COLLEGE OF DENTISTRY

The UNIVERSITY *of* OKLAHOMA HEALTH SCIENCES CENTER

44th Annual

Scientific Day

March 27, 2025

Champion Convention Center
737 S. Meridian Avenue
Oklahoma City, Oklahoma

Sponsored by:

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44th Annual Scientific Day

The first Scientific Day was held in 1981 and consisted of table clinics in the hallways of OUCOD and a few dozen donuts in the Commons. The following year, the event became more sophisticated with the addition of orange juice and coffee. We then graduated to bagels and quickly outgrew the confines of our building. As the student research program grew and corporate support became stronger, the event evolved into what it is today – **the 44th Annual Scientific Day!**

The evolution of Scientific Day to what you will experience today is due to the dedication and support of numerous stakeholders. To the students and their faculty mentors who complete meaningful research projects, to the faculty and staff who help plan and coordinate this event, and to the many sponsors who provide funding and show us how advances in research translate into better products and services for our patients, **We Thank You!** We are particularly grateful to Delta Dental of Oklahoma, the Delta Dental of Oklahoma Foundation, and the J. Dean Robertson Society for their sponsorship of this event and our Student Research Program.

Today's event is particularly momentous because we welcome Vineet Dhar, BDS, MDS, PhD, FAAPD, FDSRCS (Eng), FICD, FACD, an internationally renowned researcher and faculty person as the Keynote Speaker. We are honored that he is present today to support our students and their research projects. His presentation title and biography are presented on the next page.

Please enjoy the outstanding projects, diligently prepared and presented today by our dental students, dental hygiene students, residents, and graduate students. We hope that you will reflect on our humble beginnings, be proud of where we are today, and help us build an even better future.

Welcome to the University of Oklahoma
College of Dentistry's 44th Scientific Day!

Keynote Speaker: Dr. Vineet Dhar

Using Evidence-Based Dentistry as Your North Star

Biography:

Dr. Dhar holds multiple positions at the University of Maryland School of Dentistry, including Clinical Professor and Chair of Orthodontics and Pediatric Dentistry, and Assistant Dean of Postgraduate and Professional Studies. He currently serves as a Director of the American Board of Pediatric Dentistry (ABPD). Within the AAPD, Dr. Dhar is a member of both the Editorial Board of the Journal of Pediatric Dentistry and the Evidence-Based Dentistry Committee. He also acts as a consultant for the American Dental Association (ADA) Council on Scientific Affairs and the Council on Postdoctoral Education. Additionally, he leads the Science Committee for the International Association of Pediatric Dentistry (IAPD). His work focuses on integrating evidence-based dentistry into education and patient care. Dr. Dhar contributes his expertise to AAPD, IAPD, and ADA expert panels, helping to develop evidence-based clinical recommendations.

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University of Oklahoma College of Dentistry

44th Annual Scientific Day

Schedule of Events

7:30 – 9:00 a.m.	Poster Presentation Judging *Closed session*
9:00 – 9:30 a.m.	Registration and Continental Breakfast
9:00 – 10:40 a.m.	Poster Presentations
10:45 – 12:00 p.m.	Keynote Address – *Dr. Vineet Dhar*
12:00 – 1:00 p.m.	Lunch (Buffet lunch)
1:00 – 2:30 p.m.	Ishmael Essay Contest Finals
1:00 p.m.	*Dorena Doucette (DH2)* *The Frequency of Nutritional Counseling*
1:15 p.m.	*Jessica Hamilton (DH2)* *Green Tea as an Adjunct in Oral Health*
1:30 p.m.	*Jaclyn Miller (DH2)* *Oral Pathologies and Physiological Pigmentation: Dental Perceptions*
1:45 p.m.	*Leslie Garcia (DS2)* *H_2O_2-Altered Nanofilled Dental Adhesive Resins: Dental Perceptions*
2:00 p.m.	*Angela Jarjoura (DS3)* *Analysis of p53 Patterns to Access Malignant Transformation in Dysplasia*
2:15 p.m.	*Sara Jarjoura (DS2)* *Testing the Radiographic Accuracy of Proximal Caries Detection Utilizing Filters*
2:30 – 3:00 p.m.	Break
3:00 – 4:10 p.m.	Awards Ceremony – *Dean Mullasseril, Mr. Gladden Dr. Khajotia, Dr. Esteban Florez,*
4:10 p.m.	Students check out and non-faculty check out for CE credit

POSTER PRESENTATIONS

Poster #	Presenter Name(s) & Title
#1	DORENA DOUCETTE (DENTAL HYGIENE STUDENT) The frequency of nutritional counseling
#2	JACLYN MILLER (DENTAL HYGIENE STUDENT) Oral pathologies and physiological pigmentation: Dental perceptions
#3	PHALYN ANDRES (DENTAL HYGIENE STUDENT); KYAH DIXON (DENTAL HYGIENE STUDENT) Periodontal disease: Dementia's worst nightmare
#4	DARIAN APLIN (DENTAL HYGIENE STUDENT); DRINITY CROSS (DENTAL HYGIENE STUDENT) Hearing loss in dental professionals
#5	BLAKELY BARNETT (DENTAL HYGIENE STUDENT); KENNA HARMON (DENTAL HYGIENE STUDENT) Oral health care barriers in the foster care system
#6	BRE BOHNENBERGER (DENTAL HYGIENE STUDENT); JADYN DAVIS (DENTAL HYGIENE STUDENT) The effectiveness of school sealant programs and preventative technique utilization
#7	AVERY CLARK (DENTAL HYGIENE STUDENT); LANIE HUGHES (DENTAL HYGIENE STUDENT) Rural oral health care disparities
#8	SARAH CRABB (DENTAL HYGIENE STUDENT); KAYLEE COCHENOUR (DENTAL HYGIENE STUDENT) The effects of different mouthrinses in the oral cavity
#9	MAKINA CROFT (DENTAL HYGIENE STUDENT); KENLEY HAYES (DENTAL HYGIENE STUDENT) Prevention of early childhood dental caries
#10	MELONI DEAN (DENTAL HYGIENE STUDENT); DAX GREENFIELD (DENTAL HYGIENE STUDENT) The effects of stress on the oral cavity
#11	MCKAELYN DEQUASIE (DENTAL HYGIENE STUDENT); PIERCE AUBREY (DENTAL HYGIENE STUDENT) Natural oral care: Is it worth the switch?

