduces both plaque accumulation and gingival inflammation. Consequently, the probiotic mouth rinse demonstrates clear potential for therapeutic applications in sustaining optimal oral hygiene and promoting overall oral health.

#68: Validity of digital cephalometric tracing: A systematic review

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Purpose

Aim of this systematic review was to assess the accuracy of digital cephalometric tracing with manual hand tracing.

Methods

Electronic records of PubMed, SCOPUS and Web of Science databases were searched. Initial search revealed 279 potentially relevant articles. Relevantarticles were selected after examining titles and abstracts. After screening, 23 full text articleswere assessed in detail. 15 publications were excluded for not meeting the predetermined inclusion criteria. The methodological quality of the selected 9 studies was assessed using 12 criteria related to study design, measurement and statistical analysis used.

Results

Data was collected and analyzed for the reliability and reproducibility of variables. All studies were performed on digitally acquired lateral cephalograms. Angular and linear measurements were analyzed. Results revealed statistically significant differences between the methods for certain variables. Cephalogram quality, lip posture, positioning, difficulty in locating landmarks had an influence on variations in measurement. However, these differences were minimal and clinically acceptable.

Conclusions

Moderate quality evidence was found that showed digital cephalometric tracing to be equally reliable to manual tracing. Systems described in the literature are accurate for clinical use.

#69: Differential serum inflammatory cytokine elaboration in Nepali brick factory workers

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Purpose

Previous studies involving workers at brick kilns in the Kathmandu Valley of Nepal have revealed chronic exposure to hazardous levels of fine particulate matter (PM2.5) common in ambient and occupational environments. Such exposures are known to cause and/or exacerbate chronic respiratory diseases including chronic obstructive pulmonary disease (COPD). However, there is a paucity of data regarding the systemic inflammatory status of exposed workers at brick manufacturing facilities.

Methods

In the current study, we sought to elucidate systemic inflammatory responses by quantifying the molecular cytokine/chemokine profiles in serum from study participants. A sample of participants (N = 48; 54% female; 31.77±9.76 years-old) were distributed among four different job categories. Blood was procured from participants on-site, allowed to clot at room temperature, and centrifuged to obtain total serum. A human cytokine antibody array was used to screen cytokines/chemokines in serum samples. Comparisons were generated between a control group of administration workers vs. fire master workers, administration vs. green brick hand molders, and administration vs. top loaders.

Results

We discovered significantly increased concentrations of eotaxin-1, eotaxin-2, GCSF, GM-CSF, IFN-□, IL-1□, IL-1□, IL-6, IL-8, TGF-□1, TNF-□, and TIMP-2 in serum samples from fire master workers vs. administration ($p < 0.03$). Each of these molecules, with the exception of TIMP-2, were also significantly elevated in the serum from green brick hand molders ($p < 0.02$). In addition, each molecule was significantly elevated in serum from top loaders compared to administration workers ($p < 0.03$). With few exceptions, the fire master workers expressed significantly more systemic inflammatory molecular abundance when compared to all other job descriptions.

Conclusions

These results reveal an association between pulmonary exposure to PM2.5 and systemic inflammatory responses likely mediated by cytokine/chemokine elaboration. Additional characterization of a broader array of inflammatory molecules may provide valuable insight into susceptibility to lung diseases including COPD.

#70: **The Use of Platelet-rich Fibrin for Accelerated Orthodontic Tooth Movement: A systematic review**

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Purpose

Platelet-rich fibrin is an inexpensive, minimally invasive, and readily obtainable autologousbiologic agent that can help increase the rate of tooth movement during orthodontic treatment. It presents ahigh concentration of growth factors that are released progressively over time and can help increase boneturnover consequently increasing the rate of tooth movement. This article systematically reviews studies thatused platelet-rich fibrin as an adjunct to affect orthodontic tooth movement and the intervention of the outcome.

Methods

The systematic review was registered in PROSPERO (CRD42021278698) and conducted accordingto PRISMA guidelines. A search of PubMed(MEDLINE), Embase, Scopus, and Web of Science databases wasconducted without any time restrictions. Publications in English were considered. The studies identified fromthe search were exported to EndNote online. After removing duplicates, the studies were screened andassessed for eligibility by two independent reviewers. Qualitative analysis used the Cochrane risk of bias tooland the ROBINS-I tool. Data were extracted in a tabular form.

Results

The initial search of databases retrieved 51 results from which 7 studies fulfilled the inclusion criteria.Six were prospective randomized studies and one was a prospective non-randomized study. Most reported anincrease in tooth movement with the use of PRF while one reported a decrease in tooth movement per month.The majority of the randomized studies presented a high risk of bias and the non-randomized study had amoderate risk of bias.

Conclusions

Acceleration of orthodontic tooth movement with the use of platelet-rich fibrin is supported bystudies with moderate to high risk of bias. There is a need for further clinical studies with a robust design thatalso explore the effect of dose, frequency and site of intervention to determine the effect of platelet-rich fibrinon orthodontic tooth movement.

#71: Dental malocclusion and gastrointestinal problems: A scoping review

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Author Affiliations

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Purpose

Gastrointestinal (GI) problems are often reported by patients presenting for orthodontic treatmentconsultations. The assumption is that there is a functional link between dental structures and thegastrointestinal tract. Addressing the patients' complaints is important for overall treatment successunless there is no proven association with the treatment offered. The purpose of this review is to summarizethe currently existing evidence regarding the association between dental malocclusion andgastrointestinal problems.

Methods

A thorough review of the literature was conducted. Five databases were searched for peer-reviewedhuman studies, including information about gastrointestinal problems and/or masticatory deficiency in patients with dental malocclusion. Article screening was performed independently by two reviewerswith the use of predefined inclusion/exclusion criteria. Data extraction was performed independently bytwo reviewers with the use of a data extraction tool. Information about article type, study design,participants' characteristics, interventions, and outcomes were extracted, summarized, and synthesized.

Results

N=4 prospective cross-sectional studies met the review criteria. The rate of gastric emptying (GER) wasthe primary outcome in two studies, whereas the other two studies reported constipation andgastroesophageal reflux disease (GERD) incidences as part of patient self-reported questionnaires.There was a correlation between slower GER and malocclusion in both studies. Self-reportedconstipation was significantly associated with malocclusion, and GERD symptoms were more frequent in skeletal Class III malocclusion subjects in comparison to controls.

Conclusions

According to the results of this review, there is evidence for a positive direct association between dentalmalocclusion and GI symptoms. The limited number of publications on this topic indicates the need formore detailed reporting of GI problems in dental malocclusion-related studies. Also, additional targetedstudies are required that will contribute to the knowledge on this matter.

#72: Orthodontic Treatment and Quality of Life

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Purpose

This research delves into the multifaceted ways in which orthodontic treatment significantly enhances the quality of life for patients beyond cosmetic improvements. Utilizing databases such as Ovid, Scopus, Web of Science, and PubMed, the study's search strategy involved terms like Quality of Life, Orthodontics, Outcomes, Life Quality, QOL, and Health-Related Quality of Life. Analysis of 285 scholarly articles identified nuanced impacts on Oral Health-Related Quality of Life (OHRQoL) across demographics. Specific studies highlighted benefits for individuals with low psychological well-being and emphasized the positive influence of orthodontic interventions on reported OHRQoL across various age groups and treatment methods.

Methods

The research focuses on six specific articles, including one involving 44 adults with clear aligners or fixed appliances, revealing higher OHRQoL and shorter treatment durations for those with clear aligners. The findings underscore the need for future research prioritizing the long-term impact of orthodontic treatments on patients' quality of life. The recommendation includes post-treatment tracking to assess enduring effects and investigating emerging technologies such as clear aligners and digital planning systems.

Results

Overall, the research emphasizes optimizing patient experiences and quality of life through a comprehensive understanding and consideration of individual needs and psychological aspects.

Conclusions

The conclusion synthesizes various studies, highlighting benefits for individuals with low psychological well-being, the impact of treatment necessity on OHRQoL, and the need for tailored, holistic approaches in orthodontic care.

#73: Dilemma of Micro-osteoperforations in orthodontics

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Purpose

With more adults seeking orthodontic correction there is a need to shorten the duration of orthodontic treatment. Various surgical and non-surgical methods are being reviewed for accelerating tooth movement. Reduction of effective treatment time will also reduce the chances of white spot lesions, caries, periodontal problems, root resorption, etc. Surgical techniques for accelerating tooth movement are associated with a higher risk. Minimally invasive techniques may reduce the risk of adverse effects and have higher patient acceptance.

Methods

This review aims to analyze the latest available literature on micro-osteoperforations and assess its applicability in the clinical setting for the acceleration of orthodontic tooth movement.

Results

Micro-osteoperforations (MOPs) cause localized trauma to the alveolus which accelerates the aseptic inflammatory pathways that have been previously established to be a biological response to orthodontic forces. The increased concentration of the pro-inflammatory markers amplifies the orthodontic force associated with bone remodeling response resulting in faster resorption of the bone (transient osteopenia). Development of osteopenic porosis of the alveolus surrounding the teeth being moved using orthodontic forces advocates a reduction in overall treatment time after MOPs. Due to the temporary nature of the chemical pathways resulting in decreased bone density, MOPs need to be repeated during every activation till the end of space closure. Pain and discomfort are associated with the procedure. The clinical application of the procedure varies widely between studies. Systematic reviews question whether MOPs can lead to clinically relevant shortening of treatment time. Few studies reported any details on patient-reported outcomes. Future studies and synthesis of reviews may serve to shed light on the contested claims of effectiveness of micro-osteoperforations.

Conclusions

Studies support the possibility of accelerating the rate at which teeth translate within the alveolar bone following micro osteoperforations. Several recent systematic reviews have questioned its clinical effectiveness. However, further well-designed clinical trials are necessary to confirm the claims made by its commenders and develop a clearer picture of micro-osteoperforations.

#74: The pharmaceutical use of MDMA for the treatment of PTSD

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Purpose

Current treatments indicated for post-traumatic stress disorder (PTSD) are sertraline and paroxetine. Their symptom remission efficacy is 50%. Studies indicate 3,4-Methylenedioxymethamphetamine (MDMA) improves PTSD symptoms, with psychotherapy accompaniment. Medical MDMA is controversial. The purpose of this research is to conduct a literature review on PTSD treatment with MDMA.

Methods

A three-phase literature review began on April 11, 2023, via PubMed. Search terms were 'psychiatric' AND 'psychedelic.' Filters included: full-text scholarly articles published in the last 5 years, in English, with humans as the study subjects. Phase one identified 192 articles.Articles were further evaluated in phase two. Disease state inclusion criteria included depression and anxiety; and for drugs are psilocybin, MDMA, and Ketamine. Drug exclusion criteria included CBD, LSD, and Ayahuasca. Disease state exclusion criteria included end-of-life anxiety, autism, addiction, and cancer. Self-reported and recreational psychedelic use were excluded. Phase three resulted in 12 articles on PTSD treatment using MDMA. The articles were evaluated and categorized by: evaluating dose, treatment/control, outcomes, population, design, supporting psychotherapy, limitations, and key findings.

Results

Subjects were PTSD/anxiety diagnosed, primarily Caucasian adults, averaging 54.9 years old. Females represented 53-77.8% of subjects. Medical professionals administered MDMA and psychotherapy, simultaneously. Subjects underwent preparatory, treatment, and integrative therapy. Initial treatment doses ranged from 75-187.5 milligrams across 1-3 sessions averaging 2-8 hours. Some studies utilized supplemental doses and most utilized active controls.The Clinician-Administered PTSD Scale (CAPS-5) identified PTSD changes and remission post-MDMA exposure. Studies reported reduced PTSD symptoms and remission. Lasting therapeutic effects averaged 3.5 years.Limitations include lacking patient diversity, small sample sizes, and difficulty separating MDMA effects from psychotherapy. Adverse events include jaw-clenching, fatigue, low mood, and insomnia, lasting a week. Temporary increases in blood pressure and heart rate make patient cardiovascular evaluation crucial.

Conclusions

Studies indicated psychotherapy supplemented MDMA use for PTSD treatment has long-lasting effects. The FDA has designated MDMA a 'breakthrough therapy.' MDMA administration is periodic, unlike current daily dosed PTSD medications. Further safety and efficacy evaluation is needed. Psychedelic research without psychotherapy creates an ethical dilemma. Next steps include drafting treatment protocols, proper handling/regulation of MDMA, addressing negative stigmas, and educating pharmacists regarding patient counseling.

#75: Overlooked Dental Disease in CBCT Imaging and the Impact of Oral Radiologist Interpretation

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Purpose

This study aims to underscore the necessity for a comprehensive interpretation of Cone Beam Computed Tomography (CBCT) volume images obtained by dentists. The research demonstrates and quantifies potentially overlooked dental pathology, categorizing incidental findings into three groups: 1) requiring some form of treatment or follow-up, 2) necessitating follow-up (monitoring) only, and 3) demanding no further treatment or follow-up.

Methods

Radiology report findings from the last 100 CBCT cases in 2022, conducted at the Oral Surgery clinic of Roseman University College of Dental Medicine, were thoroughly examined. The identified findings were categorized into paranasal and airway, spine and TMJ, skull, soft tissue calcifications, bone, pathological, and dental conditions. Further classification of dental conditions included endodontic, periodontal, caries, fractures, third molars, developmental, implant, and acquired categories.

Results

The analysis revealed 687 incidental findings across 100 cases, averaging 6.87 findings per patient (range: 1 to 23). Every case presented at least one incidental finding (100%). Intervention-requiring findings constituted 49.1%, Monitoring 27.9%, and No treatment 23%. Dental findings accounted for 63% of the total, while 79.8% of intervention-requiring were being dental-related and 82.8% of those requiring monitoring were dental-related.

Conclusions

The majority (~80%) of findings necessitating treatment or monitoring were dental-related, emphasizing the critical need for a meticulous review of dental structures. Identifying dental and non-dental conditions mandates a dentist well-versed in CBCT interpretation or a trained oral radiologist.

#76: Investigate the biochemical basis of the neurological phenotype of Xeroderma Pigmentosum

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Purpose

Although it is known that dysfunctional DNA repair is the primary pathogenesis in XP, growing evidence suggests that a mitochondrial phenotype might be the cause for its neurological presentation. Here, we want to investigate the metabolism profile of patient derived fibroblasts with a focus on mitochondrial phenotyping to explore the putative mechanism leading to this neurological phenotype.

Methods

Fibroblasts were generated from cells derived from skin biopsies taken from XP patients. After immortalization, cells were cultured in regular DMEM + Pen/Strep. Measurement of mitochondrial respiration versus glycolysis was performed using a Seahorse Xfe Flux Analyzer using the standard mitochondrial stress test method. Here we chose ERCC1 because it is the binding partner to XP-F and is phenotypically identical to the loss of XP-F.

Results

We will collect cell pellets from 6 human fibroblast cell lines (grown in standard culture media) from XP patients and will perform metabolic phenotyping using metabolomics (a comprehensive analysis of metabolites in a biological specimen) using mass spectrometry. We will analyze the metabolome using the recently published platform 'metaboverse'. Metabolic regulation of affected pathways will be confirmed using western blotting. We would also like to explore if there is accelerated aging in specific organ tissues (kidney, liver, pancreas, ovaries).

Conclusions

Our preliminary respiratory characterization using Seahorse unraveled an interesting metabolic phenotype in which we see an inhibition of the glycolysis based ATP production, diminishing the total availability of ATP in the cell. Based on our preliminary respiratory characterization using Seahorse, we expect changes in mitochondrial metabolites and other metabolic pathways. This will inform our current understanding of the pathophysiology of XP and could be used to develop novel therapies to counteract the neurological symptoms.

#77: Evaluation of Weight Trends in Prostate Cancer Patients on Anti-Androgen Therapy

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Purpose

The purpose of this quality improvement evaluation is to investigate the adverse drug reaction of weight change associated with anti-androgen therapy within the prostate cancer population. This data analysis was requested by the Intermountain Health Oncology Pharmacy and Therapeutics (P&T Committee) with an effort to optimize quality patient care around survivorship.

Methods

Thank you for submitting a poster abstract for the 2023 Midyear Clinical Meeting & Exhibition. You will be notified by mid-October if your abstract has been accepted for presentation.Call for Posters: 2023 Midyear Clinical Meeting & ExhibitionYou can access your Abstract at any time by clicking here.Submission TypeStudent PosterSubmission Category:Evaluative StudyAbstract Status:CompleteAbstract ID:1640039Abstract Title:Evaluation of Weight Trends in Prostate Cancer Patients on Anti-Androgen TherapyPrimary Author(s)Erin C. Frohnapfel (she/her/hers) (Role: Primary Author)Co-Author(s)Danielle Gundrum (she/her/hers)Gary Lynch (he/him/his)AbstractSubmission TopicOncology/HematologyPurposeThe purpose of this quality improvement evaluation is to investigate the adverse drug reaction of weight change associated with anti-androgen therapy within the prostate cancer population. This data analysis was requested by the Intermountain Health Oncology Pharmacy and Therapeutics (P&T Committee) with an effort to optimize quality patient care around survivorship.MethodsThis project was a retrospective data analysis looking from July 1, 2020 to June 23, 2022. Patients who received anti-androgen therapy starting on July 1, 2020 or later and had measured weight's at a 6 month, 9 month, or 12 month time period w ere included. They were then separated into time intervals of 6, 9, and 12 months; and further differentiated by what drug they were taking. Patients who were missing weight data points within 3 weeks from the designated time points were excluded from the analysis. Data collection included start date, end date, start weight, time interval weight, and end weight. Weight change was analyzed by calculating the percentage weight gain or loss among the different drug groups. Data was de-identified and stored on a password protected file. Data did not include any patient specific information to mitigate the risk associated with confidentiality. This project was quality improvement in nature therefore the institutional review board approval was not deemed necessary.

Results

Weight data was collected for 491 patients initially, and 127 were included in the analysis a s a result of the length of time their weight was observed. 72 patients were analyzed at 6 months, 52 at 9 months, and 31 at 12 months. For the 6 month interval patients taking apalutamide had a 1.46% weight change, patients taking enzalutamide had a 1.05% change, and patients taking darolutamide had a 2.42% weight change. For the 9 month interval patients taking apalutamide had a 1.66% weight change, for patients taking enzalutamide had a -1.91% change, and for patients taking darolutamide had a -4.41% change. For the 12 month interval patients taking apalutamide had a 0.87% weight change, for patients taking enzalutamide had a 1.24% change, and for patients taking darolutamide had a 3.72% weight change. Overall, patients taking enzalutamide and darolutamide both resulted in an average weight loss at 9 months, but all other values showed an average weight gain.

Conclusions

We were not able to identify a noticeable trend regarding whether the anti-androgen drugs used in the study caused a significant weight gain or loss after 6-12 months. Our data was limited by inconsistent weights for each patient, and small sample sizes within each drug differentiation. There were also several outliers that could be skewing our data. Further studies may be beneficial in identifying the prominence of this adverse drug reaction.

#78: **Pinhole surgical technique - A minimally invasive approach for the management of gingival recession using i-PRF: A case series**

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Purpose

To evaluate the effectiveness of i-PRF using pinhole technique in the management of gingival recession

Methods

Four patients with 5sites with Miller's Class I or II recession defects in the esthetic zone were selected. All the patients complained of either receding gums or elongation of teeth which appeared unaesthetic. Clinical parameters observed were as follows: probing depth, recession depth (RD), recession width (RW), clinical attachment level (CAL), and width of keratinized tissue (WKT)

Results

All the parameters observed at baseline were again evaluated at 6-months recall visits showed statistically significant improvement.

Conclusions

A statistically significant root coverage was achieved using pinhole technique and i-PRF in 6-months follow-up.

#79: The Immunomodulating Effects of Delta-9 Tetrahydrocannabinol (THC) and Cannabidiol (CBD) in Human Neuronal SH-SY5Y Cells in vitro

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Purpose

Recreational and medicinal use of the cannabinoids delta-9-tetrahydrocannabinol (THC) and cannabidiol (CBD) are based on their activity as analgesics, anti-inflammatory agents, antipsychotic and anxiolytic agents. THC and CBD lipophilicity and their neurological actions makes them candidates as new medicinal approaches. Accumulating evidence suggests that the non-intoxicating cannabinoid compound cannabidiol (CBD) may be a promising new agent in the treatment of psychotic and anxiety disorders. However, the neurobiological substrates underlying the potential therapeutic effects of CBD are still unclear. The purpose of the current study was to 1) test varying doses of CBD and THC in a dose dependent manner, and 2) test the immunomodulating effects of varying doses of CBD and THC in the context of neuronal inflammation.

Methods

The cytotoxic effects of CBD (2, 5, 15, 25, 50, 100 µg/mL) and THC (5, 10, 15, 50, 100, 200 µg/mL) were tested by measuring lactose dehydrogenase (LDH). Human neuronal SH-SY5Y cells were pre-treated with saline, vehicle, or media supplemented with CBD or THC for 2 and 6 hours. The results were read via spectrophotometry.

Results

THC, not CBD, decreased cytotoxicity in human neuronal SH-SY5Y cells compared to control. CBD increased cytotoxicity in a dose-dependent manner; doses 50 and 100 µg/mL significantly increased cytotoxicity compared to control. Whereas THC decreased cytotoxicity in dose-dependent manner; doses 100 and 200 µg/mL significantly decreased cytotoxicity compared to control.

Conclusions

Previous findings in the laboratory indicated that CBD at large doses (> 25 µg/mL) significantly decreased cytotoxicity and inflammation in RAW264.7 macrophage cells. The current study demonstrates that at increased doses of CBD and THC, cytotoxic effects may vary between tissues from the peripheral and central nervous system. The increasing use of “ultrapotent” cannabis that contains deleterious effects of THC in large concentration may be mitigated by CBD; however, the positive effects on cognitive function could be considered through the aspect of cerebrovascular structure and BBB integrity. In addition, delivery of these cannabinoids in the brain following different routes of administration (subcutaneous, oral, and pulmonary) may contribute to differences in cytotoxicity at large doses. Future studies should investigate the mechanism of action from “ultrapotent” THC and CBD as it relates to sex, age, and tissue specific immunomodulation.

#80: **Distinguishing Leukemic Cells Using Fractal Chromatin Patterns and Machine Learning**

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Purpose

One of the most important tests in the clinical laboratory is the Complete Blood Count, which involves identifying the white blood cells in a patient's blood. The respective counts of the different white blood cell types correlate with various states of health and disease, and are critical to diagnosing diseases such as leukemia. Leukemic cells are considered especially difficult to distinguish, and it is of the upmost importance that these cells are identified correctly. To aid in the process of leukemic cell identification, we quantified fractal patterns in the chromatin of white blood cells and used the data to identify cells with a random forest algorithm. By distinguishing between cells with the help of a machine learning algorithm, we hope to improve accuracy and efficiency in the clinical laboratory and more easily identify leukemic cells.

Methods

We compiled image banks for fifteen types of white blood cells by taking pictures of patient blood samples. We then isolated the nucleus in each image and used a program called TWOMBLI to calculate various fractal parameters. Using these parameters, we calculated the average values for each cell type and compared them to one another. Additionally, we ran our data through a random forest algorithm and calculated the accuracy, precision, specificity, and sensitivity from the confusion matrix.

Results

The random forest algorithm was able to identify five different types of leukemic cells with 90% accuracy and 73% precision. We also found that the algorithm could distinguish leukemic cells from non-leukemic cells with 97% accuracy and 95% precision. The most important parameters used in the algorithm were endpoints and branch points. A t-test revealed that certain parameters, such as lacunarity and percent high density matrix, have a p-value of 1.3e-25 or lower when compared amongst cell types.

Conclusions

Our results suggest that a random forest algorithm can effectively distinguish between leukemic cells based on fractal chromatin patterns, and it is possible that a similar algorithm could be used in the clinical laboratory to assist medical laboratory scientists and pathologists in identifying white blood cells for both routine blood counts and diagnoses.

#81: Porcelain Fused to Zirconia Wing Bridge: A Clinical Trial

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Purpose

This study evaluated the durability and retention of nine porcelain fused to zirconia wing bridges with the addition of counter sunk holes in the wings. Prior to this clinical trial, preliminary in-vitro testing of bridges with porcelain fused zirconia was performed. The nine bridges were then fabricated for the replacement of missing anterior teeth.

Methods

Patients were selected from Roseman University College of Dental Medicine. To qualify for this study, patients were required to have a single missing anterior tooth with two intact abutment teeth with little to no previous restorations. Nine bridges were fabricated for eight patients. Delivery of the wing bridge was carried out by dental students under faculty supervision. Follow-up was accomplished through clinic appointments, phone calls, and text messages.

Results

The results for this clinical trial demonstrated that the porcelain fused-to-zirconia wing bridges have acceptable durability, reasonable esthetics, and sustainable retention within the time frame of this study. The complications of this clinical trial included a wing fracture prior to bonding, porcelain chipping, a fracture at the countersunk hole, and three bridges debonding (one after 10 months, one after 5.6 years, one after 6.1 years). Regarding the fracture, it was determined that although the countersunk holes provided an advantage in bond strength, they also created a weak point in the zirconia wings which lead to a fracture in this singular case.

Conclusions

Porcelain fused-to-zirconia wing bridges with countersunk holes can be a viable treatment option for patients under certain circumstances. Based on this clinical study, the success and failure of the prosthetic is tied closely to occlusal forces, bonding technique, and surface area of the wings. These bridges are a durable and retentive treatment option for patients when used as a long-term provisional or when the advantages of conservative preparation in abutment teeth outweigh the disadvantages of potential debonding.

#82: Assessing Migraine Treatment Efficacy: Shear Wave Elastography in Optimizing Osteopathic Manual Manipulation Techniques

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Purpose

Ultrasound imaging has gained significant traction in the medical field due to its safety and efficacy in diagnostics and therapeutic applications. Elastography, a specialized form of ultrasound, enables the assessment of tissue elasticity, offering both qualitative and quantitative insights into various soft tissues and organs. This modality holds substantial promise for detecting pathological tissue changes, thereby augmenting diagnostic accuracy and treatment efficacy. Our research aims to leverage Shear Wave Elastography (SWE) ultrasound to objectively evaluate and optimize the effectiveness of Osteopathic Manual Manipulation (OMM) techniques as a treatment option for migraine patients. Specifically, our study pursues two primary objectives. Firstly, to employ SWE in identification and measurement of the tonicity of suboccipital skeletal muscles of migraine patients and compare those findings to a healthy control group. Secondly, it seeks to quantify the impact of High Velocity Low Amplitude (HVLA) OMM on suboccipital skeletal muscles within the cervical spine, to measure post-treatment improvements in muscle tonicity.

Methods

We will use the GE XD9 Ultrasound machine to perform SWE. We will select subjects from existing patients being treated for migraines at the Migraine and Neuro Rehab Center (MNRC) and from those with migraine contacted by word of mouth. When working with subjects we will measure patient discomfort/pain, ROM, and other contributing factors to their migraines. We will use SWE to measure suboccipital muscle stiffness. We will identify the structure/s that are overly tight or loose with their corresponding measurements. We will perform treatment as is standard at the MNRC (OMM, neurocognitive rehab). Using SWE, we will remeasure stiffness of affected and surrounding structures and note changes. We will then reassess patient symptoms and note changes with SWE.

Results

Pending further investigation and data collection

Conclusions

Pending further investigation and data collection

#83: Effect of Low Intensity Pulsed Ultrasound (LIPUS) and Emdogain on Root Resorption in Amelogenin Knockout (AMEX) Mice

Caitlin Huynh;[1] Osama Eissa;[2] Jeremy Plonkowski;[1] David Jeong;[1] Mariam Ehsan;[3] Nazila Ameli;[1] Jacqueline Crossman;[4] Tarek El-Bialy[1]

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Purpose

In amelogenesis imperfecta, mutations are often found in the amelogenin gene. Inactivation of this amelogenin gene in 6-12 month old mice has led to root resorption in teeth and an increased number of osteoclasts in their bones. The objective of this study was to determine whether local injection of Emdogain (EMD) and low intensity pulsed ultrasound (LIPUS) application to the jaw has a synergistic effect on the regeneration of root resorption (RR) in Amelogenin knockout (AMEX) mice; the ideal model representing Amelogenesis Imperfecta.

Methods

The study consisted of 18 AMEX and 20 wildtype mice divided into 4 groups. There were 2 groups of wildtype mice and 2 groups of AMEX mice. Groups received just EMD or LIPUS and EMD. LIPUS and/or EMD was applied to the right maxillary region of treated mice for 20-minutes, for 28 consecutive days. In EMD treated mice, 30-µL of Emdogain was injected in the right maxillary region while the left maxillary region acted as a control. After 4 weeks, mice were euthanized. These scans were uploaded into 3D Slicer, a software used for manual segmentation of root resorption lacuna. RR was measured in the molars of all mice using MicroCT analysis. Total root volumes were calculated and compared between groups using statistical tests.

Results

Minimum RR was measured in the right molars of the AMEX+EMD+LIPUS group (0.00065 mm^3 ± 0.00075 (SD)). The maximum RR was found in the left maxilla of the Wild+EMD+LIPUS group (0.00467 mm^3 ± 0.0073 (SD)). There was a significant difference in the resorption volume between the Wild+EMD+LIPUS group and the AMEX+EMD+LIPUS group ($p = 0.02$) while the pairwise difference between any other groups was not statistically significant ($p > 0.05$) (Dunn's Post-hoc analysis).

Conclusions

Based on the current study, it can be concluded that EMD and LIPUS can minimize RR in AMEX knockout mice. Future studies to explain the mechanism of action of EMD and LIPUS and its effect on RR in AMEX KO mice are needed. This modality may be valuable for future patients with Amelogenesis Imperfecta.

#84: A Clustering Model of Biometric Data Collected from Patients with Cardiovascular Disease in Nigeria

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Purpose

We aim to establish a biometric baseline for patients in Nigeria with cardiovascular disease (CVD) through the creation of a clustering model. Clustering models are a way to analyze data by grouping them into clusters that share similarities. They allow for the discovery of natural groups that may exist but have not yet been described. Here, we will use a clustering model on Nigerian biometric data to identify commonalities between patients with CVD compared to patients without. These clusters can then be used to inform future patient diagnoses in that a subject whose biometric data clusters similarly to patients with CVD will be referred for CVD screening. These clusters also open the door to the use of artificial intelligence (AI). AI in its simplest form combines computer science with collected datasets to enable problem-solving. Here, we will use AI in conjunction with the proposed clustering model to create virtual clinical trials (VCTs), a means of data collection from a fully digital platform. VCTs are a cost and time efficient alternative to traditional in-clinic trials. The central hypothesis of this proposal is that a clustering model formed from biometric data of Nigerian patients with CVD combined with the development of VCTs based on AI will enable future predictive and diagnostic power. This will result in more personalized patient care and improved healthcare outcomes.

Methods

We have partnered with Monovo Care to clinically measure patient biometrics over the span of 2 months utilizing Monovo Care's FDA-approved clinical monitoring devices. Patient biometrics will be measured constantly outside of bathing. Data collected will include electrocardiogram, heart rate, heart rate variability, pulse rate, oxygen saturation, and respiration. These data will then be used to create clustering models and will be combined with AI to create VCTs for future prediction of patient outcomes and refining of recommendations for targeted genetic and cultural populations. Emphasis will be placed on genetic and cultural minority groups for which cardiovascular biometric data is currently limited.

Results

NA

Conclusions

NA

#85: Photodynamic therapy effects in the treatment of residual pockets

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Purpose

This systematic review examined the adjunctive effect of photodynamic therapy to treat residual pockets.

Methods

Scopus, Embase, Medline, and Web of Science databases were searched based on specific inclusion and exclusion criteria in January 2023. Studies that evaluated the effects of a single application of photodynamic therapy in residual pockets were included. The primary outcome examined was pocket depth with the secondary outcome being the clinical attachment level. Articles in languages other than English were excluded. Study quality was assessed based on the Cochrane Handbook for Systematic Reviews of Interventions Handbook guidelines and the ROB2 tool.

Results

A total of nine studies that examined 286 subjects were included in the review. The majority of studies, specifically six out of nine, found that the use of photodynamic therapy resulted in improved pocket depth levels. Similarly, six out of eight studies reported a favorable outcome in terms of clinical attachment levels withphotodynamic therapy. Nevertheless, these observed differences failed to achieve statistical significance. A limited number of studies revealed statistically significantimprovement in both pocket depth levels and clinical attachment levels after photodynamic therapy. The overall risk of bias was high in four studies while three studies showed some concerns and one study had a low risk of bias.

Conclusions

Based on the limited evidence available, photodynamic therapy used in combination with scaling and root planing may result in modest reductions in residual pocket depth levels and improvements in clinical attachment levels. Further high-quality research is required to establish the true efficacy of this adjunctive therapy and to enable clinicians to make informed decisions and improve patient outcomes.

#86: Efficacy of bone marrow aspirates in bone regeneration compared to conventional bone grafts- A systematic review

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Purpose

The search for a superior bone graft substitute compared to the gold standard of harvesting autogenous bone grafts has plagued dentists for decades. With the advent of tissue engineering, the search has been aimed at bone graft substitutes with osteogenic potential, in addition to the osteoinductive and osteoconductive properties. Bone Marrow Aspirates (BMAs) has evolved as a potential adjunct to conventional bone grafts that can substantially enhance the bone regeneration potential of these materials. The present systematic review aims to explore and assess the literature on the efficacy of bone marrow aspirates in new bone formation.

Methods

An electronic search of three databases, including PubMed, Web of Science, and Scopus, to identify articles published until September 2022. A supplementary manual search of references from these articles was performed to include any articles that may have been overlooked in the electronic search. Articles that evaluated the efficacy of bone marrow aspirates for new bone formation were included. Case reports, case series, commentaries, letters to the editor, and narrative or systematic reviews were excluded from the consideration. Articles in languages other than English were excluded. The articles were assessed against the ROB-II tool for Randomised Control Trials (RCTs) for risk of bias assessment. Grade assessment was followed based on the Cochrane Handbook for quality assessment. A summary of findings table was used to present the results.

Results

A comprehensive electronic search identified 150 articles from the three databases. The articles in the present systematic review included five Randomised Control Trials (RCTs) that assessed new bone formation in healthy partially edentulous patients that underwent bone regeneration with bone marrow aspirates compared to conventional bone grafts autogenous harvested bone, allogenic, and alloplastic substitutes.

Conclusions

The present systematic review suggests that adding bone marrow aspirates results in comparable results as bone graft alone. The results must be interpreted cautiously owing to its 'low quality' GRADE assessment. Future research with greater sample size, homogenous populations, and comparable digital imaging and software may provide results that can be aptly applied to broader populations.

#87: **The Dominance of Porphyromonas Gingivalis in Implant Crevice –A Clinical Research**

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Purpose

To quantify and compare the presence of Porphyromonas gingivalis in subgingival plaque sample around implant and tooth crevice using qRT-PCR.

Methods

Ten patients with healthy dental and peri - implant soft tissues, aged 25 to 60 years, having adequate bone volume and vertical inter-arch space, accommodating an implant with prosthesis were selected. Sulcular bleeding index and Pocket depth were recorded followed by collection of subgingival plaque around the tooth (Group I) and implant area (Group II) using sterile endodontic paper points. The samples were then analyzed using qRT-PCR.

Results

The peri implant site showed increased presence of P.gingivalis (60%) compared to that of natural teeth (40%).

Conclusions

Proper periodontal infection control before the placement of dental implants in partially edentulous individuals may prevent early bacterial complications and also continuous monitoring of partially edentulous teeth site making it infection free will help in the longevity of the implant

#88: Accuracy of IOL Power Calculators Following Myopic Refractive Surgery

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Purpose

Predicting refractive outcomes of cataract surgery is more difficult in eyes that have undergone keratorefractive adjustments. Various free online intraocular lens (IOL) calculators have been created to account for prior surgical history in predicting IOL power and postoperative refraction. We performed a retrospective chart review on eyes with a history of LASIK or PRK that subsequently underwent cataract surgery to assess the accuracy of these formulas.

Methods

We included 106 patients with 146 total eyes who underwent cataract surgery at a single refractive surgery center. Eyes were excluded if they had conditions that would influence refraction. Ocular measurements were inputted into the ASCRS, PEARL-DGS, and EVO calculators. The ASCRS calculator contained several formulae producing exact IOL powers to reach the actual post-operative refraction. EVO and PEARL-DGS produced predicted post-operative refractions for the implanted IOL power. IOL predictive error (IPE) and refractive predictive error (RPE) were calculated, and IPE was converted to RPE as needed. The RPE results were compared using a clustered Bland-Altman analysis, mean arithmetic error, mean absolute error, and median absolute error before and after lens optimization.

Results

Through 146 eyes, the following formulas produced a myopic RPE: EVO (-0.01 ± 0.58 D), Shammas (-0.38 ± 0.61 D), Haigis-L (-0.11 ± 0.63 D), Galilei (-0.15 ± 0.76 D), Barrett True-K No History (-0.11 ± 0.59 D), Masket Formula (-0.01 ± 0.65 D), Modified-Masket (-0.24 ± 0.73 D), and Adjusted ACCP/ACP/APP (-0.39 ± 0.85 D). The following formulas produced a hyperopic RPE: Potvin-Hill Pentacam (0.16 ± 0.62 D), OCT (0.38 ± 0.63 D), Barrett True-K (0.06 ± 0.61 D), and PEARL-DGS (0.32 ± 0.63 D).

Conclusions

The difference in mean outcomes between each formula are modest, ranging from zero diopters to almost half of a diopter. Further statistical analysis will determine the significance of these outcomes.

#89: Development of a Combination Pre-participation Dental Screening and Triaging Form

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Purpose

Athletes experience a complex array of oral health issues, two of which include: dental caries and infection/pain. These oral health conditions can impact the athlete's ability to perform well and participate in both training and competitions. Treatment costs for athletes can be minimized and potential loss of playing time reduced when carious lesions are identified and treated early-on. The objective of this study was to develop a combination Pre-participation Dental Screening and Triaging Form.

Methods

This research team utilized PubMed to review the literature regarding clinical studies on "Athletes" and "Dental Caries" to determine how dental caries were identified and classified among athletes.

Results

A total of N=7 research studies were identified. Dental caries has been identified and classified via three methods. These methods (N=7) include: (1) "Basic Percentage of Athletes", N= 4 (2) "DMFT" Classification System, N=2 (3) "ICDAS" Detection and Assessment System (N=1). Reporting caries as the "Percentage" of athletes does not give an accurate stage of caries present. Similarly, "DMFT" – gives a numbered value which includes but is not limited to caries present nor does it give an accurate stage of caries present. The "ICDAS", however, records not only caries prevalence, but the extant of caries progression. When a Sports Dentist performs a pre-participation dental screening, he/she should use the "ICDAS" assessment. However, the "ICDAS" assessment should be paired with Carious Triaging form with time frames: ICDAS 6 – pre-season, 5 – beginning, 4 – middle and 3 – end of season, and 2,1,0 – follow-up but no treatment. (This new and combined form, "Wisniewski Pre-participation Dental Screening and Triaging Form", will be displayed.) This form/concept has been used in Atlanta Braves Spring Training Physicals since 1993.

Conclusions

A new dental screening form allows for caries identification, prevalence, triaging, and treatment plan development.

#90: Antibiotic resistance-A global concern?

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Purpose

Antibiotic resistance during dental therapy is substantial, because dentists prescribe approximately 10% of all antibiotics around the world. Excessive and unnecessary use of this antibiotics could lead to resistance which is a global health problem. Hence the present study was aimed to determine the pattern of antibiotic prescription pattern and to assess the knowledge on antibiotic resistance among dentists.

Methods

A structured questionnaire was mailed to dentists, undergraduate and postgraduate students in various institutes. The questionnaire included questions about the knowledge and attitude of dentists toward prescribing antibiotics and their knowledge on antibiotic resistance and their responses were recorded. Data obtained was analysed using descriptive statistics.

Results

Out of 130 responses recorded 45.4% of dentists prefer prescribing antibiotics daily. Amoxicillin was the most often recommended antibiotic by majority (49.6%) of the practitioners, While 54.6% of dentists considered a duration of 3 days course of antibiotics for odontogenic infections. 43.7% of the respondent's considered clindamycin as an alternative in penicillin-allergic patients. Abscess was the most common (67.2%) condition considered for antibiotic prescription ,49.6% of the participants stated that availability of a particular brand as a primary factor for prescription of antibiotics. 40.3% of dental surgeons felt that failure to prescribe antibiotics was the main reason for the spread of infection. Almost 91.8% of dental surgeons were aware that antibiotic resistance was becoming a global concern. Overall, evidence suggests over prescription of antibiotics in various aspects.

Conclusions

Antimicrobial resistance (AMR) is a global health problem that increases antibiotic treatment failure and, consequently, mortality and healthcare costs. It should also be kept in mind that the most common encountered problem in a dental clinic is pain. The cause of the pain may or may not be an infection. If the cause of pain is not an infection, there is no point in prescribing antibiotics. Antibiotics may be used as an adjunct in the treatment.

#91: Comparison of Carbon Monoxide Breath Levels in Smokers and Non-Smokers—A Cross Sectional Study

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Purpose

Smoking is correlated with diverse breathing illnesses wherein carbon monoxide plays a key role in pathophysiology of such diseases. Measuring the level of exhaled carbon monoxide (CO) may also provide a simple, non-intrusive way to estimate whether a person is likely to be a smoker. The aim of the present study was to assess and compare the carbon monoxide levels in smokers and non-smokers.

Methods

A total of 200 subjects who visited the department of Oral Medicine and Radiology at our institute were randomly selected. Out of them,150 were smokers and categorized as Group A, while the remaining 50 were non-smokers, categorized as Group B. The levels of carbon monoxide levels were analyzed using PiCO bedfont smoke-analyzer and the resulting data was recorded and depicted in the form of graphs and bars.

Results

The exhaled CO levels of smokers and non-smokers were 7.40 +/-5.90,1.06+/-0.71 and cigarettes, chutta, and beedi were 7.88 +/-5.97, 2.5+/-1.73, and 2.9+/-2.93 respectively. A cutoff of 2.5 ppm or above was given with 81% sensitivity and 72% specificity to distinguish smokers from non-smokers. There was also a significant positive correlation between CO levels and daily cigarette consumption and CO levels and period of smoking, with r=0.63, p=0.0001 and r=0.272, p=0.001 respectively.

Conclusions

Clinical significance of the present study was to educate and create awareness among the smokers by behaviour counselling and CO breath analysers as well as to enhance the lifestyle by preventing the ill effects of carbon monoxide on the respiratory system and the environment.

#92: A Comparative Study of Chitra-Hydroxyapatite Silicate Granules(HASi) and Platelet Rich Fibrin in Reconstruction of Maxillary and Mandibular Benign cystic lesions

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Purpose

The main aim of reconstruction of a craniofacial defect is to restore facial form, function, and aesthetics. Chitra HASi granules is a bone substitute containing hydroxyapatite and calcium-phosphosilicate glass(HASi) developed by wet precipitation technique which is adopted for use after multiple invitro and invivo studies after confirming biocompatibility and safety.Platelet-rich fibrin (PRF) is an autologous platelet concentrate that consists of circulating stem cells, platelets, cytokines, leukocytes. The purpose of the study is to compare the regenerative effects of bone using Chitra HASi granules and Platelet rich fibrin in patients with maxillary and mandibular benign cystic lesions.