#12 LAUREN EGGER (DENTAL HYGIENE STUDENT); CARLI SALES (DENTAL HYGIENE STUDENT)
Guided biofilm therapy

#13 KENNEDY FIELD (DENTAL HYGIENE STUDENT); TAYLOR TREAT (DENTAL HYGIENE STUDENT)
Therapeutic use of honey in dentistry

#14 LAUREN HALLAUER (DENTAL HYGIENE STUDENT); VALERY RODRIGUEZ (DENTAL HYGIENE STUDENT)
Oral health knowledge of nursing students

#15 JESSICA HAMILTON (DENTAL HYGIENE STUDENT); TORI SCHELLER (DENTAL HYGIENE STUDENT)
Green tea as an adjunct in dental treatment

#16 ANDREA HOFFEN (DENTAL HYGIENE STUDENT); BRICEIDA SERVANO (DENTAL HYGIENE STUDENT)
Importance of odontology in forensic science

#17 AARON HUI (DENTAL HYGIENE STUDENT); LAINIE BRITTON (DENTAL HYGIENE STUDENT)
Artificial intelligence in dentistry

#18 KASSI HYDE (DENTAL HYGIENE STUDENT); MACIE MICHAEL (DENTAL HYGIENE STUDENT)
Vaping: The effects on oral health

#19 MADISON HYMER (DENTAL HYGIENE STUDENT); FAITH IRWIN (DENTAL HYGIENE STUDENT)
Musculoskeletal disorders among dental hygienists

#20 SARAH ISAACS (DENTAL HYGIENE STUDENT); SHELBY GODBEY (DENTAL HYGIENE STUDENT)
Animal assisted therapy in dental care

#21 JALEIGH LEMONS (DENTAL HYGIENE STUDENT); SUNNIE PLETCHER (DENTAL HYGIENE STUDENT); HAYLEE RHYNES (DENTAL HYGIENE STUDENT)
Treatment options for viral oral manifestations

#22 HALEY MAGES (DENTAL HYGIENE STUDENT); TAYLOR ROBERTS (DENTAL HYGIENE STUDENT)
Determinants of oral health in the foster care system

#23 JADE PETERSEN (DENTAL HYGIENE STUDENT); SEN NAULAK (DENTAL HYGIENE STUDENT)
Dental practices: effects of the cosmetic industry

#24 PAIGE RESLER (DENTAL HYGIENE STUDENT); KATELYN WILSON (DENTAL HYGIENE STUDENT)
Teeth whitening and the use of charcoal in dentistry

#25 JASPAL DHESI (PRE-DOCTORAL DENTAL)
Flexural strength and antibacterial properties of experimental nanofilled orthodontic adhesives

#26 GHAZEL ELLIOT (PRE-DOCTORAL DENTAL)
The effect of delayed treatment on patient's periodontal health

#27 LESLIE GARCIA (PRE-DOCTORAL DENTAL)
Mechanical and Antibacterial Properties of Hydrogen-Peroxide-Modified Nanofilled Dental

#28 PARIA IRANPOUR (PRE-DOCTORAL DENTAL)
The dynamics of time and expertise on radiographic findings

#29 ANGELA JARJOURA (PRE-DOCTORAL DENTAL); LEYANN ADI (PRE-DOCTORAL DENTAL)
Analysis of p53 patterns to assess malignant transformation in dysplasia

#30 SARA JARJOURA (PRE-DOCTORAL DENTAL)
Testing the radiographic accuracy of proximal caries detection utilizing filters

#31 MANAS KOMMAREDDI (PRE-DOCTORAL DENTAL)
Decreasing Open Chair Time Through Best Practice Management Systems

#32 STEVEN LIN (PRE-DOCTORAL DENTAL)
Characterization of experimental adhesives containing surface-modified nanoparticles

#33 TRENTON MCAREAVEY (PRE-DOCTORAL DENTAL)
A retrospective analysis of oral lesions in Native American patients

#34 JINYOUNG PARK (PRE-DOCTORAL DENTAL)
Detecting and locating MB2 canal in maxillary molars using AI

#35 HAREEM SHOAIB (PRE-DOCTORAL DENTAL)
Release of monomers and by-products from adhesive-resins after esterase exposure

#36 SARA ALDARKAZANLY (PRE-DOCTORAL DENTAL); PRIYAN DAJI (PRE-DOCTORAL DENTAL)
Histological comparison of analytical methods using bone cores

#37 CAMERON LOPER (PRE-DOCTORAL DENTAL); JORDAN BASKETTE (PRE-DOCTORAL DENTAL)
Antibiotic Prophylaxis for preventing Infective Endocarditis in pediatric dental patients

#38 DORNA AKHAVAIN (ADVANCED EDUCATION IN GENERAL DENTISTRY); SHARICE DAVIS (ADVANCED EDUCATION IN GENERAL DENTISTRY)
Gummy smiles diagnosis and treatment approaches: A systematic review

#39 LORRAINE BYRD (ADVANCED EDUCATION IN GENERAL DENTISTRY); CLEMENT HSU (ADVANCED EDUCATION IN GENERAL DENTISTRY)
AI intraoral image analysis: Enhancing early diagnosis of oral cancer

#40 KISHAN GAJERA (ADVANCED EDUCATION IN GENERAL DENTISTRY); SRITEJA GUMMADI (ADVANCED EDUCATION IN GENERAL DENTISTRY)
Clinical outcomes and implications of zirconia versus titanium implants

#41 PRITA DHAIMADE (GRADUATE PERIODONTICS)
Radiographic outcomes of alveolar ridge preservation: Autogenous tooth graft/allograft

#42 TANAY CHAUBAL (GRADUATE PERIODONTICS)
Crown lengthening: A solution to supracrestal tissue attachment violation

#43 ABHILASHA PATIL (GRADUATE PERIODONTICS)
Restoring periodontal health: Case report on free gingival graft outcomes

#44 JOSE SILVERIO (GRADUATE PERIODONTICS)
Expanded mesh free gingival graft - A case report

#1

Title: The frequency of nutritional counseling

Presenter(s): Dorena Doucette (Dental Hygiene Student, Class of 2025)

Advisor(s): Donna Wood; Tim Fagan

Abstract:

Purpose: Nutritional counseling serves an important role in treating pediatric patients with a high caries risk. The purpose of the study is to determine if pediatric patients with a high caries risk are being provided with any nutritional counseling at their dental preventive care visits. Methods: A cross-sectional survey was distributed via Qualtrics to n=2,439 Oklahoma dentists and n=2,720 Oklahoma dental hygienists. The survey consisted of questions assessing demographics, as well as questions concerning practices in nutritional counseling and assessment among pediatric patients with a high caries risk. The study was approved by the Oklahoma Health Sciences Institutional Review Board (#17645). Results: Dentists and dental hygienists were asked if they performed nutritional counseling for pediatric patients. The majority of dentists reported they always provide nutritional counseling while half of dental hygienists reported they are also always providing the counseling. Dental hygienists were asked if they use a caries risk assessment form to aid in their counseling. Almost half responded they do not use a form because they determined it was not necessary. Dentists replied similarly, and instead, both providers verified caries risk by clinical examinations, charting of cavitated lesions, demineralized areas, and radiographs. Conclusion: This study indicates that dentists and dental hygienists in private practices throughout the central and northeastern parts of Oklahoma do not always provide nutritional counseling to their pediatric patients. They almost never use a caries risk assessment form for pediatric patients exhibiting high caries risk. These analyses conclude the necessity to improve on what should be discussed during the patient centered counseling. Incorporating a caries risk assessment as part of the counseling efforts could benefit dental professionals in focusing the preventive intervention on the patient's specific needs which may be discussed with each patient and their caregivers.

Funding for this project was provided by the Delta Dental of Oklahoma Foundation and Student Research Program 2024-25.

#2

Title: Oral pathologies and physiological pigmentation: Dental perceptions

Presenter(s): Jaclyn Miller (Dental Hygiene Student, Class of 2025)

Advisor(s): Sarah Justus-McMakin

Abstract:

Purpose: The purpose of this research study was to investigate the extra-oral/intra-oral (EIE) procedure performed by licensed dental hygienists and dentists and their knowledge and confidence detecting pathogenic lesions in patients with and without physiological pigmentation. Methods: This study was a quantitative, cross-sectional survey and was approved by the Oklahoma Health Sciences Center Institutional Review Board (#17640). The anonymous 24-question survey was distributed electronically via Qualtrics to licensed dentists and dental hygienists in the state of Oklahoma. Results: 216 dental hygienists and 147 dentists completed the survey. 39.29% of participants reported performing an extra-oral exam with every patient, and 77.75% reported performing an intra-oral exam with every patient. Regarding recognizing a potentially pathological lesion in a patient, most participants were "moderately confident" (56.75%). When asked knowledge-based questions, only 37.08% of participants were able to answer all questions correctly. Conclusion: It can be determined based on the results of this study that more dental professionals need to be performing an EIE with their patients as this increases the likelihood of potentially pathological lesions being diagnosed early. Patients with physiological pigmentation are at a greater risk of going without a diagnosis or receiving a misdiagnosis than their counterparts without physiological pigmentation. This highlights the importance of a culturally inclusive educational process that includes comprehensive oral pathology education, including pigmented lesions and case studies with patients that have physiological pigmentation.

Funding for this project was provided by the J. Dean Robertson Society and Student Research Program 2024-25.

#3

Title: Periodontal disease: Dementia's worst nightmare

Presenter(s): Phalyn Andres (Dental Hygiene Student, Class of 2025); Kyah Dixon (Dental Hygiene Student, Class of 2025)

Advisor(s): Lydia Snyder

Abstract:

Purpose: The purpose of this literature review is to examine the relationship between oral health and Alzheimer's disease, while evaluating the pathogens associated with periodontal disease and the importance of oral hygiene. Background: Alzheimer's disease (AD) is a progressive disorder that destroys parts of the brain involving cognitive skills and memory. There is not only one risk factor for AD, but periodontal disease has been shown to be one of these determinants. The threat of periodontal disease includes gram negative anaerobic bacteria along with the inflammatory response that crosses the blood brain barrier, accumulating amyloid-B plaques. Several studies have been found to support the evidence that the inflammatory response caused by periodontal disease creates a destructive environment in the brain. Findings: A study done in 2021 found gram negative bacteria, including P. gingivalis, P. intermedia, T. denticola and A actinomycetemcomitans in the brain tissues of multiple autopsy patients with AD. This is one of many studies that shows the significance of periodontal disease being a contributable factor to AD. Conclusion: Nearly half of America's population have been found to have periodontal disease, making the education on oral hygiene critical for clinicians. Only about 40% of risk factors for cognitive decline have been identified and there is currently no cure, indicating the need for further research on the relationship between periodontal disease and AD.