Methods

Pre-operative assessment is done using CBCT (Cone beam Computed Tomography). Benign cystic lesions of size < 4 cm is taken as inclusion criteria. Patients are randomly divided into group A and B. Group A receiving HASi Granules and group B receiving PRF .Full thickness mucoperiosteal flap is to be raised to expose the cystic area , bone above the lesion is removed to expose underlying cystic lesion, and cyst enucleation is being done. In group A- HASi granules are placed into defective site (1 vial contains 0.5 grams granules) and In Group B; patient's blood is drawn from antecubital vein, platelet rich fibrin is prepared after centrifugation for 10 min under 3000 revolutions per min, and placed in the defective site. The mucoperiosteal flap will be approximated and sutured.Post operatively, at 4th month CBCT is taken to assess healing and bone density. Bone density is measured in Hounsfield unit(HU) using NNT SOFTWARE.

Results

Group A -Chitra HASi granules shows much better bone density compared to Group B (PRF)

Conclusions

Chitra HASi granules has a higher regenerating potential in areas of cortical bone perforation and also showed much higher bone density in defective sites compared to PRF group.

#93: Comparative Evaluation of Bone Thickness in Infrazygomatic Crest Region For Optimal Insertion of Bone Screws : A CBCT Study

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Purpose

Infrazygomatic crest (IZC) is a palpable bony ridge running between the alveolar ridge and the zygomatic process of maxilla. IZC bone dimension is an important factor in the safety and stability of bone screws. IZC thickness depends on the site of insertion, angulation and height from the occlusal plane. This study embarks on a comprehensive Cone Beam Computed Tomography (CBCT) exploration, to assess infra zygomatic Crest bone thickness.

Methods

This is a cross-sectional observational comparative study conducted in Kerala population. CBCT images of 25 untreated orthodontic patients (13 males, 12 females) in the age group of 15-35 were included in this study. CBCT image was taken using a Newtom Go scanner with a voxel size of 0.15 mm. Image reconstructed using NNT software.

Results

There is significant difference in IZC bone thickness above Mesiobuccal root of 1st molar and between 1st and 2nd molar when approaching at a height of 13mm and an angle of 70 ^{o} above the occlusal plane. There is no correlation between IZC bone thickness and gender. There is no significant difference in IZC bone thickness between the right and left side for both sites.

Conclusions

The findings underscore the importance of precise screw placement in this specific region to ensure optimal stability and successful outcomes in various clinical applications. This research contributes to the existing body of knowledge by elucidating the variations in bone thickness, aiding clinicians in making informed decisions during bone screw placement.

#94: Neurocognitive Considerations and Impacts in Chronic Migraines

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Purpose

Migraine, characterized by moderate-to-severe headache, may arise from neurological, psychological, orthopedic, metabolic, or endocrine origins. Pain associated with migraine, while commonly cited as the primary patient concern, only represents a small portion of short- and long-term effects caused by the condition. Many presenting cases include neuromuscular dysfunction, increased neuronal firing, inflammation, and cortical spreading depression. These effects can induce multiple symptoms such as pain, aura, brain fog, confusion, hangover, multiple hypersensitivities, and decreased memory capacity. These effects and symptoms can lead to neurocognitive and neuropsychological deficiencies in many patients. This study aims to investigate the relationship between migraines and neurocognitive function.

Methods

Neurocognitive skills were elevated across migraine patients utilizing Creyos for data collection and analysis. Preliminary data (n=173) gathered neuropsychiatric results individually via computer program across 12 neurocognitive metrics. Migraine patients were compared to standardized results for significant variations in cognitive performance. Additionally, following treatments including chiropractic manipulations, diet modifications, posture aids, medications, and injections, several neurocognitive performance areas improved.

Results

Preliminary descriptive statistical findings indicate multiple areas with below-average performance among migraine patients. Of the 12 Neurocognitive metrics, 5 demonstrated that migraine patients scored significantly lower than average (p-value/FPR: 6.42E-13/7.71E-12; .00035/7.92E-4; 2.98E-6/8.95E-6; 2.02E-8/8.06E-8; .0004/7.92E-4) with only 2 metrics showing higher than average performance (p-value/FPR: 2.31E-10/1.38E-9; .0061;.01), and 5 within normal limits. Significant below-average metrics include episodic and verbal short-term memory, visuospatial processing and rotation, and reasoning and inhibition. Initial findings indicate neurocognitive performance increases as treatment reduces migraine frequency and regresses with migraine relapse.

Conclusions

These findings indicate a significant negative relationship between migraines and neurocognitive performance. As migraine frequency increases, neurocognitive performance decreases. Additionally, as migraine treatments reduce frequency, neurocognitive performance improves. With more data, our goal is to add a new and innovative treatment option for patients who suffer from migraines. Additionally, understanding specific neurocognitive domains affected by migraines may guide more precise treatment methods. With these treatment methods reducing the frequency of migraines, our data suggests that these patients will have increased neurocognitive skills and a decrease in negative symptoms associated with focus, organization, memory, and other neuropsychological functions.

#95: PINNACLE PRECISION: A SYMPHONY OF TISSUE ADHESIVE AND SUTURES IN PERIODONTAL FLAP SURGERY

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Purpose

Suturing is an integral part of periodontal flap surgery, but it has disadvantages such as difficulty in maintaining oral hygiene, increased post-operative discomfort, and higher infection rate. To overcome these problems, a search for an alternative like tissue adhesives, possibly a sutureless technique has been experimented. The aim of the study was to compare the stability & healing properties after periodontal flap surgery using tissue adhesive and surgical sutures.

Methods

A total of 5 patients were iincluded in this split-mouth study. Periodontal flap surgery was done on five patients bilaterally, followed by stabilisation and approximation of surgical site using 4-0 silk suture on one side (Group 1) and tissue adhesive on other side (group 2). The clinical parameters such as Roll test, Visual analogue scale and Simplified healing Index were evaluated immediately on the day of surgery and 7th day respectively.

Results

We observed that cyanoacrylate had better healing with less post-operative complications compared to the suture group.

Conclusions

Thus, cyanoacrylate tissue adhesive may serve as promising alternative to sutures for better wound stability, post-operative healing and minimal post-operative discomfort after periodontal surgery.

#96: Assessing Oral Cancer Knowledge, Attitude and Practice Amongst Dental Students

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Purpose

Health care providers may need to become more familiar with HPV and its connection to oropharyngeal cancer in order to have an impact on patient health. The aim of the study was to assess the knowledge of dental students towards HPV. In addition, we also assessed the attitude and perception towards HPV among the students.

Methods

A cross-sectional study using a self-designed, anonymous questionnaire was conducted among dental students to assess oral examination habits, delivery of advice on oral cancer risk factors, knowledge of oral cancer risk factors and clinical presentation, preferred point of referral, and attitude towards oral cancer screening.

Results

A total of 200 students participated in the study. While assessing the respondents' knowledge about HPV, 195 (97.5%) students reported that they had already heard of HPV and nearly 133 (66.5%) reported that HPV causes oropharyngeal cancer. In terms of attitude, 152 (76%) stated that they do not routinely discuss HPV as a risk factor, while 104 (52%) reported not feeling comfortable asking patients about their sexual life. In terms of prevention, while 148 (74%) stated that HPV vaccine protect against cervical cancer, just over half (n=109; 54.5%) stated that it can protect against oropharyngeal cancer.

Conclusions

Our results revealed low attitude and poor understanding among respondents about the health problems associated with HPV, its prevention, modes of transmission and arability of HPV vaccine.

#97: **Assessment of Condylar volume changes in Class II Division 2 patients treated with proclination of maxillary incisors, overbite reduction and dentoalveolar expansion using Invisalign Clear Aligners**

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Purpose

To assess the possible three-dimensional changes in condylar volume in Class II Division 2 growing patients following the use of Invisalign clear aligners to “unlock” the mandible. Unlocking the mandible was done through proclining the maxillary incisors, correcting the overbite, and expanding the maxillary arch.

Methods

The study sample was provided by (T.E), an Invisalign-experienced orthodontist in Edmonton, AB, Canada. The inclusion criteria in this study are as follows: (1) Adolescent patients (age range: 12-16 years), (2) Skeletal Class II (ANB > 4°), (3) Dental Class II Division 2 Malocclusion (molar and canine Class II, retroclined maxillary incisors, increased overbite), (4) Normal or forward grower (FMA < 29 degrees) (5) Planned dual arch Invisalign orthodontic treatment (to procline the maxillary incisors, correct the overbite and expand the maxillary arch)- except for the control group (6) Available T1 (before the start of treatment) and T2 (one year after T1) cone-beam computed tomography (CBCT) generated lateral and posteroanterior cephalograms, (7) Aligners made of SmartTrack material (year 2012 to present), (8) Good patient compliance throughout treatment as assessed by the treating orthodontist, and (9) No planned Class II mechanics.Fifteen patients served as a treatment group, and eight patients served as a control group. Individuals in both groups were matched according to age, gender, growth pattern, Class II and malocclusion severity.For each participating subject, a CBCT was obtained at T1 and T2 time points. Invisalign clear aligners were used for the treatment group to procline maxillary incisors, correct the overbite, and expand the maxillary arch. No intervention was introduced for the control group between T1 & T2. The mean condylar volume at T1 and T2 is to be analyzed with Slicer Software and to be compared between the two treatment and control groups. The semi-automatic segmentation via Slicer software and the identification of cephalometric landmarks is to be done by the principal investigator (H.M). Twenty-five percent of the samples will be randomly selected to be re-analyzed after two weeks of the first assessment.

Results

yet to be obtained

Conclusions

yet to be finalized

#98: **Masticatory efficiency improvement after Class III orthognathic surgery: Scoping Review**

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Purpose

Orthognathic surgery (OS) aims to resolve esthetic and functional concerns with the restoration of themaxillomandibular anatomical balance, which results in improved facial proportions and biodynamics.While surgical treatment results in predictable skeletal and soft tissue corrections, improvement in oralfunction is not always guaranteed. The objective of this study is to review and summarize the existingliterature regarding the impact of orthognathic surgery on the masticatory performance of patients withClass III skeletal malocclusion. This information will be useful to clinicians involved in the care of OSpatients, as well as in the design of future related research studies.

Methods

A thorough review of the literature was conducted. Six databases were searched for peer-reviewedhuman studies, including information about Class III orthognathic surgery and masticatory efficiency.Article screening was performed independently by two reviewers with the use of predefinedinclusion/exclusion criteria. Data extraction was performed independently by two reviewers with theuse of a data extraction tool. Information about article type, study design, participants' characteristics,interventions, and outcomes were extracted, summarized, and synthesized.

Results

34 studies met the review criteria: 17 cross-sectional, 12 case-control, 5 cohort studies. 19 studies withsingle jaw surgery (17 mandibular, 2 maxillary), 11 with double jaw surgery, and 4 non-specifiedprocedures. The masticatory efficiency assessments varied between studies, including the numberand/or area of occlusal contacts, masticatory muscle function, bite force measures, recordings of thechewing cycle, and chewing gum tests. The latest post-operative assessment timepoints ranged from 1-5years. Most studies (28) concluded that there is a positive direct or indirect impact of OS on masticatoryfunction, although it did not always reach the control group levels, even 3-years post-operatively.

Conclusions

Masticatory efficiency improves in most cases after Class III OS.

#99: **A Study on the Comparative Influence of Minimal Access Laser Versus Conventional Scalpel Incision on Post-Operative Outcome in Surgical Removal of Impacted Mandibular Third Molars – A Randomized Control Trial.**

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Purpose

Most commonly impacted tooth is the mandibular third molars which accounts for most of the surgical removal. it is most often due to pericoronitis. The procedure is associated with discomfort to the patients mainly due to pain, difficulty in mouth opening and swelling in the post operative days. Scalpel is the classical tool used for making the incision during surgical extraction of third molars. The disadvantage of scalpel is profuse bleeding which hamper the visibility of the surgical site for the surgeon. The advantage of the laser is that it causes coagulation and seals the blood vessels mainly arteriole so it keeps the surgical site clear. It also sterilizes the wound hence causing reduced chances of infection and eliminate the need for suturing. The aim of the study is to evaluate the influence of diode laser (zolar 810nm, 3w) and conventional scalpel incision in surgical removal of impacted mandibular third molars in terms post operative edema trismus and pain.

Methods

Pre operative difficulty assessment for extraction of mandibular 3rd molars is done using intra oral periapical radiograh. Pre operative measurements are taken. Patients who receive minimal access laser or conventional scalpel incision are selected randomly. Pain mouth opening and swelling is assessed preoperatively 2nd day and 7th day.

Results

In laser group there is significant improvement in swelling and pain on post operative 2nd day. There is no significant change in pain or swelling on 7th day in both groups.

Conclusions

Soft tissue laser when used to make the incision in lower 3rd molar extraction reduces pain and swelling in the immediate post operative days.

#100: **Exploring Glucose Dysregulation in Migraine: Insights from Continuous Glucose Monitoring**

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Purpose

Despite being associated with hypoglycemia for nearly a century, a definitive relationship between migraines and glucose dysregulation remains elusive. Accumulating evidence suggests that migraines are in part due to a metabolic mismatch between cerebral demand and available energy. Research analyzing plasma glucose levels and migraine activity may further elucidate this interface between metabolic dysregulation and migraine pathophysiology and may potentially open avenues for therapeutic interventions targeting holistic metabolism for migraine management.

Methods

We collected CGM data from 58 patients with chronic migraine and compared them to 14 controls. We analyzed the data using multiple metrics, including the Composite Glucose Index (COGI), Glycemic Risk Index (GRI), Glycemic Risk Assessment in Diabetes Equation (GRADE), Average Daily Risk Range (ADRR), Low Blood Glucose Index (LBGI), and Index of Glycemic Control (IGC), which quantify different aspects of glucose control and variability. We also calculated total glucose variance between groups and summed instances of significant glucose variation (+/- 10 mg/dL) within 25-minute periods to assess semi-quantitative glucose variance over time.

Results

COGI scores were lower in the migraine group during both sleep ($p=0.0075$) and wakefulness ($p=0.021$). GRI scores were higher in the migraine group during both sleep ($p=0.015$) and wakefulness ($p=0.035$). Migraine patients had a higher percentage of glucose values that were below 70 mg/dL during both sleep ($p=0.00468$) and wakefulness ($p=0.0087$) and had a higher hypoglycemic index while awake ($p=0.0102$). IGC scores were higher in the migraine group while awake ($p=0.025$). The migraine group had more intervals of significant change (>10 mg/dL) per day ($p=0.0128$) and a greater cumulative variance ($p=0.04$).

Conclusions

We found that the migraine patients had poorer glycemic control across multiple metrics compared to control patients, suggesting that migraine patients have a significantly more varied glycemic baseline. Despite higher average daytime blood glucose levels, migraine patients experienced more frequent episodes with blood glucose levels below 70 mg/dL and showed an elevated hypoglycemic index, suggesting a possible compensatory mechanism in migraine pathophysiology. These observations underscore the need for further metabolism-focused migraine research to unravel the intricate links between glucose metabolism and migraine, which could ultimately lead to more effective therapeutic strategies for migraine management.

#101: Vitamin D and Dental Caries

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Purpose

Insufficient levels of vitamin D has become an oral health concern as it has been linked to hypocalcification in the oral cavity. Dental caries affect nearly half of the world's population resulting in it becoming the most prevalent disease. This study aims to further analyze how vitamin D levels can affect the prevalence of dental caries.

Methods

Three cycles of data (2011-2016) from National Health and Nutrition Examination Survey (NHANES) was used for this study. Dental caries experience was measured using decayed, missing, filled teeth DMFT and untreated caries. Vitamin D deficiency were categorized as severe VDD, moderate VDD, insufficient, and sufficient. Chi-square, Man-Whitney U, and logistic regressions were used to analyze the association between vitamin D and untreated caries adjusting for socioeconomic status. Two-sided p value of <0.05 was statistically significant.

Results

Individuals with severe VDD had 2.219 times higher untreated dental caries than those with sufficient levels of vitamin D. After taking demographic factors into account, the association was stronger. This continued to be significant ($p<0.05$) after taking both added sugars and BMI into account. Vitamin D was found to be associated with dental caries experience.

Conclusions

Significant relationship was found between vitamin D levels and dental caries. Individuals with vitamin D deficiency are at a higher risk for developing dental caries. This study emphasizes the importance of dentists taking an active role in educating patients on the significance of adequate vitamin D levels for prevention of future decay. Social demographics should play a role when assessing a patient's risk for dental caries. Taking both of these factors into account will allow for a more comprehensive care approach for the patient.

#102: Assessment of Condylar Morphology in Different Facial Patterns: A CBCT Study

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Purpose

Mandibular condyle being part of the TMJ complex , its volume and shape play a pivotal role in treatment stability and outcomes in orthodontic and orthognathic patients over long term periods. Different loading patterns would result in different morphology of the TMJ. The association with different facial types and understanding the relationship between condylar position, morphology and jaw base divergence is limited. This study's objective is to assess the condylar structure which includes condylar height, width and height of the fossa in different jaw base divergences

Methods

A cross-sectional study was conducted in which 90 patients undergoing Orthodontic treatment were selected and allocated into 3 groups of 30 each namely Hypodivergent, Normodivergent and Hyperdivergent based on Frankfort mandibular plane angle. Patients satisfying the inclusion criteria were subjected to the lateral cephalogram and CBCT under standard resolution and FOV of 8 x 8 cm2 with the teeth in maximum intercuspation. On the obtained DICOM image ten anatomical landmarks were marked and analysed using the Carestream imaging software. The results were then statistically analysed using ANOVA.

Results

The average values of the condylar width, height, and axis angulation showed statistically significant values in the hypodivergent and superior joint spaces in the hyperdivergent group respectively

Conclusions

Hypodivergent individuals have condyles which are larger in size and larger condylar axis angles. Whereas, hyperdivergent individuals have more superiorly positioned condyles. This relationship has to be considered while planning orthodontic treatment.

#103: The effect of deep marginal elevation on fatigue of indirectly restored permanent molars: A systematic review

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Purpose

This systematic review examines the effect of deep marginal elevation on the fracture resistance, stress distribution of indirectly restored permanent molars.

Methods

An electronic search was performed on PubMed, Scopus,Web of Science and Google Scholar databases to identify relevant articles to be included in the review until June 2022.

Results

Analysis of fractureresistance showed best results when indirect restorations were placed directly ontotooth surface, though there was no difference in performance of groups with DME.Indirect resin composite restorations exhibited more catastrophic failures as compared to ceramic. Stress distribution was limited to restoration/DME material in ceramic restorations. DME did not statistically significantly affect the fracture strength.

Conclusions

Even though the specimens without DME exhibited better results in in vitro studies, the difference between outcomes was not statistically significant. Clinical survival rates of teeth and restorations with DME is comparable to that without DME. Further long term clinical assessment is necessary to corroborate laboratory findings with clinical outcomes.

#104: Change in Basic Pulmonary Function in Response to Altitude Change

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Purpose

This study aims to determine if there is a lasting effect in lung function when an individual relocates from an area of low elevation to an area of high elevation.

Methods

Our study monitored changes in pulmonary function over time after individuals moved from a region of low elevation (1,000 feet above sea level or lower) to a higher elevation area (4,500 feet above sea level in Provo, Utah). We followed incoming students to Noorda College of Osteopathic Medicine from places of elevation lower than 1,000 feet. Spirometry was used to assess forced vital capacity (FVC) and peak expiratory flow (PEF) rate. Initial testing on subjects was completed on days three and seven after arriving in Provo and repeat testing occurred monthly over the subsequent 4 months to track changes in the above markers. Test values were assigned to a confidential subject number and lung function was graphed over time.

Results

No significant changes were observed in forced vital capacity and peak expiratory flow rate over time. However, an additional discovery revealed a correlation between sex and height when compared to FVC, as well as a correlation between weight and height when compared to PEF.

Conclusions

The primary goal of this research is to deepen our understanding of how changes in elevation impact pulmonary function and how rapidly our lungs can adapt to such changes. We anticipate that this data will prove valuable for individuals relocating to higher elevations from regions of lower elevation, reassuring them that there is no significant alteration in forced vital capacity and peak expiratory flow rate.

#105: Assessing the Impact of Spinal Manipulative Therapy on Thoracic Range of Motion Using DARI Motion Capture

Layla Risdon;[1] Luis Alvarez;[1] Cassidy Byers;[1] Nick Curtis;[1] Davis Elm;[1] Louis Michelon;[1] Michael Milius;[1] Andrew Mortensen;[1] Tallon Muhlestein;[1] Natalie Tate;[1] Garret Vincent;[1] Christina Small;[1] David Sant;[1] John Kriak;[1] Kurt Alexander;[1] Kyle Bills[1]

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Purpose

This research proposal investigates the effects of spinal manipulative therapy (SMT) on thoracic range of motion using DARI™ 3-D Markerless Motion Capture (DARI™). Limited thoracic range of motion (ROM) can adversely affect musculoskeletal health, resulting in discomfort, reduced flexibility, and compromised function. This study proposes to assess participants' initial thoracic range of motion using DARI™ exercises, followed by either sham treatment or administration of spinal manipulative therapy and reevaluation of range of motion to identify changes. The existing literature suggests that SMT exhibits a small effect on ROM, particularly in the cervical spine. However, it is noted that further research should shift its focus to areas of the spine with the potential for substantial improvement, where changes can be readily discerned. This recommendation aligns with the current study's emphasis on investigating the thoracic spine, an area that may demonstrate more noticeable improvements in ROM following SMT. Additionally, DARI™ technology enhances the potential for demonstrating improvements in thoracic range of motion. Previous research has shown that DARI™ motion capture, due to its high technological reliability and minimal risk, allows for more frequent measurement of patients' movement characteristics compared to alternatives including X-rays and MRIs. The precision and frequency of DARI™ measurements are expected to significantly contribute to uncovering and quantifying changes in thoracic range of motion following spinal manipulative therapy.

Methods

Thoracic range of motion data will be collected using the DARI™ system’s suite of standardized patient movements, providing precise and comprehensive measurements before and after spinal manipulative therapy. Collected data will be analyzed using paired t-tests and linear mixed models to determine changes from baseline and between groups.

Results

NA

Conclusions

We hypothesize that spinal manipulative therapy techniques will lead to a significantly greater improvement in thoracic range of motion than the sham group. This research is essential for understanding the direct effects of SMT on thoracic ROM, contributing valuable insights to enhance clinical practices and develop evidence-based interventions for individuals experiencing limitations in thoracic mobility.

#106: Behind the Spine: Investigating Cervical Posture, Range of Motion, and Their Role in Mental Health

Layla Risdon;[1] Luis Alvarez;[1] Cassidy Byers;[1] Davis Elm;[1] Louis Michelon;[1] Tallon Muhlestein;[1] Natalie Tate;[1] Garret Vincent;[1] Christina Small;[1] David Sant;[1] Kurt Alexander;[1] Kyle Bills[1]

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Purpose

This research explores the correlation between abnormal forward head posture, cervical range of motion, and psychiatric disorders. Specifically, the study examines the relationships between the loss of cervical lordosis and anxiety, depression, and ADHD. Previous studies have demonstrated the beneficial effect of manipulative therapy on forward head posture and provided a link between postural alignment and cognitive function. This investigation aims to build on existing literature and enhance understanding of how loss of cervical lordosis impacts cervical and overall range of motion as well as its potential association with psychiatric conditions.

Methods

We will assess participants' baseline posture, cervical range of motion, and global range of motion using the simple ruler method, a posture screening application called PhysioMaster or APECS, a cervical range of motion measurement app called Goniometer Pro, and DARI Markerless Motion Capture. We will conduct psychiatric testing and evaluation to explore the connection between study subjects' physical and psychiatric symptoms using Creyos software. The study will consist of two phases: an initial testing phase and a six-month intervention period. During the intervention period, participants exhibiting a loss of cervical lordosis will undergo spinal manipulative therapy. We will perform monthly post-treatment assessments using the same measurement tools engaged during the initial screening to evaluate the link between cervical lordosis and psychiatric symptoms and the effectiveness of the intervention in treating these symptoms.

Results

NA

Conclusions

This research aims to provide an understanding of the intricate connection between the loss of cervical lordosis, musculoskeletal function, and neuropsychiatric well-being. Our hypothesis suggests that an abnormal forward head posture can result in a decreased range of motion in the cervical spine and overall body and may be associated with anxiety, depression, and ADHD. The study outcomes have the potential to reveal new possibilities for integrated therapeutic interventions addressing both physical and mental health domains.

#107: Impact of Non-Surgical Periodontal Treatment on Salivary HIF-1α in Gingivitis and Periodontitis Patients

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Purpose

To estimate and compare the level of salivary HIF-1α in periodontally & systemically healthy volunteers, generalized chronic gingivitis & periodontitis patients before and after non-surgical periodontal treatment

Methods

A total of 24 subjects were selected and categorized into three groups. Saliva samples were collected and periodontal parameters were assessed before and 90th day after intervention. Molecular analysis was carried out for detection of HIF-1α using enzyme linked immunosorbent assay (ELISA).

Results

Following non-surgical periodontal treatment, periodontal parameters were improved significantly in patients with gingivitis and periodontitis. The level of salivary HIF-1α was also found be to be reduced after non-surgical periodontal treatment.

Conclusions

This study proves that HIF- 1α can be used as potent biomarker to assess the effect of periodontal treatment and also signifies its possible interlink between hypoxia and periodontal disease pathogenesis.

#108: Vitamin B1 derivatives benfotiamine and fursultiamine prevents glioblastoma cells growth in vitro and in vivo

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Purpose

Brain tumors are responsible for over 15,000 deaths per year with 49% of those tumors defined as glioblastomas, the most malignant and aggressive forms of CNS tumors. Five-year survival rates currently only stand at 36% with treatment options limited to supportive care, tumor resection and intensive chemotherapy regimens. Some immunotherapies have demonstrated marginal effectiveness but present considerable risks to patients. Thiamine, more commonly known as vitamin B1, has been shown to play a crucial role in the regulation of cellular metabolism and the nervous system. Benfotiamine and fursultiamine are the lipid soluble derivatives of Vitamin B1 with better absorption and retention rate when compared to water soluble thiamine. Benfotiamine and fursultiamine with their potent antioxidative and anti-inflammatory actions shown to prevent several complications including diabetic neuropathy, neurodegenerative diseases, alcoholic polyneuropathy. However, their anti-carcinogenic effects are not well known. Therefore, we hypothesize that benfotiamine and fursultiamine could prevent glioblastoma in vitro and in vivo

Methods

Human glioblastoma (U87) cell lines obtained from ATCC were incubated in Eagle's Minimum Essential Media (EMEM) in the absence and presence of various concentrations of benfotiamine and fursultiamine for 24 and 48 h. Cell viability was determined by MTT assay in a time- and dose-dependent manner. We will next examine how vitamin B1 derivatives prevents the growth of U87 cells by examining the apoptosis by Annexin-V staining, and live-dead cell assay kits. Expression of various pro-apoptotic factors, anti-apoptotic factors and other inflammatory factors will be determined by specific antibody array kits. Finally, we will inject glioblastoma cells in the athymic nude mice xenograft model and examine the growth of glioblastoma in the mice treated with vitamin B1 derivatives.

Results

Our initial results indicate that the vitamin B1 derivatives, benfotiamine and fursultiamine, decrease the growth of glioblastoma cells at optimal concentrations of 50µM benfotiamine and 75µM fursultiamine. Further, research work in progress to understand the molecular mechanisms.

Conclusions

So far, our studies indicate that lipid soluble derivatives of thiamine could prevent the growth of glioblastoma cells in culture.

#109: **An Analysis of Artificial Intelligence Studies in Dentistry: Clinical Applications and Next Steps**

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Purpose

Artificial intelligence (AI) is a novel technology that is taking every industry by storm because of its ability to mimic human cognition. Several industries are looking into how to leverage AI to transform their operations, products, and services. Dentistry is no stranger to that with AI studies dating back to 2011. The objective of this literature review is to analyze AI studies in dentistry and highlight the clinical applications, challenges, and next steps for future research.

Methods

A database search was conducted across the following databases: Google Scholar, Web of Science, Clinical Keys, Cochrane, PubMed, and Scopus. Search was initiated using simple, non-specific search terms such as [“AI” or “Artificial Intelligence” and “Dentistry”] and evolved into a more targeted query, incorporating dental specialties and clinical terms. An example of such a query is [("Diagnosis" OR "Prognosis") AND ("AI" OR "artificial intelligence" OR "Artificial Intelligence") AND ("dentistry" OR "dental") AND ("decision-making" OR "clinical decision making") AND ("orthodontic" OR "orthodontics")]. Additionally, a different database search was conducted for studies that explored the link between oral and systemic health. AI studies were limited to those published between 2017-2023, whereas the search for links between oral and systemic health contained no restriction.

Results

41 articles were incorporated in this review with 37 pertaining to AI and 4 to the relationship between oral and systemic health. From the collection of AI studies, the following 6 clinical applications were determined: Diagnosis, Prognosis, Risk Assessment, Treatment Planning, and Decision Support. Some articles could be fit into one category, however, most overlapped multiple clinical applications. In analyzing the articles, both individually as well as collectively, three issues were identified: 1), deficit in non-retrospective study designs, 2), lack of clarity in data used to train AI, and 3), studies testing AI’s ability to incorporate varying sets of data to aid the clinician in the above-mentioned applications.

Conclusions

AI is a tool that could create value in the field of dentistry. However, more studies, specifically prospective and RCTs need to be conducted to understand its role and value in the dental setting and develop guidelines for dentists to follow.

#110: The efficacy of TADs in skeletal open bite correction

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Purpose

Skeletal anterior open bite (AOB) is a type of malocclusion characterized by a lack of vertical overlap between the anterior teeth. The etiology is variable, but the most common cause is the vertical overgrowth of the maxillary posterior dentoalveolar processes. It is arguably one of the most difficult malocclusions to treat and retain in orthodontics. The emergence of temporary anchorage devices (TADs) has made the correction of skeletal AOB cases possible without the need for surgery. The objective of this scoping review is to summarize the currently published evidence related to the efficacy of skeletal AOB correction using TADs.

Methods

A thorough review of the literature was conducted. Six databases were searched for peer-reviewed human studies, investigating the efficacy of TADs in skeletal AOB correction. Article screening was performed independently by two reviewers with the use of predefined inclusion/exclusion criteria. Data extraction was performed independently by two reviewers with the use of a data extraction tool. Information about article type, study design, participants' characteristics, interventions, and outcomes were extracted, summarized, and synthesized.

Results

33 studies met the review criteria. 30 cohort studies, 2 randomized controlled clinical trials, and 1 case-control study. Most studies (21) included skeletally mature subjects, whereas the rest of the studies used mixed-age samples. Mini-screws/mini-implants were used in most studies (23) positioned on the maxillary alveolar process and/or palate with an average 1st molar intrusion of 2.6 (1.6-4)mm and treatment duration 12.8 (0.7-27.6) months. Mini-plates fixated on the zygomatic buttress area were used in 10 studies, with an average of 2.8 (1.5-3.6)mm 1st molar intrusion and an average treatment duration of 14.8 (3-29.3) months. In 30/33 studies the efficacy of the TADs in the correction of skeletal OB has been confirmed.

Conclusions

Initial correction of skeletal AOB was successful in most cases with the use of TADs.

#111: Estimation of SARS-CoV-2 IgG Antibodies in Healthcare Worker-Administered Covishield and Covaxin Vaccines at a Tertiary Care Hospital in Jharkhand, India

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Purpose

To mitigate the impact of the COVID-19 pandemic caused by the SARS-CoV-2 virus, global distribution ofvaccines such as Covishield and Covaxin has been undertaken. This research aimed to assess the responsesand potential differences between these vaccines by examining the presence and levels of SARS-CoV-2 IgGantibodies in healthcare professionals who received them.

Methods

A comprehensive cross-sectional study was conducted at a tertiary care facility in Ranchi involving 227healthcare professionals who had completed both doses of either Covishield or Covaxin. Blood samples werecollected and subjected to chemiluminescence immunoassay analysis to measure IgG antibodies.Demographic data, immunization records, and previous COVID-19 infections were recorded. Statisticalanalyses, including analysis of variance (ANOVA), linear regression, and independent sample t-tests wereperformed.

Results

Antibody titers exhibited variability, potentially influenced by factors. There was no difference in antibodytiters between recipients of Covishield and Covaxin vaccines. Linear regression analysis revealed acorrelation between antibody levels and the number of days after vaccination. Factors such as age, gender,blood group, and prior COVID-19 infections did not significantly impact antibody titers.

Conclusions

This study contributes to responses elicited by Covishield and Covaxin vaccines among healthcare workers.The results highlight that Covishield showed a higher mean titer value than Covaxin, which is notstatistically significant. The overall model showed statistically significant results indicating age, type ofvaccine, number of days after vaccination, blood group, and previous history of COVID-19 infectioncollectively influenced the CoV-2 IgG titer values. The findings indicate that age, number of days aftervaccination, and prior history of COVID-19 infection have substantial relationships with the CoV-2 IgG titer,but sex, vaccine type, and blood group show lesser, nonsignificant associations.

#112: **Psychedelics for Pharmaceutical Use - What the literature says 2018-2023**

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Purpose

Mental health continues to be an area many struggle to find effective therapeutic relief. Given the increase utilization of psychedelics for depression, anxiety, and other related illnesses the purpose of this study is to identify peer reviewed articles in the scientific literature to describe efficacy of the pharmaceutical use of MDMA, Psilocybin, and ketamine for the treatment of depression and anxiety disorders.

Methods

A literature review was conducted on April 11th, 2023. Terms included 'psychiatric' and 'psychedelic'. Restrictions limited articles to English, publication dates from 2018 on and only human subjects. Exclusion criteria included end-of-life anxiety, autism, addiction, CBD, LSD, OCD, alcohol, and Ayahuasca, Illicit drug use and results with self-reported information.Once screened, 70 articles remained, they were further categorized into psilocybin, 3,4-methylenedioxymethamphetamine (MDMA), and ketamine. 11 articles discussing the pharmaceutical use of psilocybin for depression were identified for analysis; 12 articles for MDMA, and 4 for ketamine.

Results

Sample sizes in Ketamine studies were 7 to 1247 participants. Ketamine was used sublingually, IV, IM, or intranasally. Recorded results used PHQ-9, GAD-7, SHAPS, MADRS and CADSS. Persistent results occurred in up to 62.8% of patients with results evident as early as one day post-treatment initiation. Adverse events included nausea, vomiting, agitation, and sexual dysfunction in up to 4.7% of participants.Psilocybin study participants' ages ranged from 18 to 80. Mental health professionals supervised most trials. Depression remission rates reached up to 67%. Common side effects included headache, nausea, and increased blood pressure.MDMA studies consisted of predominately adult Caucasians, with females represented equally. Psychotherapy and MDMA administration were simultaneous. Doses ranged from 75-187.5 mg, often accompanied by a supplemental second dose. The CAPS-5 test shows symptom reduction and PTSD remission effects averaging 3.5 years.

Conclusions

Results of this literature review show the potential of these psychedelics for the treatment to be long lasting with minimal side effects. Additional research is needed with larger study sample sizes, randomized controlled trials, increased patient ethnic diversity, and long-term studies of efficacy and side effects. Monitoring of pharmaceutical treatment as well as involvement of mental health professionals and treatment plans is essential.

#113: **Edible mushroom-derived compound, vialinin-A, prevents ocular inflammation.**

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Purpose

Uveitis an ocular inflammatory complication is one of the major causes of visual impairment worldwide with unknown etiology. Infections, autoimmune diseases, and other unknown factors could lead to this complication that damages the uveal tract as well as adjacent ocular structures. Corticosteroids are commonly used for the therapy of uveitis. However, their prolonged use has several unwanted side effects. Therefore, the development of potential therapeutic approaches is required to treat ocular inflammatory complications with better safety and efficacy. Vialinin-A, isolated from the edible Chinese mushroom, has been shown to be a potent antioxidant with anti-inflammatory actions. However, its role in preventing uveitis is not known. We hypothesize that vialinin-A, with its potent antioxidative and anti-inflammatory actions, could prevent ocular inflammation in normal and hyperglycemic conditions.

Methods

We will use human non-pigmented ciliary epithelial cells (HNPECs) and Thp-1 monocytes to determine the anti-inflammatory effects of vialinin A. The cells will be treated with LPS and/or high glucose in the absence or presence of vialinin-A, and cell viability will be determined by MTT assay in a time- and dose-dependent manner. The expression of various inflammatory cytokines, chemokines, and growth factors will be determined by multiplex assays. Endotoxin-induced uveitis will be developed in normal and diabetic rats, and the effects of vialinin-A treatment in preventing ocular inflammation will be examined in various ocular tissues.

Results

The proposed research work is in progress.

Conclusions

We expect that vialinin-A could be developed to treat ocular inflammatory complications.

#114: Modified Zero-Gravity Chair and Bed in the Management of Anxiety and Insomnia with Emphasis on Pre and Post Anesthesia for a Surgical Procedure

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Purpose

The purpose of this research is the integration of a zero-gravity chair with planar vibration as a non-pharmaceutical approach to preoperative anxiety and postoperative pain management. The treatment plan involves preoperative familiarization with the chair's vibrational patterns and postoperative use for pain relief. Integration of this approach holds promise in reshaping postoperative care paradigms, advocating for personalized, holistic interventions to enhance patient well-being and mitigate opioid-related risks.

Methods

Patients undergoing various surgical procedures are considered for inclusion in the study, particularly those with a history of polypharmacy, opioid use, and heightened preoperative anxiety. Selection criteria is aimed at representing diverse surgical populations. To evaluate the risk of opioid misuse, the Opioid Risk Tool and Hamilton Anxiety Rating Scale (HAM-A) were administered. The Opioid Risk Tool provided a self-reported screening exam, categorizing patients into low, moderate, or high risk for future opioid abuse. The HAM-A assessed psychological and somatic symptoms related to anxious mood. The intervention involved introducing patients to a zero-gravity chair with planar vibration patterns designed for relaxation. Patients are instructed on adjusting vibrational settings for optimal comfort. The chair is aimed to shift the focus from somatic discomfort to relaxation, potentially reducing pain, depression, and anxiety. The primary outcome measures included pain control, opioid dependence, and recovery time. The effectiveness of the intervention will be evaluated based on the patients' reported experiences and any observed changes in postoperative care requirements.

Results

N/A

Conclusions

N/A

#115: Factors Leading to White Blood Cell Misidentification

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Purpose

Manual white blood cell (WBC) differentials performed in clinical laboratories contribute important diagnostic information for the care of patients. In order to improve the accuracy of those who perform this procedure, potential sources of WBC misidentification must be investigated. The purpose of this study is to elucidate factors that lead to WBC misidentification in clinical laboratories.

Methods

In an online study, participants were shown pictures of 19 WBCs, one at a time, asked to identify each cell, and provide reasoning for the identification. Two pictures were identical, only rotated, allowing for observation of consistency in WBC identification. Information regarding participants' level of education, certifications, and years of experience was also collected. 26 of the 46 participants provided identification for at least 14 of the 19 cells. The response for each cell was analyzed by the number of responses identifying the cell as correct, partially correct, and incorrect to determine which cells were more commonly misidentified. Text responses supporting the reasoning leading for each WBC identification were evaluated for factors leading correct and incorrect WBC identifications.

Results

Those holding a bachelor’s degree represented the majority of respondents. Experience varied between 20 years and <1 year. The data showed a slight inverse correlation between score and experience, and no correlation between score and education level. Cells with accuracy above 90% correct included monocytes, a lymphocyte, segmented neutrophil, and eosinophil. Two cells, a reactive lymphocyte and promonocyte, were identified incorrectly 74% and 92% of the time respectively. Observation of the reactive lymphocyte’s bluish edges aided in correct identification, while the color and appearance of vacuoles was a detracting factor. For the promonocyte, observation of the nuclear shape was essential. For the repeat cell, 78% of the respondents gave a consistent identification of the cell in both instances.

Conclusions

Overall accuracy of survey respondents in identifying WBCs was 69%. Overemphasis of minor morphological features at the expense of more significant features was the predominant cause of WBC misidentification. Further research will need to be done to determine ways to address this pitfall in clinical laboratories.

#116: Medication Errors Among ALS Providers in the Prehospital Setting

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Purpose

EMS providers administer a variety of medications to patients in the prehospital environment, and while there are numerous published studies on medication errors pertaining to the hospital environment, there are comparatively fewer studies which focus on the prehospital environment. Therefore, the purpose of this survey is to investigate the type and frequency of medication errors occurring in the prehospital environment.

Methods

A 28-question survey was constructed utilizing SurveyMonkey software (Momentive, Inc). This survey contained a variety of questions aimed at determining the type and frequency of medication errors occurring among EMS providers in the previous 12 months, including a matrix of dropdown menus that permitted respondents to specify medication error type and frequency from 12 error categories. Following IRB review and approval (protocol # 446), the survey and informed consent form were distributed electronically to EMS providers via media, social media, and email from January 30, 2023 to March 1, 2023. Filtered survey data were exported to ensure that only qualified responses (completed and submitted responses) were included in the final data analysis.

Results

A total of 192 qualified responses were returned. Of these qualified responses, 175 were paramedics and 144 were nationally registered paramedics. The mean reported experience was 18.24 (SD = 11.24) years. From the error categories provided in the survey, there were 99 reported instances of medication errors that occurred during the previous 12-month period. The type and frequency of drug errors in descending order were dosage errors (32.32%), indicated drug not delivered (21.21%), rate errors (14.14%), allergic reaction after failing to obtain allergy history (11.11%), route errors (5.05%), administered incorrect drug (5.05%), administered expired drug (4.04%), incorrect timing (3.03%), incorrect concentration (2.02%), non-indicated drug delivered (1.01%), incorrect patient (1.01%), and incompatible drugs delivered (0%).

Conclusions

While all the reported drug errors have the potential to cause serious harm and even death, dosage errors, which were the most frequently reported error type in this study, are cited by the FDA as the most common error type linked to mortality in patients. Therefore, additional research is required to identify and address factors contributing to medication errors in the prehospital environment.

#117: Evaluating EEG Monitoring of Standard TMS Intervention for Anxiety

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Purpose

Transcranial magnetic stimulation (TMS) is a non-invasive procedure designed to induce a magnetic field around the brain to stimulate or quiesce neurons. TMS received FDA approval to treat anxious depression in 2021. Using the WAVi EEG system and analytical pipeline software, we aim to identify specific brainwave ratios during active TMS treatment. Currently, the only approved diagnostic EEG measurement is theta/beta ratios for diagnosing ADHD. The results from this study will aid in identifying unique markers for diagnosing State or Trait Anxiety. This study will investigate the use of the WAVi EEG system to visualize the effects of TMS on anxiety in real-time, allowing physicians greater insight into neurological reactions to stimulus and a better understanding of mechanistic functionality of TMS anxiety treatments.

Methods

Participants are screened using a Hamilton Anxiety Rating Scale (HAM-A) to establish trait anxiety baseline, with initial EEG readings to establish brainwave ratios. Subsequently, artificially heightened anxiety (state anxiety) provides a reference for EEG-measured response to anxiety. Following comparison of baseline EEG readings to anxiety-induced EEG readings, subjects are provided TMS treatment. A repeat of HAM-A and EEG ratio evaluation will indicate the localized and time-sensitive areas of response following TMS treatment.