#4

Title: Hearing loss in dental professionals

Presenter(s): Darian Aplin (Dental Hygiene Student, Class of 2025); Drinity Cross (Dental Hygiene Student, Class of 2025)

Advisor(s): Ashley Clark

Abstract:

Purpose: The purpose of this literature review is to explore the latest research on hearing loss and its prevalence in the dental profession. The studies included in this literature review measure the amount of occupational noise dental professionals are exposed to and test to determine if hearing loss is present. Background: Noise-induced hearing loss (NIHL) is identified as prolonged exposure to noise levels exceeding 85-decibel sound pressure level using an A-weighted scale (dBA) that leads to permanent damage of the cochlea in the ear. NIHL can occur in many professions; thus, the Occupational Safety and Health Administration (OSHA) recommends using hearing protection devices (HPDs) exceeding certain levels. Although various instruments used in dentistry can exceed the safety level, most dental professionals do not wear HPDs. Significance: The studies reviewed determine that dental professionals are exposed daily to noise levels exceeding 85 dBA and some have already experienced hearing loss. Research shows that using hearing protection devices lowers the risk of developing NIHL Conclusion: While there is limited research on this topic, these studies show that hearing loss does occur in the dental profession. Research highlights the importance of preventive measures such as hearing protection devices and suggests that dental professionals should receive regular hearing tests for early detection. More research should be done on this topic to help educate all people in the dental field about their risk and how to prevent this disease.

#5

Title: Oral health care barriers in the foster care system

Presenter(s): Blakely Barnett (Dental Hygiene Student, Class of 2025); Kenna Harmon (Dental Hygiene Student, Class of 2025)

Advisor(s): Tina Tuck

Abstract:

Purpose: This literature review aims to assess the awareness of social workers regarding the importance of oral hygiene in foster care. It specifically examines the prevalence of Early Childhood Caries (ECC) among children in foster care, a group disproportionately affected by this chronic disease. Background: Children in foster care face significant oral health challenges, often entering the system with existing dental issues such as ECC. Contributing factors include neglect, inadequate nutrition, and limited access to preventive care. These conditions are compounded by difficulties in finding dental providers willing to accept Medicaid. Significance: Addressing barriers to oral healthcare for foster youth is vital to improving their overall health and well-being. Poor oral health can lead to infections, speech development delays, and diminished self-esteem, all of which can hinder a child's ability to thrive. The lack of dental providers accepting Medicaid exacerbates these challenges, creating a systemic barrier to care. Discussion: Children in foster care experience significant barriers to oral health care, despite having Medicaid coverage. Once care is established with a provider, care can sometimes be disrupted by placement changes. Addressing these barriers can include educating foster parents and social workers. Collaborative efforts between healthcare providers and foster care agencies are important to ensure foster care children receive the comprehensive care that they need.

#6

Title: The effectiveness of school sealant programs and preventative technique utilization

Presenter(s): Bre Bohnenberger (Dental Hygiene Student, Class of 2025); Jadyn Davis (Dental Hygiene Student, Class of 2025)

Advisor(s): Emily Forthun

Abstract:

Purpose: The purpose of this research is to examine the effectiveness of school sealant programs in providing preventative treatment options for low-income children. Background: Dental caries is a significant chronic disease affecting children, with nearly one in five having untreated decay, according to the CDC. School sealant programs help address this matter by offering dental sealants to children, particularly those who have limited access to dental care. These programs apply a protective coating on occlusal surfaces of molars while in a school setting, making preventative treatment more accessible to underprivileged populations. Significance: It is reported that 60% of children do not have dental sealants, contributing to the high rate of untreated decay among children. The CDC estimates that if sealants were placed on these children, 3.4 million cavities could be prevented over a four-year period, emphasizing the substantial impact of expanding school sealant programs. Discussion: Dental sealants provide a barrier on the occlusal surfaces of molars, reducing the risk of caries development. However, they cannot remineralize existing carious lesions, limiting their use for compromised teeth. Additional considerations include ensuring proper application and maintenance of sealants, as improper placement can affect longevity and effectiveness. Sealant programs remain a practical strategy to improve access to care among underserved children. Conclusion: Expansion of school sealant programs has the potential to impact the reduction of untreated tooth decay among children, addressing a major public health issue. Prioritizing preventative methods, such as sealants, can improve oral health equity in children.