Results

Preliminary results indicate that higher gamma and beta readings correlate with anticipatory anxiety, and an increase in anxiety from baseline. Additionally, theta/beta ratios demonstrate an association with greater declines in attentional control. Following TMS treatment, we expect a relative decrease in gamma and beta readings and decreased theta/beta ratios. Additionally, because lower alpha/beta ratios correlate with state anxiety paradigms in FP1 and FP2, we anticipate that in following treatment, these ratios will increase.

Conclusions

We conclude that utilizing TMS treatment with EEG concurrently assists in visualizing the mechanistic processes of state and trait anxiety, and their treatment with TMS. Future directions include utilizing the HAM-A classifications to determine similarities or differences between EEG response in state vs trait anxiety patients following TMS. Including patients with an active diagnosis of Generalized Anxiety Disorder (GAD) will help establish brainwave effects of TMS treatment.

#118: **Association of Vitamin D Receptor (VDR) genes with Hypomineralization: Anarrative review**

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Purpose

This paper elucidates the critical role that VDRs play in the hypomineralization of teeth.

Methods

Pubmed, Medline, Scopus, Embase and Web of Science database were used with the following keywordsvitamin D receptor, enamel mineralization hypomineralization, vitamin D, dentin mineralization molar incisor hypomineralization.

Results

Vitamin D and its receptors (VDRs) play a vital part in calcium and phosphate absorption which in turn has a significant role in enamel and dentin mineralization during tooth formation. Any alteration in the VDR pathway will result in hypomineralization or hypermineralization ascribed to insufficient calcium andphosphorous levels in the circulating plasma.

Conclusions

Vitamin D, acting through its receptor VDR, has an effect on blood calcium levels which affects enamel and dentin mineralization of tooth. Timely access tosufficient amount of vitamin D and by association VDR is essential for protensive regulation of mineralized enamel and dentin.

#119: Correctly Fitting the Q-Collar by Measuring Changes in Brain Compliance through Tilt Table Testing.

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Purpose

Repeated instances of concussion, characterized by temporary loss of consciousness or confusion pose a considerable threat to the long-term well-being of the brain. This heightened risk is particularly evident in the realms of aggressive team sports. The Q-collar, a device designed to reduce the risk of head injuries by inducing a level of stiffness in the brain through moderate compression of the jugular vein, could help reduce future neurologic damage. The success of this intervention hinges on critical factors such as proper sizing, individualization, clear instructions for use, and consistent wearing. As the incidence of repeated concussions remains notably high, especially in the context of high school and college-level sports, understanding and implementing interventions like the Q-collar becomes crucial for the overall well-being of the affected individuals. The study seeks to comprehensively investigate the efficacy and impact of the Q-collar in mitigating the risks associated with repeated concussions, with a specific focus on its application in high-risk scenarios such as competitive sports and other activities prone to head injuries.

Methods

To test the effectiveness of proper sizing of a Q-collar, we plan to place participants on an inversion table at several positions and measure changes in brain compliance with the Q-Collar and without. The inversion table will be utilized in two ways: stopping at +45, 0, -15, and -30 degrees and secondly a continuous excursion from start to stop, upright at +45 to -30 and back again. To measure this, we will monitor the pulse at the supra-orbital artery (SOA) with a forehead pulse sensor and then compare that to a pulse monitor placed on the forefinger that the patient will hold positioned over the lower sternum. We will also work in unison with a group of engineers from the BYU engineering department, they will calculate the phase shift of the Fast Fourier Transform (FFT) of the waveforms from both the SOA and forefinger. Using both the FFT and the changes in pulse we will be able to calculate the changes in brain compliance to measure the efficacy of the Q-collar that is correctly fitted.

Results

NA

Conclusions

NA

#120: Modified Tunnel Technique for Management of Gingival Recession in Esthetic Zone Using Platelet Rich Fibrin – A Case Report

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Purpose

Gingival recession poses to be a challenge in periodontal practice. Various techniques have been proposed to cover the denuded root surface and to advance the marginal gingiva to cover the recession defect. Among these, the Modified tunneling technique which comprises of preparation of a supra periosteal mucosa flap with intrasulcular incisions has proved to be successful in achieving optimal root coverage. This allows the mobilization of the cervical gingiva and, therefore, the creation of a "pouch". Hence, the aim of this case report was to demonstrate the application of modified tunnel technique for root coverage in Miller's Class I recession defect.

Methods

: A 20 year old systemically healthy female patient reported to the outpatient Department with chief complaint of sensitivity in the lower front teeth region for the past 3 months. Clinical evaluation revealed RT2 (Clinical attachment level-5 mm, Recession depth-3mm) in relation to 31 (2017 classification of phenotype and gingival recession- Cairo's Classification). Following phase I therapy frenotomy was performed in relation to lower labial frenum. Four weeks of post operative healing, root coverage was planned. Intrasulcular and vertical vestibular incisions were made through the periosteum in the interdental area, from the vestibular depth apically to beneath the papillae that remained intact. A subperiosteal tunnel was created. Platelet rich fibrin (PRF) was placed in the tunnel and stabilized at the mesial and distal ends using 5-0 vicryl suture. Periodontal dressing was placed in the surgical site for a period of 2-weeks.

Results

The results of the study showed predictable outcomes for root coverage with a gain in the clinical attachment level (4mm) along with the reduction in the recession depth (2mm).

Conclusions

The proposed technique is promising for the management of deep mandibular anterior recessions, as it provides optimal root coverage and esthetic results.

#121: **Fixation of Customized Healing Collar Using Flowable Composite in Implant Placement Following Horizontal Ridge Split Procedure Using PRF and Bone Graft**

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Purpose

Ridge augmentation of the deficient alveolar ridge is often required to compensate for the bone loss and to make it suitable for an implant placement. In this case report, we followed the technique of ridge split technique with simultaneous PRF and bone graft in implant placement using customized healing collar and flowable composite in the anterior maxillary region.

Methods

Twenty five year old male patient reported to the out patient department with a chief complaint of missing 21. Patient gave a history of traumatic extraction after failed endodontic treatment in relation to 21. Patient had been using a removable partial denture in missing region for past 4 years after extraction. On examination the edentulous site was atrophic. Treatment planning included Ridge split technique with customized healing collar using flowable composite, prf and bone graft in order to improve the width of soft and hard tissue. Following which the permanent prosthesis was placed after 6 months.

Results

Five years follow up showed no significant bone loss and good emergence profile.

Conclusions

The ridge split technique with simultaneous implant placement can be one the best treatment option for horizontal augmentation of narrow alveolar ridges. Thorough preoperative evaluation, precise surgical and prosthetic protocol are required to achieve predictable clinical results.

#122: Treatment of Craniofacial Problems With Stem Cells in Dentistry

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Purpose

To focus on regenerative capabilities and self-renewal abilities of stem cells on bone and tissue regeneration

Methods

We examined articles published from the years 2013 to 2023, selecting relevant papers from databases including PubMed, Web of Science, and Scopus. The selection process focused on stem cells in oral tissue and bone regeneration for potential bone and periodontal tissue formation. Out of 2,408 articles screened, 19 articles met the inclusion criteria for this review.

Results

The majority of the studies were lab trials (52.6% of articles). 53.57% of articles included Dental Stem Cells, 35.71% of articles included Mesenchymal Stromal Cells, 10.71% of articles included Blood Stem Cells, 7.14% of articles included Periodontal Ligament Stem Cells. Stem cells showed benefits prominently in Bone Regeneration and Repair (36.84% of articles), followed by Biomedical Applications and Therapeutics (26.32% of articles), and Advanced Cell Therapies (10.53% of articles). Successful bone and tissue formation were evidenced in almost all of these studies.

Conclusions

This study offers a comprehensive review of the role of stem cell-based tissue and bone regeneration in craniofacial problems in dental applications. It demonstrated the effectiveness of stem cell-based techniques. These findings have significant implications for advancing regenerative medicine for correcting craniofacial abnormalities through advancements in efficacy and bioengineering.

#123: **Complicated by Bilateral Cystadenomas: Insights from a Surgical Intervention Case**

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Purpose

Cystadenomas are benign neoplasms occurring in the ovaries and other glandular tissues. They can contain mucinous or serous fluid-filled cysts, categorizing them as mucinous cystadenomas or serous cystadenomas. While typically non-cancerous, their size and location can lead to significant clinical concerns, including pain, bloating, pressure on surrounding organs, and in some cases, potential for malignant transformation. In pregnant individuals, the management of cystadenomas can be particularly challenging due to the need to balance the potential risks to both the mother and the fetus. The purpose of this case report is to discuss the management of a pregnant patient with cystadenomas and highlight the surgical approach that was taken.

Methods

A 25 year old female in her 9th week of pregnancy presented with lower abdominal pain, hyperemesis, fatigue, and insomnia. Physical examination revealed an abdominal girth of 26 cm, positive signs of dehydration, and pallor. MRI findings multilocular bilateral cysts consistent with cystadenomas measuring 16 cm and 20 cm in diameter.

Results

After a multidisciplinary discussion involving the obstetrics, gynecology, oncology, and surgery teams, a laparotomy was performed at 15 weeks of gestation to remove the cystadenomas. The patient was discharged on the 5th day following her laparotomy after safe intrauterine pregnancy was confirmed.

Conclusions

The management of cystadenomas in pregnancy requires a careful and individualized approach, taking into consideration the size and symptoms of the tumors, as well as the gestational age and overall health of the patient. Surgical interventions like laparotomies should be considered when the size or symptoms of the cystadenomas pose a significant risk to the health and well-being of the patient and/or fetus.

#124: COVID 19, Mucormycosis and Pulmonary Tuberculosis in Hiv Positive Patient -- An Extremely Rare Case Report

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Purpose

This case report represents an extremely rare event of coinfection associated with SARC-coV-2, Mucormycosis and Mycobacterium Tuberculosis (MTB) in HIV positive patient.

Methods

A 41-year-old patient with a known history of HIV/AIDS was hospitalized with an 8 days history of fever, tiredness, sore throat, anosmia, myalgia, headache, shortness of breath, and cough with hemoptoic sputum. To confirm the diagnosis patient underwent laboratory and diagnostic tests in the form of RT-PCR with HRCT score being 16/25, D dimer and CRP for COVID-19, Monteux test and gene expert test for MTB, Complete blood count showing Leukocytosis and Monocytosis, ESR found to be 41, CD4 count was 340 cells mm3 and HIV-1 RNA level was 9000 copies/ ml to confirm HIV positivity. After 10 days of admission, the patient had started with dull aching pain in the upper right posterior region of the oral cavity which had worsened in due course with the presentation of numbness in the malar region area and mobility of teeth. Diagnostic tests in the form of CT paranasal sinuses, CT brain, and orbit were performed, suggestive of suspected invasive fungal infection. To confirm the diagnosis biopsy was taken and sent for histopathological diagnosis and the report suggested to be mucormycosis.

Results

NA

Conclusions

Despite quadruple co-infections, patient survived and recovered from complications. Further diagnosis and investigations for Mucormycosis, MTB, and HIV/AIDS should be carried out for all the patients admitted to the COVID ward due to their similar and non-specific clinical manifestations

#125: Immediate implant placement following Pre-extractive molar interradicular osteotomy – A case report

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Purpose

Immediate implant placement in fresh extraction sockets has become a commonly used procedure in the field of implantology. A novel technique combining molar interradicular pre-extraction osteotomy followed by the simultaneous implant placement has been thought to increase the primary stability of implants. In this case report we aim to achieve implant stability with interradicular osteotomy and immediate implant placement in an ideal prosthetic position in a multirooted molar site

Methods

Forty three old, systemically healthy female patient reported to the department with a complaint of fractured, root canal treated lower left molar (36) with remaining root stumps. On the day of surgery, after administration of local anesthesia, pre-extraction interradicular osteotomy was prepared using sequential drills with retained tooth structure in 36 which was used as a guide. Before implant placement, the remaining root segments were extracted atraumatically using a periotome. Dental implant of dimension 5.0 x 8mm was placed along with allograft and A-PRF membrane. Flaps were approximated using 4-0 silk suture and periodontal dressing was placed. Post-operative instructions and medications were given to the patient.

Results

A good primary stability was achieved intraoperatively and one month post operatively. The patient is under review for the next three months until complete osseointegration.

Conclusions

The use of a modified pre-extractive interradicular implant osteotomy technique resulted in adequate primary implant stability and ideal implant position.

#126: Challenges in diagnosing Hepatic Epithelioid Hemangioendothelioma (HEHE): a case series report

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Purpose

Hepatic epithelioid hemangioendothelioma (HEHE) is a rare liver vascular tumor characterized by a broad spectrum of clinical behaviors. HEHE can be mistaken for more aggressive tumors, and due to its rarity, the diagnosis and treatment of HEHE pose significant challenges. This case series describes current diagnostic techniques and highlights different therapeutic approaches for HEHE management. We present four patients with unique clinical manifestations of HEHE that were diagnosed using radiologic imaging, immunohistochemistry, or both for calmodulin-binding transcription activator 1. These patients underwent different treatment methods with varying degrees of success, including living donor liver transplantation, bevacizumab, vincristine, capecitabine administration, hepatic trisegmentectomy, and radiofrequency ablation. Diagnostic techniques and treatment of HEHE varied for each patient, emphasizing the importance of continued research to establish well-defined diagnoses and treatment plans. Misdiagnosis can also harm a patient's health, and HEHE should be considered in the differential diagnosis.

Methods

NA

Results

NA

Conclusions

NA

#127: Raynaud's Phenomenon: A Case Report

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Purpose

Raynaud's Phenomenon (RP) is a vasospastic disease that can be characterized by mild to extreme color changes in the digits due to vasoconstriction and lack of oxygenation. Vascular compromise of the digits may occur following exposure to cold, emotional stress or vibration. These episodes or attacks may last from a few minutes to several hours, potentially causing vascular complications. Primary, or idiopathic RP, presents more commonly, whereas secondary RP can be linked to other conditions such as lupus or scleroderma. We present a case of Raynaud's Phenomenon affecting the distal aspects of the digits bilaterally and describe the patient's management post-diagnosis.

Methods

NA

Results

A 25-year-old female presented with blanching of the distal digits noting numbness and pain bilaterally. Patient reports loss of tactile sensation and some fine motor function. The patient has been experiencing similar episodes for the past 4 years. Each episode typically lasts around 15-30 minutes and typically occurs after exposure to cold temperatures. The patient is not currently taking any medications. Laboratory tests were ordered to rule out autoimmune conditions. A diagnosis of primary Raynaud's Phenomenon (RP) was made, and patient was educated on possible treatment options.

Conclusions

While the most common form of Raynaud's Phenomenon can be relatively mild, there is an increasing need for more research to better understand this phenomenon and find superior treatment options. This case is important to raise awareness for primary and secondary RP and provide an inside view of how one patient can conservatively manage their symptoms when treatment options can be limited.

#128: **Once Upon A Lime: A Tale Of Pediatric Phytophotodermatitis**

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Purpose

Phytophotodermatitis is a blistering skin condition caused by photoactivation of furocoumarins in certain plants including limes, carrots, and parsnips. High clinical suspicion based on the presentation and distribution of findings, followed by history-taking and exposure identification, were enough to diagnose this condition in an otherwise healthy child.

Methods

A 5-year-old female developed moderately painful, tense bullae in a linear arrangement over the dorsolateral aspects of all fingers of both hands. These began several days into a tropical vacation and subsequently resolved over the next few days leaving hyperpigmented patches in the same distribution. The skin findings were not accompanied by fever, sore throat, nasal discharge, vomiting, or diarrhea. The bullae were isolated to her hands and she did not have concomitant oral lesions. The patient had no prior medical history and was not taking any medications. Hydrocortisone 1% cream had no effect. Upon further interviewing, the patient's parents recalled there had been a lime tree in the yard of their vacation rental. The patient admitted to cutting open limes with her siblings and playing with the lime juice. The family had spent a large portion of the trip outdoors.

Results

Based on the presentation and history, a diagnosis of phytophotodermatitis was made. Phytophotodermatitis is a dermatosis caused by photoactivation of furocoumarins, a substance found in various plants, to certain wavelengths of UV radiation. It may be confused with acute allergic or irritant contact dermatitis due to its similar presentation of blistering, itching, and erythema. Phytophotodermatitis causes a characteristic post-inflammatory hyperpigmentation, however, which other forms of dermatitis do not. The differential diagnosis in this patient included hand, foot and mouth disease, and impetigo. Ultimately, phytophotodermatitis was diagnosed given symptom onset after handling lime juice followed by sun exposure, the distribution of blisters, and lack of other systemic symptoms.

Conclusions

Although factors leading to phytophotodermatitis are commonplace, their combination and the resultant dermatosis is unique. This case illustrates how a detailed history helped identify mysterious skin findings as benign, requiring only supportive care. Providers should consider phytophotodermatitis when evaluating blisters in photo-exposed areas in patients, particularly during the summer months.

#129: De Novo Microdeletion Spanning YWHAE and CRK in an Individual with Intellectual Disability and Stunted Growth

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Purpose

In this report, we present a case of a 20-year-old female with congenital intellectual disability, stunted growth, and hypothyroidism. Competitive genetic hybridization (CHG) revealed a loss of a portion of 17p13.3 at least 195 Kb in size, not present in either parent. This area of chromosome 17 is associated with Miller-Dieker Syndrome (MDS) and Isolated Lissencephaly Sequence (ILS), but these conditions are related predominantly to PAFAH1B1, which is not included in the patient's deletion.

Methods

Peripheral mononuclear cells (PBMCs) were used for karyotyping and competitive genetic hybridization (CGH) at Baylor College of Medicine. Further bioinformatic analysis was carried out using the Genome Data Viewer (ncbi.nlm.nih.gov/genome/gdv). Further confirmation of endpoints is planned using qPCR and long-range PCR.

Results

Symptoms included congenital intellectual disability, stunted growth, and hypothyroidism. Karyotype was found to be normal, but CGH revealed a deletion toward the tail end of the p-arm of chromosome 17, 17p13.3. At least 134 genes are present in this genomic location, 35 of which are uncharacterized. Both MDS and ILS are characterized by a smooth cerebral cortex, which was not found in this patient. Notably, PAFAH1B1, which is thought to cause the majority of the symptoms of MDS and ILS, was not deleted. YWHAE and CRK were both deleted and may contribute to this unique phenotype. Deletion of CRK is associated with growth abnormalities, including stunted growth. Although not traditionally treated with growth hormone, the patient grew more than 12-inches in height with treatment, suggesting that growth hormone therapy may be effective for treating growth retardation, at least partially. Several reports have suggested that deletion of YWHAE without deletion of PAFAH1B1 is associated with intellectual disability similar to MDS, but without lissencephaly, and deletion of YWHAE is believed to contribute to a more severe phenotype in individuals with MDS.

Conclusions

Here we present a patient with intellectual disability and a previously uncharacterized deletion on chromosome 17. Analysis of the literature indicates that CRK and YWHAE are likely responsible for the phenotype. Further directions include confirming the endpoints of the deletion.

#130: Non-Traditional Presenting Grade II Brain Meningioma: A Case Study

Alessandra Rivera;[1] Garret Phillips;[1] Serin Baker;[1] Michael Trapnell;[1] Conrad Ashby;[1] Jacob Hill;[1] Prina Patel;[1] Alexander Ruiz;[1] Elden Jenkins;[1] John Kriak;[1] Kyle Bills;[1] Voicu Ciobanu;[1] Tipsuda Bahri;[1] David Sant;[1]

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Purpose

Meningioma is a relatively common form of cancer, occurring in approximately 97 out of 100,000 individuals. Although it arises from the meninges surrounding the central nervous system (CNS) rather than from neurons, it is classified with CNS tumors due to overlapping symptoms caused by compression of nerves and vessels in the head. Extracranial metastasis is rare, at less than 1%, and correlates with reduced survival rates.

Methods

Magnetic resonance imaging (MRI), whole exome sequencing (WES), and immunohistochemistry (IHC)

Results

This case study examines the presentation, progression, and treatment of an atypical case of meningioma. A 49-year-old male presented with chronic migraines which did not respond to traditional treatments or procedures. By MRI, a unilateral mass was found in the right parietal region measuring 6x4x2 cm. The mass was removed surgically, and the patient was diagnosed with atypical grade II meningioma. Immunohistochemistry results indicated positive staining for epithelial membrane antigen (EMA), S100 (focally positive), progesterone receptor (PR), and a Ki-67 of 20%. Somatic mutations were detected in NF2 (p.Y144fs) and SUFU (p.N374fs). Over the next eight years, the patient had several (12+) recurrences of meningiomas in various locations non-adjacent to the original tumor. The patient was treated with various modalities including 7 additional craniotomy surgeries, chemotherapy, gamma knife radiation, and immunotherapy. Immunohistochemical analysis on a meningioma removed in the latest surgery indicated that Ki-67 levels had risen to 70%. Further analysis of sequencing data revealed several somatic copy number variants, including the deletion of the unmutated copies of both NF2 and SUFU, which are suspected to have been deleted in the original tumor.

Conclusions

Eight years after the resection of the original tumor, the patient was found to have masses in the liver, vertebrae L5, and right femur. The mass from the liver was removed and stained positively for EMA, suggesting that it originated from the meninges. The tumor grade was raised to level III following the discovery of a metastasis. Femur and vertebrae masses have not yet been evaluated, but are believed to also be metastases from the meningioma. Further chemotherapy is planned to shrink metastases and prevent further spread.

#131: Angiofibroma of Soft Tissue

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Purpose

We present a newly described benign, soft tissue tumor found within the back muscles of a 66-year-old male with a past medical history of HTN, HLD, OSA. After a diagnosis of malignant spindle cell neoplasm was made, the case was referred to the Sarcoma Department and the mass was excised. Intraoperatively, it appeared to be well encapsulated and was sitting in between the muscle bellies. On gross examination, the tumor was a well-circumscribed, heterogeneous mass, measuring 5.8 x 3.5 x 2 cm, tan-brown to white-yellow cut surfaces with focal areas of hemorrhage and without definitive necrosis.

Methods

H&E sections show a well-circumscribed mass composed of relatively uniform, bland spindle cells within a variably myxoid-to-collagenous stroma, scattered lymphoplasmacytic infiltrates, and prominent and complex vascular pattern, some with hyalinized walls and fibrin depositions. Immunohistochemical stains were performed; the neoplastic cells showed EMA immunoreactivity with retained Rb nuclear staining, but negative for CD34, Pan-cytokeratin, MUC4, SMA, Desmin, and S100 protein. UCSF500 cancer gene panel test was performed, which revealed a pathogenic translocation involving AHRR, the gene encoding the aryl hydrocarbon receptor repressor, and NCOA2, the gene encoding the nuclear receptor coactivator two. Overall, the clinical, histological, and immunohistochemical findings are most consistent with angiofibroma of soft tissue (AFST).

Results

N/A

Conclusions

The accurate diagnosis of this tumor is essential to prevent additional unnecessary treatments and/or surgeries. This can be achieved by proper genetic testing for the presence of markers including the NCOA2 fusion gene, CD34, α-SMA, and epithelial membrane antigen. Genetic testing is an essential component of accurate diagnosis as the appearance of these lesions can mimic other, more harmful neoplasms. Immunohistochemical analysis frequently shows the AHRR-NCOA2 driver mutation which is thought to be associated with t(5;8)(p15;q13), also commonly found in AFSTs. In combination, these immunohistochemical findings allow for accurate diagnosis of angiofibroma of soft tissue in any location of the body.

#132: Mandibular Bone Block Graft for Localised Ridge Augmentation- A Case Report

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Purpose

Dental implants in the anterior mandible is a challenge for clinicians because of patients exacting esthetic demands and difficult pre-existing anatomy. The placement of endosteal implants requires adequate bone volume for successful osseointegration. When themorphology of the bone does not allow proper implant placement, there are various bone augmentation procedures like bone grafts, which may be autografts, xenografts, allografts or alloplasts aids in reconstruction of the residual alveolar ridge for ideal implant placement. Among various bone grafts, the autogenous bone graft is still the “gold standard” for bone augmentation procedures. The symphysis region can act as an excellent source of autogenous bone for augmentation of alveolar ridge deficiencies. The purpose of this case report was to increase the vertical and horizontal ridge augmentation with autogenous bone block graft for implant placement.

Methods

A 46-year-old female patient was referred with a complaint of missing lower anterior tooth in relation to 31 region. Radiographic examination showed a thin horizontal bone width of 3.6mm and vertical bone height of 10.7mm at anterior of mandible. Clinical examination revealed good oral hygiene with missing in relation to 31 region. Augmentation was carried out using a block graft taken from the mandibular symphysis (Chin block) and following bone block healing implants were positioned to restore the 31 region.

Results

Successful results were achieved with increased in bone height from10.7mm to 12.15 and bone width from 3.6mm to 6.03mm significantly after augmentation.

Conclusions

Block bone graft is a gold standard procedure to gain vertical and horizontal augmentation of alveolar ridge in the anterior of the mandible.

#133: **Comprehensive Assessment of Socket Preservation Techniques: Exploring the Effectiveness of Titanium-PRF and Demineralized Freeze Dried Bone Allograft in Implant Dentistry**

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Purpose

To evaluate the effectiveness of Titanium-prepared Platelet rich Fibrin (T-PRF) gel combined with demineralized freeze-dried bone allograft (dFDBA) for Socket Preservation versus spontaneous healing with the aid of Cone beam computed tomography (CBCT).

Methods

In order to preserve the ridge for future implant placement, socket preservation was planned. Atraumatic extraction was performed for the tooth which has poor prognosis, socket was preserved using T-PRF gel combined with dFDBA. Hard tissue healing was evaluated using CBCT immediately after extraction and 6 months later prior to implant placement. Further, implant placement was done and restored.

Results

Grafted sites showed that the use of T-PRF along with dFDBA resulted in preservation of the ridge height and width and improved ridge dimensions when compared to spontaneous natural healing of the socket.

Conclusions

Socket preservation with the use of T-PRF gel combined with dFDBA is a favorable technique that preserves the dimension of the ridge.

#134: Urogenital Vascular Anomaly: A Cadaveric Case Study

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Purpose

The kidneys are bilateral filtration organs that are perfused by the right and left renal artery. The presence of multiple renal arteries are anatomical variations, with varying health implications and outcomes. The current literature varies in classification methods, with no classification method fully encompassing all variations. This makes it necessary to utilize multiple classification systems. This report utilizes the Cases et al. classification system to classify the renal artery variations. To classify the testicular artery variations, the Machnicki and Notkovitch classifications were used.

Methods

A cadaveric dissection at Noorda College of Osteopathic Medicine presented with abnormal urogenital vascular findings. A standard ruler was used to measure the length and width of each artery in situ. All measurements were recorded in centimeters by three observers. A camera was utilized to document findings. The renal artery data was classified by the Cases system, which separates renal arteries by origin and insertion points, and the number of renal accessory arteries (RAA) present. The testicular artery data was classified by the Machnicki and Notkovitch systems which identifies variations based on origination and course.

Results

Upon dissection, a 67-year-old male donor presented with five renal arteries, and two testicular artery variations. There was one RAA on the right and two RAAs on the left. The right and left renal arteries originated from the abdominal aorta at the L2 level and inserted at the renal hilum. The right RAA originated 3 cm superior to the abdominal aortic bifurcation and inserted at the inferior pole of the right kidney. One of the left RAAs originated from the left renal artery and inserted into the superior pole of the left kidney and the other left RAA originated at the abdominal aorta, 4.4 cm superior to the abdominal aortic bifurcation and inserted into the inferior pole of the left kidney. An early bifurcation of the renal arteries was noted bilaterally. The right testicular artery originated from the right renal artery and bifurcated 3.8 cm below the origin. The left testicular artery originated from the aorta above the renal vein.

Conclusions

Multiple urogenital vascular anomalies were discovered in a cadaver during a dissection lab at Noorda College of Osteopathic Medicine. According to the Cases system, the right kidney had a Type D, Pattern II classification. The left kidney had a Type B and D, Pattern III classification. According to the Machnicki classification system, the right testicular artery is Type B. According to the Notkovitch classification system, the left testicular artery is Type II.

#135: Chronic Intractable Migraine: A Case Study

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Purpose

Migraines can be extremely debilitating for patients and can have a great impact on their physical, mental and emotional well-being. The role of musculoskeletal disorders and neuropsychiatric abnormalities in the presentation and frequency of migraines is under continuous debate. We report the case of a 44-year-old female who presents with a 33-year history of chronic, unmanageable migraines accompanied by a variety of comorbidities and ailments. As there may be a causative relationship between these varying conditions, this case study discusses the possibility of developing a standardized, systemic approach to the diagnoses and treatment of chronic migraines.

Methods

The patient is to receive chiropractic manipulations of the cervical spine, cognitive behavior therapy and vagal nerve stimulation as part of a whole-systems approach to this patient's treatment-resistant migraines.

Results

Baseline X-Rays and neurocognitive exams were taken in May of 2023. Her cervical spine showed notable loss of lordosis with bone spurring and her neurocognitive exams showed below average scores in areas such as episodic memory and verbal short-term memory as well as moderate to severe levels of reported stress, anxiety and depression. The patient has since received 6 months of weekly chiropractic, neurocognitive rehabilitation and transcranial vagal nerve stimulation treatments. A follow-up neurocognitive analysis showed a decrease in reported anxiety, depression and overall perceived stress. In addition, she improved in attention, response inhibition, visuospatial processing, and episodic memory. As her treatment sessions continue, data collection is ongoing.

Conclusions

We hypothesize that the implementation of a whole-systems approach to migraine treatment will significantly reduce this patient's number of migraines and their intensity in conjunction with improving her neurocognitive scores. Our aim is to contribute to the development of better diagnosis and treatment strategies for chronic migraines which can increase the quality of life for those who suffer from similar, treatment-resistant chronic migraines.

#136: Neuropsychological Findings in Idiopathic Adult-Onset Epilepsy Case Study: Noorda COM Student Investigation

Jacob Warner;[1] Michael Milius;[1] Jordyn Huecker;[1] Tiffany Nguyen;[1] Luke Sanders;[1] Joseph Harbold;[1] Kennedy Madrid;[1] Nicholas Curtis;[1] Chase Taylor;[1] James Barber;[1] Jayne Stuter;[1] Ethan Zaugg;[1] Aaron Andrews;[1] David Sant;[1] Kyle Bills;[1] John Kriak[1]

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Purpose

We report the case of a 25-year-old male patient with idiopathic adult-onset epilepsy. The patient presented with a chief complaint of recurrent seizures and no identifiable cause. These seizures were associated with a lack of extremity control, muscle spasms, and loss of cognitive function. His condition began while living in Thailand, where he experienced multiple environmental stressors including hostile living conditions and tense situations, approximately five years before being seen in the clinic. Over the past several years, the seizures have not ceased, and the patient now notes a loss or decrease of several special senses.

Methods

Following baseline data collection and analysis of various biomarkers (continuous glucose levels, heart rate, EEG, neuropsychological evaluation, and mental health metrics) the patient was prescribed a ketogenic diet in or to control glucose levels, thereby reducing seizure incidence. The patient was also provided with audiovisual recording capacity to document physical responses during seizures, should they happen outside of clinic settings. This data will be analyzed for concurrence between glucose levels, EEG ratios, and environmental factors that may coincide with seizure onset.

Results

Initial data results indicate potential causes, such as environmental stressors, neuropsychological disorders, and post-prandial reactive hypoglycemia. While the development of epilepsy remains idiopathic, preliminary data collection shows several clinically significant findings in neuropsychological examination, glucose regulation, and psychological history. Following the initial prescription of a ketogenic diet, the patient's symptoms have markedly improved, resulting in a dramatic decrease in seizure frequency.

Conclusions

Future directions of this case include a reexamination of baseline biomarkers following a six-week adherence to the ketogenic diet. Video data of an epileptic episode has also been submitted by the patient for analysis. In addition, investigation of genetic factors, performing an fMRI and EEG, epileptic categorization, and correlating glucose changes with seizure incidence will be conducted. Indicators such as fMRI and EEG will assist in localizing and time-binding brain activity as related to seizures to identify which cortical areas may be most affected. Additionally, brainwave ratios and relative comparison to baseline measurements of others with similar neuropsychiatric conditions can provide insight into contributing neurological factors.

#137: The Impact of Smoking Hookah on the Dental Anatomy

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Purpose

The purpose of this poster is to do systemic research on the affects of smoking hookah/ waterpipe smoking. This poster will aim to show the long and short term affects, while also discussing the importance of understanding how it can

Methods

Multiple data bases were used to research the articles. The perimeters were that the articles needed to be: primary researchPreferably no older than 10 years The key words used were:HookahWaterpipe tobacco smoking

Results

About 2,100 articles were found on google scholar.From there I had to filter out the ones that discussed non dental related health issues.

Conclusions

The research is still ongoing.

#138: The Role of Genetics in Class II Dentoskeletal Malocclusion

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Purpose

Malocclusion is a heterogeneous condition with multifactorial etiology that affects populations worldwide and often results in impaired esthetics, function, and quality of life. Class II skeletal malocclusion is defined as a distal relation of the mandible to the maxilla, and it is considered the most prevalent type of malocclusion, occurring in 33% of all orthodontic patients in the USA. Studies in families and twins have shown a significant genetic component in the Class II malocclusion phenotype. Understanding the genetic etiology of this condition will assist in early and more accurate diagnosis and therapeutic interventions. The aim of this study is to summarize the currently existing knowledge regarding the genetic variants implicated in the etiology of Class II skeletal malocclusion.

Methods

A thorough review of the literature was conducted. Six databases were searched for peer-reviewed human studies, investigating genetic variants associated with Class II malocclusion. Article screening was performed independently by two reviewers with the use of predefined inclusion/exclusion criteria. Data extraction was performed independently by two reviewers with the use of a data extraction tool. Information about article type, study design, participants' characteristics, interventions, and outcomes were extracted, summarized, and synthesized.

Results

18 articles met the review criteria: 16 prospective cross-sectional and 2 retrospective case-control studies. Class II skeletal malocclusion was associated with single nucleotide polymorphisms (SNPs) in FGFR2, ACTN3, MYO1H, COL1A1, COL11A1, GLI2, GLI3 and MSX1 genes. Mandibular retrognathism has been associated with SNPs in ADAMTS9, MYO1H, BMP2, MYH7, MATN1, and genes encoding parathyroid hormone (PTH) and Vitamin D receptor (VDR).

Conclusions

Class II skeletal malocclusion is a polygenic trait with epigenetic influences. Genetic variants associated with cartilage and bone remodeling, muscle composition and activity, craniofacial morphogenesis, as well as mineral metabolism regulation have been associated with Class II skeletal malocclusion.

#139: **Antierosive potential of fluoride toothpaste associated with aminomethacrylate copolymer**

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Purpose

This study aimed to evaluate if the aminomethacrylate copolymer could potentiate the protective potential of sodium fluoride in toothpaste formulations against enamel initial erosion

Methods

Polished bovine enamel specimens were divided into five treatments: ultra-pure water (negative control - NC), toothpaste without active agent (placebo- PL), experimental toothpaste with aminomethacrylate (AMC 4% - AMC), toothpaste with sodium fluoride (NaF 1450 ppm F- - F), and toothpaste with sodium fluoride + aminomethacrylate (NaF+AMC - AMC+F). The specimens were immersed in human saliva (1 h) to allow acquired pellicle formation. Then, an erosive/rehardening cycling was performed with exposure to 0.3% citric acid (natural pH - 5 min), human saliva (30 min), treatment with toothpaste slurries (120 s), human saliva (30 min), and 0.3% citric acid (5 min). All the steps were performed under agitation (30 rpm). Knoop surface microhardness (KN) was assessed in four moments: KNinitial (sound enamel), KNE1 (after the first acid exposure), KNT (after the treatment), and KNE2 (after the second acid exposure). Rehardening (Re) and protective (Prot) potential were assessed with the following formulas: %Re = [(KNT-KNE1) / (KNE1)] x 100 and %Prot = [(KNE2-KNE1) / (KNE1)] × 100. The data were analyzed by One-Way ANOVA and Tukey tests (5%).

Results

The mean ± standard deviation values and results of Tukey's test for %Re were: NC (3,11±4,09)a; PL (1,78±3,51)a; AMC (5,59±3,08)a; F (7,53±9,17)a; AMC+F (20,23±7,10)b. For %Prot were: NC (-50,68±5,27)a; PL (-51,65±3,74)a; AMC (-41,21±8,47)b; F (-34,10±5,99)b; AMC+F (-19,80±7,95)c.

Conclusions

It was concluded that the addition of aminomethacrylate copolymer in the experimental fluoride toothpaste increased the enamel rehardening and the protective potential of the sodium fluoride against enamel initial erosion.

#140: A Multidisciplinary Approach: Creating a Spanish for Medical Professionals Course

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Purpose

Given the increased demand for Spanish-speaking physicians, we designed this course to be used as a model for other medical schools. The course is divided into three levels according to its complexity. The beginner, intermediate, and advanced Spanish for Medical Professionals course aims to improve medical students' proficiency in the use of the Spanish language through patient interviews, physical examination, and patient education. Students learn common medical vocabulary, communication strategies, discussion of differing cultural aspects of health; all of which contribute to providing quality care to Spanish-speaking patients. All students of NoordaCOM are encouraged to enroll. No previous knowledge of Spanish is required for the beginner course.

Methods

Forty-four curriculums from various schools were used as templates. The courses are graded based on students' written assignments, role-playing performance, quizzes, and midterm/final examinations. During the first 4 weeks, the beginner course teaches students vocabulary, common verb usage, basic greetings, and identifying personal information. During weeks 6-8, students learn how to take a patients' medical history, describe common symptoms of diseases/disorders, and list management options. In weeks 10-13, students are taught to describe anatomical body parts, conduct a physical examination, talk to family members, and give admission/discharge orders. Students role-play on weeks 5, 9 and 14. Midterm and final examinations are on weeks 9 and 15, respectively. The intermediate course follows a similar format and allows students to solidify what was taught in the beginner course. In the advanced course, the first 2 weeks review content from the previous two courses; after which, students spend 11 weeks learning medical terminology for each of the body systems: integumentary, skeletal, muscular, nervous, cardiovascular, respiratory, endocrine, digestive, reproductive, lymphatic and immune, and urinary.

Results

Course evaluations are pending.

Conclusions

The Spanish-speaking population increased by 26% in 2022 in the US. Therefore, it is important to overcome language barriers. Six students, along with a native Spanish-speaking Professor, created different levels of Spanish medical terminology courses, which can be used as a template for other medical schools. The test pilot beginner Spanish medical terminology course starts Spring of 2024. Data will be collected.

#141: Birth Progression Monitor

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Purpose

Over the last two decades, there has been an increase in the number of cesarian sections performed in the United States both planned and unplanned. To help reduce the rise in unplanned cesarian sections we have developed a device that will give physicians and other medical professionals more information about where the fetus is in the birth canal in real time. This current study aims to test the accuracy and usability of the prototype birth progression monitor on birth simulations.

Methods

Using birth simulators, we will conduct 36 trials using the prototype monitor to track the vertical descent of the fetus's head with various orientations (e.g. right occiput anterior, right occiput transverse, etc.) tracking the accuracy and finding effects of simulated pushes for the tracking component.

Results

NA

Conclusions

NA

#142: Evaluation of Intermountain Health Outpatient Infusion Reactions

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Purpose

The purpose of our project was to evaluate hospital system data for adverse reactions to infused medications to establish trends and actionable patterns for improving system processes.

Methods

This project was a retrospective chart review evaluation of patients 18 years or older who reported adverse reactions to intravenous medications administered between May 1, 2022 through May 1, 2023. Medication administered to pediatric patients was excluded from analysis. All data was analyzed using descriptive statistics. The data evaluated was reported by location, most common reaction type, most common medications reported, pre- and post-medications administered, and if medications administered were appropriate. Appropriate use of premedication was assessed by manufacturer package inserts and National Comprehensive Cancer Network (NCCN) antiemesis guidelines. Additionally, investigators determined if the health system infusion reaction protocol was followed and appropriately documented. Data was de-identified and stored in a password-protected file on a password-protected hospital computer. This project was process improvement in nature therefore the institutional review board approval was not deemed necessary.

Results

Evaluation of charts showed inconsistent reaction protocol use (11.6%) and caregiver summary documentation (15.0%). Existing Intermountain Health AMB Infusion Reaction Standing Order was used in 11.6% of cases. An appropriate caregiver note was charted in 15.0% of cases. Pre-medications were given in 74.5% of incidences, with appropriateness variable. Post-medications were given in 85.4% of incidences. Most common medications provoking a reaction were carboplatin (3.7% of total incidents),irinotecan (4.4%), oxaliplatin (6.8%), infliximab biosimilars (Inflectra, Renflexis and Remicade; 7.5%), IVIG products (Privigen, Gammagard and Gammunex-C; 7.5%), iron sucrose (9.5%), paclitaxel (10.5%), andrituximab biosimilars (Rituxan, Ruxience and Truxima; 11.2%). Pre-medications for the most reacted infusions varied considerably as to use, appropriateness, and completeness. All Intermountain Health locations reported percentage of reactions for the most common infusions in comparison to the total dispensed were less than 2%.

Conclusions

Existing AMB Infusion Reaction Standing Order utilization and adherence was inconsistent across all sites. Use of standardized pre-medication regimens was likewise inconsistent, regardless of use of internal tools like prescribing protocols. Caregiver documentation of infusion reactions varied considerably. Overall, standardization was minimal across all ten sites and across medications administered, leading to decreased useability of reported data. Future directions include system-wide education on proper use of infusion reaction order sets and documentation.

#143: 3D Printed Models in Undergraduate Endodontic Education

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Purpose

The present review aimed to systematically review the literature available for the effectiveness of the use of 3D printed tooth models for undergraduate endodontic education.

Methods

Based on the inclusion and exclusion criteria, PubMed, Scopus, Web of Science, and Google Scholar electronic databases were searched for. Clinical studies with full-text articles available in the English language were selected. Data extraction, risk of bias assessment using the ROBINS-I tool, and assessment of the quality of evidence were performed independently by two authors, with a third author consulted when needed.

Results

A total of five studies involving 460 participants were included in the review. Three studies supported the use of 3D-printed teeth, one study found no statistically significant difference and one study reported negative results. All studies showed a moderate risk of bias. The quality of evidence for outcomes is low.

Conclusions

Based on the limited evidence available, it can be concluded that 3D-printed teeth may help replicate the complex internal anatomy of teeth for the preclinical training of students. However, the materials used for producing the 3D-printed teeth need to be developed to replicate the properties of dental tissues.

#144: Imposter Phenomenon Among Osteopathic Medical Students

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Purpose

Imposter phenomenon (IP) is a psychological pattern in which people doubt their accomplishments and have an internalized fear of being exposed as a fraud. It is associated with anxiety, burnout, low level of self-esteem, and lack of confidence with potential implications on medical education. Those with IP are less likely to speak up or volunteer information than their unaffected peers. We want to determine the prevalence and severity of imposter phenomenon among osteopathic medical students at our institution. We also want to determine differences in IP and perceptions among non-traditional students and gender. Awareness of IP and discussions to minimize IP are pertinent for current medical students, school and residency administration, and faculty.

Methods

The Clance survey, validated by Dr Clance and several researchers, were distributed to the Class of 2025 (Total N= 89). In addition to the 20 IP questions, 4 non-traditional student and 1 gender identity question(s) were also included. Participants identifiers (names, emails) are requested to determine student course grades and exam performance correlations. Students would be made aware of their score and the level of severity of IP. Resources and contact information would be provided to help them seek assistance and counseling. It would raise self-awareness, help lessen the embarrassment of these feelings, and may reduce the isolation these individuals' experience.

Results

Thirty-seven completed responses were collected (N=37); 42% response rate. Respondents exhibited frequent (57%), moderate (27%), and intense (5%) IP scores, respectively. Forty percent (40%) of respondents had spouses/domestic partners,13% had infants/toddlers at home, and 16% had greater than 3 years before entering medical school. For the statement, “outside of medical school commitments, I have little time for myself”, 51% agree/somewhat agree and 40% disagree/somewhat disagree.

Conclusions

Participants can benefit with awareness of their IP score and severity. They are encouraged to pursue resources and assistance. The study is ongoing with survey distribution to the class of 2026 and 2027. We plan to utilize the results and work with our institution’s Wellness department to develop workshops and student mentor training, as well as improve the school environment.

#145: **Enhancing Orthodontic Care: Reducing Discomfort and Treatment Time**

Aman Kaur;[1] Claudia Tellez Freitas[1]

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Purpose

The aim of this literature review is to assess the effectiveness of vibration devices, low-level laser therapy, and micro-osteoperforations in diminishing both the duration and pain commonly associated with orthodontic procedures.

Methods

For this literature review, a search was conducted using various databases, includingGoogle Scholar, PubMed, and Web of Science. The search strategy employed a combination ofterms such as 'orthodontic treatment,' 'vibration devices,' 'low-level laser therapy,' and 'micro-osteoperforations.' Studies selected for inclusion were published between 2013 and 2023,encompassing the most up-to-date research in the field. Only English-language articles wereconsidered for inclusion in this research. Most studies were designed as randomized controlledtrials and observational studies, ensuring an evidence-based approach to evaluate the impact ofthe specified orthodontic methods on both treatment duration and pain management.

Results

30 articles were used in this literature review. High-frequency vibrational devices wereassociated with facilitating complex tooth movements in conjunction with clear aligners withoutthe need of surgery. Similarly, low-level laser therapy exhibited accelerated bone remodelingwhich led to lower pain levels and treatment duration. Micro-osteoperforations are minimallyinvasive and have shown an increase in tooth movement. However, it is crucial to acknowledgevariations in study designs and patient populations, warranting further investigation forcomprehensive validation of these outcomes.

Conclusions

Vibration devices, low-level laser therapy, and micro-osteoperforations prove effective inmanaging orthodontic treatment pain and reducing duration.

#146: Relationship Between Exercise and Depression in Osteopathic Medical Students

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Purpose

Prevalence of depression in medical students is higher than in the general public. This is likely due to the academically rigorous environment of medical school leading to increased stress and decrease in healthy habits such as exercise. There is little literature regarding depression in osteopathic students and if following osteopathic principles impact depression by promoting physical activity and healthy lifestyle. NoordaCOM is an osteopathic school that emphasizes and integrates wellness into its curriculum. Our goal is to determine the prevalence of depression amongst NoordaCOM students, correlate exercise with degree of depression, and whether osteopathic principles and tenets play a role in students' mental health.

Methods

Anonymous surveys were distributed to 1st through 3rd year students. The survey included the Beck Depression Inventory (BDI-ii), Morgenstern Exercise Survey (MES), and questions regarding osteopathic tenets. The BDI-ii scores of normal, mild, borderline, moderate, severe and extreme levels of depression were recorded. The MES reported respondents' types and levels of physical activity. Questions regarding osteopathic tenets were: "Do you feel that your values toward mental health and exercise align with an osteopathic mindset?" and "Do you feel that your values towards mental health and exercise played a factor in applying to osteopathic medical school?" A list of wellness resources was provided at the end of survey.

Results

A total of 147 responses were collected (35% response rate). Levels of depression: None-68% (56 Male; 41 Female), Light-27% (17 Male; 21 Female), Moderate-5% (4 Male; 3 Female), Severe-1% (1 Male). Exercise hours: Up to 5hrs/week: Light-82%, Moderate-89%, Vigorous-73%. 6-19 hrs/week: Light-14%, Moderate-7%, Vigorous-21%. Osteopathic alignment: 89% strongly agree/agree that their values align with an osteopathic mindset, 66% strongly agree/agree that their mental health and exercise were a factor in osteopathic medical school application.

Conclusions

Study is ongoing. There are lower levels of depression in those engaging in 6-9 hours of exercise weekly. Exercise possibly contributes to minimizing depression and is an important aspect of a student's lifestyle. Lower depression scores are also noted for those who align with osteopathic principles compared to those who don't align or feel neutral to them.

#147: **Assessment of Perceived Stress Levels among Students in Dental Colleges - A Cross-Sectional Study from South India.**

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Purpose

According to a report of the Global Congress in Dental Education (2008), “Dental Education is regarded as a complex, demanding and often stressful pedagogical exposure. It involves acquisition of required academic, clinical and interpersonal skills during the course of learning.” Practicing dentistry requires clinical and patient management skills, characteristics that also add to the stress perceived by the students. The aim of this study is to assess the factors affecting stress among students in dental colleges.

Methods

A cross sectional study was conducted using a questionnaire to assess the factors affecting stress among dental students. Simple random sampling method was used for data collection and the distribution of responses was presented as frequencies and percentages.

Results

A total of 500 students participated in the questionnaire. Among them 76% of participants joined dentistry as their own choice and 24% on their parents’ choice. About 55% participant’s feels severely stressful about the amount of unfairness and biased attitude of faculty and 33% are having fear of not having the possibility to pursue a post graduate programme. About 54% have the fear of unemployment after graduation.

Conclusions

Results shows that levels of stress increased over the academic years and peaked in the fourth year. Stress experienced might impact the academic and future professional development of students, motivating a need for intervention at faculty level.

#148: Influence of Sleep Pattern and Oral Hydration on Academic Performance among Undergraduate Dental Students-A Pilot Study

Bassam Alibrahim;[1] Zohaib Khurshid;[1] Muhammad Faheemuddin;[1] Abdullah Alshamrani;[1] Ziyad Alotaibi;[1] Ayub Ali;[1] Syed Akhter Bokhari;[1]

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Purpose

Sound sleep is important for preserving good physical, mental, and emotional health. An association with learning skills, critical decision making and thinking is also observed [1]. Poor hydration is associated with several health outcomes including poor oral health and academic performance. Timely assessment of oral hydration of students holds a potential to improve their oral health and academic performance [1, 2]. This study is designed to investigate the influence of oral hydration status and sleep deprivation on academic achievements of dental college undergraduates

Methods

A cross sectional study was conducted among undergraduate students at the College of Dentistry, King Faisal University, Saudi Arabia. Relationship between sleep patterns, oral hydration and academic performance was investigated using a self-reported questionnaire [3]. Oral dehydration was assessed using FishburneTabsTM. Participants were instructed to follow the procedure as directed by the manufacturer. The procedure involved placing the tablet on the lingual surface, closing the mouth on the device, and opening and closing the mouth three times. The examiner recorded two readings: one as Stage-1 and the other as Stage-2. Stage-2 readings shown in figure-1, were considered as final. Linear regression was employed to identify a relationship between academic performance and sleep pattern, and at Stage-2 oral hydration status among students. Univariate and multivariate linear regression analyses were applied to reveal the associations between academic performance, sleep pattern, and Stage-2 oral hydration status. Data was analyzed using STATA 18.0 and the results were considered statistically significant at $P \leq 0.05$.

Results

A sample of 36 dental students participated in the study. Univariate regression analyses indicated a significant association between both oral hydration (Stage-2 scores) and sleep pattern (hours of sleep) with GPA. For oral hydration, the regression coefficient (β) was -0.27 (95% CI [-0.14, -0.41]), suggesting that increase in oral hydration scores is associated with a decrease in GPA. For sleep pattern, the regression coefficient was 0.28 (95% CI [0.38, 0.17]), indicating that an increase in the number of hours of sleep is associated with a higher GPA.Subsequently, a multivariate regression analysis was conducted, considering both sleep duration and Stage-2 oral hydration scores simultaneously. The results revealed that sleep duration exhibited a statistically significant positive association with GPA ($\beta = 0.23$, $p = 0.004$), signifying that a longer sleep duration is associated with a higher GPA. However, Stage-2 oral hydration scores did not show a statistically significant association with GPA ($\beta = -0.0715$, $p = 0.423$), suggesting that oral hydration status at Stage-2 does not significantly predict GPA in the context of the multivariate model. Indicator Univariate Regressionβ [95% CI] Multivariate Regressionβ [95% CI]Stage-2 scores -0.27 [-0.14, -0.41]* -0.07[0.10 -0.25]Sleep pattern (Hours) 0.28 [0.38, 0.17]* 0.23[0.38 0.08]**Significant P<0.05

Conclusions

These findings emphasize the importance of addressing sleep patterns in efforts to enhance academic performance among dental students. While oral hygiene remains a noteworthy aspect of overall health, its isolated impact on GPA may be more nuanced and require further exploration. It is essential to acknowledge the potential limitations of the sample size. With a larger and more diverse sample, the results may reveal a more comprehensive understanding of the relationship between oral hydration and academic success. In conclusion, optimizing oral hydration and promoting healthy sleep patterns could potentially serve as modifiable factors to bolster the academic achievements of undergraduate dental students. Future research and interventions in this area hold promise for enhancing both oral health and academic success in this demographic.

#149: GLP-1 Agnosists and Alcohol Dependency

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Purpose

Alcoholism remains a significant public health concern in the United States, with millions of individuals grappling with its devastating consequences. Despite its widespread prevalence, alcohol addiction remains inadequately understood, particularly in terms of its potential effects on the cellular level. This knowledge gap underscores the urgency of exploring novel therapeutic avenues.

Methods

Our study will focus on dopamine DA2 receptor-positive neurons, frequently located in the ventral striatum, encompassing the nucleus accumbens. We will cultivate cell cultures in three distinct environments: one serving as a control, one exposed to ethanol, and one exposed to ethanol in conjunction with semaglutide. To assess the impact of Semaglutide, we will utilize receptor antibody fluorescence imaging techniques.

Results

**Results are pending at the moment.

Conclusions

Our central hypothesis posits that the presence of Semaglutide, a GLP-1 agonist, will prevent the decrease in the number of DA2 receptors typically observed in addictions. By investigating the potential role of GLP-1 agonists in preserving dopamine receptor integrity, this research aims to contribute to a deeper understanding of alcohol dependency at the cellular level, offering hope for innovative therapeutic interventions in the future.

#150: Effectiveness of blended learning in UG periodontal training: a systemic review

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Purpose

We aimed to evaluate published research on the effectiveness of blended learning in dental students' periodontal training.

Methods

Scopus, PubMed and Web of Science databases were searched using predetermined keywords according to specific inclusion and exclusion criteria. The educational outcomes of the students were categorised into Reaction (Level 1), Learning (Level 2), Behaviour (Level 3), and Results (Level 4) as per Kirkpatrick's four-level trainingevaluation model and knowledge gain was considered as the primary outcome. Data extraction and quality assessment was performed independently by two authors, with a third author consulted when needed. The risk of bias was assessed using the Cochrane Collaboration's Tool for Assessing Risk of Bias Version 2.0, and the certainty of the evidence was evaluated using the GRADE assessment tool.

Results

Eight studies were included involving a total of 391 students. Computer-assisted learning was well-received, with 96% endorsement from participants.

Conclusions

Blended learning can be effectively used as an adjuvant teaching aid; it cannot completely replace face-to-face learning in periodontal training. Further well-designed trials adhering to reporting guidelines and using objective measures are necessary before outlining universal guidelines for best practice.

#151: Development of a Curriculum for Osteoporosis Education in Rural Populations

Serin Baker;[1] Hannah Berhow;[1] Rebekah Hans;[1] Alizon Pachas;[1] Emily Schwartz;[1] Hunter Stutz;[1] Mehruba Alam;[1] Darell Schmick;[1] David Sant;[1] Erika Noonan;[1]

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Purpose

Osteoporosis contributes to annual costs exceeding $10 billion in the U.S. due to hip fractures and is the primary cause of hospitalization among older women. Historically, geriatric populations have received inadequate education in navigating the U.S. medical system, emphasizing the importance of targeted education among the elderly. The study's objective is to improve health literacy among the geriatric population in rural Utah by expanding their understanding of osteoporosis.

Methods

A curriculum was developed under the guidance of a board-certified geriatrician to bridge the gap in public knowledge regarding the management of this disease. This curriculum includes education about osteoporosis prevention, diagnosis, and treatment, as well as information about public health websites sponsored by the National Library of Medicine including PubMed and MedLine Plus. Group-based presentations will be given by medical students in designated low-income Health Professional Shortage Areas, namely in Utah, Summit, and Wasatch Counties.

Results

To date, this comprehensive curriculum has been presented at one location in Summit County and three locations in Utah County, with additional presentations scheduled. Twenty people have attended sessions and returned the educational quizzes. On average, 77% of questions were answered correctly before being taught the curriculum and 85% of the questions were correct directly following ($p=0.129$). Before attending, only 1 in 5 individuals had used one of the NLM resources. Surveys also indicated that newspapers and Google were the most common resources used to obtain health information, at 46% of respondents each. Of the 19 post-education surveys collected, 17 said they had learned something and 18 said that they felt more comfortable speaking with their provider. Of the three that have returned one-month follow-up surveys, 2 have taken steps to minimize falls and made changes in their diet. None of the three have contacted their provider regarding osteoporosis.

Conclusions

Although participant numbers were too low to achieve statistical significance, the majority of individuals tested higher on the quiz following the presentation, and almost all indicated that they had learned something and were more comfortable speaking with their provider. Further presentations are needed to determine if this curriculum is an effective intervention to teach elderly individuals about osteoporosis.

#152: Patient Education on Naloxone Use and Fentanyl Testing

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Purpose

To educate patients on the importance of naloxone use to prevent unintended opioid overdoses and deaths. To provide community resources for fentanyl testing and destigmatize their use.

Methods

Systematic data collection on Utah opioid overdoses (with a focus on prescription overdoses), rate of fentanyl-related overdoses and deaths, naloxone access and counseling points, and fentanyl testing resources and education.

Results

N/A (in-progress)

Conclusions

N/A (in-progress)

#153: **Exploring Challenges in Accessing Oral Health Care Services: A Descriptive Study of Barriers among Patients in Rural South India.**

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Purpose

The concept of health service utilization delineates the extent of interaction between service providers and their intended recipients. Primary Health Centers (PHCs) and Community Health Centers (CHCs) have been established with the specific purpose of delivering comprehensive healthcare, including referral and specialized services, to the rural population. Notably, a limited number of these PHCs and CHCs offer oral care services in India. Given the critical importance of understanding oral health care utilization behavior for effective delivery, this study is designed to gather post-COVID-19 pandemic data on the utilization of oral health care services. Additionally, the research aims to identify and examine the barriers hindering the effective utilization of oral health care services.

Methods

A specifically crafted and pretested questionnaire was employed to gather data on barriers impacting the utilization of oral health services, as well as the socio-economic and demographic factors influencing this utilization. The questionnaire was developed in the regional language, and a qualitative interview with a focus group comprising 20 participants was conducted to ensure conceptual equivalence and content validity. The internal reliability of the questionnaire was pretested on the pilot sample using Cronbach's alpha, resulting in an α value of 0.81. The study included a total of 1201 subjects selected through stratified random sampling, meeting the established inclusion and exclusion criteria.

Results

Of the participants, 85% (n=1020) acknowledged a lack of knowledge regarding oral health care, while 78% (n=936) perceived oral diseases as non-serious. Additionally, 60% (n=720) of the subjects identified fear or anxiety toward dental procedures as a significant barrier to the utilization of oral health care services. Notably, transportation also emerged as a common barrier to health care utilization.

Conclusions

Within the confines of this study, it is deduced that prominent barriers hindering the utilization of oral health care services include a lack of knowledge, anxiety toward dental procedures, cost considerations, and transportation challenges. The findings underscore the importance of recognizing individualized factors that impede service utilization, emphasizing the need for tailored strategies to effectively motivate individuals in seeking oral health care services.

#154: ENDS use and periodontal status - Findings from the PATH Study

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Purpose

While electronic nicotine delivery systems (ENDS) use is rapidly increasing in the U.S., there is limited information on its long-term risks and benefits. This study aimed to assess the relationship between ENDS use and periodontitis in the United States adult population.

Methods

Data came from 33,822 adults who participated in the 2016-2018 wave of the Population Assessment of Tobacco and Health (PATH) study. Participants were included if they had no history of cigarette smoking and reported no history of diabetes. Logistic regression analysis was performed to estimate associations between ENDS use patterns and lifetime history of gingival disease diagnosis with adjustment for factors associated with poor oral health.

Results

A total of 2,893 participants met study criteria. Compared to never ENDS users, regular ENDS users had increased odds of poor oral health including bone loss around teeth (OR = 4.82, 95% CI = 1.04 to 22.35).Similarly, regular ENDS use was independently associated with a higher odds of poor oral health than non-regular ENDS users (OR = 12.2, 95% CI = 1.94 to 76.37).

Conclusions

Based on findings from this study, we conclude that ENDS use is a risk factor for periodontal health in the United States. These findings are consistent with previous research works linking ENDS use to poor oral health.

#155: Anxiety in Medical Students

Camron Chugg;[1] Carolina Sabates;[1] Brittney Shiue;[1] Mariah Gardner;[1] Katy Older;[1] Nathan Nyberg;[1] Tipsuda Junsanto - Bahri[1]

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Purpose

A comparative descriptive study of how men and women quantify and express anxiety in high-stress environments is not well studied. The purpose of this study is to look at female and male medical students at Noorda-COM during various periods in their medical education and examine how anxiety manifests in high-stress environments such as medical school.

Methods

Demographics of the study will include female and male students from the Noorda-COM student population (approximately 413 students). Students have been asked to fill out a survey, aiming to recruit at least 200 participants. The sample size has been calculated with a 95% confidence interval, 5% margin of error, and 50% population proportion. Inclusion criteria include Noorda-COM medical students older than 18. Student self-exclusion is possible by their decision not to participate or withdraw participation at any point. Other exclusion criteria include non-Noorda-COM students and Noorda-COM faculty/staff.

Results

N/A

Conclusions

By filling out the survey, we will be able to compare male and female GAD-7 scores, Hamilton symptoms and compare classes and repeat participants. With the study's completion, we hope to better understand the prevalence and symptoms of anxiety in each gender in high-stress environments.

#156: The Role of the Pharmacist in Substance Use Disorder

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Purpose

The study illuminates the pivotal role of community pharmacists as accessible healthcare providers, offering medication management, patient education, and preventive care services. Simultaneously, it explores the intricate responsibilities of inpatient pharmacists, emphasizing their involvement in therapeutic monitoring and collaboration with healthcare teams.

Methods

This study presents an extensive literature review aimed at discovering the various roles of pharmacists aiding in the treatment and prevention of substance use disorders. The roles of both community and inpatient pharmacists were compared. By synthesizing findings from diverse sources, including scholarly articles and reputable databases, the research provides a nuanced understanding of the responsibilities, challenges, and contributions of pharmacists in these two distinct environments.

Results

The literature review found that there is an extensive role for pharmacists in the prevention and treatment of substance use disorders. Pharmacists in the community setting can focus on preventing substance use disorders through appropriate screening and patient counseling. Pharmacists in the inpatient setting can focus on working with other healthcare providers to help manage symptoms of withdrawal and guide patients to recovery. Patient outcomes are better when pharmacists are adequately involved.

Conclusions

The findings underscore the indispensable nature of pharmacists in promoting optimal patient outcomes and advocate for continued research and recognition of their significance in both community and inpatient healthcare settings.

#157: Oral Health and Alzheimer's: The Oral Microbiome Link

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Purpose

This literature review aims to explore the impact of oral microbiota on brain function through the neuroinflammatory process of Periodontal disease (PD), with a specific focus on the pathogenesis of Alzheimer's disease.

Methods

For this literature review, a range of databases were used, such as Google Search, PubMed, and Web of Science. The search strategy used a combination of the terms "Periodontal disease," "Microglia," "Alzheimer's," "Oral microbiome," "Oral microbiome and Alzheimer's Disease," and "Periodontal disease associated to Alzheimer's Disease." The selected studies were published between 2021 and 2023. Only English-language articles were considered for this research.

Results

35 articles were used in this literature review. Most study designs looked at older individuals diagnosed with periodontal disease and how the brain was affected. On analysis of these articles, all 35 found some link between Periodontal disease and Alzheimer's disease. Most found a link between periodontal disease dysbiotic microbiome and microglial cell responses during the neuroinflammatory process.

Conclusions

Periodontal disease, a chronic inflammatory condition affecting the gums and supporting structures of the teeth, is often characterized by microbial dysbiosis. These studies suggest that the oral microbiome, when dysregulated due to conditions like periodontal disease, can contribute to systemic inflammation, such as neurological inflammation, and neurodegenerative conditions, such as Alzheimer's disease (AD). One proposed mechanism involves the migration of oral bacteria or their byproducts from the oral cavity into the bloodstream, which might reach the brain, where they could trigger inflammation. Additionally, the immune cells in the brain, including microglial cells, may be activated in response to this inflammatory challenge response. These events seem to lead to β-amyloid deposition in the brain, suggesting a link between oral microbiome dysbiosis in PD and AD. Further research is needed to describe better the involved mechanisms.

#158: Diversity and inclusion: A Qualitative study design

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Purpose

Our institution has a diverse student body. This study attempts to gain students' perspectives regarding diversity, exclusion, and inclusion (DEI) within the school environment.

Methods

Focus groups/individual interviews were conducted by student moderators using structured questions: What does diversity and inclusion mean to you?What does an inclusive learning environment mean to you?Do you feel that groups such as pods, clubs, or research groups meet your future goals?Do you believe your feelings of inclusion and/or exclusion affect your learning?How do you feel the current curriculum approaches cultural sensitivity/awareness? Transcribed responses were evaluated individually to obtain themes, then discussed among the research team to determine inter-rater reliability.

Results

Forty 1st-3rd year students, composed of 27 females, 13 males; age ranged 20-25 years (N=14), 26-30 years (N=18), and 31-35 years (N=8). Race/ethnicity: 25 White, 13 Asian/Pacific Islander, 7 Hispanic, 4 Black/African American,, 2 other (unspecified), 1 Native American, and 1 >2 race/ethnicities. Preliminary themes and sample quotes:Cultural sensitivity/awareness "…having to dress [for lab]..what about people who because of religious backgrounds are not comfortable wearing those kinds of clothing?"Environment/location "[As] a black [student] in Utah, when I tell people I'm in medical school, I get the same reaction; their eyes open up, and they're so shocked"Institution's diversity and inclusion"Our school makes an effort to be inclusive and diverse, but for … the decision makers, diversity and inclusion is kind of a box that needs to be checked."Support by professors/administration"I feel like I've had to go outside to find that support or find that mentorship."Limitations: Voluntary student participation and perspectives may not reflect opinions from the entire student body.

Conclusions

Although students acknowledge school's attempts for DEI, there is room for improvement. Challenges include difficulty in belonging, inadequate representation, culture shock with predominant population, navigating resources, social groups, and specific cultural awareness of faculty/curriculum. The study is ongoing to recruit more participants and themes. Collected themes would help faculty and administration expand DEI measures for current and prospective students.

#159: Substance Use Disorder (SUD) – The Cost in Utah

Amber Escobedo;[1] Mackenzie Cruzan;[1] Danica Herron;[1] Kent Wood;[1] Ryan Speckman;[1] Shandon Bradford[1]

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Purpose

Substance use disorder (SUD) is a manageable mental disorder that causes affected individuals to lose control over their use of substances such as drugs or alcohol. The cost of this disorder leads to the loss of billions of dollars each year. The purpose of this study is to explore ways to minimize the cost SUD bring to Utah and the United States.

Methods

To quantify the economic impact on Utah and the United States, a comprehensive literature review was done. The study also investigated strategies aimed at mitigating these financial losses.

Results

The results of this review demonstrated the advantages of implementing initiative programs such as overdose Education and Naloxone Distribution (OEND) or Syringe Exchanges (SE) which have been shown to save millions of dollars.

Conclusions

This literature review advocates for the adoption of harm reduction programs such as OEND and SE as a viable approach to control the economic load associated with Substance Use Disorder.

#160: Pharmacogenetics and its implementation in pharmacy practice

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Purpose

Pharmacogenomics (PG) involves the study and interpretation of an individual's genes, thereby dictating the best way to prescribe and treat. An individual's genes determine how an individual responds to medications and give providers a bigger picture of whether the benefits outweigh the risks on a case-by-case basis. This helps avoid drug toxicity in patients. As PG becomes more prevalent, an important next step is to encourage insurers/carriers to incorporate coverage under medical/pharmaceutical plans. The objective is to advocate for widespread coverage of PG by insurers/carriers by informing insurers/carriers of how cost-effective and beneficial PG adoption would be to them in the long term.

Methods

Literature review search terms used were: pharmacogenetic AND pharmacist AND (insurer OR carrier OR insurance coverage). Articles looked at were published between 2018 and 2023 and only included free full test articles. The search resulted in 9 articles which were read. Upon further analysis, 2 more articles were withdrawn.

Results

The consensus among physicians, pharmacists, and patients toward PG is that of enthusiasm. One article discussed the creation of a PG-passport that was created using the Dutch Pharmacogenetics Working Group (DPWG) guidelines which included the 58 variant alleles in 14 genes that could be used to ease the prescribing process of 49 different medications. Another article looked at Medication Therapy Management (MTM) and how PG could be used in conjunction to help in identifying potential drug therapy problems; MTM was found to be enhanced. Another study focused on the direct-to-consumer aspect, in such cases, pharmacists must be well-trained and feel confident in interpreting results and counseling patients.

Conclusions

The biggest barrier of widespread PG adoption is not so much a lack of effectiveness, but a primary reason is cost-effectiveness and coverage. Another barrier is a lack of education and role definition for physicians and pharmacists. While PG can result in medication changes, the ability to interpret and implement said changes is crucial for success. For wide adoption of PG practices, it is clear that insurers/carriers must begin making changes and including coverage to improve patient health in the long term.

#161: Impact of E-cigarette use on oral health

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Purpose

The surge in popularity of electronic cigarettes or vaping, particularly among younger demographics raises concerns about its effects on oral health. This narrative review aimed to offer a comprehensive synthesis of the current scientific understanding of vaping's impact on oral health, exploring the chemical makeup of e-cigarettes and their interactions with oral tissues.

Methods

The review methodically examined the chemical composition of e-cigarette vapor, including nicotine, flavoring agents, and other additives, and their potential interactions with oral tissues. The review addresses the impact of vaping on the oral microbiome, periodontal health, dental caries, and oral mucosal changes.

Results

Vaping introduces a complex chemical milieu to the oral cavity, with both direct and systemic implications for oral tissues. E-liquids are composed of an intricate amalgamation of chemicals. They undergo complex transformations upon heating and inhalation, thereby provoking inflammatory responses within the oral cavity. Findings indicate that vaping can lead to immediate oral health concerns such as dry mouth, irritation of the oral mucosa, altered taste perception, and halitosis. Over time, there is an elevated risk of periodontal diseases and dental caries, alongside potential implications for the development of oral malignancies. Nicotine emerges as a significant mediator in these processes, contributing to addictive behaviors and exerting harmful effects on oral tissues. Comparative analyses reveal distinct oral health risks associated with vaping compared to conventional smoking, with nuances in the extent and nature of damage caused. Furthermore, vaping is shown to impair wound healing and modify responses to periodontal therapies, complicating dental treatment outcomes.

Conclusions

There are significant oral health risks associated with vaping. Healthcare professionals must stay informed of these implications to provide appropriate care and guidance to patients who have an e-cigarette habit.

#162: **Pharmacist Interventions increase uptake of Pneumonia Vaccination in at-risk populations: A Review.**

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Purpose

Pneumonia is a large burden to healthcare costs and a large cause of hospitalization (Hayes, BH. Chest. 2018, 153(2), 427), and bacterial pneumonia can be prevented through vaccination. While pediatric vaccinations are routinely given, an additional dose is required for adults 65+ years of age or otherwise immune compromised, including diabetics. Only 22.2% of Immunocompromised patients and 65% of the elderly population have received the extra dose (Hung, MC. CDC. 2022). With pharmacist interventions, these vaccination rates could increase significantly. The purpose of this study was to conduct a review of the literature to identify interventions that have yielded higher pneumonia vaccination rates.

Methods

A PubMed search of terms [“pneumonia vaccin*” AND diabet*] was conducted on 10/22/23 with 24 articles Dated from 1989 to 2023. An additional PubMed search of terms ["pneumonia vaccin*" AND pharmac*] was done on 10/30/23 with 29 results from 1982 to 2023. Data was also taken from recent CDC reports on immunizations.

Results

In the community setting, simple interventions caused patients to receive the vaccine, or to talk with their PCP about receiving the vaccine, with over 50% not being aware of the need for an additional dose (Page, A. Journal of the American Pharmacists Association. 2020, 60(3) S51). Inpatient settings used chart reminders, standing order programs, and included vaccinations in their medication reconciliations as interventions. These helped to increase vaccination from 19% to 74% during the intervention period (Sokos, DR. American Journal of Health-System Pharmacy. 2007, 64(10), 1096). In a diabetic clinic there were interventions such as initial diabetic training, medication and vaccination education 3 months to 1 year after initial diagnosis, and annual checks with pharmacists to go over medication and vaccinations. These increased compliance and likelihood of vaccination significantly (Mendez, I. The Science of Diabetes Self-Management and Care. 2022, 48(1), 23).

Conclusions

Results show pharmacist interventions can increase pneumonia vaccination rates for at-risk patients (Sokos, DR. American Journal of Health-System Pharmacy. 2007, 64(10), 1096). There were limitations in assessing effectiveness in the community setting due to limited data. This merits further research with tracking outcomes of best practices of interventions at the pharmacist level in multiple areas of pharmacy practice: community, inpatient, endocrinology/diabetes clinics.

#163: **Transforming Oral Cancer Care in Saudi Arabia: A Collaborative Innovation to Enhance Early Detection and Prevention via an Interactive Decision Support System**

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Purpose

Addressing the challenges caused by oral cancer (OC) necessitates innovative strategies for early detection and prevention. Early detection and prevention of OC are vital in improving patient quality of life. However, dentists often need help in consistently performing OC examinations. The expressed need for a system that interacts with dentists led to the conception of a state-of-the-art clinical decision support system (The ISAC-arm) through a co-participatory approach (Intervention Mapping), to enhance early detection and prevention via an interactive decision support system

Methods

By aligning the ISAC-arm with dentists' specific needs, challenges, and behavioral observations, the intervention was meticulously designed to ensure its relevance, acceptability, and effectiveness. Drawing from recent studies and feedback from experts and dentists, the ISAC-arm served as an interactive tool that actively engages dentists in adhering to OC examination protocol (the ISAC).

Results

The development and pretesting of the ISAC-arm incorporated insights from national and international experts, 4600 patients and 80 dentists. The ISAC-arm implementation demonstrated its ability to identify a substantial number of high-risk patients of OC. Moreover, it facilitated real-time risk assessments, personalized diagnostic recommendations, and intervention strategies.

Conclusions

The ISAC-arm reinforced dentists' adherence to OC examination steps and contributed to the quality elevation of patient care through heightened detection rates and improved record-keeping practices. Finally, the development of the ISAC-arm sets the stage for collaborative healthcare innovations that harmonize scientific research and practical application.

#164: Management of Biomedical Waste in Prosthodontics

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Purpose

This study investigates the management of biomedical waste in prosthodontic clinics, aiming to assess current practices, identify areas of improvement, and propose sustainable disposal methods.

Methods

A comprehensive survey of prosthodontic clinics recorded types and quantities of biomedical waste generated. A literature review explored best practices in biomedical waste management. Guidelines were formulated based on data and literature findings

Results

Survey results indicated variations in biomedical waste management, emphasizing the need for standardized protocols. Commonly generated waste included dental impressions, prosthetic materials, and contaminated items. The literature review revealed successful practices such as source segregation, proper labeling, and eco-friendly disposal. Proposed guidelines include color-coded bins, staff training, and collaboration with specialized disposal services.

Conclusions

Effective biomedical waste management in prosthodontics is essential for environmental sustainability and public health. Standardized protocols, staff training, and collaboration with disposal services are recommended. Implementation of these measures aligns prosthodontic practices with global efforts toward sustainable healthcare waste management, contributing to a cleaner and healthier environment.

#165: Bridging Knowledge and Care: The Role of Health Literacy in Diabetes Outcomes Among South Asian Populations

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Purpose

Diabetes is a global public health problem, and the prevalence of diabetes is significantly higher among South Asian populations compared to other ethnicities. Epidemiological data has demonstrated that the South Asian demographic has a higher prevalence of diabetes, even in the absence of obesity. Therefore, diabetes management and prevention strategies targeted towards South Asian populations are crucial for reducing the burden of diabetes in this ethnic group and improving long-term health outcomes. The purpose of this study is to explore the role of health literacy in the management of diabetes among South Asian populations. Recognizing the crucial impact of health literacy on health outcomes, this research aims to investigate how understanding and engagement with health information influences diabetes management practices in this demographic. The study seeks to elucidate the relationship between health literacy levels and effectiveness in diabetes self-care, medication adherence, dietary habits, and overall glycemic control.

Methods

Utilizing a cross-sectional survey, data will be collected from a sample of South Asian adults diagnosed with Type 1 or Type 2 diabetes. Integrating validated tools such as the Health Literacy Questionnaire (HLQ) and Diabetes Self-Management Questionnaire (DSMQ), the survey will assess health literacy levels, diabetes self-management knowledge, and adherence to recommended diabetes management practices. Additional questions will be included to assess barriers to diabetes self-management, including cultural and communication barriers, access to healthcare services, and technology use.

Results

The findings of this study will shed light on the health literacy levels and diabetes management practices within the South Asian population.

Conclusions

The findings from this study will provide valuable insights into the role of health literacy in diabetes management among South Asian populations. These insights can inform the development of targeted interventions and strategies to improve diabetes self-management, enhance health outcomes, and reduce the burden of diabetes in South Asian populations.

#166: **Investigating Racial and Ethnic Healthcare Disparities in Screenable Ob/Gyn-Related Cancers**

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Purpose

This is a scoping review of peer-reviewed literature addressing healthcare inequity based on race and ethnicity with a specific focus on Ob/Gyn-related management and treatment of screenable cancers.

Methods

For the analytical review, PubMed was primarily used to retrieve research articles exploring the impact of race and ethnicity on Ob/Gyn-related cancer outcomes and screenings, focusing on cervical, ovarian, endometrial, fallopian tube, and vulvar cancers from 2015 to 2023. Non-original studies and studies published prior to 2015 were excluded from being reviewed. To ensure the reliability and relevance of the subsequent analysis, findings were uniformly summarized using a synthesis matrix, highlighting common themes across articles.

Results

Based on the articles compiled thus far, there is strong evidence pointing to increased incidence of OB/GYN related cancers diagnosed at later, more aggressive stages in African American and Hispanic women, specifically when compared to Non-Hispanic White women. Management also differed along the same racial lines, but especially for African American patients that were not offered similar access to life-saving treatments such as brachytherapy. Additionally, there is evidence showing that women of color are less likely to be offered preventive care screening or vaccinations, and are offered less education on OB/GYN related cancers by their healthcare professional. Conversely, outreach programs, higher provider competency, and patient education initiatives, increased likelihood of vaccine compliance and adherence in the group of African American and Hispanics to regular check-ups.

Conclusions

Our ongoing review aims to unveil healthcare inequities related to patient race and/or ethnicity which are focused on preventative care, patient-physician relationships, and patient education. The preliminary findings suggest that racial/ethnic disparities contribute to reduced adherence to recommended obstetric screenings and established effective treatment regimens. Interestingly, the data also shows that outreach programs and patient education is an effective tool which could be utilized more.

#167: Hypersensitivity Reactions with Chlorhexidine: A Concern for Dentists

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Purpose

Chlorhexidine is a widely used antiseptic, renowned for its broad-spectrum and substantive antimicrobial properties since its introduction in 1954. In the field of dentistry, it is used extensively in maintaining oral health and preventing infections. Chlorhexidine offers broad-spectrum antimicrobial properties effective against both Gram-positive and Gram-negative bacteria and prevents gingival inflammation. Despite its recognized benefits, concerns about chlorhexidine allergies have emerged in the medical and pharmacological research. Though rare, adverse reactions can range from localized skin irritations to systemic manifestations. Notably, in dental considerations, there is potential communication with the blood system in cases of periodontitis and ongoing treatment progression, making the introduction of chlorhexidine a possible trigger for hypersensitivity reactions. Acknowledging this rare yet critical issue, dentistry requires an awareness of this allergy potential via a systematic review to unravel the prevalence, clinical manifestations, diagnostic intricacies, and associated management strategies.

Methods

In this scientific research, a comprehensive systematic review of the literature was performed to gain insights into the current state of knowledge regarding chlorhexidine allergies. Two independent reviewers were responsible for the execution of data collection and evaluation. The search for pertinent articles included databases (PubMed, Scopus, Web of Science, and Ovid), following inclusion and exclusion criteria: Only articles published within the past decade (2013-2023) were considered, with a preference for English language papers to maintain linguistic consistency.Relevant studies, articles, and reviews providing insights into the prevalence, risk factors, clinical presentations, and management of chlorhexidine allergies were identified. Key findings and any gaps or controversies in the existing scientific literature were summarized.Data will be analyzed using appropriate statistical and qualitative methods, with results interpreted in the context of our research question, highlighting any significant findings. If applicable, limitations and potential biases in the study will be discussed.

Results

in progress

Conclusions

in progress

#168: An Analysis of Common Psychopathology Diagnoses and Treatments in Primary Care Pediatrics

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Purpose

Amid a national emergency in children's and adolescents' mental health, and with a shortage of child psychiatrists across the United States, general practice pediatricians are being called upon to diagnose and treat psychopathology. Extant research highlights the gap between pediatric mental health care needs and physician training. Although 85% of pediatricians report that parents would prefer mental health services be provided in a primary care office, those same doctors also understand that the training they received to treat mental health issues was inadequate. The purpose of this study is to begin a critical analysis of pediatric mental health prevalence and training provided to primary care providers.

Methods

The study utilized a survey asking pediatricians in Utah and pediatricians from across the United States about the prevalence of common psychopathologies treated by the provider, the provider's comfort level in treating these disorders, and general demographic information of the provider.

Results

The results demonstrate that cases of pediatric mental health are trending upward and indicate that the prevalence of psychopathology in Utah is higher than the prevalence of psychopathology in other states. There is a significant correlation between provider comfort levels in treating, diagnosing, and caring for patients with depression and anxiety and provider experience with these conditions. Additionally, the results suggest that experience in treating patients with depression or anxiety influences provider comfort levels above and beyond their residency training program.

Conclusions

With the growing concern over mental health, especially among children and adolescents, a greater emphasis should be placed on teaching pediatricians how to appropriately diagnose and treat common psychopathologies like ADHD, depression, and anxiety.

#169: Combatting the Opioid Crisis: Improving Communication between non-English Speaking Communities and their Providers

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Purpose

Opioid-use-related deaths have surged in recent years with the economic cost of the opioid epidemic estimated to be over $500 billion annually. Amid calls for declaring a national opioid emergency, health policymakers are considering the best ways to rapidly address the gap associated with the social determinants of health. The opioid epidemic is deeply rooted in social and economic disparities by exposing at-risk populations' vulnerability to opioid use disorder (OUD). As globalization and immigration increase, communication between non-English speaking populations and their healthcare providers becomes more difficult. Reducing language barriers can improve healthcare outcomes for OUD patients. Translation apps have been found to encourage better communication; however, accessibility and ease of use of these apps can prove to be limiting factors among clinics and their patients.

Methods

The purpose of the current study was to 1) create a bi-lingual educational health pamphlet, containing digestible information about the opioid crisis and 2) provide support for OUD and mental health in the Latinx community. Various iterations of the pamphlet were developed to include: • Advances in basic science • A reduction in harmful stigma • Include accessible resources in Salt Lake and Utah County, USA • Combined English and Spanish languages.

Results

Successfully addressing the opioid crisis will require more effective treatments to implement equitable and notable changes to the current outcome of the opioid epidemic. The present study can provide clinicians and researchers with an additional resource in their patients' native language to promote health and significantly reduce the opioid-related mortality rate.

Conclusions

The opioid crisis is a complex, evolving epidemic. It is a public health objective that involves closing cultural and language barriers and promoting treatment and prevention strategies without stigmatization. Additionally, the advancements achieved by the study can be adopted for other substance use disorders to expand knowledge of science, treatment, and communication.

#170: Ergonomics and Musculoskeletal Disorders among Dental Students and Practitioners

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Purpose

Musculoskeletal disorders (MSD) are defined as muscular pain or injuries to the human support system that can occur after a single event or cumulative trauma, hence causing negative impact on daily activities. MSD can vary from discomfort, numbness, ache, pain and it can even prevent normal daily activities. One of the risk factor categories for MSD is work related (ergonomic) risk factors. Dentists are more susceptible to have MSD, psychological stress, fatigue, cumulative trauma disorder and occupational health hazard. Increased in MSD occurrence had caused the reduction in the amount of the productivity, early retirement and increased number of sick leave among dental practitioners. The aim of this study was to determine the prevalence of musculoskeletal disorders among dental students and dental practitioners.

Methods

The cross-sectional study was conducted among dental undergraduate students, interns and postgraduate students to assess musculoskeletal symptoms and their quality of life. Simple random sampling method was used for data collection and distribution of responses was presented as frequency and percentages. Descriptive statistics were performed for age groups and subgroups based on the percentage of correct responses. Individual pair wise comparison was done using the median test for the percentage of correct responses.

Results

About 60 percentage of the responders to the study faces different symptoms of MSDs like ache, pain, discomfort of joints, wrist, spine, neck and shoulder. These troubles reduced daily physical activity of subjects. Approximately 26% had decrease in muscle strength and flexibility and some faced anxiety or depression or stress.

Conclusions

Dental students were reporting MSD at rates on par with professional dental practitioner, suggesting that MSD could be developed well before the beginning of a professional dental career. The high prevalence of MSD among dental students highlighted the need for further emphasis to be placed on ergonomic education throughout their undergraduate and postgraduate studies.

#171: The Effect Of Fluoride Mouthrinse On Demineralization During Orthodontic Treatment

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Purpose

White spot lesions are in iatrogenic side effect of fixed orthodontic therapy. Fluorides have been the chief preventative therapy against demineralization. Research has shown a high potency professionally applied fluoride to be effective in reducing demineralization. However, there is little research on effectiveness of self-applied home based fluorides.

Methods

Scopus, Embase, Medline and Web of Science databases were searched according to specific inclusion and exclusion criteria. Randomized controlled trials and controlled clinical trials were selected that examined the efficacy of fluoride mouthrinses in preventing demineralization compared to a placebo or dentrifice in patients undergoing orthodontic therapy. Data extraction and quality assessment was performed independently by two authors, with a third author consulted when needed.

Results

A total of six studies were included in the review. Five of them showed a high risk of bias relating to methodological insufficiencies. One study was classified as having a low risk of bias. Three studies used a control of no mouthrinse or placebo, while three studies compared fluoride mouthrinse to regular brushing alone. Pooling of results was not possible due to heterogeneity in study designs. Four studies reported a decreased formation of white spot lesions in the group using fluoride mouthrinse daily, while one study reported no statistical significance and other reported that high frequency brushing with highly potent fluoride dentrifice showed lesser white spot lesion formation.