#7

Title: Rural oral health care disparities

Presenter(s): Avery Clark (Dental Hygiene Student, Class of 2025); Lanie Hughes (Dental Hygiene Student, Class of 2025)

Advisor(s): Julie Schneberger

Abstract:

Purpose: This review examines oral health disparities in rural U.S. populations, emphasizing provider shortages and systemic barriers to care. It explores challenges contributing to these inequalities and evaluates potential solutions, including workforce development, policy reforms, and community initiatives. Background: Over 30 million Americans, especially in rural areas, face significant oral health disparities due to limited access to dental care. Nearly 71% of dental health professional shortage areas (HPSAs) are in rural regions, leading to high rates of dental disease. Factors such as financial barriers, inadequate insurance, and geographic isolation exacerbate these issues. Minority populations may face additional systemic and cultural challenges. Poor oral health is linked to chronic conditions like diabetes and cardiovascular disease, highlighting the need for targeted interventions. Significance: Improving access to dental care in rural areas can enhance public health, reduce healthcare costs, and improve quality of life. Addressing provider shortages, economic barriers, and geographic challenges is essential for promoting equitable healthcare access and long-term health improvements. Discussion: Proposed solutions involve offering loan forgiveness and financial incentives to dental professionals in underserved areas. Additional strategies include expanding teledentistry, integrating oral and general healthcare, and enhancing public health measures such as water fluoridation and oral health education. A multi-faceted, collaborative approach is necessary to ensure sustainable improvements in rural oral health care. Further research is needed to assess the effectiveness of these interventions.

#8

Title: The effects of different mouthrinses in the oral cavity

Presenter(s): Sarah Crabb (Dental Hygiene Student, Class of 2025); Kaylee Cochenour (Dental Hygiene Student, Class of 2025)

Advisor(s): Robin Graham

Abstract:

Purpose: To study the effects of commonly used therapeutic mouthrinses compared to cosmetic and herbal mouthrinses in the oral cavity. Background: Mouthrinses have been used for thousands of years with various ingredients. Approximately 60% of mouthrinse users cite "freshening breath" as a primary reason for using a mouthrinse. While therapeutic mouthrinses are the standard for addressing oral health issues, an interest in herbal and cosmetic mouthrinses has been on the rise. Significance: Therapeutic mouthrinse ingredients such as chlorhexidine gluconate and essential oils have the highest efficacy when compared to herbal and other therapeutic ingredients. Cosmetic mouthrinse ingredients are also shown to be effective at accomplishing their goals. However, therapeutic and cosmetic mouthrinses have a long list of complications. Alcohol has been shown to cause destruction of oral tissues at high percentages, but it has not been proven to cause long-term xerostomia despite its negative reputation (Cortelli et al., 2009; Kerr et al., 2015). Alcohol in mouthrinse has also not been linked to oral cancer and is safe to use (Osso & Kanani, 2013). Herbal mouthrinses have a comparable efficacy to some therapeutic mouthrinse ingredients such as cetylpyridinium chloride and without many documented side effects. Therefore, herbal mouthrinses offer a natural alternative to therapeutic mouthrinses with similar positive results. Conclusion: Patients should be included in conversations about the impact different types of mouthrinses can hold. For short-term goals, therapeutic mouthrinses have been proven to be more effective than most herbal and cosmetic mouthrinses. However, the list of complications may deter patients. For long-term, prophylactic use, herbal mouthrinses may be a better alternative to therapeutic mouthrinses due to their proven efficacy and lack of side effects, depending on the patient's preference and cosmetic goals.

#9

Title: Prevention of early childhood dental caries

Presenter(s): Makina Croft (Dental Hygiene Student, Class of 2025); Kenley Hayes (Dental Hygiene Student, Class of 2025)

Advisor(s): Tiffany Dougherty

Abstract:

Purpose: The purpose of this literature review is to highlight common themes regarding the prevalence of early childhood caries (ECCs) and explore the relationship between oral health education programs for caregivers and their role in the prevention of this multifactorial disease. Background: ECCs is one of the most common chronic, preventable diseases in young children worldwide. As this is a multifactorial disease, there are many etiologic factors that contribute to the progression. This includes low socio-economic status (SES), poor child diet, inadequate parental education levels and oral health knowledge, quantity of harmful bacteria, and quality of saliva present in the child's oral cavity. Prevention strategies of ECCs can be greatly improved by highlighting proper oral hygiene techniques, as well as implementing appropriate diet and feeding practices beginning during pregnancy and continuing throughout the postpartum, infancy, and toddler stages. Significance: There are almost 1.8 billion new cases of ECCs per year globally. Unfortunately, the lower SES and education levels of caregivers has a direct correlation with a higher occurrence of ECCs in young children. However, literature has shown that education on child diet and feeding practices reduced the risk and prevalence of ECCs by 15% (Riggs et al., 2019). Conclusion: As there are a multitude of contributing factors related to ECCs, dental professionals should standardize and prioritize the education of young patients and their caregivers about prevention strategies. Understanding the detrimental effects this complex disease can have on children's oral health, in addition to proper education, can help decrease the incidence of ECCs and promote widespread prevention.

#10

Title: The effects of stress on the oral cavity

Presenter(s): Meloni Dean (Dental Hygiene Student, Class of 2025); Dax Greenfield (Dental Hygiene Student, Class of 2025)

Advisor(s): Robin Graham

Abstract:

Purpose: The purpose of this literature review is to determine how stress impacts the oral cavity. Background: Approximately, 78 percent of Americans were stressed in the last month (Single Care, 2024). Due to the higher percentage of stress in the population, it is crucial to consider the effects of this on oral health. Regarding the oral cavity, stress has an impact on several pathologies, including caries, bruxism and periodontal disease. These pathologies can cause not only oral issues but systemic health issues if progressed. Stress has been linked to other idiopathic conditions, such as primary burning mouth syndrome. Significance: A study by Solana (2021) showed an increase of 71 percent of patients experiencing grinding which is leads to fractured teeth, headaches, and joint disorders. Research exhibits a positive correlation to both xerostomia and stress which can lead to decay and burning mouth syndrome. Increased probe depths and periodontal disease were a common factor found in those with high levels of stress. Conclusion: Due to the high percentage of the population enduring stress, these harmful manifestations found in the oral cavity can be commonly seen by dental professionals. This requires dental healthcare professionals to recognize stress as a causative factor. According to Brennan (2023), a few ways to combat stress are wearing a nightguard, practicing good oral hygiene and consuming a healthy diet.