Conclusions

Based on the limited evidence available, fluoride mouthrinse appear to reduce the occurrence of white spot lesions in patients undergoing orthodontic treatment. Further well-designed trials adhering to reporting guidelines and using objective measures are necessary before outlining universal guidelines for best practice

#172: Diversity and Inclusion: A Quantitative Survey Study

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Purpose

Over the past several years, the medical education community is not immune to issues of bias. More research is needed to quantify bias at all levels of medical education. We want to determine perceptions of bias and whether bias correlate with demographic identities, including race/ethnicity, gender, and socioeconomic status. We hypothesize that those who identify with minority groups and/or come from lower socioeconomic status will perceive a great degree of bias and less inclusion compared with those who identify with majority groups and/or socioeconomic status.

Methods

Students (1st through 3rd years), faculty, and staff were invited to participate in an anonymous online survey, comprised of 22 questions comprised of bias, diversity, and inclusion questions, demographics and an open-ended question. Descriptive analysis is performed.

Results

Preliminary responses were received (N=119) with 26% response rate (119/450). Only student data is presented (115/395; 29% response rate), due to low faculty/staff response. Race/ethnicity composition: 15 Asian, 5 Black/African American, 68 White, 10 Latin/Hispanic, 5 prefer not to say, 10 >2 mixed; 1 Native American; and1 Near-eastern. Gender: 55 females, 58 males, 1 non-binary, 1 prefer not to say. Household income before age 18 years: 40 <$75,000, 16 $75-100,000, 22 $100-149,000, and 30 >$150,000. Students felt that the school treated them fairly (76% strongly agree/agree). They were valued as an individual: 65% strongly agree/agree, and by high leadership: 69% strongly agree/agree. The school has achieved diversity among faculty: 71% strongly agree/agree and within student body: 62% strongly agree/agree, and school supports diversity and cross-cultural initiatives: 71% strongly agree/agree. There was a slightly higher disagree/strongly disagree rate regarding school has achieved diversity within student body (20%) and ability to find mentor (19%). Perceptions that school demonstrated intolerance to harassment: 69% agree and accepting of those with different ideas: 72% strongly agree/agree.

Conclusions

Overall, students perceived that they were valued by the school and leadership with presence of diversity amongst student body and faculty. High agreement rate was seen with school support regarding diversity initiatives, intolerance towards harassment, and acceptance towards different ideas. Continued research is needed to further ascertain bias and diversity within the medical school environment.

#173: **Evaluating the oral health-related quality of life among dental patients in South India - A Descriptive Study.**

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Purpose

Oral health (OH) serves as a pivotal indicator of individuals' general well-being, intimately linked to overall health and health-related quality of life (HRQoL). HRQoL, a pertinent metric for gauging overall health and the impact of health conditions on life quality, provides a foundation for comprehending the concept of oral health-related quality of life (OHRQoL). OHRQoL encapsulates the subjective experience of symptoms related to oral conditions, influencing an individual's well-being. Utilizing patient-centered outcome measures, OHRQoL discerns the impact of oral health on various facets of daily life, encompassing social, psychological, and functional dimensions. Suboptimal oral health and OHRQoL can precipitate adverse outcomes, including diminished self-esteem, depression, reduced performance in daily activities, limited social interaction, and an increased burden on healthcare systems. This study aims to evaluate the oral health-related quality of life among dental patients in South India.

Methods

In August 2023, a cross-sectional study was conducted to assess the oral health-related quality of life among dental patients. A total of 301 respondents participated, selected through a simple random sampling method. The survey, presented in printed form and comprising 20 questions in plain local language, was distributed to gather insights from participants. The respondents were asked to complete the questionnaire based on their knowledge and experiences.

Results

The findings reveal that a substantial majority of the participants possess awareness of Oral Health Related Quality of Life (OHRQOL), with all of them actively taking oral hygiene measures. Notably a significant portion (47.3%) experiences occasional disruption in daily living due to oral health, with 21.3% reporting frequent impact. Concerns about dental problems vary, with 57% rarely being worried, while 11% are consistently anxious. The ability to speak is largely unaffected (68% rarely feel difficulty), but a subset of patients (10.6%) always feels unhappy about their speech due to dental issues. Concerning appearance, 60.5% feel uncomfortable about their teeth, mouth, or dentures. Chewing difficulties are prevalent (59%), leading 78% to sometimes limit their food choices. Painful aching in the mouth or teeth is rare (67.3% rarely), while dry mouth is infrequent (2.6% often). Dental hygiene practices vary, with 41.3% brushing twice daily and 9.3% brushing more than twice.

Conclusions

The study findings underscore a significant association between oral health and the quality of life among dental patients in Kerala. This emphasizes the critical role of maintaining good oral health for overall life success. However, further research is imperative to elucidate the underlying mechanisms driving this connection.

#174: Interprofessional Healthcare: A Systematic Review

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Purpose

Interprofessional healthcare provides patients with the access to receive patient-centered care through interdisciplinary providers to improve the quality of care. The objective of the study is to understand the benefits and challenges encountered by interprofessional healthcare teams in treating individuals who seek care. The review expands on the need to find strategies and solutions to overcome the challenges interprofessional healthcare teams' experience. Furthermore, the study explores the unique challenges that dental professionals experience when working within interprofessional healthcare teams.

Methods

A literature review was conducted using Web of Science, Scopus, and PubMed. The extraction of articles through these databases were subject to the inclusionary and exclusionary criteria. The inclusionary criteria include research conducted within the United States, research within the last 10 years, peer-reviewed, publications only in English, and human based studies. The exclusionary criteria include interprofessional education, non-peer reviewed, and non-full professional education to understand patient outcomes outside of institutional settings was also excluded.

Results

This study is ongoing; preliminary evidence indicates that better patient outcomes were associated with utilization of interprofessional healthcare teams. Patients benefited and reported higher ratings of satisfaction with their quality of care when there was a cohesive collaboration amongst their healthcare providers.

Conclusions

This study strongly suggests that the use of interprofessional healthcare teams has a positive impact on patient outcomes. This integrated approach to healthcare, where providers collaborate cohesively, not only improves the quality of care received by patients but also significantly enhances their satisfaction levels. This underscores the importance of fostering collaborative practices in healthcare settings to achieve better patient outcomes

#175: Prophylactic antibiotic prescribing in dental practices

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Purpose

This literature review investigates the effectiveness of antibiotic prophylaxis per the guidelines provided by the American Dental Association and American Heart Association in preventing subacute bacterial endocarditis in predisposed patients.

Methods

The article will examine studies and research papers on this subject, analyzing the evidence and evaluating the efficacy of the recommended prophylactic measures.

Results

The review will highlight the presence or absence of evidence for these guidelines and provide insight into the potential risks and benefits of the treatment.

Conclusions

The goal of this literature review is to provide the dental industry with a compendious paper to understand the literature that is currently available to aid and support evidence-based decision-making in practice.

#176: **The public health concerns associated with the harmful and potentially harmful constituents (HPHC) in tobacco products and tobacco smoke.**

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Purpose

Smoking and tobacco use have been a public health concern for many years. According to the Centers for Disease Control and Prevention (CDC), 11.5% of adults in the US smoke. The adverse health effects of smoking are well known, including exposure to tobacco smoke. The toxins in tobacco smoke pose a severe health risk to all who encounter it. This study will examine the negative health effects and potential public health concerns associated with inhaling tobacco smoke for the smoker and those exposed to secondhand smoke

Methods

A list of 93 harmful and potentially harmful constituents (HPHC) in tobacco products and tobacco smoke has been created by The Food and Drug Administration. A study conducted by The National Cigar Institute categorized the 93 HPHC into 10 subgroups. Data was collected about the adverse health effects of the subgroups using PubMed.

Results

Nicotine is the most well-known tobacco alkaloid. The negative effects of nicotine are well established and can cause various health concerns including maternal and fetal health. HPHC in the volatile inorganic compounds includes carbon monoxide (CO). CO can diminish the ability of hemoglobin in the blood to carry oxygen, leading to many adverse health effects Tobacco-specific nitrosamines 4-(methylnitrosamino)-1-(3-pyridyl)-1-buta-none (NNK) and N'-nitrosonornicotine (NNN) have shown in multiple studies to increase the risk of tumors in the lungs. Lead is a metal found in tobacco smoke. Prolonged exposure can cause heart disease, high blood pressure, and kidney disease. There are also polycyclic aromatic hydrocarbons, aromatic amines, and phenols that have shown to increase the risk of tumors in lab animals, suggesting a possible correlation in humans.

Conclusions

Smoking and tobacco use is a grave public health concern. Exposure to tobacco smoke can cause various serious health problems for not only the smoker but all that encounter the smoke. There have been many steps taken in reducing the exposure of secondhand smoke, including bans on planes, at restaurants, and at many businesses. However, with smoking allowed in other public places, the question arises: are we doing all we can to reduce the risk of exposure to tobacco smoke?

#177: Race, Ethnicity, and Food Allergy

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Purpose

Food allergy (FA) is a prevalent and growing problem, and its associations with race and ethnicity are still being determined. The objectives of this study were to analyze clinical data to determine how FA prevalence varies based on race or ethnicity specifically for Asian or Pacific Islander (A/PI), African American (AA), White, Hispanic, and Non-Hispanic children.

Methods

Patient data from the Children's Hospital of Philadelphia was analyzed. Removing entries where no race or ethnicity was unspecified left data for 298,476 children. This set was used to determine the overall prevalence of FA, how FA diagnosis has changed over time for each race or ethnicity, the overall percent having multiple FAs, and the percent prevalence of the top 9 food allergens. Logistic regression was used to calculate the odds of having FA for each race or ethnicity, controlling for sex, insurance, and birth year. Analysis of the subset of 20,582 children with FA was used to calculate the percent of each race or ethnicity allergic to each of the top 9 food allergens. Logistic regression was used to calculate the odds ratio of being allergic to a particular allergen, using White as the reference group.

Results

The overall prevalence of FA was 6.90%, with a trend of more FA diagnoses with birth year. The highest percentages were reported for Peanut (2.65%), Milk (2.21%), Egg (1.83%), and Shellfish (1.64%). The percent of FA children with multiple FAs was 32%. Compared to Whites, Hispanics had lower odds of having any FA, while AA and A/PI children had higher odds. Differences were also observed in both the prevalences and the odds of FA to particular allergens. The most common allergen for food-allergic White and A/PI children was peanuts (40% and 45%), shellfish for AA children (39%), and milk for Hispanic children (37%).

Conclusions

This study shows that A/PI and AA children have increased odds of FA compared to Whites, with allergies to peanuts and shellfish, respectively, the most common allergens for these groups. These data can help inform outreach and interventional efforts for these groups.

#178: **Perception of Dental Students Regarding the Role Of Dentist In Smoking Cessation Counselling**

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Purpose

Tobacco use is one of the leading causes of premature death, disease and disability around the world. Six out of eight leading causes of death worldwide are attributed to the diseases related to tobacco use as a risk factor. Healthcare professionals rank high both in effectiveness and preference for providing tobacco cessation counselling. Surveys have found that 58% of smokers made regular appointments with their dentist. Cessation rates of up to 18% have been seen when dental professionals counselled their patients to quit tobacco. The study evaluated dental student's views about tobacco cessation counselling and their skills as cousellors.

Methods

A crossectional study was conducted using a pretested questionnaire about role of dentist in smoking cessation and counselling. The questionnaire seeks to determine dental student's views about tobacco cessation counselling and their skills as counsellors. Study population consist of dental students and most of them are interns or final year students.

Results

In the survey, 27% of participants asked the patient about tobacco use (Asking), 31% of participants have helped a patient to quit tobacco use (Advise), 5% counseled patients about the effects of tobacco on oral health (Assess), 2% provided patients with written information and self-help material (Assist), 3% suggested NRT (Assist) and only 2% arranged follow up visits (Assist).

Conclusions

Dental students did not show much confidence in providing tobacco cessation counseling which can help the tobacco addicts; especially psychologically dependent ones; in quitting their habit. This is despite the fact that they felt that most of the tobacco users look forward to them for tobacco cessation counseling and will follow their advice.

#179: **A cross-sectional study to assess the emotional intelligence among students of dental colleges in South India.**

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Purpose

Over an extended period, the examination of intelligence predominantly centered on the adaptive deployment of cognitive abilities. In more recent times, scholars such as Gardner (1983) and Sternberg (1988) have proposed comprehensive frameworks for comprehending intelligence. Pioneering the concept of "emotional intelligence," Salovey and Mayer (1990) posited that emotional intelligence encompasses three distinct categories of adaptive capabilities: the evaluation and expression of emotions, the regulation of emotions, and the utilization of emotions in problem-solving. The objective is to evaluate emotional intelligence among dental students across various educational institutions.

Methods

A cross-sectional study was executed, involving 300 participants who actively engaged in a questionnaire-based survey comprising 33 questions. The distribution of questionnaires was facilitated, and respondents were instructed to provide answers based on their insights into the experience. The data collection process employed a convenient sampling method.

Results

In a survey of 300 participants, comprising mainly final year part 2 students (64.3%), house surgeons (15.7%), and PGs (20%), notable findings emerged. 45% (n=135) solved problems fairly often when in a positive mood, while 26.7% (n=80) did so sometimes. Regarding overall competence, 37% (n=111) believed they could sometimes excel, with 26% (n=78) indicating fairly frequent success. Emotionally, 35.7% (n=107) perceived new possibilities during mood changes, and 29.7% (n=89) reported fairly often having such insights. Additionally, 36.7% (n=110) admitted to occasionally giving up when faced with challenges, while 26.3% (n=79) claimed never to do so. Noteworthy expectations included 36.7% (n=110) anticipating very frequent positive outcomes, while 26% (n=81) expected outcomes to be fairly positive. The study explored participants' beliefs about life events influencing priorities, finding that 34.3% (n=103) fairly often underwent reevaluation, while 33% (n=99) did so sometimes. Socially, 36.3% (n=109) engaged in organizing events for others, sometimes being enjoyed, while 35% (n=105) fairly often arranged such events. Motivationally, 40.3% (n=121) fairly often stimulated themselves by envisioning positive task outcomes, while 33.7% (n=101) did so sometimes. Lastly, 33.3% (n=100) were sometimes aware of their emotions, with 31.3% (n=94) being fairly often aware during experiences.

Conclusions

The survey of 300 participants in dental colleges revealed insightful patterns in emotional intelligence and behavioral tendencies among students. Notably, a significant proportion demonstrated a positive correlation between problem-solving abilities and positive moods. Additionally, a substantial number acknowledged occasional challenges yet exhibited resilience, with a noteworthy percentage expressing confidence in their overall competence. The findings suggest a nuanced understanding of emotional intelligence among dental students, emphasizing the interplay between emotions, problem-solving, and perseverance in academic and personal endeavors. These insights provide valuable considerations for educational and support programs tailored to enhance emotional intelligence and coping strategies among dental students.

#180: Libido in Medical Students

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Purpose

This is a descriptive study of libido in medical students looking at both male and female students. The purpose of the study is to compare genders and focus on the factors that impact women. Previous studies have shown that there is even more of a decline in libido if accompanied by factors such as stress, androgen level fluctuations, cancer, and the use of hormonal contraceptives. This study aims to look at a unique period of transition in a prospective physician's life: the path to becoming a doctor. We surmise that females have decreased libido in comparison to males due to hormones and factors that affect libido.

Methods

A survey was sent out to all students at Noorda-COM. Inclusion criteria are biological females and males aged 18 to 45 years old (this age range was selected for sexual maturity and the average age of menopause for females). Exclusion criteria are individuals under 18 years of age or over 45 years of age and non-medical students. Student self-exclusion is possible by their decision to withdraw from participation at any point.

Results

The study is ongoing and currently has 125 responses comprising 68 females and 57 males. Preliminary data indicate that males are two times more likely to desire and have sex compared to females. Males at Noorda are more likely to be married or in a relationship compared to females. The males are also more likely to predict their drive in comparison to the average than females. Lastly, the average sexual encounters presumed each week are the same in both genders and the average encounters are the same. Previous studies state that the average encounter for couples is one time a week and so far, the data is congruent.

Conclusions

This study aims to bring light to some of the factors that impact libido. Specifically, this study provides a more comprehensive understanding of the effects of stress and contraceptives on libido in the Noorda-COM community. These results may help practitioners better understand the effects of high stress environments in conjunction with contraceptives on libido in medical students.

#181: Improving Pharmaceutical Compounding as a Drug Shortage Mitigation Strategy in Kenya with a Train-the-Trainer Course in Pharmaceutical Compounding

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Purpose

Drug shortages in Kenya occur at a significant rate. This can disrupt patient access to critical life-saving drugs. Pharmaceutical compounding of drugs on shortage is an allowed practice activity for Kenyan pharmacists. However, questions of ability to prepare quality dosage forms and proper training of pharmacy personnel may decrease the confidence of pharmacists and pharmacy technologists to fully engage in this service. To improve the utility and quality of pharmaceutical compounding as a mitigation strategy for key low-risk drug shortages in Kenya a novel training course is proposed.

Methods

A training course on selected key low-risk preparations will be designed. This course will be delivered in-person in a train-the-trainer format that will enable the pharmacy personnel to independently update and maintain the optimal knowledge level in their pharmacy going forward. Instructional strategies will be generally structured with a pre-lab didactic instruction period that will include resenting pharmaceutics, regulations and counseling information about the dosage form/s scheduled to be prepared. In addition, stability, and formulation as well as quality control procedures for the dosage forms to be prepared will be discussed. This will be followed by laboratory instruction including demonstration of preparation of dosage forms, instruction on labeling and packaging of the final compounded dosage form and training on calculation of the beyond-use-date for each compounded dosage form. To assess the impact of the training course on pharmacy personnel perceptions of pharmaceutical compounding a cross sectional survey using a structured questionnaire will be conducted.

Results

This is a research in progress submission.

Conclusions

This is a research in progress submission.

#182: A Pharmacist's Central Role in Improving Hormonal Contraceptive Access

Aleese Smith;[1] Alexandra Arledge;[1] Urvi Patel;[1] Josie Young[1]

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Purpose

The purpose of this study was to identify the role of the pharmacists in improving access to hormonal contraceptives in Utah

Methods

The researchers conducted a literature search and investigation of standards of practice requirements for pharmacists in the state of Utah regarding contraceptives.

Results

When a patient is prescribed a hormonal contraceptive, their pharmacist or pharmacy intern is required to provide the following information how to appropriately store and administer their new contraceptives. The possible risks and adverse effects, like that of the necessity of backup birth control when starting. Possibility of acquiring an STI and risk-lowering strategies. The significance of specific screenings by the patient's primary care provider or women's health provider allowing pharmacists to promote better health.

Conclusions

Pharmacists have a great role in the state of Utah to provide birth control to the women in their community. This allows for their patient population to readily access birth control with out having to see their primary care provider. As a pharmacist, you do have specific criteria you need to meet to be allowed to prescribe hormonal contraceptives. As well as having key areas you need to assess to make sure patients are receiving the best care. With the continuous growth in this role, pharmacists can genuinely make an impact on their community.

#183: **The National Status of Pharmacist Ablilty to Prescribe Hormonal Contraceptives**

Aleese Smith;[1] Alexandra Arledge;[1] Urvi Patel;[1] Josie Young[1]

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Purpose

The purpose of this study was to identify the status of pharmacists in improving access to hormonal contraceptives across the nation.

Methods

The researchers conducted a literature search and investigation of the standing that pharmacists have for prescribing contraceptives nationally and their standards of practice requirements to do so.

Results

There is ever-growing progress in the national status of pharmacist and their ability to prescribe hormonal contraceptives. Since California in 2016, the first state to allow this practice, over half of the states have implemented these practices. There is still more room for growth and development across the nation for pharmacists. In states with this new practice pharmacist make hormonal contraceptives more accessible for their patients.

Conclusions

Pharmacists' roles are continuing to grow and evolve across the nation. Their prescribing ability provides accessible birth control to the women in their community. Each state pharmacists need to meet specific requirements for this prescribing ability. With the continuous growth in this role, pharmacists can genuinely make an impact on their community.

#184: Prevalence of headaches and migraines amongst osteopathic medical students

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Purpose

Headaches and migraines are common conditions that can have a significant impact on individuals' daily lives. Some triggers for headaches and migraines include stress, lack of sleep, and screen glare. In the general population, migraines affect approximately 10% of males and 17.5% of females, whereas headaches in general affect around 47% of the population. While these conditions affect a significant portion of the general population, it is hypothesized that medical students may experience higher rates of headaches and migraines due to various factors such as stress, lack of sleep, and other triggers commonly associated with their education. We present a survey design intended to identify students' headaches or migraines experience, frequency, severity, and degree to which they interfere with daily life. Our hypothesis is that there will be an increased prevalence of headaches and migraines, similar to what is published in the literature. However, we also want to determine the measures that students use to help alleviate their headache experiences, such as osteopathic manipulative treatment, pharmacotherapeutics, alternate/complementary measures, and/or wellness.

Methods

To investigate the prevalence of headaches and migraines among medical students, a survey will be conducted to gather information on the frequency, severity, and interference with daily life experienced by the students. The survey will also assess potential triggers and factors that may contribute to these conditions. The survey is comprised of 2 main parts: the headaches questionnaire and a demographic section. Survey questions are a hybrid of de novo questions and questions based on existing surveys, ie Migraine disability assessment survey (MIDAS), StonyBrook Headache screening questionnaire. IRB approval has been obtained and will begin being disseminated this month.NoordaCOM students (OMS1 through OMS3) will be invited via email communication to participate in an online survey (Qualtrics). The survey period will last at least 10 months. Participation is voluntary and anonymous. Results will be collected, without any identifiers, and analyzed collectively once the survey period ends.

Results

NA

Conclusions

NA

#185: Obesity and Dental Caries in School Children

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Author Affiliations

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Purpose

Childhood obesity and dental caries are prevalent chronic, multifactorial conditions associated with adverse health outcomes and substantial healthcare costs. The aim of this study was to evaluate the relationship between obesity and dental caries among school children.

Methods

Data from 3,431 6-12-year-olds children from the National Health and Nutrition Examination Survey (NHANES) 2011–2016 were analyzed. The Centers for Disease Control and Prevention (CDC) standard was used to define obesity. Dental caries was measured during clinical examinations and summarized as counts (dmft scores) for caries experience and prevalence (dt>0) for untreated caries. The association of obesity with dental caries was assessed in regression models controlling for demographic factors, family socioeconomic status and child's intake of added sugars.

Results

In crude models, overweight children had 1.355 (95%CI: 1.080,1.700) times higher untreated caries than children with normal weight. This association was weakened but continued to be significant after adjusting for child demographic factors (1.319, 95%CI: 1.049, 1.659). However, it was boosted after additional adjustment for poverty income ratio and child's intake of added sugars (1.327, 95%CI: 1.054, 1.670). The association between obesity and caries experience was not significant in either unadjusted or adjusted models.

Conclusions

The data indicates that untreated caries and caries experiences are not directly correlated with childhood obesity. There are, however, common causes of poor dental health and childhood obesity, such as culture, poverty level, lifestyle, and family traditions and habits. It is important for dentists to be aware of factors influencing the development of childhood caries so that they can intervene as early as possible.

#186: Harm Reduction Measures in Substance Use Disorder (SUD)

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Purpose

This literature review aims to comprehensively analyze harm reduction strategies employed in addressing Substance Use Disorder (SUD). Focusing on key interventions such as fentanyl testing strips, naloxone distribution, syringe exchange programs, and methadone/buprenorphine clinics, the study seeks to evaluate the effectiveness of these approaches in reducing the associated harms of substance misuse.

Methods

To achieve the objectives, an extensive review of scholarly sources was conducted, encompassing studies and articles that investigated various harm reduction strategies in the context of Substance Use Disorder. The methods involved in-depth analysis and synthesis of findings to ascertain the impact of these interventions on preventing overdoses, reducing the transmission of bloodborne infections, and facilitating safer substance use practices.

Results

The synthesized results highlight the significance of harm reduction strategies, including fentanyl testing strips, naloxone distribution, syringe exchange programs, and methadone/buprenorphine clinics. These interventions have demonstrated effectiveness in promoting public health outcomes and reducing the societal burden associated with Substance Use Disorder. Notably, the findings emphasize the potential of harm reduction programs to address specific challenges related to substance misuse.

Conclusions

In conclusion, this literature review advocates for the continued integration and expansion of harm reduction programs as integral components of comprehensive strategies to address the complex challenges posed by substance misuse. The results underscore the importance of adopting evidence-based harm reduction interventions to enhance public health and mitigate the adverse effects of Substance Use Disorder on individuals and communities.

#187: Evaluation of the Roseman Basics Leveling Course – Comparing Survey Results from February 2022 and 2023

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Purpose

In Roseman University's accelerated PharmD program, everything is very fast paced. Therefore, assessing the effectiveness of the leveling course given to incoming P1 students is critical. Roseman's Basics course is essential in further developing a solid foundation that can help students thrive in the program. The continual improvement of this course for the incoming P1 class should help in the transition from undergrad to Roseman to prepare students for the upcoming material. By collecting information from students who have previously taken the course, we are able to evaluate and analyze key concepts that students find useful. In this study, we convey some of the survey results attained from the 2021-2022 and 2022-2023 Roseman Basics student surveys.

Methods

The survey was given to P1 students on both campuses February 2022 and February 2023, asking questions concerning the Roseman Basics course each class had been exposed to. In this survey we asked questions such as, "Do students find it helpful?" and, "Which sections did the P1 class find the most beneficial and which did they find the least helpful?"

Results

In our survey, the students' opinions provided subjective information which has enabled us to further evaluate the basics course to better prepare future students. Negative and positive feedback varied. According to the surveys, student opinions on some topics remained the same whereas some became more positive while some were more negative year to year. For example, although P1 students did appear to like the organization of Roseman Basics, the response to the statement of, "The Roseman Basics course was well organized," showed a more negative trend in 2023 versus in 2022.

Conclusions

This study details feedback from students concerning the 2021 and 2022 versions of Roseman Basics administered to the incoming P1 class of 2021 and 2022. These survey results are important because ultimately Roseman basics is for the incoming P1 students, and if it is not doing any good for the students why have it. For future course development, focus group results should be compared between the incoming P1 classes to ensure that proper improvements have been made. Tracking of the survey results will also continue.

#188: Comparing Osteopathic Student Preferences and Outcomes Between Virtual Reality and Cadaveric Anatomy Labs

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Purpose

This study will attempt to reveal any differences in educational outcomes and osteopathic medical student preferences when comparing anatomy instruction by cadavers and virtual reality (VR). It aims to: 1) compare academic outcomes between students who learned purely on cadaveric prosections with students who supplemented their learning with VR anatomical models, 2) determine student preferences for learning tools, and 3) determine reasons for those preferences.

Methods

Participants will take a pre- and post-study survey asking comfortability with VR technology and the efficacy of VR in teaching anatomy. In addition to their regular curriculum-assigned cadaveric instruction, the participants will receive three supplemental anatomy lessons using the Oculus VR headset and the Virtual Medicine VR Anatomy software. The study participants will take 6 Complete Anatomy (CA) quizzes, 3 corresponding to the VR sessions, and 3 control quizzes. The quiz scores corresponding to the VR sessions will be compared to the quiz scores without. The scores of the participants in these regularly assigned quizzes will be compared to the control group. In addition, the overall grades in the course will be compared between the control group and participants.

Results

We expect to see overall positive sentiment from using the VR technology for cadaveric anatomy instruction. We also expect some initial difficulty in learning to control the VR technology but plan to mitigate that with a training session and in-session support. We hope that the value gained from using VR technology will outweigh the challenges of initially learning how to use the software.

Conclusions

Overall, we hope this research will show the validity of the use of this innovative technology in osteopathic medical school anatomy education. Not all students may feel comfortable learning from cadavers, and we hope that this technology can provide an educationally equivalent alternative to learning medical school curriculum. Additionally, if successful, the addition of VR sessions could limit the teaching strain on faculty members, decrease the number of personnel needed for a traditional cadaveric lab, and decrease the training responsibilities of lab assistants.

#189: Changes to the University Curriculum Can Cause Negative Social and Emotional Impacts on Peer Mentorships and Relationships, Including Stereotype Threat

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Purpose

Altering the curriculum of a program can have negative repercussions for the student experience, including peer mentorships and interclass relationships. This study seeks to investigate what those consequences could be for students' emotional and social well-being in a predoctoral dental program, and if any of these consequences could be related to the theory of stereotype threat.

Methods

This study utilizes a quasi-experimental design with two different treatments, New Curriculum Treatment and Past Curriculum Treatment, n=87. Data were collected using mixed methods via survey and semi-structured interviews.

Results

Findings from our survey suggest that student relationships and peer mentorships were impacted by the curriculum changes implemented by the program. In our interviews, each participant indicated that they did believe that stereotype threat may have played a role in the difficulties experienced.

Conclusions

When making changes to the structure, sequencing, or content of a program, administrators need to be aware of the potential ramifications these changes could have on students' relationships with their peers. Stereotype threat, in particular, can have negative consequences for mental well-being, and working to address this issue when implementing change could help mitigate any potential repercussions.

#190: Effectiveness of Virtual Learning Environments for Teaching Tooth Morphologyto Dental Students: A Systematic Review

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Purpose

To evaluate the effectiveness and acceptance of Virtual Learning Environments (VLEs) in teaching tooth morphology to dental students compared to conventional methods.

Methods

An electronic search was conducted across PubMed, Scopus, and Web of Science databases to identify studies that evaluated the effectiveness of virtual learning environments (VLEs) in teaching tooth morphology to dental students. Inclusion criteria encompassed studies that (1) employed AR or VR for dental morphology education, (2) had a control group using conventional teaching methods, and (3) reported quantitative data on student performance or qualitative data on student perceptions. Studies were excluded if they did not focus on tooth morphology or lacked a comparative group. Quality assessment was done using the Joanna Briggs Institute's critical appraisal tool.

Results

Out of 874 studies, we included 7 studies in the review. Five out of seven studies reported that AR/VR is a valid tool for teaching dental morphology. However, two studies noted no significant improvement in test scores when using VR, compared to conventional methods. Students using the AR tooth carving practice tool (AR-TCPT) showed increased accuracy in carving teeth compared to those using plastic models. Feedback towards VLEs was largely positive, with a recommendation rate of 85.5%5. It is suggested that VLEs act as a complementary tool to traditional methods, particularly beneficial for distance learning.

Conclusions

Based on limited evidence, Virtual Learning Environments, including AR and VR, are effective tools for teaching dental morphology. While there is strong evidence of their validity and positive student feedback, these technologies should be seen as supplementary to traditional methods, rather than replacements. They offer particular advantages for distance teaching, but the selection between AR and VR should be based on specific educational contexts and goals.

#191: Correlation between Descriptors and Differential Diagnoses in Oral Radiology Resident CBCT Interpretation

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Purpose

The purpose of this study was (1) to assess image interpretation by Oral Radiologyresidents over time, (2) to determine whether selection of an accurate descriptive term led to anappropriate differential diagnosis, and (3) to determine which descriptive categories were more likely toresult in selection of accurate differential diagnoses.

Methods

Three Oral Radiology residents reported on 200 cone beam CTs with known pathology overthe course of a 24-month residency (2013-2015). Sixty-seven of these cases were selected and 101possible descriptors and up to five differential diagnoses for each case were compared with those of asenior Radiologist. Spearman's Rho and Kruskal-Wallis tests were employed with p-values set at 0.05.

Results

Significant improvement in selection of both description and differential diagnosis for allresidents over time was observed. Descriptive categories which most strongly correlated to an accuratedifferential diagnosis varied by resident. Categories that showed consistent correlation across allresidents were location, size, and whether the lesion was thought to be in the dentoalveolar region.

Conclusions

Significant improvement in selection of both description and differential diagnosis for allresidents over time was observed. Descriptive categories which most strongly correlated to an accuratedifferential diagnosis varied by resident. Categories that showed consistent correlation across allresidents were location, size, and whether the lesion was thought to be in the dentoalveolar region.Conclusions: Emphasis on selection of correct pathologic image descriptors and the ability to derive acorrect diagnosis significantly improved for all residents. Identification of a resident's individual strengthsand weaknesses with respect to descriptor selection could also be identified allowing for a focus onimprovement in descriptor selection and generation of differential diagnoses. This methodology could beapplied to improve student outcomes in radiology and other educational programs.

#192: The Effect of Augmented Reality Feature in Complete Anatomy Application on Educational Outcomes in Students with Autism Spectrum Disorder

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Purpose

Autism spectrum disorder (ASD) is one of the earliest appearing neurological disorders characterized by social communication deficits and repetitive sensorimotor behaviors. Children with ASD understand the world around them with unique perspectives and a modified curriculum is essential to better suit their learning styles. One such curricular modification is the introduction of Augmented Reality (AR) technology. AR creates an interactive environment by combining real world images with virtual elements. AR has shown advantages for the ASD population as the interactive environment can be adapted to benefit the characteristics of children with ASD. A study utilized AR for Global Reading Methods in preschool children on the Autism Spectrum and demonstrated increased effectiveness of the educational process. A better understanding of anatomy was seen when comparing pre- and post- questionnaire results after university students used the Human Anatomy Mobile Augmented Reality software. Similarly, the current study intends to use AR to reform conventional teaching methods to incorporate learning styles compatible with children with ASD. Although studies have shown the benefits of AR in school curriculums, this study focuses on advantages for ASD students in Human Anatomy education. This study aims to determine the differences in outcomes when students use AR interventions in addition to traditional lectures in comparison to students who do not. We hypothesize that students receiving AR interventions will score higher on the post-intervention questionnaire than students who do not. The results of this study will be beneficial for educators devising lesson plans for children with ASD interested in studying Human Anatomy and Physiology.

Methods

This study will take place at a high school in Provo, Utah. Participants, consisting of sixteen students diagnosed with ASD, are randomly divided into control and intervention groups. The control group will receive a 30-minute lecture about extremity muscles using Microsoft PowerPoint. The intervention group will receive the lecture along with the AR feature of the Complete Anatomy iPad application. Both groups will complete a pre- and post-intervention questionnaire of 10 multiple choice questions each. Quizzes will be scored out of 10 and plotted on bar and line graphs in Microsoft Excel for analysis.

Results

N/A

Conclusions

N/A

#193: **Effectiveness of the Anatomy Academy Program on teaching 6th graders Healthy Behaviors**

Katherine Watson;[1] Mariah Gardner;[1] Rebekah Hans;[1] Kevin Steed[1]

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Purpose

Anatomy Academy is a research program with 6th-grade children in Utah county aimed to improve their understanding of the human body and how to keep it healthy. Childhood obesity is an epidemic in the United States and is the most common chronic condition in children. Obesity at any age has severe adverse consequences on one's health but childhood obesity, in particular, is associated with numerous detrimental long-term effects on both physical and mental health. The goal is to improve the student's understanding of the body in an effort to promote a healthy living style.

Methods

Anatomy Academy is a 6-week program where volunteers go to a classroom each week and teach the students about a different body system. The effectiveness of the program will be determined by comparing the pre-program questionnaire to the post-program questionnaire and analyzing how much the program increased their knowledge of the human body. The responses will also be compared to a survey about the individual's interest in science to determine if that plays a role in the efficacy of Anatomy Academy.

Results

The expected outcome is that Anatomy Academy could be a useful tool in improving kids' health awareness.

Conclusions

The increase in health awareness may positively impact the rate of childhood obesity. However, this study is limited because it does not address the socioeconomic determinant of health related to childhood obesity.

#194: Nanorobotics - A revolution in endodontic care

Mary Elizabeth[1]

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Purpose

Nanorobotics holds incredible potential in various fields, including endodontic care. These tiny machines can navigate the intricate root canal system with precision, allowing for targeted therapy, efficient cleaning, and even potential repair of damaged tissues. It's an exciting advancement that could significantly improve the effectiveness and outcomes of endodontic procedures.

Methods

NA

Results

NA

Conclusions

Nanorobotics in endodontics involves the use of extremely small robots to perform tasks like cleaning, disinfecting, and repairing within the root canal system. These nanorobots can navigate complex structures with precision, improving the efficacy of treatment and potentially reducing the need for invasive procedures. While still in early stages, their development offers promising possibilities for enhancing endodontic care.

#195: ALGINATE DRESSINGS– REVISTING THE PAST

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Purpose

Wound healing in simple terms is the healing of skin which involves various mechanisms. It is not dressings themselves that heal wounds, but the careful selection of appropriate dressings that provide the optimal wound-healing environment for the individual wound. Wound dressings are prepared from biopolymers, synthetic polymers and biomaterials.

Methods

Alginate dressings have been available since 1984. Alginate application in wound dressings is due to its unique properties, such as non-toxicity, biocompatibility, non-immunogenicity, affordability, and high absorption capacity. Alginate dressings are produced from alginic acid. Alginic acid is a polymer of mannuronic and guluronic acid molecules, and alginate dressings vary in their proportions of these molecules. The dressings are composed of calcium and sodium alginate fibres, which have been entangled to form a strong cohesive product. This produces a highly absorbent, non-adherent dressing that transmits oxygen and moisture vapour.

Results

Alginate has been used to prepare different forms of materials for wound dressings, such as hydrogels,films, wafers, foams, nanofibres, and in topical formulations. The wound dressings prepared from alginate are able to absorb excess wound fluid, maintain a physiologically moist environment, and minimize bacterial infections at the wound site. The therapeutic efficacy of these wound dressings is influenced by the ratio of other polymers used in combination with alginate, the nature of cross linkers used, the time of crosslinking, nature of excipients used, the incorporation of nanoparticles and antibacterial agents.

Conclusions

Alginate-based dressings were in use since the past, with more futuristic approach alginate dressings can be the boon for the wound healing.

#196: LIGAPLANT: RECREATING NATURAL FROM ARTIFICIAL

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Purpose

Missing teeth can be substituted by the use of the dental implants. The most widely used implants in the current scenario are the osseointegrated implants with various shortcomings and the most prominent one is the lack of the periodontal ligament. To overcome this, implants with periodontal ligaments can be procured and this can be possible by the application of the tissue engineering concept along with suitable implant material.

Methods

Tissue engineering has become an integral part of the periodontal therapy and its use has opened various gates in the field of dentistry. A tissue engineered periodontal ligament around the dental implant has been introduced in the past few years and is called as ligaplant

Results

These ligaplants has become a promising option that can provide good biological performance leading to an increased life of the prosthesis.

Conclusions

These ligaplants are considered to recreate the natural teeth in some aspects and are better promising option than implants

#197: **Shilajit elicits apoptosis and suppresses cell migration in oral cancer cells through targeting Urokinase-type plasminogen activator (uPA) and its receptor (uPAR) and chemokine signaling pathways**

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Purpose

Shilajit (Mumio) is a humic substance with a dark brown colour that comes from rocks found at high altitudes. For centuries, shilajit has been a widely employed traditional medicinal remedy to address various physical ailments. Given the prevalence of oral cancer, there is a growing need for more effective therapies in its treatment.

Methods

In this in vitro study, the impact of shilajit on normal human gingival fibroblast cells (hGFs) and oral cancer cells (KB-1, subline of the KERATIN-forming tumor cell line HeLa) was compared. The MTT and Annexin-V tests were used to measure the KB-1 cells growth and apoptosis after they were exposed to varying concentrations of Shilajit for 24h. An inverted microscope was used to evaluate the shilajit treated cell morphology. On the other hand, AO/EtBr dual staining was employed to analyse cellular apoptosis quantitatively. ROS production analysis was carried out utilizing DCFH-DA staining, while the gene expression of proapoptotic and antiapoptotic proteins was assessed through real-time PCR.

Results

The viability of oral cancer cells exhibited a concentration and time dependent response to Shilajit. Notably, Shilajit demonstrated selectivity against cancer cells. Through an examination of the Annexin-V apoptosis assay, it was observed that Shilajit induces apoptosis by upregulating the proapoptotic gene expression ($P \leq 0.05$) and downregulating anti-apoptotic proteins ($P \leq 0.05$). Furthermore, the impact of shilajit on cell migration decreased significantly when compared to control cells through modulating the uPA/uPAR and chemokines gene expression.

Conclusions

Based on the above-mentioned findings, it was observed that shilajit exhibited greater cytotoxicity towards oral cancer cells compared to normal cells. These promising outcomes indicate that shilajit holds potential as a robust promising option for oral cancer treatment underscoring the need for further research in this domain.

#198: **Cheiloscopic Characteristics detection and Pattern Classification by Machine Learning Technique**

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Purpose

Machine Learning (ML) is a field enhancing the rapid growth of technology. Though use of digital softwares for cheiloscopic investigations have been attempted with limited success, the use of ML based techniques are scarce and seldom have been employed in forensic odontology. The present study aimed to identify cheiloscopic patterns through machine learning based methods and to correlate the segmented patterns with age and gender of individuals.

Methods

A pilot study was conducted in the department of oral pathology and microbiology, FDS, RUAS with a sample of 30 lip prints of individuals on obtaining informed consent. A lip impression was made after applying dark lipstick and transferred to a white paper to record the wrinkles and grooves without smudging. The images obtained were photographed and subjected to MATLAB software analysis. The lip outlines were extracted using image segmentation. Parameters like area, diameter, extent and perimeter were assessed. Neural networks were used to train the lip print patterns, later the test prints were subjected for classification into type I - V (Suzuki and Tsuchihashi's method).

Results

Significant differences were observed in the parameters assessed and lip print patterns in both genders. ML based techniques enhance the uniqueness of cheiloscopy in forensic identification.

Conclusions

For the first time a novel ML based technique of cheiloscopic recognition was performed with promising outcomes. In the ever-evolving age of global digitization, cheiloscopic evaluation through AI and ML could offer new panoramas for personal identification of individuals and gender determination.

#199: **Application of In-silico Computational Biology Strategies to Demonstrate Mechanism of Oral Cancer Cell Death by Natural Peptide**

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Purpose

This research work is designed to identify biomolecules from Earthworm Coelomic Fluid (ECF) of Eudrilus Eugeniae (EE) that can inhibit oral cancer cells from proliferating. The study aims to construct a homology model of the 18 kDa protein from ECF of EE (18-ECFP) with molecular dynamics simulation (MDS) to enable its molecular docking with pro-apoptotic caspase receptors with determination of binding energy scores. The study also evaluates the anti-cancer potential of 18-ECFP on SCC-9 cells in vitro by wet lab techniques.

Methods

Following SDS-PAGE & MALDI-TOF/MS-MS sequencing the 18kDa protein was subjected to Nano-LCMS based AA sequencing. Due to unavailability of 3D structure in Protein Data Bank (PDB), it had to be modelled via energy-based methods using Prime module-Schrödinger. The MDS of the protein was analyzed followed by Protein-Protein Docking (PPD) using Schrödinger 2020 software. Top 5 poses exhibiting high PIPER score were subjected to energy calculations. The 18-ECFP was also evaluated by RT-PCR, western blot and Q-PCR techniques on SCC-9 cells in vitro to further establish its anti-cancer potential.

Results

The homology model of the 18-ECFP was constructed with Schrödinger software with stable molecular dynamics. PPD demonstrated binding affinity of 18-ECFP with pro-apoptotic genes Caspase-3 and Caspase-8. The MM-GBSA revealed satisfactory binding energy scores. Gene expression studies revealed upregulation of apoptotic genes Caspase-3 and Caspase-8 induced by the 18-ECFP validating the in-silico findings.

Conclusions

This is the first report of a homology model with MDS of an oral anti-cancer protein from an earthworm source docked to human caspase receptors with determination of binding energy values supported by validation through multiple in vitro gene expression techniques. The current study has provided valuable insights pertaining to the molecular structure of the novel anti-cancer protein of ECF. The findings may contribute to the development of naturally available drugs to combat oral cancer.

#200: Association Between ABO Blood Grouping and Odontometry: An Unexplored Evidence in Forensics

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Purpose

Recent research has exhibited a strong association between ABO blood groups and susceptibility to diseases. Extraoral and intraoral hard tissue landmarks provide a stable and reliable record for odontological and anthropological analysis, forensic investigations and identification. The association between anthropometric indices and ABO blood grouping have been reported in the past, however, the association between ABO blood groups and odontometric indices is yet to be comprehensively explored. This study aimed to establish the correlation of ABO blood groups with odontometric indices and extraoral hard tissue landmarks for personnel identification.

Methods

A total of 200 subjects were selected, aged between 18-25 years. Blood groups of the subjects were determined and dental parameters measured were incisal height, incisal width, inter-canine distance, inter-premolar distance and molar relation. The skeletal parameters recorded were facial divergence, facial height and bi-zygomatic width. The stature(height) and weight of each subject was also recorded. Appropriate tools of measurement like scales, dividers, ligature wires and measuring tapes were used to record these values. The recorded values will be tabulated and statistically analysed using SPSS software version 22, IBM Corporation, USA.

Results

Awaited.

Conclusions

A positive association of ABO blood groups with skeletal and odontometric parameters may be used as a valuable source of information in forensic odontology. As teeth dimensions and arch parameters are exclusive to each individual, association of population specific data and blood grouping would provide significant assistance to the forensic expertise in identification of individuals during ante-mortem and post-mortem analyses.

#201: Pathogenic Implications of Candidal Species in Both Oral Cancer and Oral Potentially Malignant Disorders - A Review

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Purpose

Oral squamous cell carcinoma (OSCC) is the 6th most common cancer in worldwide. Cigarette smoking, alcohol consumption, and betel quid chewing are its major risk factors other factors that can lead to OSCC include excessive sun exposure, viral or fungal infection, poor nutrition, and poor oral hygiene. The carcinogenesis of OSCC occurs gradually and oral epithelial dysplasia is considered a potential histologic precursor of OSCC. Most OSCC cases are preceded by clinically evident oral potentially malignant disorders (OPMDs). The aim of this review is to correlate the association between Candida species and oral potentially malignant disorders and its possible mechanisms in oral cancer progression.

Methods

NA

Results

The mouth is an important source of infections that may even be associated with mortality. Candida albicans, a most common opportunistic pathogen which is the predominant genus among the yeasts of the oral cavity. Candida though a commensal, can also cause oral mucosal infections in immunocompromised situations which are frequently seen in older individuals, infants, people infected with HIV, and individuals with cancer. Certain strains of Candida albicans and other yeasts play a causal role in the development of oral cancer by means of endogenous nitrosamine production.

Conclusions

The association of Candida with premalignant states has been studied extensively and many authors have shown an increase in Candida colonization in these lesions as compared to controls. Candida infections have been associated with oral epithelial dysplasia and neoplasia.

#202: Torsional evaluation on different bending conditions of two Nickel Titanium Rotary Glide Path files with different alloy

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Purpose

The aim of the current study is to compare the torsional resistance of two different glidepath files, the Mtwo 10.04 and the Hyflex EDM Glide Path files 10.05, under differentbending conditions.

Methods

Thirty Mtwo 10.04 files and thirty Hyflex EDM glide path file 10.05 were used in thepresent study (N=60) and divided into 3 test groups of 10 files. A customized devicemade of a mobile structure with a connection that holds the handpiece and the artificialcanal was used for the experiment to make the measurements repeatable. Three artificialcanals with a 90° curvature, a 60° curvature a straight canal were used. Each file wasrotated at 300 rpm with a maximum torque value of 5.5 Ncm with the apical 3 mm firmlysecured in a vise. The torque at fracture and the time to fracture were recorded by thesoftware integrated in the handpiece and evaluated through statistical analysis.

Results

Statistical analysis did not found significant differences in the values of torque to fracture(TtF) between these 3 groups.

Conclusions

In conclusion, the results of the present study should be explained by the flexural rigidity,for Hyflex EDM Glide Path 10.05 is influenced by the combination of rectangular cross-sectional shape and CM Wire and S Shaped cross-sectional design and Austenitic NiTi forthe Mtwo 10.04. These combinations of characteristics could justify the absence ofdifference between an austenitic and a martensitic file on the torsional resistance underdifferent bending conditions.

#203: Mechanical evaluation of a newly introduced reciprocating file

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Purpose

Aim of the study is to evaluate a rotary file recently introduced on the market, the Direct R Gold (Direct Endodontics S.A.S, Paris, France), since there are no data available. This study want to assess its mechanical properties comparing them with the following widespread reciprocating instruments: Reciproc (VDW, Munich,Germany), Reciproc Blue (VDW, Munich,Germany) and WaveOne Gold (Dentsply Maillefer, Ballaigues, Switzerland).

Methods

A total of 120 nickel-titanium files, 30 each from 4 different reciprocating systems, (DirectR, Reciproc, Reciproc Blue and WaveOne Gold) were evaluated through mechanical tests. The performances of above-mentioned file were tested by subjecting each specimen to torsional resistance tests at 3 mm from the tip, cyclic fatigue resistance tests with a 90° degree and 2 mm radius of curvature and bending resistance tests at 3 mm from the tip. One-way analysis of variance and the post hoc Tukey test were performed with the significance level set to a 95% confidence level.

Results

Direct R showed the best mechanical performances in terms of torsional resistance (1.84±0.12 Ncm) with statistically significant difference for this test, while in terms of flexibility and cyclic fatigue resitance no statistically relevant difference has been found between the three thermally treated instruments, Direct R Gold, Reciproc Blue and WaveOne Gold. The Reciproc files showed the worst flexibility and cyclic fatigue resistance (157.2 6 8.3 g and 9.27 6 1.18 seconds, respectively).

Conclusions

Within the limitations of this study, the recently introduced Direct R Gold file showed mechanical performance that could encourage its clinical use, with a higher resistante to torsional stresses without losing flexural performances, in comparison to the worldwide spread tested instruments.

#204: **Development of a portable and rapid decalcification device for oral hard tissue specimens**

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Purpose

Decalcification is a routinely carried out procedure by oral pathologists, as the lesions involving the pulp can only be seen and identified through decalcified sections. The present methods involve usage of chemical agents, either with inorganic acids which dissolves the calcium to form soluble calcium salts or with chelating agents. Even though the chelating agents preserve the tissue morphology and show excellent microscopic picture, it has less diagnostic efficacy, as the time taken for it to decalcify the specimens is considerably high. It becomes important for us to develop a decalcification technique which will be faster and will maintain the balance between decalcification speed and tissue morphology. Hence, the aim of this study was to develop a portable rapid decalcification unit and compare the efficacy among all the three-decalcification procedure using teeth and bone specimens, namely the conventional method, microwave method and electrolytic method.

Methods

In our study, 60 specimens including 30 teeth specimens and 30 bone specimens were analysed. 10 teeth and 10 bone specimens were allocated for conventional, microwave and electrolytic methods using 10% nitric acid and 5% nitric acid. After decalcification various other parameters were considered, so to access the efficiency among the above three mentioned methods. After which a portable decalcification unit was developed employing the best decalcification method among the above-mentioned methods.

Results

It was seen that the time taken for decalcification was significantly reduced in case of electrolytic method, when it is compared with microwave method and conventional method. Patchy staining was observed in case of conventional method whereas the best nuclear cytoplasmic contrast was also seen in the conventional method. There was mild osteocytic retraction from lacunae seen in microwave method. The yellowing of the specimens was also seen in conventional method which could be due the use of nitric acid in higher concentration.

Conclusions

In case of urgent requirement and where diagnostic efficacy is also important electrolytic method of decalcification can be employed.

#205: **Role of Mumio in periodontal wound healing–an in vitro study on human PDL cells**

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Purpose

Mumio, used in ancient medicine for almost 4000 years, is the gold standard of traditional medicine. Mumio, a tar-like compound made from rock dissolved minerals and degraded organic matter, takes a century to form. Dibenzo-alpha-pyrones, humic acid, and fulvic acid are important in Mumio, which includes 60–80% humus, benzoic acid, fatty acids, ichthyol, ellagic acid, resin, triterpenes, sterol, aromatic carboxylic acids, bioactive 3,4-benzokoumarins, amino acids, phenol Active chemicals improve Mumio's antioxidant effects. Despite its anti-ulcerogenic, anti-inflammatory, antioxidant, immunomodulatory, memory-enhancing, and anxiolytic characteristics, mumio has been studied rarely on oral tissues.The present study examined the cytotoxic, antioxidant, anti-inflammatory, and reparative effects of the aqueous fraction of Mumio on primary cultures of human periodontal ligament (PDL) fibroblasts.

Methods

Human PDL cells were subjected to Mumio at various concentrations and and durations. Cell viability of Mumio-treated cells was analyzed by an MTT assay. An in vitro wound healing assay was applied to PDL cell monolayers either in the presence or absence of Mumio to assess the wound healing potential of Mumio. The effects of Mumio on a number of specific wound healing markers (TNF-α, COX-2, IL-1β and COL1A1) were studied at transcriptional level using real-time PCR. Additionally, the protein level of MMP-2 and MMP-9 were analysed using ELISA Kit.

Results

Mumio showed no harmful effects at concentrations of 0.5-3mg/ml ($p<0.05$). Mumio was cytocompatible at 3mg/ml, increasing cell survival without altering PDL cell shape. In an in vitro scratch wound healing study, Mumio showed faster wound closure and cell migration than the control group.Mumio treatment dramatically elevated cytokine expression, including TNFα, COX-2, IL-1β, and COL-1α gene expression. In addition, Mumio increased MMP-2 and MMP-9 protein expression. Enzymes that break down extracellular matrix components are essential to physiological and pathological processes including wound healing.

Conclusions

Mumio upregulates cytokines and matrix metalloproteinases to increase periodontal ligament (PDL) cell survival and wound healing. Our data show that Mumio stimulates periodontal ligament cell proliferation and migration, which improves wound closure and may be important in periodontal remodeling and repair.

#206: **Implications and Types of Artefacts in Oral Histopathology Tissue Processing**

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Purpose

There is a scarcity of information regarding the occurrence and appearance of artefacts in the literature studies observed till date. This study aims to provide a more a comprehensive approach on identifying the different types of artefacts and also attempts to provide with description regarding their relation to the parent slide and the remedies in order to prevent misinterpretation. This study aimed to prepare a comprehensive report of the commonly occurring artefacts in archival collection of pathology laboratory.

Methods

A retrospective study was done to identify the different artefacts by reviewing 1200 archived slides and photomicrography was done to study their morphology and their correlation to the parent tissue section.

Results

Awaited

Conclusions

A sound knowledge regarding the artefacts is necessary for the surgeon and pathologist to prevent its occurrence and identify its presence and be able to differentiate it from the pathology. This study provides with the information regarding the pathology that various artefacts mimic and means to differentiate them.

#207: Advanced Techniques for Tooth Pulp RNA Extraction in Forensic Investigations-A Systematic Review

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Purpose

Teeth are fundamental structures in a forensic context due to their high strength and specificity. It is challenging to obtain high quality RNA from pulpal tissues. It has been described that pulp RNA degradation could be an indicator of post-mortem interval. Researchers have been in the quest to develop optimal techniques for tooth RNA extraction. The systematic review aimed to determine the most reliable method of RNA extraction from dental tooth pulp for forensic investigations.

Methods

Several databases including Google Scholar, PubMed, Science Direct were searched from 2011 to 2021 December using various combinations of following key words: “Tooth Pulp RNA”, “Dental RNA extraction” and “Pulp RNA extraction”. Original experimental studies published in English were included. We excluded letters to the editors, historic reviews. The detailed of the chosen studies were tabulated and analyzed.

Results

A total of 4 articles were found and finalized. The most reliable technique was found to be RN easy for RNA extraction from dental pulp tissue. However, assessment of RNA integrity needs to be performed additionally, and validation of this method is necessary on blinded samples.

Conclusions

Personal identification is crucial during forensic investigation to identify the victim when other morphological indicators are destroyed. Tooth pulp RNA extraction plays a vital role in such cases. The use of RN easy technique for RNA extraction has proven to be the most reliable technique.

#208: Decoding Dental Superheroes: Stem Cells Unleash Antibacterial and Immunomodulatory Powers in Vitro

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Purpose

Stem cells derived from human exfoliated deciduous teeth (SHED) represent a crucial autologous resource for stem cell-based regenerative therapies, owing to their facile acquisition and multipotent nature. Despite their significance, the understanding of SHED's antibacterial and immunomodulatory properties remains limited. We investigated the effects of SHED on the proliferation of Streptococcus mutans and Enterococcus faecalis and evaluated its immunomodulatory influence by quantifying interleukin (IL) -2 and -6 levels

Methods

SHED were harvested from the pulp of deciduous teeth with no more than two-thirds root resorption. These cells were subjected to comprehensive characterization, encompassing assessments of morphology, viability, surface marker expression, and their capacity for differentiation into osteocytes and adipocytes in vitro. The antibacterial potency against S. mutans and E. faecalis was determined using a colony-forming units (CFU) assay, while their immunomodulatory attributes were examined through enzyme-linked immune sorbent assay (ELISA) for cytokine quantification.

Results

The results revealed that the cultivated SHED exhibit a fibroblastic morphology and enhanced viability. Their differentiation into osteocytes and adipocytes, coupled with the presence of specific stem cell markers, underscored their versatility and potential in vitro. SHED displayed notable antibacterial properties, evidenced by a significant reduction in S. mutans CFU ($p<0.05$), though their effect on E. faecalis CFU was comparatively minimal. Furthermore, SHED maintained consistent levels of inflammatory markers, including IL-2 and IL-6, relative to the control group.

Conclusions

Our findings indicate that SHED could potentially serve a preventative or therapeutic role in infections through their antibacterial actions, and may demonstrate immunomodulatory capabilities by modulating cytokine production.

#209: **Investigating the Impact of Annealing on Chemically Precipitated Hydroxyapatite Nanoparticles: A Combined Structural and Spectroscopic Approach**

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Purpose

The field of biomaterial technologies continually evolves, impacting healthcare, cell biology, and drug delivery. Hydroxyapatite (HA), a biomimetic calcium phosphate compound, has gained prominence for its biocompatibility and applications in orthopedics, dental implants, drug delivery, and tissue engineering. This study investigates the impact of annealing on chemically precipitated HA nanoparticles. The goal is to understand the relationship between synthesis parameters and material properties, contributing to biomaterial advancements.

Methods

High-purity reagents were used for wet chemical co-precipitation synthesis of HA nanoparticles. The samples, including as-prepared and those annealed at 200ºC, 400ºC, and 600ºC, underwent comprehensive characterization using HRTEM, EDAX, XRD, and FTIR.

Results

The HRTEM analysis revealed rod-shaped nano hydroxyapatite crystals with agglomeration, and annealing led to increased particle proximity and rounding of crystal tips. EDAX confirmed the stoichiometric composition of Ca, P, and O without impurities. XRD analysis showed distinct peaks for as-prepared HA and enhanced crystallinity in annealed samples. FTIR identified characteristic vibrational modes, including PO_4^{3-} and carbonate ions, indicating high-purity hydroxyapatite.

Conclusions

Chemically precipitated HA nanoparticles were successfully synthesized and customized through annealing. The study provides insights into the nanocrystal morphology, elemental composition, crystallinity, and functional groups of HA. The chemical co-precipitation method proves effective for producing crystalline HA nanostructures, emphasizing its potential in medical applications.

#210: **Convolutional Neural Network based Machine Learning for Ameloglyphics: A Forensic Analysis**

Sanjana Shetty;[1] Dr Dominic Augustine;[1] Dr Dominic Augustine;[1] Sai Prasad Alva;[1] Mukul Saini[1]

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Purpose

Tooth prints, considered to be the hard tissue analogues of finger prints have been studied extensively over the years by manual and in some cases, digital methods. While Artificial intelligence and Machine Learning have witnessed a steady rise in their applications in various fields with promising results, its utility in ameloglyphics has not been tried and tested. This study employed Machine learning through Convolutional Neural Network (CNN) to analyse enamel prints. The aim of this study was to analyse tooth prints through Convolutional Neural Network based technology and correlate the patterns with gender and age.

Methods

The study was done on a sample size of 60 extracted deciduous teeth and 60 extracted permanent teeth. The surface of the teeth were acid etched and the enamel prints were taken by means of cellulose acetate strips. The obtained prints were photographed, subjected to manual analysis and classified based on the patterns described by Manjunath et al in 2011. CNN was then used for training and testing the data sets.

Results

CNN was successfully trained and tested for its ability to identify and differentiate ameloglyphic patterns. Significant differences were observed between the enamel prints of the two genders and between the analysed age groups. Ameloglyphic patterns, being unique to individuals, act as aids in personal identification and hold immense value in mass disaster situations where soft tissues being friable are seldom preserved. Enamel being highly resilient and resistant to various degrading actions such as heat and acid, can be a crucial tool for human identification in such circumstances. Artificial Intelligence and Machine Learning based CNN for the analysis of these enamel prints can simplify and potentially replace the conventional methods.

Conclusions

Ameloglyphics for personal identification is a significant forensic tool. Ameloglyphic analysis via CNN based machine learning was found to be accurate, cost effective and time efficient. The analysis of tooth prints by manual means can be a cumbersome process and the incorporation of AI and ML for the same, as observed in this study, can overcome this drawback. Hence, CNN for ameloglyphic analysis is a reliable tool.

#211: Determination of The Correlation Between Age and Gender with Canine Index, Intermolar Width and Palatal Rugae Patterns

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Purpose

Dental records are of paramount importance in human identification considering the distinct traits of every individual. Although DNA and finger print analysis are techniques employed for faster and secure identification, in mass disasters, odontometric analysis can play a vital role in identification. Studies in the past have used parameters like arch perimeters, lip prints and palatal rugae pattern to determine age and gender of an individual. However, these studies correlated one parameter at a time and concluded that there was no significant correlation of the parameters to age and gender. The present study aimed to assess the canine index, intermolar width and palatal rugae pattern from the obtained dental casts. The correlation of age and gender with canine index, intermolar width and palatal rugae patterns were determined.

Methods

Diagnostic casts were obtained by making impressions of 53 patients visiting the dental OPD. The age and gender of the patients were blinded. The intermolar width and intercanine distance were measured using vernier calipers. The canine index was calculated and the rugae pattern was analyzed. The data obtained from this will further be used to assess the normality using Kolmohorov-Smirnov test, based on which the correlation of age and gender to the canine index, intermolar width and palatal rugae pattern was determined using the Wilcoxon signed rank test and chi square test.

Results

The mean left canine index in females and males is 22.56 ± 1.9 and 30.96 ± 1.9 respectively showing significant correlation of gender to left canine index ($p<0.05$). The mean right canine index in females and males is 23.02 ± 1.7 and 30.55 ± 1.7 respectively showing no correlation of gender to right canine index ($p>0.05$). The mean intermolar width in females and males is 15.6 ± 5.09 and 37.1 ± 5.09 respectively showing significant correlation of gender to intermolar width ($p<0.05$).

Conclusions

The two parameters, intermolar width and the rugae pattern could play a vital role in dental identification. In circumstances where other techniques are unreliable, odontometry is of great significance in gender determination and provide accurate human identification. Dental evidences are the most indestructible owing to the properties of enamel. In cases of severe injury with extensive tissue damage, using odontometric parameters in age and sex determination is valuable, accurate and cost effective.

#212: **Micrometastasis Detection using Papanicolaou stain in Nodal Tissues of Oral Squamous Cell Carcinoma – A Histological Study**

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Purpose

Cervical lymph node metastasis is the most important prognostic factor in Squamous Cell Carcinoma of Head and Neck (SCCHN). Detection and evaluation of micro-metastasis forms the basis for diagnosis, staging, treatment options and prognosis. Lymph node prognostic factors are extremely important for the survival of and recurrence in the patient. Assessing lymph node metastasis in the absence of clinical enlargement is challenging. The study aimed to evaluate micrometastasis and Individual Tumour Cells (ITC) in regional lymph nodes of Oral Squamous Cell Carcinoma (OSCC) by Papanicolaou (PAP) stain and re-evaluate the tumor staging.

Methods

The current study constituted a total of 40 histopathologically proven non metastatic lymph node sections. Other than Haematoxylin and Eosin (H & E), modified PAP was used for identification of micrometastasis deposits

Results

Papanicolaou stain proved to be more useful than H&E stain in detecting Micrometastasis which accounted for 15% of non-metastatic lymph node sections used in our study. According to the observations, the p-value obtained from the chi square test was 0.006 which proves that the results were statistically significant.

Conclusions

Special stain like modified PAP stain is valuable and sensitive in detecting micro-metastasis over H&E stain. Detection of micrometastasis in OSCC patients is advantageous for the patient as it influences staging, it modifies the treatment plan in terms of both radiotherapy and chemotherapy.

#213: **Parental awareness, Knowledge, and attitude towards Conscious sedation and protective stabilization in children of North Kerala: A questionnaire-based study.**

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Purpose

To assess the Parental awareness, knowledge and attitude in North Kerala population about Conscious sedation and protective stabilization as behaviour management techniques during dental treatment

Methods

A questionnaire in English/ Malayalam is provided to parents who accompanied the child for treatment in Department of Pediatric and Preventive Dentistry, Sree Anjaneya Institute of Dental Sciences, Calicut.Information regarding Demography, existing knowledge gained through media about both the procedures, opinion about satisfaction of the procedures and parental preference of both procedures were asked.A video of a child undergoing dental treatment in conscious sedation was shown to the parents after filling the survey form and opinion about the preference of the procedure was again asked to be written in the form. Also their desire to stay with the child during the procedure was asked.

Results

55% of parents are not satisfied with the use of restraints while doing dental procedures. 54% of parents has not heard about dental sedation through any type of media. 52% of parents accepted to do procedure under nitrous oxide sedation before video demonstration which increased to 77% after video demonstration. 76% of parents want to stay with the child while doing procedure under nitrous oxide sedation.

Conclusions

Majority of the parents are unaware of dental sedation procedures and haven't heard about it through any media. Parental acceptance for nitrous oxide sedation is higher after video demonstration than before it. Educational status of the parent plays a significant role in acceptance of nitrous oxide sedation. Higher the educational level, the more the acceptance. During sedation procedures, parents prefer to stay with their child

#214: **Correlation between salivary levels and tissue expression status of HER2 in breast cancer patients - A cross-sectional study**

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Purpose

The study aims to investigate if soluble salivary human epidermal growth factor receptor-2 (HER2) would play a role in the diagnosis of breast cancer patients and also to find out the influence of demographic and hormonal factors on the salivary HER2 levels in breast cancer.

Methods

A total of 45 subjects were selected and divided into three groups: Group A: healthy patients (n=15), Group B : HER2 negative breast cancer patients (n=15), and Group C: HER2 positive breast cancer patients (n=15). Patient demographic data, past medical, family and habitual history were noted and the patient's saliva was collected. Assessment of salivary expression of soluble HER2 was done by using an ELISA kit.

Results

The salivary HER2 levels in group A were 32.3, in group B were 43.2 and in group C were 147.8. On evaluating the risk factors with the salivary HER2 levels it was found that patients with increased age(p=0.007), positive family history(p=0.006), patients with the habit of tobacco chewing(p=0.001) and patients with no history of Breastfeeding (p=0.001) showed a statistically significant result.

Conclusions

The salivary HER2 levels have been increased in both the HER2 positive and negative group when compared with the control group, thereby salivary HER2 analysis can be used as a non-invasive diagnostic tool in screening Breast cancer patients. The salivary samples of the patients with risk factors may be evaluated for HER2 levels thereby prompting the early diagnosis of HER2- positive breast cancer, which is stated to be more aggressive than other variants of breast cancer.

#215: Long non-Coding RNA as a potential diagnostic tool in coronary artery diseases - A Systematic review

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Purpose

This systematic review aims to evaluate the diagnostic accuracy of specific lncRNAs in identifying CAD and to identify promising biomarkers for CAD diagnosis.

Methods

Following the PRISMA guidelines, a comprehensive literature search was conducted in PubMed, Scopus, and Web of Science using specified keywords. Inclusion criteria were English language human studies focusing on the diagnostic accuracy of lncRNAs in CAD. Exclusion criteria included animal or in vitro studies, lack of diagnostic accuracy data, and non-original articles. A total of 293 articles were initially identified, with 22 studies meeting the inclusion criteria for the review. The Quality Assessment of Diagnostic Accuracy Studies (QUADAS-2) checklist was used for quality assessment of individual studies.

Results

The review included 22 studies, collectively analyzing 5,301 patients. These studies investigated the regulation of 27 distinct lncRNAs, with 23 found to be upregulated and 4 downregulated in CAD patients. Key upregulated lncRNAs included H19, MALAT1, LIPCAR, and HOTAIR with increased diagnostic potential, while downregulated lncRNAs included GAS5 and MIAT. The studies employed a variety of designs including case-control, cohort, and cross-sectional observational studies.

Conclusions

This systematic review highlights the potential of lncRNAs as biomarkers for CAD. The identification of 23 both upregulated and downregulated lncRNAs in over 5,000 patients offers valuable insights for early diagnosis and therapeutic intervention. Their stable presence in human internal fluids and their association with CAD pathophysiology underscore their diagnostic and therapeutic potential.

#216: Analysis of Total Lip Score System and Total Groove Score for gender identification: A cross sectional study

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Purpose

Endless ink and pixel space have been spent to validate the use of cheiloscopy classification systems in the field of identification. It is becoming evident that lip-print patterns may provide indications about an individual's gender, race, occupation, habits, blood type, and paternity. Over the course of time, much data has been collected on a substantial population in this field. In the present study, we strive to see how well a noble total lip scoring system (TLS) works in identifying a person's gender among College of Dentistry students. We also quantified the total groove score (TGS) and compared it with each quadrant for better authentication of the set study design.

Methods

A cross-sectional descriptive study was conducted among 60 dental students (30 males and 30 females), with an age range of 18–30 years. Lip prints were recorded using the writing pad method and subsequently digitalized by capturing the images using Adobe Photoshop CS 6 Extended Version, counted and summed up, quadrant wise, in both upper and lower lip. The TLS and TGS between males and females were statistically calculated using Jamovi project (https://www.jamovi.org).

Results

The mean value for TLS for males (n = 402; SD ±92.1) is higher than that for females (n = 348; SD ± 86.1). The correlation matrix applying a non-parametric test for non-continuous data using Spearman’s ratio inferred a statistically significant correlation (-0.354) with a p value of 0.005 for TLS, whereas a correlation (-0.162) of TGS with gender was not so significant with a p value of 0.217.

Conclusions

Our study proved the uniqueness of applying TLS as a novel approach to gender identification. The study revealed that males had a statistically higher lip score compared to females. Clinical Significance/Future Implications: Being unique, our study inferred the importance of TLS, which needs to be explored in detail for applying, evaluating, and validating its accuracy in forensic research that can help for errorless investigations as full proof evidence in court.

#217: Convolutional Neural Network Based Analysis - An Aid to Diagnose Bacterial and Fungal Osteomyelitis

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Purpose

Osteomyelitis may be classified as Bacterial (Actinomycotic), Fungal (Mucormycotic), or combined based on the etiological agent. During histopathological examination, there is a high chance that bacterial colonies or fungal hyphae may be missed by the human eye, especially when there is a paucity of organisms. This may lead to a faulty diagnosis of the type of osteomyelitis which along with an improper treatment plan would cause further progression of the disease and various other complications. Therefore, the diagnosis of the exact etiological variant of osteomyelitis is of prime importance to design an appropriate treatment plan. In the present study, bone parameters based on the osseous changes, were used to diagnose Osteomyelitis by employing Machine Learning through Convolutional Neural Networks (CNN). No studies in literature have utilized a CNN based analysis to differentiate between Bacterial and Fungal Osteomyelitis based on the osseous changes which would help in designing an appropriate treatment plan.

Methods

Histopathologically confirmed cases of Osteomyelitis were stained with Modified Gallego's stain, a differential for hard tissue structures. A total of 10 slides of each of the three study groups were used and 10 images were captured from each slide. The slides were analysed for the bone parameters of osteocytic lacunae, osteoblastic rimming, bone area, bone outline and necrosis. The bone parameters assessed were then compared between the three study groups i.e. bacterial, fungal and combined osteomyelitis. CNN was used to train the software for the bone parameters to differentiate between the three study groups.

Results

The bone parameters showed significant differences between Actinomycotic and Mucormycotic Osteomyelitis The trained machine was able to assess and differentiate between the bone parameters of the given samples with high level of accuracy which was useful in diagnosing the type of osteomyelitis.

Conclusions

Convolutional Neural Network based analysis successfully helped us to differentiate between bacterial and fungal osteomyelitis based on the bone parameters thereby assisting pathologists in accurate diagnosis and facilitating the clinician to provide a definitive treatment plan.

#218: **Comparison of efficacy of arthocentesis and prolotherapy in the management of temporomandibular joint osteoarthritis – a randomised control trial.**

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Purpose

Temporomandibular joint osteoarthritis (TMJ OA) is a degenerative disease characterized by deterioration of articular tissue with concomitant osseous changes in the condyle and/or articular eminence, joint positive for TMJ noise with jaw movement or function, crepitus detected on palpation on opening, closing, right/left lateral, or protrusive movement.1 The aim of this study is to compare the efficacy of arthrocentesis and prolotherapy in management of Temperomandibular Osteoarthritis.

Methods

This is a randomised control trial with a sample size of 30. Patients with clinical and radiographic features of temperomandibular Osteoarthritis will be divided into two groups 15 each by simple random sampling .One group will undergo arthrocentesis using normal saline and second group will undergo prolotherapywith 25% dextrose solution, diluted with local anesthesia. Evaluation of Mouth opening, Joint pain and Joint sounds will be assessed, immediately following the procedures, on 1st , 2nd , 3rd week, followed by 6 months.

Results

On-going study

Conclusions

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#219: **Assessment of Micrometastasis in Lymph Nodes of Oral Squamous Cell Carcinoma – Attaining Excellence through Immunohistochemistry**

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Purpose

Cervical lymph node metastasis is the most important prognostic factor in Squamous Cell Carcinoma of Head and Neck (SCCHN). Lymph node prognostic determinants hold immense significance in influencing both patient's survival outcomes and the propensity for recurrence. The current study aimed to evaluate the diagnostic accuracy of Cyclin D1 and Pan-CK for the detection of lymph node micrometastasis in oral squamous cell carcinoma tissue sections and re-evaluate the tumor staging.

Methods

The current study constituted a total of 20 histopathologically proven non metastatic lymph node sections. Other than Haematoxylin and Eosin (H & E) and modified PAP, Immunohistochemistry for Pan-CK and Cyclin D1 were used for identification of micrometastatic deposits.

Results

Pan-CK and Cyclin D1 exhibited exceptional precision and effectiveness in detecting micrometastasis in 10% of non-metastatic lymph node sections used in our study. The p-value obtained from the chi square test was statistically significant.

Conclusions

Pan-CK and CyclinD1 are sensitive in detecting micrometastatic deposits compared H & E and PAP stains. Detecting micrometastasis confers benefits by impacting staging and adjusting in treatment strategy.

#220: **Relationship between periodontal disease and coronary heart disease: A bibliometric analysis**

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Purpose

Periodontal disease (PD) and coronary heart disease (CHD) are both prevalent diseases worldwide and cause patients physical and mental suffering and a global burden. Recent studies have suggested a link between PD and CHD, but there is less research in this field from the perspective of bibliometrics. This study aimed to quantitatively analyze the literature on PD and CHD to summarize intellectual bases, research hotspots, and emerging trends and pave the way for future research.

Methods

The Science Citation Index Expanded (SCI-E) database was used to retrieve study records on PD and CHD from 1983 to 2022. After manual screening, the data were used for cooperative network analysis, keyword analysis, and reference co-citation analysis by CiteSpace software.

Results

A total of 580 studies were included in the analysis. The number of publications in this field has shown an upward trend over the past 30 years. There was less direct collaboration among authors and institutions in this field but closer collaboration between countries, with the United States being the country with the most published articles in this field (169/580, 29.14%). Based on the results of keyword analysis and literature co-citation analysis, C-reactive protein (CRP), oral flora, atherosclerosis, infection, and inflammation were previous research hotspots, while global burden and cardiovascular outcomes were considered emerging trends in this field.

Conclusions

Studies on PD and CHD, which have attracted the attention of an increasing number of researchers, have been successfully systematically analyzed using bibliometrics and visualization techniques. The results presented in this study can provide better ideas and directions for future research in this field.

#221: **Evaluating Pi Angle Efficacy Against Established Cephalometric Angular Parameters in a South Indian Population: A cephalometric study**

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Purpose

Cephalometrics is a cornerstone of orthodontic diagnosis. Numerous angularmeasurements are used to assess the anteroposterior jaw relation include the ANB angle, Betaangle, Yen angle, and W angle. However, these have limitations, leading to the development of thePi angle. Our study aimed to evaluate the predictability of the Pi angle in a South Indian populationand compare it with other established antero-posterior dysplasia indicators such as the ANB angle,W angle, Yen angle, and Beta angle. This comparison is crucial for determining the most accuratemethod for assessing sagittal skeletal discrepancies.

Methods

Lateral cephalometric radiographs from 150 untreated orthodontic subjects were analyzed. Subjectswere categorized into Classes I, II, and III based on their ANB angle. Measurements of Pi angle, Yenangle, W angle, and Beta angle were taken for each subject. Statistical analyses, including ANOVAand correlation coefficient analysis, was done to assess the significance and predictability of theseangles.

Results

Yen angle emerged as a significant determinant for differentiating between the three skeletalgroups. The Pi angle showed 66% predictability for Class I, but only 16% and 24% for Class II andClass III, respectively. The Beta angle was most predictable for Class II and Class III subjects.Significant correlations were observed between various angles, differing by class.

Conclusions

The Pi and Yen angles were most significant for differentiating Class I subjects. Pi angle was lesspredictable for Classes II and III. The Beta angle was more predictable for Class II and Class IIIsubjects.

#222: **To Evaluate the Effect of Surface Moisture on Dentinal Shear Bond Strength of Glass Ionomer Restorations in Primary Teeth: An In-Vitro Study**

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Purpose

Glass ionomer cements that form aninevitable part of pediatric restorative dentistryare inherently sensitive to moisture. The influenceof different drying techniques on the shear bondstrength of glass ionomer cements to primaryteeth dentin has not been established.Thepurpose of the study was to evaluate the effects ofdifferent drying methods for different drying timeperiods on the shear bond strength of GC Fuji IX toprimary tooth dentine

Methods

A total of 135 caries-free primary teeth were selectedand ground to a flat dentinal surface. Specimenswere randomly divided into three groups – air dry,blot dry, and suction dry of 45 specimens each. Ofthese, 15 specimens each were dried for 2 s, 5 s, and10 s. GC Fuji IX was condensed into Teflon molds,and the specimens were subjected to shear bondstrength testing.

Results

The mean shear bond strength values for the different time intervals were analyzed with analysis of variance test. In the air-dry group, the maximum shear bond strength values were obtained when the specimens were dried for 5 s and the least when dried for 2 s (P = 0.00). In the blot-dry and suction-dry groups, the highest values were obtained when the specimens weredried for 10 s and least for 2 s (P = 0.039 and 0.000,respectively).

Conclusions

Among the three drying methods employed in the study, the maximum shear bond strength of the glass ionomer restoration was observed in the air-dry group

#223: Clinical, Radiographic, and Biochemical Evaluation of One-Piece vs Two-Piece Single Implants After 5 Years af Functional Loading

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Purpose

The aim of this study was to compare the clinical and radiographic conditions and the expression of proinflammatory cytokines in peri-implant crevicular fluid (PICF) of two-piece/bone level (TP/BL) versus one-piece/tissue level (OP/TL) single implants with a laser-microgrooved collar after at least 5 years of functional loading.

Methods

For this study 20 systemically and periodontally healthy patients were selected. Each patient received 2 implants, both with a laser-microgrooved collar surface, with a split-mouth design: one TP/BL implant and one OP/TL implant. Levels of IL-1β, IL-1RA, IL-6, IL-8, IL-17, b-FGF, G-CSF, GM-CSF, IFN, MIP-1β, TNF-α, and VEGF were assessed in PICF using the Bio-Plex 200 Suspension Array System. Plaque index (PI), probing depth (PD), bleeding on probing (BOP), and gingival recession (REC) were recorded. Radiographic crestal bone levels (CBL) were assessed at the mesial and distal aspects of the implant sites.

Results

The mean PI, PD, BOP, and REC values had no significant differences in either group. TP/BL implants showed a significantly higher CBL value. The levels of IL-1β, IL-6, IL-8, GM-CSF, and MIP-1β and TNF-α were higher at TP/BL implants than at OP/TL implants. However, only IL-1β, IL-6, and TNF-α values presented significant differences between the groups.

Conclusions

After 5 years of loading single TP/BL and OP/TL implants with a laser-microgrooved collar surface presented similar good clinical conditions, a higher proinflammatory state and higher crestal bone loss were detected for TP/BL implants.

#224: Spatial Analysis of Maxillary Central Incisors in Relation to the Nasopalatine Canal and Surrounding Alveolar Bone

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Purpose

The use of mini-implants in orthodontics has enabled greater retraction of incisors than previously achievable. This change underscores the need to understand how incisors relate to the alveolar bone and nasopalatine canal. The varying labiolingual inclination of incisors during orthodontic treatments may influence these anatomical relationships. Our study aimed to assess the spatial relationship between maxillary central incisors and the surrounding alveolar bone and nasopalatine canal.

Methods

CBCT scans of 40 patients were analyzed. Lateral cephalograms derived from CBCTs were used to determine the inclination of the teeth. This inclination was then correlated with the alveolar bone's dimension posterior to the incisor roots and adjacent to the nasopalatine canal. Linear measurements at two distinct levels were evaluated.

Results

Our findings revealed a negative correlation between the labiolingual inclination of the teeth and the bone width between the roots and the canal at the apical level. Additionally, the bone width posterior to the central incisor roots was observed to be greater at the apical level compared to the cervical level.

Conclusions

The findings indicate that the proximity of the maxillary central incisors to the nasopalatine canal and the availability of the alveolar bone posterior to these incisors can vary with the teeth's labiolingual inclination. Therefore, comprehensive evaluation of the alveolar bone is essential when planning significant anteroposterior tooth movement.

#225: Whitening efficacy of activated charcoal-based dentifrices related to the mode of action and adverse effects on the tooth surface

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Purpose

To evaluate if tooth color alteration of activated charcoal-based dentifrices may be attributed to the dye adsorption potential of charcoal (chemical action - C - slurry only) or to the association of dye adsorption with abrasion (chemo-mechanical action - CM- slurry/toothbrushing). Potential adverse effects in surface roughness, gloss, and wear were also assessed.

Methods

Bovine enamel/dentin specimens were randomly allocated into the groups according to treatments and test model (n = 15): deionized water (negative control- NC); Colgate Maximum Anticaries Protection (conventional toothpaste-positive control- PC); Colgate Luminous White Activated Charcoal (LW); Oral-B 3D White Therapy Charcoal (WT); Curaprox Black is White (BW); Dermavita Whitemax (Activated charcoal powder- WP). Specimens were exposed to the C or CM models, in 28-day staining-treatment cycling. Color change (ΔE00), whiteness index (ΔWID), percentage of alteration of surface roughness (%Raalt), and gloss (%GUalt) were calculated. Additional specimens (n = 9) were indented with a Knoop diamond and subjected to 100,000 abrasion cycles. Enamel wear was determined by calculating the decrease in indentations geometry. Data were analyzed by ANOVA/Tukey tests ($\alpha = 0.05$).

Results

The CM-model produced lower color change (staining) than C ($p = 0.0001$). PC, LW, WT, BW, and WP showed similar color results for both models, differing from NC ($p < 0.05$). %Ra and %GU did not differ among the C-model groups ($p > 0.05$) and WP exhibited the highest variation (%Ra and %GU) under CM-model. Enamel wear values were lowest in the NC and PC groups, intermediate for LW, WT, BW, and highest for the WP ($p < 0.05$).

Conclusions

Activated charcoal-based dentifrices have a similar ability to minimize tooth staining as the conventional toothpaste, with increased enamel wear potential in the long term (after 100,000 cycles). The activated charcoal powder damaged the enamel surface, showing a higher deleterious effect on enamel roughness, gloss, and wear.

#226: **Assessment of failure rates and factors associated with failure ofInfrazygomatic crest implants.**

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Purpose

The use of Temporary Anchorage Devices (TADs) in orthodontics helps facilitate complex tooth movements with minimal risk. The infrazygomatic crest (IZC) of the maxilla, distanced from the dentoalveolar region, provides a robust structural foundation for anchorage, thereby facilitating complex dental movements. TADs in this region enable controlled tooth movements with minimal risk of dental root interference or adverse periodontal effects. We investigated the use of Infrazygomatic Crest (IZC) mini-implants as a skeletal anchorage method for orthodontic applications such as en-masse distalization of the maxilla, anterior tooth retraction, and intrusion of the maxillary posterior teeth. We characterized failure of the mini-implant by the loss of the screw or its inability to function as a stationary anchorage, necessitating subsequent removal or replacement.

Methods

We analyzed 32 randomly selected patients, totalling 64 mini-implants, through an exhaustive review of treatment logs, photographic records, radiographic data, and clinical evaluations. These subjects were recipients of IZC implants for orthodontic anchorage purposes. Comprehensive examination of patient histories, clinical manifestations, implant statuses, and treatment trajectories were conducted, employing digital PA cephalograms and Nemoceph software for precise angulation measurements. Chi-Square test and Fischer's exact test was used to dissect the relationship between various independent and dependent variables.

Results

We found a failure rate of 28.1% for mini-implants situated in the IZC region. A notable discrepancy was observed between implants positioned on the left side (31.3% failure rate) and those on the right (25.0% failure rate). Critical factors influencing implant failure encompassed the patient's mandibular plane angle, oral hygiene status, peri-implant inflammation, time duration before loading the implant, and the degree of implant mobility. We observed that elevated failure rates were associated with patients exhibiting a high mandibular plane angle, suboptimal oral hygiene, immediate loading of the implant, pronounced peri-implant inflammation, and significant clinical mobility. In contrast, variables such as age, gender, sagittal skeletal pattern, implant length (12mm/14mm), type of tooth movement, occluso-gingival position, method of force application, and implant placement angle did not significantly correlate with the likelihood of implant failure.

Conclusions

Effective control of oral hygiene and peri-implant inflammation is crucial to minimize the failure of IZC mini-implants. A latency period of two weeks before the loading of the implant can optimize treatment outcomes. Heightened caution is advised when considering mini-implant placement in patients with an elevated mandibular plane angle, due to the associated increased risk of failure.