#11

Title: Natural oral care: Is it worth the switch?

Presenter(s): McKaelyn Dequasie (Dental Hygiene Student, Class of 2025); Pierce Aubrey (Dental Hygiene Student, Class of 2025)

Advisor(s): Tina Tuck

Abstract:

Purpose: The purpose of this review is to compare the effectiveness and benefits of natural oral care products and traditional alternatives. Background: Oral health plays a vital role in overall well-being, with conditions like dental caries and periodontitis being among the most common health issues globally. Traditionally, oral care has relied on chemical-based products such as fluoride toothpaste, chlorhexidine mouthwash, and synthetic additives to maintain oral hygiene and prevent disease. While these products are proven to be effective, concerns about their long-term effects and environmental impact have led to an increased interest in natural oral care alternatives. Significance: Literature suggests that products with little to no chemical agents can be as effective as traditional chemical-based options. Natural oral care products, including herbal toothpastes, essential oils, and plant-based extracts, have gained popularity for their perceived gentleness and alignment with a more sustainable and holistic approach to health. Ingredients such as aloe vera, coconut oil, clove, and cinnamon have demonstrated antimicrobial, anti-inflammatory, and cavity-preventive properties in clinical studies. Despite these benefits, skepticism remains about their efficacy compared to conventional formulations. There is also a need for dental professionals to guide patients in choosing products that align with their health goals while ensuring effective oral disease prevention. Conclusion: While traditional toothpastes remain safe and effective, many individuals have turned to natural alternatives to avoid potentially harsh chemicals with long-term impacts on their bodies. Natural ingredients, such as herbal extracts, essential oils, and probiotics, offer promising antimicrobial and anti-inflammatory properties, which may support oral health while minimizing risks associated with synthetic chemicals. Exploring the effectiveness of these alternatives can help bridge the gap between consumer preferences and clinical evidence, ensuring that patients receive care that is both safe and tailored to their values and needs.

#12

Title: Guided biofilm therapy

Presenter(s): Lauren Egger (Dental Hygiene Student, Class of 2025); Carli Sales (Dental Hygiene Student, Class of 2025)

Advisor(s): Robin Graham

Abstract:

Purpose: The purpose of this literature review is to determine if Guided Biofilm Therapy is an effective prophylaxis method. Background: Guided Biofilm Therapy (GBT) is a relatively new method of biofilm management in dentistry. It is an exciting development in the practice of biofilm removal as it claims to be more effective than hand scaling and root planning, as well as more comfortable for the patient. While the concept of air polishing devices is not new, their efficacy as instruments of biofilm removal is still being researched and compared to the traditional instrumentation methods. Previously, air polishing devices had been developed and utilized for restorative purposes, such as cavity preparation (Shrivastava et. al., 2021). Significance: Guided biofilm therapy is an all-encompassing prophylaxis unit that can be used to treat any variety of hygiene patients, from healthy patients to periodontal and periodontal maintenance patients (EMS et. al., 2024). The AirFlow unit utilizes ultrasonic scalers and abrasive powder to remove plaque and calculus without having to manually scale all tooth surface. Discussion: Though guided biofilm claims to be a revolutionary approach, it has not been implemented in day-to-day routine prophylaxis care. This may be due to the lack of education surrounding the method, completed research that favors GBT, and difficulty implementing new systems. However, in surveys completed by patients receiving the treatment, the responses have reflected greater patient comfort and acceptance, as well as more thorough biofilm removal. Though this technology promises to be a better substitution for traditional methods, recent research appears to be inconclusive on which method is superior.

#13

Title: Therapeutic use of honey in dentistry

Presenter(s): Kennedy Field (Dental Hygiene Student, Class of 2025); Taylor Treat (Dental Hygiene Student, Class of 2025)

Advisor(s): Tiffany Dougherty

Abstract:

Introduction: In recent years, the use of holistic or alternative treatments in medicine have been on the rise. This demand for natural remedies has been evident in dentistry leading researchers to explore alternative therapeutic treatments, such as the beneficial uses of honey due to its well-documented healing properties. Specifically, studies have shown that honey has proven significant in helping to reduce plaque biofilm accumulation, decrease bleeding sites, effectively treat burns, ulcers, and other oral diseases by serving as an antibacterial, anti-inflammatory, and antifungal agent. Purpose: The purpose of this literature review is to explore honey as an alternative therapeutic agent for healing in the oral cavity and the different clinical settings in which honey can be used. Background: Honey has been used as functional medicine over millennia and across cultures including the Egyptians, Assyrians, and Greeks for treating wounds and aiding digestive issues. Modern medicine has recognized its therapeutic value, prompting more research into its potential to treat various health conditions, including oral diseases. Findings: Specifically, research has shown Manuka honey's effectiveness in treating biofilm reduction, preventing caries and gingivitis, promoting wound healing, and alleviating oral mucositis in patients with cancer. Additionally, when compared to chlorhexidine gluconate, honey proves just as effective without the long-term side effects associated with the former. Honey is also more accessible and cost-effective than many other therapeutic agents. It is widely available over the counter in various forms, including mouth rinses, ointments, dressings, lozenges, and toothpaste. Conclusion: The promising research on honey's role in oral health highlights its potential as a natural and effective treatment option. However, existing studies are limited which is why more comprehensive, long-term clinical trials are needed to validate its therapeutic potential as an alternative to conventional oral treatments.