#227: **Comparative Evaluation of Effectiveness of green tea mouth rinse with Probiotic mouth rinse on oral halitosis and gingivitis**

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Purpose

To assess and compare the efficacy of green tea mouth rinse and probiotic mouth rinse on oral halitosis and gingivitis

Methods

60 patients were included in the study and were divided into three groups with 18 patients in each group. At baseline Oral halitosis was assessed by Winkles tongue coating index and Rosenberg Organoleptic scoring index. Presence of plaque and gingival inflammation was assessed by Turesky Gilmore Glickman modification of Quigley Hein Plaque index and gingival index. After recording indices patients received preintervention prophylaxis (scaling and polishing) and thorough oral hygiene instructions were given. Group 1 (n=18) were advised to use distilled mouth rinse, group II with green tea mouth rinse(n= 18) and Group III were advised to use probiotic mouth rinse (n = 18). Indices were recorded at fallow up visits at 2 weeks, 4 weeks interval.

Results

Significant reduction in mean gingival index in all three groups after scaling at 4 weeks interval was observed There was more reduction in mean gingival index in green tea group (2.13)than in probiotic (2.54)and distilled water group(3.44) . Significant reduction in mean plaque scores in all three groups after scaling was observed There was more reduction in mean plaque index in green tea group (1.48) than in probiotic ((1.78)and distilled water group (1.93). Mean Tongue coating score were significantly reduced in green tea group(0.66) than probiotic (0.72) , distilled water group (1.31) during Post intervention at 4 weeks. Mean halitosis scores were significantly reduced in green tea group(0.23) than probiotic (1.56) , distilled water group (2.44) during Post intervention at 4 weeks

Conclusions

The present study showed that green tea mouthwash was found to be more effective than the probiotic mouthwash, in order to reduce the extensive levels of gingivitis associated with halitosis.

#228: Evaluating the Effectiveness of Mindfulness Meditation in Reducing Chronic PainAmong the Elderly

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Purpose

This study investigated the effectiveness of mindfulness meditation (MM)techniques in alleviating pain and enhancing well-being in the elderly. Given the prevalenceof chronic pain in older adults, especially those in residential aged-care facilities, there is agrowing need for effective non-pharmacological pain management strategies.

Methods

Our exploratory study focused on a small, selected cohort of elderly patients. The participants, all above60 years of age, were diagnosed with various chronic pain-related conditions such as osteoarthritis, muscle cramps, gout, chronic back pain, and others. A convenience sampling method was employed to identify patients undergoing treatment for chronic pain. Eachparticipant consented to partake in three mindfulness meditation (MM) sessions spread across different days. The MMsessions, each lasting ten minutes, were delivered via an audio format from the Headspaceapplication. Participants were free to choose a comfortable position during the sessions.Pain levels were assessed both before and after the meditation sessions using a numericalscale and a Visual Analogue Scale, providing a comprehensive measure of the intervention's impact. The study spanned two weeks, during which data was meticulously documented and analyzed to evaluate the efficacy of MM in pain management among the elderly.

Results

The analysis revealed a notable decrease in pain intensity among the elderly participants following the mindfulness meditation (MM) sessions. The pain assessment indicated a reduction in pain levels post-intervention. Specifically, two out of the five participants reported a reduced need for PRN medication. These findings suggest that MM can be an effective tool in managing pain in the elderly. The average painlevel of all participants, as well as individual pain intensity scores before and after MM,demonstrated the positive impact of the intervention on pain reduction.

Conclusions

This study contributes to the understanding of mindfulness meditation (MM) as an effective intervention for managing chronic pain in the elderly, suggesting that regular MM practice cansignificantly alleviate pain perception. Further large-scale randomized controlled trials areneeded to more definitively assess MM's efficacy in chronic pain management.

#229: **Surface modifications of orthodontic bone screws – A novel approach**

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Purpose

Anchorage control plays a key role in the correction of malocclusion. With the advent of orthodontic bone screws, attaining absolute anchorage control has become hassle free. They have the advantages of low cost, simple surgical placement, and ease of removal; therefore, they are convenient in the treatment of various malocclusions. Although the clinical stability of bone screws is exceptionally high, stability of the bone screws is compromised by factors such as microbial contamination and morphological defects. To overcome this, surface modifications are introduced to enhance the stability of the bone screws.

Methods

For this literature review, a range of databases was used such as Google Search, Google Scholars, Scopus, and PubMed. The search strategy used was a combination of terms such as "Surface modifications", "Orthodontic bone screws", "Mini implants", "Anti-microbial", and “Failure". Studies published till October 2022. Only English-language articles were considered for this research.

Results

According to the literature various surface modification techniques were identified and they are classified into three types; Additive methods, Subtractive methods, and Non-additive non-subtractive methods. Anodic oxidation, Plasma ion implantation, and Nano scale modifications comes under additive methods as they add a layer or coating on the surface of the bone screws. Micro grooving, and Sandblasting, large grit, and acid etching (SLA) are classified under subtractive methods as they modify the surface of bone screws by removing or altering the surface of bone screws. Ultraviolet Photofunctionalization requires no removal or addition of material and thus comes under non-additive non-subtractive method.

Conclusions

Surface modifications were tested and proved to show improved stability compared to the conventional orthodontic bone screws. Surface modifications improve the quality of orthodontic bone screws and enhance its biological and physiological characteristics. Improved surface characteristics ensure the stability of the bone screws.

#230: Efficacy of Concentrated Growth Factor Membrane versus Collagen Membrane in Treating Gingival Recession

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Purpose

This study aimed to assess the efficacy of an autologous concentrated growth factor (CGF) membrane versus a collagen membrane in treating Miller's class I and II recession defects in the maxillary anterior region. We employed the Vestibular Incision Subperiosteal Tunnel Access (VISTA) technique. Comparative analysis of the membranes was done using scanning electron microscopy.

Methods

We used a split randomized control design and enrolled 30 sites with class I or II gingival recession defects in the anterior region. Following Phase I therapy, these sites were randomly allocated into two groups: one treated with VISTA and CGF Membrane (test group), and the other with VISTA and a collagen membrane (control group). Clinical periodontal parameters—gingival recession, probing depth, keratinized gingiva width, and mucosal thickness—were evaluated at baseline, three months, and six months post-treatment. SEM analysis was performed for both PRF and CGF membranes.

Results

Over six months, the test group exhibited greater recession depth reduction compared to controls, although the difference was not statistically significant. Similar trends were observed for pocket probing depth, keratinized gingiva width, and gingival mucosal thickness, with no significant differences between groups. SEM analysis at 2000x magnification revealed that the CGF fibrin matrix presented as an organized, dense structure with varied fibril thickness. In contrast, the PRF matrix appeared more mature and organized.

Conclusions

Our findings indicate that autologous platelet concentrates, like CGF, could be a viable alternative to synthetic collagen membranes or soft tissue grafts in treating gingival recessions. However, despite improvements in periodontal parameters, the differences compared to traditional treatments were not statistically significant.

#231: A STUDY ON COMPARISON OF CONVENTIONAL 2D CT SCAN TO 3D CT RECONSTRUCTION IN MAXILLOFACIAL TRAUMA. –AN OBSERVATIONAL RETROSPECTIVE STUDY

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Purpose

Recently, 3D CT reconstruction has been used widely used to study and assess variety offacial trauma deformities. Although many clinicians advocate that 3D reconstruction imagesgives the most accurate picture of complex skeletal fractures, many still believe that 3Dimages do not reveal important identification and diagnostic information when comparedwith 2D CT slices. Several reports show the use of 3D CT in managing maxillofacial injuriesbut none of them focused on the advantages and disadvantages of the same overconventional 2D CT slices. This study compares both 3D CT reconstruction and 2D CT slicesin patients with maxillofacial trauma to describe the advantages and disadvantages of boththe modalities.

Methods

Observational retrospective study including 100 CT samples with 3D reconstruction & 2D CTslices of patients with maxillofacial fractures were compared and studied.

Results

3D rendered images were similar or superior to 2D images (in the assessment of fractures)in most patients and were inferior when the fractures involved the thin bones of the orbitalregion.

Conclusions

2D CT provides excellent spatial resolution in the evaluation of fractures in the maxillofacialregion. 3D rendered images provide a better perception of the pattern of the fracture linesand the displacement of the bony fragments, especially in the mandible and zygomatic bonethus helping in the faster and improved communication of the information. 3D images werealso better in the identification of Le Fort fracture lines. However, the 3D rendered imageshave a limited role in evaluating orbital region fractures and also when there is minimaldisplacement of the fractured fragment. The 2D coronal images are superior in the detectionof fractures in the orbit.

#232: **Effect of Nano-curcumin oral administration as an adjunctive therapy with scaling and root planning in the management of gingivitis.**

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Purpose

To assess the effect of oral administration of nano- curcumin as an adjunctive therapy with scaling and root planing (SRP) in the management of gingivitis.

Methods

Twenty-four patients with established gingivitis,aged between 35 to 55 years were selected from the Department of Periodontics, SIBAR Institute of Dental Sciences, Guntur. Patients were divided randomly into Group I (SRP + nano curcumin capsules once daily for 3 weeks) and Group II (SRP + placebo capsules once daily for 3 weeks).At baseline plaque index (PI), gingival index (GI)and papillary bleeding index (PBI) were recorded and Scaling and root planning was performed to all the recruited patients. All the parameters were recorded at 3 weeks post-operatively

Results

The mean score of PI, GI and PBI at baseline in both the groups were similar and no statistically significant difference was found. At 3 weeks post- operatively, a statistically significant reduction ($P \leq 0.001$) was observed in all the parameters in both the groups. No statistically significant differences were observed between the two groups at 3 weeks after SRP.

Conclusions

The findings indicated reduced plaque, gingival inflammation, and bleeding compared to the placebo supporting nano-curcumin as a potential adjunct to periodontal therapy with good patient acceptance.

#233: **Effects of virtual reality audio visual system as a distraction aid to reduce anxiety among 6–10-year-old children undergoing restorations.**

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Purpose

To evaluate the effectiveness of virtual reality eyeglasses as a distraction aid to reduce anxiety of children undergoing the dental restoration procedures.

Methods

: 26 children of age 6–10 years were randomly selected and divided into two groups of 13 each. The first one was group I (VR group) and group II (control group). In group I (VR group), procedure was done with wearing VR eyeglasses whereas in group II (control group), the dental procedure was done without wearing VR eyeglasses. Anxiety was measured by using Venham's picture test, pulse rate and oxygen saturation. Statistical analysis was done using SPSS Version 21. Intergroup Comparisons using t-Test and Mann Whitney test.

Results

There is statistical difference in pulse rate between the study and control group .No significant difference in Venham's Anxiety scale and oxygen saturation between the 2 groups

Conclusions

The present study confirms the efficacy of VR distraction as a means of the behavior management technique.In our era of digital dentistry, use of an audiovisual aid can be an adjunct reducing the anxiety of children

#234: **Assessment of Proliferation, Clonogenic Assay and Osteogenic Differentiation of Human Periodontal Ligament Stem Cells Following Application of Orthodontic Forces**

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Purpose

Human Periodontal Ligament Stem Cells (hPDLSCs) have immense potential for use in tissue regeneration and angiogenesis. These cells are influenced by mechanical forces, particularly in orthodontic applications. Understanding how mechanical stress modulates stem cell behavior is essential for optimizing therapeutic strategies.Objectives: Our study investigated the effect of light and heavy orthodontic forces affected the proliferation, clonogenic potential, and osteogenic differentiation of Human Periodontal Ligament Stem Cells (hPDLSC

Methods

A force couple of 50 gm (Light force) was applied to the 1st premolar on one side and 250 gm (Heavy force) to the contralateral 1st premolar in the upper arch in patients undergoing orthodontic treatments that required the extraction of these teeth. After 30 days, periodontal tissues were harvested from the extracted teeth to establish hPDLSC cultures. Cells from lower premolars, which were not subjected to orthodontic forces, served as a control group. Key parameters assessed included cell morphology, viability, proliferation rate, population doubling time, clonogenic capacity, and alkaline phosphatase activity.

Results

Alizarin red staining and qRT-PCR analysis revealed that hPDLSCs retained osteogenic potential under both light and heavy orthodontic forces. However, high-force application slightly reduced their proliferative and osteogenic capabilities, although these differences were not statistically significant.

Conclusions

Our findings indicate that hPDLSCs maintain their mesenchymal stem cell-like characteristics under various mechanical stresses, as demonstrated by their consistent morphology, growth kinetics, colony-forming capacity, and alkaline phosphatase activity. The observed minor reduction in proliferation and osteogenesis under high-force conditions, while not significant, offers valuable insights into the adaptive responses of hPDLSCs. This study enhances our understanding of the interplay between mechanical stress and stem cell biology, with important implications for orthodontic treatments and periodontal tissue engineering.

#235: **Influence of abutments surface (machined vs. laser-microgrooved) in soft-tissue response during one year of function: clinical and biochemical outcomes of a RCT with split-mouth design**

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Purpose

To evaluate peri-implant soft tissue behaviour around machined vs laser-microgrooved implants/healing/prosthetic abutments during 1 year of function by assessing IL-6, IL-1b and MMP-8 levels in peri-implant crevicular fluid (PICF).

Methods

Twenty-four patients were selected. Each patient received 2 one-stage implants in the same jaw with a split mouth design . One implant, one immediate healing, and one prosthetic abutment with a machined surface (M group), and one implant, one immediate healing abutment and one prosthetic abutment with a laser-microgrooved surface (LMS group) were used. PICF sampling, pocket probing depths (PPD) and bleeding on probing (BOP) were assessed at 1, 3, and 12 months. IL-6, IL-1b and MMP-8 levels were determined by specific enzyme-linked immunosorbent assay systems (ELISA). Repeated measure ANOVA was used to compare the two groups at 1, 3, and 12 months.

Results

At 3 and 12 months, the LMS group showed significantly lower PD, BOP and IL-6, IL-1β and MMP-8 levels than the M group ($P<0.05$).

Conclusions

This study suggests the presence of more remodeling and/or inflammatory phenomena around implants/abutments with a machined surface than around implants/abutments with a laser-microgrooved surface.

#236: ESTROGEN LEVEL, OSTEOPENIA/OSTEOPOROSIS AND PERIODONTAL STATUS IN POSTMENOPAUSAL WOMEN – A COMPARATIVE EVALUATION

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Purpose

Osteopenia, Osteoporosis and periodontitis are diseases, which affect a large number of populations across the country and world. Both are silent diseases" which cause bone loss mediated by local and systemic factors. These two diseases also share some risk factors that may interfere with healing.. Estrogen deficiency is the dominant pathogenic factor for osteoporosis in women .Various reports also have linked estrogen deficiency and osteopenia/osteoporosis to increased oral bone resorption , attachment loss and tooth loss .The objective of the study is to analyse and evaluate the condition of periodontal status of twenty five osteopenic/osteoporotic postmenopausal women and their estrogen level with twenty five non osteopenic/non osteoporotic postmenopausal women and their estrogen level.

Methods

Fifty postmenopausal subjects were included in the study based on inclusion and exclusion criteria. Female subjects of age group 50 years and above all beyond 5 to 10 years after menopause were included in the studyThe subjects were categorized into two groups; group (A), study group consisting of twenty five postmenopausal women and a group (B), control group consisting of twenty five postmenopausal women. 2 ml of blood withdrawn for FSH so as to confirm whether the patient has attained menopause or not. OHI(S) and Plaque Index was taken .Patients with poor oral hygiene and poor plaque index score were excluded from the study. DEXA scan of the lumbar spine region was taken so as to rule out osteopenia / osteoporosis. 3ml venous blood was withdrawn.Serum estrogen was measured using CLIA method. The periodontal status of the patient was diagnosed clinically using gingival index & Russell's Periodontal Index.

Results

The obtained values were statistically significant for the study group (osteopenic/osteoporotic group) than the control group (non osteopenic/non osteoporotic group) .There was significant correlation between bone mineral density, estrogen scores and various parameters within the group. Postmenopausal women with estrogen deficiency had increased periodontal scores than estrogen sufficient postmenopausal women. Postmenopausal women with decreased bone mineral density had increased periodontal scores.

Conclusions

The results of this study provide evidence for an association between estrogen level, osteopenia and osteoporosis and as risk factor for periodontal disease in postmenopausal women.

#237: Changes in stress distribution of orthodontic miniscrew and surrounding bone at different angles and heights - FEM study

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Purpose

Miniscrews is introduced as absolute anchorage devices in orthodontic treatment. They are efficient in overcoming anchorage loss. The miniscrew implants can be placed at different heights and angles in the positions determined for various clinical requirements. In this study, we used these parameters for determining the changes in stress distribution on the supporting bone and the miniscrews itself using finite element analysis.The aim of this study is to determine changes in stress distribution on the supporting bone and miniscrew implant at different alveolar crestal heights in different angulations using Finite Element Analysis.

Methods

A miniscrew implant(FavAnchor) of 1.6 x 8mm is embedded into the supporting bone at heights 2 & 8 mm from the alveolar crest. The site chosen is inter radicular space between the maxillary second premolar and the first maxillary molar. The miniscrews are inclined at 30°& 90° at each of these heights. A minimal amount of force (2N) is applied on the head in each case. The stress on the supporting bone and the miniscrew are determined. CT scan data of a patient is converted into geometric model using MIMICS 8.11 software. HYPERMESH 2019.1 software is used for preparing Finite element models and ANSYS 2017.2 for simulations

Results

No values were found to be statistically significant.By changing the angulation and height of the miniscrew, the stress distribution on the surrounding bone ranges from 0.419 MPa to 0.671 MPa and the stress distribution on the miniscrew ranges from 0.938 MPa to 1.053 MPa

Conclusions

Maximum displacement is observed on the implant head and at the bone interface

#238: **Evaluating the Impact of Low-Level Laser Therapy on Accelerating Orthodontic Tooth Movement**

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Purpose

The prolonged duration of orthodontic therapy is a primary concern for patients. Low-Level Laser Therapy can accelerate bone remodeling and thus, orthodontic tooth movement. This study aimed to assess the efficacy of Low-Level Laser Treatment (LLLT) in enhancing the rate of orthodontic tooth movement during en-masse retraction.

Methods

In this prospective in-vivo split-mouth study, participants underwent en-masse retraction with and without the application of LLLT. The experimental side of the upper and lower dental arches received stimulation using an 810 ± 10 nm gallium-aluminum-arsenide diode laser. The contralateral side served as the control and underwent the same orthodontic treatment but without LLLT. Laser irradiations were administered bi-weekly at five specific points on the buccal and palatal sides of anterior teeth for three months. The distance between the canine contact point and the second premolar was measured using a vernier caliper on the 45th and 90th days.

Results

The findings indicated that LLLT significantly accelerated orthodontic tooth movement. We observed a marked acceleration of tooth movement on the experimental side relative to the control across all time intervals. Specifically, there was a 1.2-fold increase in the rate of movement in the maxillary arch and a 1.24-fold increase in the mandibular arch compared to conventional en-masse retraction techniques.

Conclusions

Low-Level Laser Therapy was found to be effective in enhancing the rate of orthodontic tooth movement during en-masse retraction in humans, offering a promising approach to reduce the duration of orthodontic treatments.

#239: **An Immunohistochemical Panel for the Accurate Differentiation between Mucoepidermoid Carcinoma and Pleomorphic Adenoma**

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Purpose

Salivary Gland Tumors (SGTs) are a diverse group of neoplasms, with a wide range of histological subtypes, some of which can exhibit overlapping features. Amongst this group of tumors, Pleomorphic Adenoma (PA) and Mucoepidermoid Carcinoma (MEC) stand out as prevalent entities originating from the salivary glands. The accurate differentiation between these two entities is crucial for treatment planning, as it influences decisions regarding the extent of surgical resection. Because of the overlapping histopathological features, it is difficult to differentiate these two lesions with the help of conventional Hematoxylin & Eosin (H& E). The evaluation of Immunohistochemical (IHC) markers holds pivotal importance in diagnosing salivary gland tumors, offering valuable insights into their molecular and cellular characteristics. The application of IHC markers assumes paramount importance in the precise diagnosis of MEC and PA within the context of salivary gland tumors. The study aimed to assess the effectiveness of immunobiomarkers in differentiation between mucoepidermoid carcinoma and pleomorphic adenoma

Methods

A total of 40 tissue sections, comprising 20 each of mucoepidermoid carcinoma and pleomorphic adenoma underwent immunohistochemical analysis. The tissue sections were subjected to immunohistochemical staining, utilizing a panel of three antibody markers such as MUC1, Alpha-SMA and Ki-67. The assessment of all sections was conducted at high magnification (×40) by three independent observers.

Results

The positive membranous as well as mild cytoplasmic expression of MUC1 was found in MEC, however, PA showed negative expression for MUC1. Alpha-SMA showed intense positive cytoplasmic expression in PA, whereas MEC showed less or negative expression for alpha-SMA. Ki-67 exhibited higher positive expression in mucoepidermoid carcinoma (MEC) compared to pleomorphic adenoma.

Conclusions

Immunohistochemistry serves a crucial role in identifying SGTs, primarily as a supportive tool for histological evaluation. It is essential to recognize that IHC should be viewed as a supplementary method aiding in the differential diagnosis, rather than a substitute for the diagnosis based on hematoxylin and eosin (H&E) staining.

#240: **Immunohistochemical Expression of Cyclin D1 In Dentigerous Cyst, Odontogenic Keratocyst and Unicystic Ameloblastoma- An In-vitro Study**

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Purpose

Cyclin D1, a G1 cyclin member, regulates the transition of the cell cycle from the G1 phase to the S phase. The uncontrolled and elevated expression of cyclin D1 has been associated with rapid growth, heightened proliferative activity and increased histologic aggressiveness. Unicystic ameloblastoma pertains to cystic lesions that present clinical, radiographic, or gross features akin to jaw cysts. Nevertheless, upon histological scrutiny, these lesions display a distinctive ameloblastomatous epithelium lining the cystic cavity, with or without luminal or mural proliferation. This cystic variant of tumor bears substantial resemblances to dentigerous cysts, and occasionally, both entities can become indistinguishable upon histological examination. The study aimed to investigate whether the immunohistochemical expression of cyclin D1 in unicystic ameloblastoma, odontogenic keratocyst and dentigerous cyst correlates with their known clinical behavior.

Methods

Paraffin-embedded tissue blocks from previously diagnosed and histopathologically reported cases of dentigerous cyst, unicystic ameloblastoma-luminal and mural types were retrieved from the archival records of the department. A total of 40 tissue sections, comprising 10 each of dentigerous cyst, odontogenic keratocyst, unicystic ameloblastoma-luminal type and unicystic ameloblastoma-mural type were subjected to immunohistochemical analysis using monoclonal antibody marker, Cyclin D1. The distribution and staining intensity score were computed for cells positive Cyclin D1.

Results

Expression of Cyclin D1 was higher in unicystic ameloblastoma compared to dentigerous cyst. The highest expression of Cyclin D1 positive cells was observed in OKC. The mural type of unicystic ameloblastoma showed high expression of expression of Cyclin D1 compared to luminal type.

Conclusions

Marked expression of Cyclin D1 in OKC and unicystic ameloblastoma suggested that higher proliferative capacity than dentigerous cyst. Higher expression of Cyclin D1 in mural-type of unicystic ameloblastoma suggested aggressive biologic behavior than luminal-type.

#241: **A Comparative Study on Fasting Plasma glucose levels (FPG), Glycated heamoglobin (HbA1c) and Glycated albumin (GA) as a better glycemic marker in dental extractions for Diabetic Patients.- A Randomised control trial**

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Purpose

Diabetes is a common co-morbidity in extraction and increases the risk of complications like delayed healing of extraction socket, post-operative pain, delayed bone formation and other complications like uncontrolled bleeding, pus formation, dry socket. Studies have shown that rrecent hyperglycemia seems to be the most important factor for preventing post-operative complications; hence it is very important to have a standardized tool for assessing glucose levels before extractions. Our study aims to compare the conventional Plasma glucose levels, glycated hemoglobin and glycated albumin levels and its correlation to post extraction complications.

Methods

The sample size in our study was 150. Patients with Type 1 and Type 2 DM requiring dental extraction will be divided into three groups using random sampling. Group 1- Plasma fasting blood glucose levels (65-99mg/dl), Group 2 -glycated haemoglobin (4-5.6% of Hb) and Group 3 - Gycated albumin (11%-15%) will be used as normal glycemic markers. Primary outcomes measured include socket healing after 1 week, radiographic changes and Secondary Out comes Measured include pain and other complications like uuncontrolled bleeding, pus formation, cellulitis and dry socket.

Results

Ongoing study

Conclusions

-

#242: Anti-erosion potential of fluoride solutions associated with aminomethacrylate copolymer: in situ randomized crossover study

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Purpose

The anti-erosion potential of fluoride solutions associated with aminomethacrylate (AMC) was evaluated in the presence of acquired pellicle on enamel and dentin.

Methods

. Twelve volunteers installed an intraoral device containing bovine enamel and dentin specimens. Afterwards, they performed the mouthwash (1 min) with one of the solutions: Water (C); Fluorine (F, 225ppm F-); Stannous Chloride (S, 800ppm Sn+2); AMC (2%); FS; AMC+F; AMC+FS and remained with the device for film maturation (30 min). Specimens were immersed in 0.03% HCl, pH 2.3, 3 min extra orally. These steps were repeated 6 times. Each solution was tested in one phase with the same volunteers (2 days apart). At the end of the cycle, a microbiopsy was performed to read the concentration of calcium and phosphorus in the acid collected by the colorimetric method in a spectrophotometer. The data obtained were converted into erosive loss values (µm) considering the stoichiometric formula of hydroxyapatite. The concentration of fluorine soluble in KOH (µg/cm²) on the surface of the specimens was also determined. Data were analyzed with RM-ANOVA and Tukey (5%).

Results

Considering the calculated erosive loss in enamel, the AMC+F solution showed the best performance ($p < 0.001$). On dentin, AMC+F and AMC+FS solutions were statistically superior ($p < 0.001$). The results of KOH-soluble fluoride concentration in enamel were: C = S = AMC < F < AMC+F ≤ AMC+FS ≤ FS and in dentin: C = S = AMC < F = AMC+F = AMC+FS < FS.

Conclusions

It is concluded that AMC was able to increase the anti-erosion potential of fluoride solutions in the presence of acquired pellicle.

#243: Facial Soft Tissue and Airway Alterations Following Mini-Implant Assisted Rapid Palatal Expansion (MARPE) Treatment

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Purpose

Mini-implant assisted rapid palatal expansion (MARPE) is used to correct transverse maxillary deficiencies in orthodontics. While MARPE's influence on occlusal stability and maxillary expansion is recognized, its impact on facial aesthetics, soft tissue morphology, and nasal airway function requires further examination. Our study analyzed the changes in facial soft tissue and airway dimensions in patients undergoing MARPE treatment.

Methods

A retrospective analysis was conducted using cone-beam computed tomography (CBCT) scans from 10 patients aged 18-30 years. Pre- and post-expansion CBCT data were analyzed using Romexis software to evaluate alterations in facial soft tissue and airway structures. Key measurements included H-angle, soft tissue subnasale to H-line, and soft palate surface area, along with airway parameters like alar base width.

Results

Findings showed statistically significant alterations in facial soft tissue parameters post-MARPE. Notably, there was an increase in the H-angle and soft tissue subnasale to H-line, suggesting that facial profile can be altered. A reduction in the soft palate surface area was noted, indicating airway changes. There was a post-treatment increase in the alar base width, which could potentially improve nasal breathing.

Conclusions

This study provides empirical evidence of the significant impact of MARPE on facial soft tissue and airway morphology. The observed changes in key parameters like the H-angle, soft tissue subnasale to H-line, soft palate surface area, and alar base width underscore the importance of considering these factors in orthodontic diagnosis and treatment planning. The findings advocate for the inclusion of MARPE as a viable treatment modality in managing transverse maxillary deficiencies, with implications for facial aesthetics and airway function.

#244: ASSESSMENT OF POSITION OF MENTAL FORAMEN, INTERMENTAL FORAMEN DISTANCE AND ITS CORRELATION WITH AGE AND GENDER AMONG PEDIATRIC PATIENTS

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Purpose

The aim of this study was to assess the position of mental foramen, inter-mental foramen distance, and its correlation with age and gender between 9 to 12 years of age.

Methods

A total of 300 panoramic radiographs taken for diagnostic and treatment purposes will be included in our study. Mental foramen position and intermental foramen distance were assessed using NNT software. Statistical analysis was done using SPSS software version 26.

Results

The position of mental foramen was more commonly found between the first and second premolar in both the right and left sides in both genders. There was also variation in the position of mental foramen as age advances among children between 9 to 12 years. The Intermental foramen distance was greater in females when compared to males, and increases as age advances

Conclusions

Mental foramen position and Inter mental foramen distance varies with age and gender, which plays a crucial role in the assessment of growth patterns and also in forensic identification

#245: **Do orthodontic treatments affect chewing efficiency and Maximum Voluntary Clenching (MVC) for different malocclusion groups?**

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Purpose

The muscles of mastication are responsible for the complex biomechanical processes involved in chewing, biting, and speaking. The evaluation of muscle activity and dysfunction is conducted through electromyography (EMG) and jaw-tracking devices by healthcare professionals.The purpose of this study was to investigate the efficacy of chewing and maximum voluntary clenching (MVC) of patients with different malocclusion types by measuring the EMG activity in the masseter and temporalis muscles before and during orthodontic treatment.

Methods

A total of 33 participants with different malocclusions were included in the study and divided into three groups (Class I, Class II and Class III) based on Angles classification of malocclusion. An Electromyography (EMG) was used to measure the muscle activity at rest position, maximum voluntary clenching (MVC), and during chewing. Readings were obtained before orthodontic therapy (T0), at 6 months of active orthodontic therapy (T1), and one year of active orthodontic therapy (T2).

Results

In the Class III group, at rest position and MVC of the temporal and masseter muscle was higher ($P<0.001$) at all three time periods i.e. T0, T1, and T2. Class II subjects had the least muscle activity among the three groups. On chewing, the temporal muscle activity of the Class III group was higher compared to Class I and Class II at T0, T1, and T2, whereas the Class I group had a higher masseter muscle activity at T1.

Conclusions

In conclusion, after one year of active orthodontic treatment, the masticatory function is slightly altered. The difference in muscle activity at one year showed that during chewing the EMG activity of the temporal muscle increased significantly for all three malocclusion groups, whereas the masseter muscle activity reduced only for Class I group. Further studies can be carried out to check for the stability of muscle activity after orthodontic treatment and after six months of retention.

#246: Automated Micronuclei Detection in Exfoliated Oral Epithelial Cells of Smokers using MATLAB Software

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Purpose

Micronuclei assay yields an excellent path to monitor individuals or populations exposed to mutagenic, genotoxic or teratogenic events. Micronuclei are small nucleic structures formed due to the deposition of nuclear envelopes around lagging chromosomes that persist in the interphase. Mutagenic and carcinogenic compounds, such as polycyclic aromatic hydrocarbons and N-nitrosamines are believed to be responsible for the formation of micronuclei. Hence, micronuclei detection in exfoliated oral epithelial cells of smokers is a significant biomarker for genotoxicity and to identify cellular changes of biological importance to carcinogenesis. While studies have been conducted for the detection of micronuclei in smokers, they may easily be missed in regular histopathological sections when viewed under the microscope. Automation of micronuclei detection can prove to be a relatively convenient, accurate and time saving process. An artificial intelligence-based software, MATLAB, is a more refined and precise tool used in recent times for image analysis. This study aimed at employing MATLAB for micronuclei detection in exfoliated cells of smokers.

Methods

This study was conducted by obtaining oral tissue samples from smokers, with informed consent, via exfoliative cytology. The tissue samples were then stained with routine hematoxylin and eosin stains and scanned under a research microscope. The scanned images were then uploaded for image processing in MATLAB 2016 Ra 9.0 software with integrated image processing toolkit (Mathworks, Natick, MA). The images were analysed by the software for the detection of micronuclei.

Results

Automated micronuclei detection in exfoliated oral epithelial cells of smokers using MATLAB software was found to be more accurate, time saving and convenient when compared to histopathological staining. The micronuclei detected by the software were more in number than the ones manually counted under the microscope.

Conclusions

Automation of the process of micronuclei detection was carried out with good success and early detection of high-risk patients through this method can potentially prevent frank malignancy, morbidity and mortality. With the automation of micronuclei detection, early and accurate diagnosis of OPMDs and oral malignancies will be a promising possibility.

#247: Estimation and Comparison of Superoxide DismutaseLevel in Patients with Oral Submucous fibrosis

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Purpose

The study was conducted to evaluate and compare the levels of antioxidant enzyme superoxide dismutase(SOD) in blood samples of patients diagnosed with Oral SubmucousFibrosis(OSMF) and their age and sex matched controls and also to compare the SOD levels within the study group between patients with stage I, stage II, stage III and stage IV OSMF

Methods

After proper history, clinical examination and histopathological examination, 30 patients with OSMF and 30 normal subjects were included as controls in this study. OSMF patients were classified according to Chandramani More et al.Sample sizeGroup I – 30 normal subjects without any oral lesions and systemic diseases Group II – 30 patients diagnosed with oral submucous fibrosisUnder aseptic conditions, 5ml of venous blood was collected from the antecubital vein of each individual and then centrifuged at 3000 rpm for 10 mts, to separate the serum. Estimation of SOD was determined by Ransel antioxidant enzyme kit provided by RANDOX laboratories Ltd (Atrium, United Kingdom) and samples were processed on Perkin Elmer UV/visible double beam spectrophotometer.

Results

There is significant difference in mean value of SOD among controls and OSMF grade patients with the p-value 0.000. The mean SOD is higher in control group patients than OSMF patients. There is significant difference in mean SOD among the four different grades of OSMF (p-value 0.019). The mean value of SOD is highest in grade I, followed by grade II, grade IV and grade III.

Conclusions

The level of SOD is inversely proportional to chances of developing malignancy. The antioxidant enzyme superoxide dismutase can be a potential biochemical index for evaluating carcinogenic potential of OSMF.

#248: Detection of Cervical Lymph Node Micrometastasis - A Machine Learning Based Approach

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Purpose

Oral malignancy rates have been on the rise globally due to lack of health care facilities, unaffordable treatment expenses and diagnosis at the advanced stages. The presence of cervical lymph node metastasis stands out as a highly consequential prognostic factor in the context of oral cancer patients. Micrometastatic deposits represent a crucial factor that not only influences the clinical staging of patients but also has a substantial impact on the choices made regarding their treatment. For detection of micrometastasis, pathologists may face the demand of scrutinizing a significant quantity of lymph node slides, often requiring the incorporation of supplementary immunohistochemical (IHC) staining alongside the conventional hematoxylin and eosin (H&E) staining process. However, the manual microscopic examination of lymph nodes by pathologists to detect micrometastatic deposits is a laborious, time-intensive, and subject-to-error procedure. The utilization of Machine Learning (ML) on photomicrographs of lymph node sections eliminates the limitation of manual technique and offers the opportunity to employ it for the automated detection of metastatic tissue. The current aimed to detect micrometastasis in lymph node sections of Oral Squamous Cell Carcinoma (OSCC) using ML technique.

Methods

50 lymph node archival tissue sections stained with Papanicolaou (PAP) stain were considered of which 25 nodes each were metastatic and non-metastatic cases. 10 images were captured from each slide accounting to 500 images. These images were stored in .jpeg file format. These were analyzed using ML tool to classify the nodes into metastatic and non-metastatic cases.

Results

ML based method is found to be superior compared to conventional technique in the detection of lymph node micrometastasis.

Conclusions

Earlier detection of micrometastasis in cervical lymph nodes is efficient in upstaging the primary tumor and thus affects treatment and prognosis of patients with OSCC. This technique is justified for improved diagnosis and treatment planning of clinically node negative OSCC patients.

#249: **MATLAB based phenotypic evaluation and gene expression of CD44 and CD133 biomarkers in the prediction of Oral Squamous Cell Carcinoma metastasis**

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Purpose

Oral cancer accounts to 20–30% of all cancers in India. The major difficulty in managing carcinomas is due to failure in the control and detection of metastases (>90% deaths). Cancer stem cells (CSCs) are tumor-initiating cells that survive even after extensive radiotherapy and chemotherapy. Recently, the use of computer-assisted quantification methods employing image processing is drawing attention wherein information can be automatically extracted from the immunostained digitized images. The aim of the study was to assess the metastatic risk of Oral Squamous Cell Carcinoma (OSCC) by the phenotypic evaluation and gene expression of CD44 and CD133 biomarkers with clinical correlation. The study also assessed the role of Cancer Stem Cells through phenotypic evaluation and gene expression of CD44 and CD133 in metastasis of OSCC.

Methods

CD44 and CD133 expression were evaluated immunohistochemically on 40 archival tissue samples of OSCC that included 20 samples each of metastatic and non-metastatic groups. Photomicrographs were captured and subjected to texture and color segmentation using image processing in MATLAB software. Semi-quantitative reverse transcriptase polymerase chain reaction was used to assess the gene expression of CD44 and CD133. Statistical analysis using Statistical Package for the Social Sciences (SPSS) software was done. The mean score of protein expression of CSCs biomarkers were analyzed using Pearson's Chi- square test.

Results

The immunoexpression was assessed by semi-quantitative and quantitative methods, both showed increased protein and mRNA expression of CD44 and CD133 in metastatic OSCC. CD44 and CD133 expression was significantly increased in metastatic OSCC of clinical stage IV.

Conclusions

This study is the first of its kind wherein image processing using texture and color segmentation in MATLAB has been used effectively to quantify the protein expression of immunostained sections of CSCs markers of OSCC. These are helpful in predicting the metastatic behaviour in primary OSCC and may be targeted for therapy.

#250: **Influence of orthodontic treatment on changes in the maxillary sinus dimensions**

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Purpose

This study aimed to investigate the correlation of craniofacial morphology with maxillary sinus morphology and to evaluate whether orthodontic treatment facilitates maxillary sinus enlargement in adults.

Methods

Forty-five adult women were performed cephalography and computed tomography before and after treatment. All the participants were classified into three subgroups: the skeletal Class I, II, and III groups. The average dimensions and volume of the maxillary sinus were calculated in each subgroup. Furthermore, multiple regression analysis was used to analyze the correlations of maxillary sinus dimensions with 20 cephalometric variables.

Results

Before treatment, the maxillary sinus width, height, depth, and volume were 32.2 ± 3.9 mm, 39.5 ± 3.8 mm, 38.6 ± 1.8 mm, and 36179.3 ± 5454.0 mm3 in skeletal Class I, 33.9 ± 6.2 mm, 37.3 ± 3.5 mm, 38.6 ± 2.4 mm, and 34729.8 ± 6686.6 mm3 in skeletal Class II, and 32.0 ± 4.3 mm, 41.8 ± 5.0 mm, 38.0 ± 2.8 mm, and 35592.3 ± 10334.3 mm3 in skeletal Class III, respectively. Despite no significant differences in maxillary sinus width, depth, or volume, the height was significantly lower in the skeletal Class II than in the other two. Regardless of skeletal pattern, maxillary sinus height and volume increased considerably after treatment. Moreover, the maxillary sinus width was substantially involved in pretreatment U1-SN and overbite and in posttreatment U1-NA and overjet.

Conclusions

Orthodontic treatment may facilitate maxillary sinus enlargement even after growth.

#251: Soft tissue Secrets: A Comparative Analysis of Facial Soft Tissue Thickness in Skeletal Class II Versus Class I Malocclusions

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Purpose

This study aimed to measure facial soft tissue thicknesses in adults with skeletal class II malocclusion and compare them to individuals with skeletal class I relationships. The outcomes intended to provide clinicians with data to enhance treatment strategies for facial reconstruction and esthetics.

Methods

A total of 120 adults, 60 males, and 60 females aged 18–30 years with class I or class II skeletal patterns were selected. The study excluded individuals with craniofacial syndromes or previous orthodontic treatment. Digital lateral cephalograms were used to measure FSTT at 10 distinct landmarks using Nemoceph software. The collected data were analyzed using descriptive statistics and ANOVA.

Results

Significant differences in facial soft tissue thickness were observed between the groups, especially at the glabella, subnasale, and stomion landmarks. Sexual dimorphism was evident, with men showing greater soft tissue thickness than women. the pattern of facial soft tissues followed a thin-thick-thin characteristic from glabella to gnathion. The lower lip's soft tissue depth was influenced by the maxillary anterior teeth's proclination. Little variation was present in the soft tissue depths at landmark points that were tightly adherent to the bone. Variations in soft tissue thickness could impact orthodontic and corrective jaw surgery planning.

Conclusions

The study confirms significant variability in facial soft tissue thickness among different skeletal malocclusions and between genders. These differences are critical considerations for clinicians during diagnosis and formulation of orthodontic and orthognathic treatment strategies. Understanding these variations can aid in achieving a harmonious post-treatment facial profile.

#252: **Comparative Efficacy of Forsus FRD and Twin Block appliance in Class II Malocclusion Correction**

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Purpose

The Forsus Fatigue Resistant Device (FRD) and Twin Block appliances are used to correct Class IImalocclusions. Both appliances work primarily through mandibular repositioning. Despite theirwidespread use, uncertainties remain about their specific mechanisms of correction andcomparative effectiveness. Our study aimed to evaluate and compare the dentoalveolar, skeletal,and soft tissue changes between the Forsus FRD and Twin Block appliance in the treatment of ClassII malocclusions.

Methods

The study involved 30 skeletal Class II patients. The subjects were divided into two groups (n=15) fortreatment with either the Forsus FRD or Twin Block appliance. Pre-treatment and post-functionaltreatment lateral cephalograms were analyzed. Inclusion criteria included specific skeletal anddental characteristics (such as SNA ≥ 80, SNB ≤ 77, and ANB ≥ 4 degrees). Cephalometric analysis wasconducted, followed by statistical analysis using SPSS software.

Results

The Twin Block group caused more effective mandibular advancement than Forsus group. However,Forsus FRD caused more upper incisor retraction and molar intrusion than Twin Block. The Forsusappliance also showed more maxillary restriction than Twin Block. Both groups helped in improvingsoft tissue convexity significantly.

Conclusions

Both appliances effectively corrected skeletal Class II malocclusion in growing children throughmandibular advancement and maxillary restriction. While significant skeletal and dental changeswere observed, the Forsus FRD showed greater upper incisor retraction compared to the Twin Block.Both appliances resulted in significant soft tissue changes.

#253: Comparative evaluation of needle less local anaesthetic system [INJEX]with conventional needle technique in children: A randomised clinical trial

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Purpose

To address the patients' injection fear, jet-injectors are designed to eliminate the NRP, and fear associated with conventional dental injectors and syringes.

Methods

Before the start of the study written informed consent was obtained after explaining the treatment protocol from each parent of the child stating they accepted the treatment.6 – 12-year children [n =58] requiringpulpotomy treatments were randomly divided intotwo groups [Group I (Dental needle method) and Group II (Needle free injection)] by using random sequence generator at an allocation ratio of 1:1. Anaesthesia was administered by single investigator. Primary outcomes (FLACC and WBS) and Secondary outcomes (time required, Frankel behaviour rating scale) was measured and statistically analysed.