#14

Title: Oral health knowledge of nursing students

Presenter(s): Lauren Hallauer (Dental Hygiene Student, Class of 2025); Valery Rodriguez (Dental Hygiene Student, Class of 2025)

Advisor(s): Sarah Justus-McMakin

Abstract:

Purpose: The purpose of this literature review is to determine the oral health knowledge of nursing students. Studies included in this review examine nursing students' education on oral health in their nursing curriculum and their implementation of that knowledge into patient care. Background: Nurses are one of the main health professionals that provide holistic care, making it important to assess their preparation in oral health. The oral cavity is a complex environment, hosting a diverse microbiome, and disruptions in this environment can lead to oral diseases that can impact systemic health. Research has shown that nursing students are not taught basic oral health skills while in school, and it is perceived as a low priority when it comes to caring for patients. Significance: Nurses should possess adequate oral health knowledge and skills to ensure comprehensive patient care and prevention of systemic diseases. Nursing students with oral health knowledge can help in early detection of oral health problems, such as dental caries, periodontal disease, and oral cancers. These oral health issues not only affect the mouth but have also been linked to systemic conditions such as respiratory illnesses, cardiovascular diseases, and other metabolic diseases. Several studies suggest that nursing students' knowledge about oral health is insufficient and that curricula related to oral health should be included in their education. Conclusion: Nursing students are the future primary providers for patient education. There are concerns regarding the lack of education relating to oral health. Unawareness about many aspects of oral hygiene and oral diseases could lead to misdiagnosis or exacerbation of a systemic disease. Future research should focus on developing and testing effective strategies for integrating oral health into nursing practice and education.

#15

Title: Green tea as an adjunct in dental treatment

Presenter(s): Jessica Hamilton (Dental Hygiene Student, Class of 2025); Tori Scheller (Dental Hygiene Student, Class of 2025)

Advisor(s): Lindsey Hays

Abstract:

Purpose: The purpose of this literature review is to investigate research conducted on green tea catechins (GTC) and its efficacy to treat the pathogenicity responsible for caries and periodontal disease progression, as well as the concurrent inflammatory response associated with periodontal disease. Introduction: Green tea is known for its health benefits for more than 4,000 years. Chlorhexidine has been used in dentistry for more than 50 years, earning its title as the "gold standard" for treatment and prevention of pathogens that cause caries and periodontal disease. With concerns arising over bacterial resistance to chlorhexidine and its subsequent adverse reactions, green tea derived adjuncts could offer alternative options to complete oral health. Significance to Dentistry: Green tea has been found to provide antibacterial, anti-collagenase, and anti-inflammatory properties when applied topically to the oral cavity. This allows clinicians to offer natural alternatives when prescribing adjuncts along with individualized treatment plans. Currently, there have been no documented adverse drug reactions identified with the use of green tea. Additionally, due to its popularity as a beverage, the therapeutic implementation of green tea would likely be widely accepted. Discussion: Studies acknowledge benefits associated with the use of green tea in dentistry. When studying the effectiveness of green tea against S. mutans, studies have shown that green tea has a direct effect on bacterial metabolites. This inhibition in the ability of S. mutans to break down glucose leads to a lack of acid production, which subsequently leads to a lack of biofilm accumulation. When comparing efficiency of green tea against periodontal pathogens, green tea has a direct effect on P. gingivalis and the hosts subsequent inflammatory response. While many benefits have been observed, there is still more research required to determine both proper dosage of GTC and whether long-term adverse effects exist.

#16

Title: Importance of odontology in forensic science

Presenter(s): Andrea Hoffen (Dental Hygiene Student, Class of 2025); Briceida Servano (Dental Hygiene Student, Class of 2025)

Advisor(s): Sarah Justus-McMakin

Abstract:

Purpose: The purpose of this literature review is to explore research studies that test the reliability of bitemark analysis and mass disaster identification. Background: Odontology is used in forensic science in many ways including bite mark analysis, mass disaster identification, and in abuse cases. The use of forensic odontology has been dated back to the 1800's and has made significant progress since. Significance: The inconsistencies in bite-mark analysis have led to wrongful convictions in the past, which have deemed bite-mark analysis as unreliable. However, victims of mass disasters are sometimes left with little to no identifying factors, and odontology often proves useful to identifying these victims. Conclusion: There are various challenges that continue to exist and affect the validity of bitemark analysis in the forensic field. Mass disaster identification has had a much higher success rate and continues to be a reliable method of odontology use in forensic science cases.

#17

Title: Artificial intelligence in dentistry

Presenter(s): Aaron Hui (Dental Hygiene Student, Class of 2025); Lainie Britton (Dental Hygiene Student, Class of 2025)

Advisor(s): Robin Graham

Abstract:

Purpose: This literature review is to explore the use of artificial intelligence (AI) in the field of dentistry. Research included in this review, cover improved diagnostic findings and patients' perceptions of AI implemented in the dental practice. Background: Artificial intelligence (AI) can be described as the use of technology to create systems that mimic or produce tasks that are typically carried out by human beings. As these innovations are becoming widely integrated across society, AI will be increasingly utilized in the dental industry. Significance: Artificial intelligence (AI) has the ability to detect caries as accurately as an experienced dentist. AI can distinguish composite fillings, amalgams, carious lesions, and bone loss on radiographs. Dentists can point out restorations and cavities on a radiograph with better understanding due to these AI technologies. This will help providers build rapport as patients can visualize the radiolucent area to see what is truly going on in their mouth, not just hearing that they have a cavity that needs to be filled. However, not all patients are accepting of the use of AI due to concerns of trust and privacy. Like many others in the world, some worry that AI will replace the jobs of dental professionals. Discussion: Findings from this literature review indicate the need for more application and exposure to artificial intelligence in the dental setting. These technologies have the potential to revolutionize the way that dental practices conduct patient care. More exposure to AI as an adjunct to dental professionals can lead to increased acceptance and positive utilization in dentistry.