Results

Comparison of time required for administration of LAamong two groups reported a very high statistically significant difference with conventional needle taking longer time (1.3±0.39 minutes). There wasno statistically significant difference in pulse rate between the two groups.On analysing the ordinal parameters, compared to those who receivedanesthesia with standard needle technique, Participants in the INJEX (needle free system) group reported significantly higher FBRS scores. High statisticalsignificance was seen between the two groups when comparing FLACC values when LA was being administered. Mode for FLACC score of participantsin conventional syringe group was 7(4, 11) and was 2 (0, 4) in INJEX group. A very high statistically significant difference was obtained for WBS scores before the procedure and immediately after the injection between the groups with a higher

Conclusions

INJEX needle free system reduces the injection pain during anaesthesia administration when compared to conventional needle method.For pulpotomy, treatment performed with 0.3ml of anaesthesia using needle free system was found as effective as infiltration anaesthesia with aconventional needle method

#254: NON-HODGKIN'S LYMPHOMA OF THE ORAL CAVITY: A RARE ENTITY

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Purpose

Non-Hodgkin's lymphoma (NHL) is a subtype of lymphoma with two-thirds of the cases presenting as lymph node enlargement. The remaining one third of NHL cases has been reported in the extra nodal sites, including the gastro-intestinal tract, Waldeyer's ring, bone, skin and brain. Intraoral NHL is uncommon and may affect either the jaw bones or occur within the soft tissues of the oral cavity. Here we report an unusual case of non-Hodgkin's lymphoma in a 54-year-old male patient who presented with a growth from the right lower molar extraction socket with pus discharge.

Methods

An Orthopantomogram revealed a diffuse radiolucent defect in relation to the extraction socket. Routine hemogram was normal. Histopathological and immunohistochemical analysis of the incisional biopsied lesion confirmed the diagnosis of NHL. A chest PA radiogram revealed clear lung fields. Routine Neck Computed Tomography (CT) confirmed the regional lesional extensions & lymph node involvement leading to presumptive radiological staging of T3 N1 M0 The variable clinical presentation of lymphoma, in addition to the nodal involvement, is sometimes a challenge for the clinician. As NHL with extra nodal involvement in the head and neck occurs at a frequency of 20-30%, biopsy should always be part of diagnosis.

Results

Microscopically, irregular epithelial strands were seen in the underlying connective tissue with dense lymphoid infiltrate leading to the provisional diagnosis of Lymphoepithelial carcinoma of alveolus. IHC panel of markers common cytokeratin AE- ruled out epithelial component. Ki-67 (proliferation index > 75%), HMB 45-, Desmin-, S100- and CD45+ confirmed NHL whereas CD20+, CD3+(few cells), BCl2+, BCl6+, CD10- confirmed lymphoma of B cell lineage of diffuse large B-cell phenotype (DLBCL of germinal centre subtype). Approximately 30% to 45% of DLBCLs have a germinal centre phenotype.

Conclusions

Among the differential diagnosis of Poorly differentiated squamous cell carcinoma, Lymphoepithelial carcinoma, reactive lympho-proliferative lesions, metastatic tumors of primary nasopharyngeal carcinoma, amelanotic melanoma, round cell tumors like peripheral neuroectodermal tumor & rhabdomyosarcoma, IHC panel confirmed NHL of Diffuse Large B-cell of germinal centre subtype.

#255: COMPARATIVE EVALUATION OF TITANIUM MICROPLATES VERSUS TITANIUM MINIPLATES IN TREATMENT OF MANDIBULAR FRACTURE

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Purpose

The aim and objectives of the study was to evaluate the postoperative treatment outcomes of mandibular fracture by semirigid fixation using Titanium Microplates and Titanium Miniplates using various parameters.

Methods

Patients with clinically and radiographically confirmed 20 cases of minimally displaced mandibular symphysis and parasymphysis fractures were enrolled for this study. The patients were randomly allocated into two groups for open reduction with internal fixation under general anaesthesia and postoperatively IMF for 15 days. Group A-patients in which Titanium Microplates (1.3mm 4 holed with gap) was used, Group B-patients in which Titanium Miniplates (2mm 4 holed with gap) was used. The patients were followed up at 7th, 30th and 90th day postoperatively for assessing soft tissue healing, soft tissue infection, wound dehiscence, hard tissue infection, hardware distortion and hardware failure.

Results

The results obtained suggest that there is statistically significant difference between the Titanium Microplates and Titanium Miniplates in terms of soft tissue healing and wound dehiscence postoperatively. Titanium Microplate showed much better in soft tissue healing on postoperative day 7, 1stmonth, 3rdmonth and wound dehiscence on postoperatively day7. But in other parameters like wound dehiscence in postoperative 30th & 90thday, soft tissue infection and hard tissue assessment Titanium Microplates is as good as that of Titanium Miniplates. Both the groups did not exhibit any postoperative complication.

Conclusions

This study concludes both Titanium Microplates and Titanium Miniplates can be efficiently used for the ORIF of minimally displaced mandibular symphysis and parasymphysis fractures. Titanium microplates has shown better results than Titanium Miniplates in terms of postoperative soft tissue healing and wound dehiscence in terms of 7thday. In case of other parameters like wound dehiscence in postoperative 30th&90thday, soft tissue infection and hard tissue assessment Titanium Microplates is as good as that of Titanium Miniplates.

#256: Evaluation of oropharyngeal airway changes in skeletal class 11 patients undergoing Twin block appliance therapy

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Purpose

The study investigated the changes in oropharyngeal airway dimensions in growing patients with retrognthic mandible and skeletal class 11 paterns, treated with twin block appliance.we evaluated skeletal changes post treatment and their relation to airway alterations

Methods

Our study cohort comprised 20 children diagnosed with skeletal class 11 malocclusion . At pretreatment stage all subjects had Angles class 11 molar relation ship with mandibular retrognathism and an ANB angle exceeding 4 degrees , and an overjet greater than 5 mm. Data collection entailed a comprehensive analysis of pre and post therapeutic lateral cephalograms, Hand -wrist radiographs , detailed clinical records. Measurements focused on superior, middle and inferior airway spaces

Results

Comparitive analysis of pre and post treatment cephalograms revealed no marked changes in sagital maxillary position.There were significant changes in the sagital mandibular position and mandibular unit length.Additionally substantial increases were observed in facial height.Notably all measured airway dimensions (SAS, MAS, IAS)exhibited significant expansion post treatment.

Conclusions

Our findings underscore a significant association between the application of the twin block appliance in growing skeletal class 11 malocclusion cases and the expansion of the OAW dimensions .These outcomes hint at potential benefits in terms of craniofacial development and function , with broader implications for addressing respiratory dysfunctions linked to mandibular deficiencies.

#257: Direct R Gold and O.R.E Technique Management of a Challenging Cases

Marco Seracchiani;[1] Maurilio D'Angelo;[1] Alessio Zanza;[1] Rodolfo Reda;[1] Lorenzo Marigo;[1] Guido Acanfora;[1] Giulia Tavernese;[1] Luca Testarelli[1]

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Purpose

The aim of the present poster is to present and clinically evaluate a new NiTi File using the Only Rotary Endodontic Technique.

Methods

A male 60 years old was referred for a swelling in the lower right jaw.To the intra oralexamination and, after a periapical x ray of the area, the diagnosis was of endodonticabscess The RCT of the two lower right teeth 4 5 and 4 8 was then performed withoutanesthesia Rubber dam was placed, pulp chamber opened, and the abscess wasdrained from the distal canal of the 4 8 Both RCTs were performed in a single appointmentas follow1)Mechanicalscouting using Direct R Gold 25 06 in CCW continous motion at 300 rpmand 2 0 Ncm2)TheShaping of all the canals was completed using Direct R Gold 25 06 (CW 60CCW 1703)SodiunHypoclorite 5 with ultrasonic activation using EndoUltra4)Themesial canals of 4 8 and the canal of 4 5 were filled using a carrier basedtechnique, while the distal canal of the 4 8 using Continous Wave Condensationtechnique.

Results

NA

Conclusions

Theshowed case with the proposedtechnique allowed the Direct R Gold toreach working length with nodeformation or fracture The use of NiTiRotary file especially with high cuttingefficiency is capable to complete RCTreducing the difficulties. Theproposed technique with the use of this new file, the Direct R Gold, seems promising to exploit the peculiar properties of this newinstrument, highlighting the boundless possibilities of the NiTi Rotary files

#258: I-PRF : A SMART CELL SCAFFOLD

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Purpose

In regenerative dentistry, platelet rich plasma (PRP) has been used as a supra-physiological concentration of autologous growth factors capable of encouraging tissue regeneration. Despite this, there have been concerns raised about the use of anticoagulants, which are known to impair wound healing. In this work, a liquid formulation of platelet rich fibrin (PRF) called injectable-PRF (I-PRF) was studied without the need of anti-coagulants .

Methods

I-PRF is prepared by taking the blood sample from the patient and centrifuging it at 700 rpm for 3 min so that the layers of the blood do not separate out as distinctly. This allows some of the white blood cells and stem cells to remain within the platelet layer that is collected for treatment.

Results

I-PRF contains approximately 10 times the platelet concentration and more healing factors within it. Also, the lower spin speed causes less trauma to the individual cells of the blood, allowing more stem cells to remain in the final IPRF product. For visible results one treatment every month for three months is recommended.

Conclusions

I-PRF demonstrated the ability to release higher concentrations of various growth factors and induced higher fibroblast migration and expression. Future animal research is now necessary to further validate the use of I-PRF as a bioactive agent capable of stimulating tissue regeneration.

#259: ROOT ANALOGUE IMPLANT-THE NEW ROUTE

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Purpose

Dental implants are an excellent option for replacing missing teeth. Traditional implants have a cylindrical or tapered geometry with threads along the screw length. The lack of proper congruency between the implant and the socket bone can eventually lead to implant failure due to stability loss and failure in osseointegration. To overcome this problem, novel approaches are being evaluated to manufacture customized root implants. This is expected to reduce the bone and soft-tissue trauma and promote a better primary stability. They do not require bone drilling, sinus lifting, bone augmentation or other traumatic procedures.

Methods

Modern computed tomography (CT) acquisition and 3D image conversion, combined with the DLMF process, allows the fabrication of custom-made, root-analogue implants, perfect copies of the radicular units that need replacing.

Results

literature review has shown successful outcome of root analogue implant in a patient after 10 years of evaluation (Figliuzzi MM et al)

Conclusions

The possibility of fabricating custom-made, root analogue implants opens new interesting perspectives for immediate placement of dental implants. Nonetheless, root analogue implants are a big step in the direction of Digital Dentistry.

#260: Mechanical behavior of premolars with incomplete rhizogenesis after apexification and revascularization: a finite element study

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Purpose

The aim of this study was to evaluate the mechanical resistance of premolars with incomplete rhizogenesis using the FEA methodology, comparing apexification methods and regenerative endodontic procedures.

Methods

The models were made using Rhinoceros 7.0® CAD software based on CT scans and were composed of enamel, dentin, pulp, periodontal ligament, cortical bone, medullary bone, gutta-percha, MTA, blood clot and composite resin. The study groups were: a) Positive control; b) Negative control; c) Revascularization; d) Apicification. The models were subjected to 200 N loads in the distal groove of the occlusal surface. Loading was directed at 45° to the occlusal surface.

Results

The results were calculated and analyzed using the maximum principal stress criterion to evaluate stress distribution. It was found that the models corresponding to apicification supported the lowest stresses when compared to the models corresponding to revascularization.

Conclusions

The revascularization technique showed better mechanical behavior of dental structures than apexification in lower premolars with incomplete rhizogenesis.

#261: Influence of Thickness Variations on Translucency and Fluorescence Characteristics in Direct Bioactive Restorative Materials

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Purpose

The aim of this study was to assess the influence of different thickness on the parameters of translucency and fluorescence of direct bioactive restorative materials.

Methods

Cylindrical specimens were obtained from the following materials (n=12): bioactive composite (ACTIVA BioACTIVE Restorative-ABR); alkasite restorative material (Cention N-CNN); glass-hybrid restorative material (Equia Forte Fil-EFF); and bovine enamel/dentin (ED). Subsequently, the specimens were submitted to polishing procedures with silicon-carbide abrasive papers (grit #1200, #2400 and #4000) until they reached a thickness of 2 mm (n=6) and 1 mm (n=6). The translucency parameter (TP) was assessed as the overall color difference (DE) between the L*, a* and b* values obtained with the specimens evaluated over the white and black standard backgrounds. The measurements were performed in a spectrophotometer (CM-2600d, Konica Minolta, Osaka, Japan) adjusted for small area view (SAV=3mm), D65 standard illuminant, ultraviolet inclusion at 100%, observer angle at 2° and with specular component included (SCI). The fluorescence measurement was carried out using a spectrofluorophotometer (RF-5301 PC, Shimadzu Corp., Japan) with a wavelength for excitation set at 365 nm and a spectrum range of 400 to 700 nm. The peak emission value was expressed in fluorescence units (FU) in a specific software (RFPC – Shimadzu Corp., Kyoto, Japan). Data were submitted to the Shapiro-Wilk test ($p>0.05$) and analyzed with 2-way ANOVA followed by Tukey's multiple comparison test (5%).

Results

For TP, significant differences were found for groups ($p<0.001$), thickness ($p<0.001$) and interaction ($p=0.003$). Higher TP values were found for ARB group, followed by CNN and ED, which exhibited similar translucency. EFF was the least translucent material. Higher TP values were found for all groups in 1mm-tickness in comparison to the 2mm-thickness, except for EFF that presented similar values. For FU, significant differences were found for groups ($p<0.001$), thickness ($p=0.034$) and interaction ($p=0.001$). Higher fluorescence was observed for ED group, followed by ARB. EFF and CNN showed similar fluorescence values. For the restorative materials, the fluorescence did not change considering the different thickness.

Conclusions

The thickness of the tested materials influenced the translucency parameter, but did not change the fluorescence, except for enamel/dentin.

#262: Influence of the addition of bioactive glass particles in resin adhesives on the cementation of orthodontic brackets

Gabriela Da Silva Chagas;[1] Ana Paula Valente Pinho Mafetano;[1] Amanda Guedes Nogueira Matuda;[1] Marcella Batista Rocha;[1] Karen Cristina Kazue Yui;[1] Cesar Rogério Pucci[1]

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Purpose

The aim of this work was to evaluate a modified adhesive with the incorporation of bioactive glass particles (SCHOTT Bioactive Glass) in different concentrations.

Methods

Fifty bovine incisors were allocated into 5 groups (n=10): TXT - Transbond XT Adhesive (3M) without the addition of bioactive glass particles, TXT20, TXT30, TXT50 - Transbond XT Adhesive plus 20%, 30%, 50% particles respectively and SH bioactive glass adhesive - FL BOND ll (SHOFU) resin adhesive with SPRG. Self-ligating orthodontic brackets were glued to the buccal surface of the incisors and the samples were subjected to the shear resistance test. The adhesives were subjected to the degree of calcium conversion and release test. The data were subjected to the normality test and then to the one-way ANOVA test, followed by the Tukey test at 0.05.

Results

In shear bond strength, the highest average was observed in the TXT group 19.50±1.40a, followed by the TXT2018 group, 22±1.04ab, SH 17.62±1.45b, TXT30 14.48±1.46c and TXT50 14.13±1.02c. In the degree of conversion, the highest average was from the TXT2073.02±3.33a group, SH 68.50±1.09a, TXT 60.28±1.06b and TXT30 58.84±4.06b and TXT50 40.67± 1.21c. For calcium release, the highest media was TXT50 2.23±0.11d, followed by TXT30 0.74±0.00c, TXT20 0.55±0.00b, SH 0.47±0.04b and TXT 0.14 ±0.00a.

Conclusions

It was concluded that the incorporation of 20% bioactive glass particles in the adhesive system does not interfere with the shear resistance and the degree of conversion and the addition of 50% bioactive glass particles showed an auxiliary capacity in preventing enamel demineralization, through of calcium release.

#263: **Fit evaluation of soft milled zirconia and CoCr by microcomputedtomography**

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Purpose

Purpose. The purpose of this in vitro study was to evaluate the marginal fit of presintered cobalt-chromium(Co-Cr) and zirconia 3-unit fixed partial dentures by using X-ray microcomputedtomography (mCT).

Methods

Material and methods. A metal model was prepared from a typodont to receive fixed partialdentures (N=12). The maxillary first premolar and first molar were prepared with acircumferential 1.2-mm chamfer and 2-mm occlusal reduction. The dies were scanned andassigned to 1 of 2 groups to receive the prostheses made of presintered Co-Cr or presinteredzirconia (n=6). Each framework was seated on its model without load application. The abutmentswere scanned by using mCT. A circle with 10 diameters, with a step of 18 degrees, was projectedat the center of the obtained image. Absolute marginal discrepancy and marginal gap meanvalues were measured, and overextended and underextended margins determined. The datawere analyzed by using the Levene t test and ANOVA (a=.05).

Results

Results. No statistically significant difference was found in the marginal fit between the materialstested (P=.939). The mean values were 66 ±14 mm for Co-Cr and 61 ±12 mm for zirconia. Theabsolute marginal discrepancy mean value for the premolar was 69 ±12 mm and 41 ±9 mm forthe molar (P<.001). Overextension was predominant for both materials tested, with a higherpercentage reported for the zirconia group.

Conclusions

Conclusions. Presintered alloys presented clinically acceptable adaptation with a predominance ofmarginal overextensions.

#264: Bonding of composites for aligner attachments to the dental enamel

Luis Felipe Abbado De Souza;[1] Louise de Aquino Silva;[1] Matheus de Paula Costa;[1] Alessandra Buhler Borges;[1] Carlos Rocha Gomes Torres[1]

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Purpose

The aim of this study was to evaluate the bond strength of flowable composites for alignerattachments to the dental enamel with or without the previous acid etching.

Methods

One hundred and twenty freshly extracted bovine incisors teeth were selected. They wereembedded in acrylic resin and a flat surface was created for bonding. The specimens weredivided into three groups, according to the kind of flowable compoiste tested: AF - AlignerFlowLC (Voco); GCAC - GC Aligner Connect (GC); GHF - GrandioSO Heavy Flow (Voco). Each groupwas divided into two subgroups (n=20), according to the use or nor of the acid etching beforethe application of the adhesive system: AE – The specimens received the application of a 35%phosphoric acid etching gel; SE – No treatment was performed. The self-etching adhesivesystem Futurabond U was applied for all groups. For AE, the adhesive was applied andimmediately light cured. For SE it was actively applied for 20s before light-curing. Small tubeswith 1mm of inner diameter were cut into pieces of 2mm length and used as matrices to applythe flowable materials over the tooth substrate, to create cylinder of the restorative material.The composite was light cured for 20s and store in water for 24 hours. After that, the tubeswere removed, and the specimens submitted to a micro-shear stress a using a universal testingmachine. The fracture patterns were analyzed in a stereomicroscope. The data were analyzedusing two-way ANOVA (composite x etching). A significance level of 5% was adopted.

Results

Results of ANOVA showed non-significant differences for the type of composite (p=0.4211) and previous acid etching(p=0.2808), as well for its interactions. The means of bond strength for all groups and subgroups were: AF/AE-14.21(±2.17); AF/SE-14.25(±1.73); GCAC/AE-14.84(±2.31); GCAC/SE-14.24(±2.27); GHF/AE-14.13(±2.10); GHF/SE-13.74(±2.01).

Conclusions

The resin composites tested presented a similar bond strength to enamel. The previous acid etching did not have a significant influence on the bond strength valued.

#265: Clinical success of restorations with bioactive and non-bioactive materials: Systematic Review and Network Meta-Analysis

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Purpose

The oral cavity is a complex and dynamic environment with frequent pH and temperature changes that can affect the longevity of dental restorations. Consequently, bioactive restorative materials, capable of advantageous interactions with the oral environment and dental tissues, are promising alternatives. However, there is limited scientific evidence of their clinical performance. Therefore, we conducted this systematic review and network meta-analysis of clinical studies to address the research question: Does the clinical evaluation of restorations on permanent teeth with bioactive materials show greater success rates than those with non-bioactive materials?

Methods

A search strategy was developed and used in the following databases: PubMed, Scopus, Web of Science, LILACS, Brazilian Dentistry Bibliography, Embase, The Cochrane Library, and OpenGrey. Only randomized clinical trials that assessed at least one bioactive material in permanent teeth with a minimum follow-up of 24 months were included. The risk of bias was evaluated using the Cochrane Collaboration tool (RoB 2). Mixed-effects Bayesian comparative treatment analysis was used to compare restorative treatments, and the Surface Under the Cumulative Ranking curve (SUCRA) was used for ranking them.

Results

In total, 27 studies were included and pooled, revealing three networks. The risk of bias was moderate, with 20 studies (74.07%) classified as having "some concerns". SUCRA rankings classified resin composite as the preferred restorative treatment for Class I and II (82.6%), as well as for Class III restorations (86.4%). Resin-Modified Glass Ionomer Cement (RMGIC) was the preferred treatment for Class V (89.9%).

Conclusions

Bioactive materials exhibited good clinical performance, particularly in the cervical region, where the adhesion of resin composite is compromised. Resin composite remains the primary choice for Class I, II, and III restorations and demonstrated satisfactory performance in Class V restorations.

#266: The influence of intraradicular restoration techniques on the biomechanical behavior of upper canines

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Purpose

This study assessed the stress distribution in endodontically treated upper canines subjected to the cementation of two types of intraradicular retainers.

Methods

The rigid tooth was modeled (18mm of root), prepared (12mm of cylindrical/conical glass fiber pin (PFV)), and restored with a full ceramic crown. Groups A (cemented PFV) and B (PFV + anatomized composite resin) were modeled using Computer-Aided Design (CAD) software (Rhinoceros) and exported to Computer-Aided Engineering (CAE) software (Ansys 23 R1). After mesh convergence testing at 5%, the models had 311,994 nodes and 175,880 tetrahedral elements for Group A and 284,335 nodes and 157,459 elements for Group B. The materials used were considered isotropic, homogeneous, linearly elastic, and all contacts perfectly bonded. Structural static analysis was divided into two and three steps according to the group, considering the polymerization shrinkage of the cement and resin used, followed by simulating a 100N force at a 45° angle on the palatal face above the cingulum region. The maximum principal stress criterion was used to analyze stress distribution in the root, dentin, pin, cement, and crown.

Results

There was a numerical difference between the two groups, with the anatomized pin technique showing the lowest stress peaks, both after polymerization shrinkage simulation and under loading.

Conclusions

Within the limitations of the methodology used, it was possible to conclude that the anatomized pin should be selected for the rehabilitation of endodontically treated teeth.

#267: **Smile Miles Away : Navigating the Future of Teledentistry .**

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Purpose

Teledentistry is a combination of telecommunications and dentistry involving the exchange of clinical information and images over remote distances for dental consultation and treatment planning. Teledentists are capable of improving access to oral healthcare, increasing the provision of oral health care and reducing its costs. The disparities in oral health care between rural and urban areas could also be eliminated. This article analyses the origin, rationale, scope, basis and requirements of teledentistry in conjunction with current evidence available in the literature. Ethical and legal issues relating to teledentistry, as well as the future of this alternative and innovative way of providing oral health care, are also examined in this Article.

Methods

NA

Results

NA

Conclusions

By providing teleconsultation support at any time and place through internet based media platforms, modern medical equipment and instruments have made teledentistry a more convenient way of reaching patients on a large scale. With the assistance of this media platform, an extensive group of targeted patients, particularly in emergency situations, can be mobilised to raise public awareness of various health issues and to disseminate valuable information. By reducing the burden of clinics in times of crisis, teledentistry offers no alternative to providing a more secure consultation for patients. Teledentistry therefore plays an essential role in providing patients with a dynamic management strategy and fulfilling their treatment needs in the best possible way.

#268: SILVER NANO PARTICLE OR SODIUM HYPOCHLORITE A BETTER DENTURE CLEANSER

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Purpose

Denture hygiene is compromised both due to the limitations of the denture base material as well as the lack of manual dexterity of denture wearers. Moreover,the rough tissue surface of the dentures affect the initial formation of candidal biofilms probably because it provides a greater surface area and protected sites for colonization. Among the various methods available to disinfect dentures,chemical method using Sodium hypochlorite seems to be the most effective one. Even though sodium hypochlorite is an effective denture cleanser,it has many disadvantages like the increased roughness of the denture surface and decreased colour stability. So a better and effective method of biofilm removal has to be practiced for the longevity of complete dentures along with the comfort of denture wearers. Silver nanoparticle have proven its efficacy against C. albicans disrupting the membrane potential and forming pores causing ion leakage and other materials inducing apoptosis and causing ultrastructural changes. Because of their small size, silver nano particle possess chemical,physical, and biological properties distinctive from those presented by traditional bulk materials.

Methods

The denture cleansing ability of Silver Nano Particles of various concentration and Sodium Hypochlorite were compared by counting the number of Colony Forming Unit(CFU) left on the acrylic samples inoculated with candida albicans after immersing in the denture cleansing solutions.

Results

The results show that the anticandidal property of both silver nano particle and sodium hypochlorite are comparable.

Conclusions

Sodium hypochlorite is a common disinfectant and an age old denture cleanser which is an effective method for the removal of adherent fungi from the intaglio surface of the dentures Silver nanoparticle is a known potent antifungal agent. Reduction in the CFU was observed in silver nanoparticle as the concentration increases till an optimum value. However the anti candidal effect of silver nanoparticle and sodium hypochlorite have no statistical significance.

#269: Defending Dentistry: Exploring the Antimicrobial Magic of Natural Ingredients in PMMA - An In Vitro Quest

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Purpose

The denture base comes into contact with diverse substances in the oral cavity, acting as a reservoir for microorganisms like corynebacterium, streptococcus, lactobacillus, and candida. This colonization elevates the risk of complications such as denture stomatitis and candidiasis. Commercial denture cleaners have explored the use of natural ingredients, less commonly employed but offering various advantages. These ingredients aim to mitigate the potential issues associated with microbial colonization on denture surfaces, contributing to improved oral hygiene for denture wearers. The exploration of natural elements reflects a nuanced approach to denture care, considering both efficacy and less conventional alternatives.

Methods

In this study, tea tree extract, tulasi extract, turmeric powder, mint extract, and heat-cure acrylic denture base material was chosen as specimens. These materials were amalgamated with the monomer and fashioned into square blocks measuring 1 cm * 1 cm * 2 mm, simulating the dimensions of denture bases. Following this preparation, a series of microbiological studies were conducted to explore the interaction and efficacy of these specimens. The aim was to evaluate their potential in addressing microbial concerns and enhancing the overall hygiene of dentures. This comprehensive approach delves into the utilization of natural extracts and their impact on the microbiological aspects of denture materials.

Results

This study underscores the antibacterial and antifungal properties of natural herbs when incorporated into denture materials. The combination of these herbs mitigates microbial development, consequently reducing the prevalence of oral diseases associated with denture usage. Notably, turmeric and tea tree oil emerge as more effective compared to tulasi, showcasing their potential in enhancing the antimicrobial attributes of denture materials.

Conclusions

This finding suggests a promising avenue for leveraging natural compounds to improve the overall hygiene and safety of dentures, offering insights into the efficacy of specific herbal elements in countering microbial challenges in the context of oral health.

#270: Brushing and staining influence on esthetic properties of attachment composites

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Purpose

The aim of this study was to evaluate the brushing and staining influence on esthetic andsurface properties of resin composites indicated for aligner attachment.

Methods

36 disk shaped resin composite specimens (6mm of diameter and 2mm thick) were createdusing three different flowable materials (n=12): AF - AlignerFlow LC (Voco); GCAC - GC AlignerConnect (GC); GHF- Grandioso Heavy Flow (Voco). The upper side of the specimens werepolished to create an initial flat and glossy surface and the baseline analysis were performed.The color was evaluated with a spectrophotometer (L*, a* and b* coordinates), while the glosswas measured with a glossmeter (GU – gloss units) and the surface roughness was measuredwith a contact profilometer (Ra). The specimens were submitted to 12,000 brushing strokes ina V8 brushing machine with toothpaste slurry and the measurements were repeated. Afterthat, they specimens were immersed in a 4% instant coffee solution (w/w) for 24 hours andthe final measurements were performed. The color differences (Delta E00) between the firstand the second and between the first and the final measurement were calculated. For glossand Ra the absolute values at each evaluation were utilized. The data were analyzed by one-way repeated measures ANOVA (material x moment of evaluation) and Tukey's test.

Results

For Delta E00 significant differences were observed and among the groups ($p=0.0032$), and theresults of Tukey's test were: AFLC-1.36a, GHF-1.40a, GCAC-1.95b. For roughness and gloss non-significant differences were observed among the groups (Ra - $p=0.5593$, GU - $p=0.2967$). For allmeasurements significant differences were observed for the moment of evaluation ($p<0.05$).The brushing reduced the gloss and increased the roughness, while the immersion in coffeechanged the color.

Conclusions

The GCAC composite showed a higher color change than AFLC and GHF. The brushing reducedthe gloss and increased the roughness in a similar way for all materials.

#271: Impact of simulated toothbrushing and dentifrice abrasiveness on the surface roughness, gloss, and microhardness of CAD/CAM hybrid restorative materials

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Purpose

This study aimed to investigate the impact of toothpaste abrasiveness on the surface roughness, gloss, and microhardness of resin composite and CAD/CAM hybrid materials.

Methods

A 4x3 factorial design was utilized. The substrate was divided into 4 groups: Vita Enamic Hybrid Ceramic (VE), SHOFU Block HC Hybrid Ceramics (SH), Grandio Blocs CAD/CAM Nano-Hybrid Resin Block (GB), and dental enamel (ESM). The factor abrasiveness of toothpaste was presented in 3 groups: Low-36 (L), Medium-78 (M), and extra-high-175 (EH). Before and after brushing represented the repetition factor. Specimens (n=15 per group) measuring 6mm X 2mm were prepared and submitted to brushing aging. Surface gloss, roughness, and microhardness were evaluated before and after the brushing simulation. Three-way repeated measures ANOVA and Tukey's test ($p<0.05$) were used for statistical analysis.

Results

Gloss measurements indicated a significant increase after brushing ESM with the M toothpaste, while GB material demonstrated an overall significant reduction in gloss. The use of EH increased the roughness of the ESM group only. An increase in microhardness was detected using L and M for VE, while a decrease was observed in ESM specimens.

Conclusions

The tested protocols influenced the surface gloss, and the roughness was similar in the groups, except in the ESM group. Dental enamel was the group most affected by the applied tests. Comparing the tested hybrid materials with the mentioned brushing protocols, all CAD/CAM materials demonstrated superiority over dental enamel.

#272: **Qualitative and quantitative analysis of collagen in Oral Submucous fibrosis**

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Purpose

The aim of the study was to assess the severity of the disease in oral submucous fibrosis, by correlating the functional staging with the histopathological grading and analyze the collagen distribution in different grades of OSMF using picrosirius red stain under polarizing microscope and also to assess the quantitative changes in collagen with respect to various histopathological grades of OSMF using spectrophotometry

Methods

The study conducted on 40 subjects, which included 30 subjects with different functional and histopathological grades of oral submucous fibrosis (OSMF), and 10 were in control group. Functional staging and histopathological grading was done based on the definite criteria. A Histopathological and quantitative analysis of collagen was conducted using picrosirius red stain, polarizing microscope and spectrophotometer, respectively.

Results

The functional staging and the histopathological grading did not show statistical correlation, but as the histopathological grade of the disease increased; there was a shift in the polarizing color from yellow-green to orange-red. In the colorimetric estimation, the optical densities of the sample decreased as with increased grades of OSMF. The results were analyzed using chi-square test, and the significance was tabulated.

Conclusions

In the present study, we observed that the histopathological grading of OSMF is not correlating with the functional staging of OSMF. Therefore, it mandates the proper correlation between the functional staging and the histopathological grading before the commencement of the treatment to render better outcome of the treatment.

#273: **Knowledge and Awareness about importance of primary among Parents and Pediatricians**

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Purpose

Primary teeth are the first set of teeth that erupt in oral cavity which will be replaced by permanent teeth. Though these primary teeth exfoliate after a certain period of time these are very important teeth, as they have certain functions and role to play till their exfoliation. Hence these teeth are considered important.

Methods

The study was conducted in Dept of Pedodontics and Preventive Dentistry, Dental college, Kozhikode, Kerala among 100 parents of children who are below 12 years from rural and urban areas attending OPD at Dept of Pedodontics, Dental college, Kozhikode and 58 Pediatricians who were working in various Govt and private hospitals and clinics randomly selected in and around Kozhikode city. The participants awareness about importance of primary dentition was evaluated based on questionnaire. Participants were requested to mark the options which they perceived as most appropriate. In case of parents educational qualification, socio-economic status and geographic background were correlated to certain questions, similiarly in the case of Pediatricians area of practice (Academics / pvt practitioners), years of practice were correlated for some questions. Frequency or percentage of good awareness were calculated in both of 2 groups. Statistical significance of factors influencing good awareness of groups were calculated using Pearson's Chi-square test.

Results

The overall knowledge of parents and Pediatricians regarding the importance of primary dentition is not satisfactory. Though most of participants were able to identify initiation of caries, most of them were unaware about the treatment needs or to restore them till normal exfoliation. However, majority of the participants were curious to know the correct response and acquire more knowledge about importance of primary dentition.

Conclusions

Regardless of educational qualification, socio-economic status and geographic background parents awareness regarding identification of carious lesion was average, but regarding the cause of early childhood caries, its prevention and treatment needs, the awareness is inadequate. It is important for the Paediatricians to receive more knowledge on importance of primary dentition, caries prevention and treatment needs by including these in their curriculam. The motivation of parents regarding prevention and treatment needs of primary teeth and its preservation till its normal exfoliation through dental camps, or educational programme by dental professionals is highly desired.

#274: **Exploring the Interplay between Alzheimer's disease and Periodontitis: Insights from Clinical Data and Inflammatory Biomarkers**

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Purpose

Alzheimer's disease, a complex neurodegenerative disorder marked by cognitive decline, may have a intriguing link with periodontitis—a chronic inflammatory oral condition. This study investigates the literature evidence regarding the association between Alzheimer's disease and periodontitis. Our research aims to determine if individuals with periodontitis face an elevated risk of Alzheimer's and if shared inflammatory pathways underlie this association.

Methods

A comprehensive review of literature on Alzheimer's and periodontitis, using key words ‘periodontal disease’ and ‘Alzheimer’s disease’ was conducted in PubMed, Medline and Scopus. Review results will be collated into the poster.

Results

Our search revealed a significant correlation between periodontitis severity and Alzheimer's risk. These results hint at potential avenues for further research and early intervention.

Conclusions

This study provides compelling evidence supporting a connection between Alzheimer's disease and periodontitis. Shared inflammatory pathways may offer new insights into Alzheimer's pathogenesis, emphasizing the importance of oral health in neurodegenerative diseases. Further research is crucial to explore this intriguing connection and its clinical implications.

#275: Prevalence, Symptoms, and Triggering Factors of Panic Attacks among Dental Students in Riyadh Saudi Arabia—A Cross Sectional Survey

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Purpose

Panic disorder by definition is an anxiety disorder of unexpected and repeated episodes of intense fear. Panic attacks are usually diagnosed by four or more of a set of symptoms that include palpitations, sweating, trembling, shortness of breath, chest pain, nausea, dizziness, and hot flushes. They usually interfere with daily life situations and also interfere with education. Hence, the aim of this study was to assess the prevalence of panic attacks, their symptoms, and triggering factors among dental students in Riyadh, Saudi Arabia.

Methods

There are 6 dental colleges in Riyadh, Saudi Arabia, and all these colleges were included in this study. A simple random sampling technique was considered for selecting a minimum of 70 participants to fulfil the quota from each university upon fulfilling the eligibility criteria. Data were collected from 394 students using a structured and validated questionnaire which was developed after referring to similar study.

Results

The prevalence of panic attacks among dental students in Riyadh, Saudi Arabia, was 42.9%. Most of the participants who experienced higher episodes of panic attacks were females (53.4%) when compared to males (24.5%). Third year students displayed greater (58.3%) episodes of panic attacks compared to their respective counterparts. The most reported symptom of panic attacks was rapid or pounding heartbeat followed by breathlessness, chest pain, and shaking or trembling. It was also noted that most of the participants (63.31%) encountered a panic attack for the first time after joining dental school. The situations where dental students frequently experienced panic attacks were during exams, clinic procedures, giving presentations, and especially while under a lot of stress.

Conclusions

The high occurrence of panic attacks among dental students highlights the importance of providing support programs and implementing preventive measures to help students, particularly those who are most susceptible to higher levels of these psychological conditions. Dental students experiencing panic attacks should be provided with necessary counseling sessions or psychiatric consultation in order to overcome such scenarios. Dental schools should consider these findings when planning the dental curriculum. Hence, the role of the faculty members is essential in these situations to provide support for the affected students.

#276: **Knowledge, attitudes, and behaviour towards dental trauma amongparents of primary school children visiting College of Dentistry, Jizan.**

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Purpose

To investigate the level of knowledge, attitude, and behaviour regarding dental trauma among parents of children attending primary schools.

Methods

This study followed the principles of the World Medical Association Declaration of Helsinki. We did not report any data on humans or human samples, nor research on identifiable human material and data. All parents took part on a voluntary basis and were not remunerated for their contribution. A semi structured questionnaire was distributed to 285 parents of primary school children who visited dental clinics. Parents demographic data and questions related to parents' knowledge, management, and experience with respect to their child and dental trauma. the results were analysed.

Results

Majority (79.2%) of the study participants were females having more than three children (28%) and were belonging to the age group of 30-39 (54.8%). Most of them (44%) had a high school level of education andwere found to be unemployed (74.8).Analyzing knowledge, attitude, and behavior towards dental trauma among parents of primary school children revealed that 78.4% of their children did notexperience any dental trauma while only 21.6% of the participants agreed that their children experienced it. Among those who experienced, 74.07% of them hadfracture, followed by avulsion (12.96%), then intrusion (9.26%; 5/54) and least experienced being extrusion (3.7%). Most of the children 68.5% experienced trauma at home, 22.22% at outdoor activities and least at school (9.26%). Around 82.4% of the participants answered, ‘dental caries’ when asked “do you know what dental trauma is?” while only a meagre (5.6%) answered correctly.Most of them (73.2%) reported that, they don’t know what to do incase of dental trauma, while 68.8% of the participants agreed that they would consult adentist. Most of the participants (64.8%) stated that “1 day” was the time which was best to intervene in case of dental trauma.

Conclusions

Most of the parents had no experience of dental trauma in their children, and most of them did not know what to do in case of traumatic dental injury and they would intervene within a day. Nevertheless, they lacked the knowledge necessary to provide the affected child with the most appropriate support possible. Motivating parents to embrace a preventative stance against oral trauma might result in positive changes that would boost the long-term health advantages for both the parents and their children.

#277: **A cross-sectional study of the association between previous diagnosis of anxiety, depression or suicidal ideation and fear of the repercussions of a possible war involving Latin American countries – A survey in 13 Latin American countries**

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Purpose

To determine the association between a previous diagnosis of anxiety, depression or suicidal ideation and fear of the repercussions of a possible war involving Latin Americans.

Methods

This is an analytical cross-sectional study carried out in Latin America during the Russian-Ukrainian war. The dependent variables were the self-report of having been diagnosed with anxiety, depression or suicidal ideation, which were crossed with the level of fear about the possible consequences of a war involving countries in the region (Alpha: 0.95). Descriptive and analytical statistics were used in the analysis.

Results

Of the 2,757 respondents, the majority thought that the main repercussion of a possible war would be the increase in the price of oil and other fuels (26% strongly agreed and 40% agreed). Participants presenting little fear of the consequences of a war involving Latin American countries had lower frequencies of anxiety diagnoses (adjusted prevalence ratio (aPR): 0.79; 95% confidence interval (CI): 0.70-0.89; p-value < 0.001). There were lower frequencies of suicidal ideation both among those who had little fear (aPR: 0.66; 95% CI: 0.53-0.81; p < 0.001) and a lot of fear (aPR: 0.78; 95 % CI: 0.67-0.90, p =0.001).

Conclusions

Although the general population has reported fear and concerns about a possible war involving Latin American countries, this finding was more frequent among those with previous mental illness.

#278: Implementation of Motivational Interviewing training in Dentistry

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Purpose

Motivational Interviewing (MI) is a counseling approach designed to facilitate and engage intrinsic motivation within a patient to change behavior. It helps practitioners build trusting relationships with patients and fosters behavioral changes. The extent of MI's integration into dental education has not been thoroughly examined. We aimed to systematically evaluate the implementation of Motivational Interviewing training within dental education.

Methods

This review used the Preferred Reporting Items for Systematic Reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR) checklist and the Joanna Briggs Institute's manual for evidence synthesis. A comprehensive search strategy of MeSH terms, keywords, truncations, and proximity operators was employed across several databases: Medline (Ovid), Embase (Ovid), CINAHL, PsycINFO (Ovid), Web of Science, and ProQuest. Articles were screened based on specific inclusion and exclusion criteria, with two researchers using the Covidence software to ensure inter-rater agreement.

Results

We included 16 studies that focused on MI training provided to dental students and hygiene students and identified some outcomes regarding their effectiveness. Most of the studies involved MI training that lasted for 1-2 semesters only, which doesn’t seem to be effective regarding retaining the knowledge although there was improvement for the duration of the course.

Conclusions

The key findings of the review seem to indicate the need for more planned, detailed, and longer MI training sessions to be integrated into the curriculum for dental and hygiene students.

#279: Tobacco and COVID19

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Purpose

The relationship between tobacco use and COVID-19 has been a subject of ongoing research. Evidence suggests that tobacco may contribute to an increased susceptibility to respiratory infections, potentially exacerbating the severity of COVID-19 symptoms.

Methods

This poster explores the available literature on the role of tobacco in the context of COVID-19, discussing potential mechanisms, the impact on respiratory health, and public health implications. Understanding this connection is crucial for public health interventions aimed at mitigating the impact of both tobacco use and COVID-19 on global health.

Results

Some studies suggest a possible protective effect, the overall consensus remains inconclusive, requiring further exploration. The poster highlights the importance of public health campaigns to address tobacco cessation, considering the potential implications for COVID-19 susceptibility and severity. Ultimately, a comprehensive understanding of the interplay between tobacco use and COVID-19 is essential for informing effective preventive measures and policies.

Conclusions

Understanding tobacco use in COVID-19 patients is vital due to the potential exacerbation of respiratory complications in smokers. Research suggests an increased risk of severe outcomes for tobacco users, emphasizing the importance of targeted clinical interventions and resource allocation. Furthermore, unraveling the intricate relationship between tobacco and COVID-19 enhances our grasp of the disease's underlying mechanisms, aiding in the development of more precise treatment strategies. Public health initiatives can benefit from tailored messaging, emphasizing the heightened risks for tobacco users and promoting cessation efforts, thereby mitigating the impact of both factors on individual health and overall community resilience.

#280: : **The Impacts of Electronic Cigarettes on Users**

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Purpose:

The prevalence of Electronic Cigarettes (E-cigarettes) has significantly increased in recent years. Ongoing research on the impact of E-cigarettes on various physiological system has consistently been focused on. With the rise in popularity of E-cigarettes, the relevant inquiry emerges regarding its influences on individual health and physiological functions. Most e-cigarettes contain nicotine which is known to have negative health implications. The e-cigarettes aerosol also contains many hazardous substances that can harm the body. Many individuals believe that using electronic cigarettes is a healthier alternative than using combustible cigarettes, however there is no sufficient data supporting the safety of electronic cigarettes. As e-cigarettes are relatively new, additional research is needed to help understand the long-term health effects. This comprehensive literature review focuses on many aspects of E-cigarettes such as its impact on an individual's physiological health and the chemical components of e-cigarettes.

Methods:

A literature search was conducted using various databases: PubMed, Google Scholar using the key words “E-cigarettes”, “Physiological Systems”, “Health Effects”, “Vaping” and “Aerosols”.

Results:

In progress

Conclusions:

N/A

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