#18

Title: Vaping: The effects on oral health

Presenter(s): Kassi Hyde (Dental Hygiene Student, Class of 2025); Macie Michael (Dental Hygiene Student, Class of 2025)

Advisor(s): Sarah Justus-McMakin

Abstract:

Purpose: This literature review aims to examine the oral health risks associated with vaping. The studies included will focus on various aspects of oral health, including periodontal measurements, plaque biofilm levels, biomarker analysis, caries development, and oral mucosal lesions. Background: Vaping is advertised as a healthy alternative to traditional smoking. Although electronic cigarettes are a relatively new device out on the market, recent research shows that electronic cigarettes are not a healthy alternative. In fact, electronic cigarettes may be contributing to several oral health issues. Significance: Most studies have shown that vaping has a direct effect on periodontal diseases and plaque adhesion. Some studies have shown that vaping leads to an increased risk of caries due to the fine aerosol that is produced, which leads to the adhesion of Streptococcus mutans. However, other studies have not shown an increase in carious lesions. Most studies also reveal that people who smoke electronic cigarettes have increased inflammatory cytokines and produce higher levels of oxidative stress, which can lead to DNA breakdown. Many studies have revealed that people who vape tend to report a higher number of oral mucosal lesions than people who do not. Conclusion: Research on the effects of electronic cigarettes is relatively new, and there are mixed results across studies. However, research supports that vaping leads to a higher prevalence of periodontal diseases and inflammatory cytokines. More research is needed on the effects of vaping on the oral cavity so that dental professionals can educate their patients on the potential risks that are associated with vaping.

#19

Title: Musculoskeletal disorders among dental hygienists

Presenter(s): Madison Hymer (Dental Hygiene Student, Class of 2025); Faith Irwin (Dental Hygiene Student, Class of 2025)

Advisor(s): Ashley Clark

Abstract:

Purpose: The purpose of this literature review is to examine the prevalence, risk factors, and preventive strategies associated with musculoskeletal disorders among dental hygienists. Background: Musculoskeletal disorders (MSDs) are prevalent among dental hygienists due to the physically demanding nature of their work, which involves prolonged static postures, repetitive motions, and awkward positioning. These occupational hazards can lead to reduced productivity, fewer working hours, and a decline in career longevity. Recently, various ergonomic interventions such as magnification loupes, saddle seats, and educational training have been explored as potential solutions to mitigate MSD risks. Significance: Studies found that 91% of dental hygienists experience MSDs during their careers, with the neck (30.6%), shoulders (25%), and lower back (23.3%) being the most commonly affected areas. MSDs are prevalent among dental hygienists due to the physically demanding nature of their work, which involves prolonged static postures, repetitive motions, and awkward positioning. Research indicates that ergonomic interventions, including the use of magnification loupes, saddle seats, and targeted training programs, can significantly reduce MSD symptoms. Additional studies confirm these findings, emphasizing the widespread nature of MSDs in the profession and the need for preventive measures. Conclusion: Research indicates that ergonomic interventions can significantly reduce MSD symptoms. Failure to address these issues may lead to chronic pain, loss of function, and early retirement from the profession. Addressing workplace factors contributing to MSDs and implementing effective strategies are essential steps toward improving musculoskeletal health in dental hygiene practice, ultimately enhancing both the well-being of hygienists and the longevity of their careers.

#20

Title: Animal assisted therapy in dental care

Presenter(s): Sarah Isaacs (Dental Hygiene Student, Class of 2025); Shelby Godbey (Dental Hygiene Student, Class of 2025)

Advisor(s): Tammie Golden

Abstract:

Purpose: Anxiety and fear are substantial obstacles for patients obtaining dental care. It has been established that animal assisted therapy (AAT) can provide support and eliminate stress and anxiety in the dental office during treatment. A broad range of animals can be certified however most literature reviewed is related to dogs. The purpose of this literature review is to evaluate the benefits and potential drawbacks of therapy animals for clinicians and patients during dental treatment. Background: It is estimated that 30 to 40 million Americans have some sort of dental phobia or fear that results in avoidance of dental appointments. Patients often report fear of needles, pain and anxiety connected to general dental procedures. The usefulness of therapy animals has been determined to provide a calming impact on patients, lowering tension and anxiety levels so that adequate and enjoyable treatment can be accomplished. Results: Therapy animals are not all defined in the same manner, so it is important to distinguish between therapy animals, emotional support animals and service animals. Rules and regulations all vary for therapy animals and constant regulation is required. Not all patients might benefit from having a therapy animal in the dental office as some may experience allergies, respiratory problems and other concerns. Offices need to have procedures in place to accommodate for patients and employees as well. Conclusion: AAT can alleviate stress and anxiety to enhance the dental experience. More studies with larger sample sizes of children and adolescents are suggested.

#21

Title: Treatment options for viral oral manifestations

Presenter(s): Jaleigh Lemons (Dental Hygiene Student, Class of 2025); Sunnie Pletcher (Dental Hygiene Student, Class of 2025); Haylee Rhynes (Dental Hygiene Student, Class of 2025)

Advisor(s): Lindsey Hays

Abstract:

Purpose: To create awareness of how viral oral lesions, such as herpes simplex labialis and Epstein Barr virus, manifest in the oral cavity, as well as different treatment options available for these viral oral manifestations. Background: It is estimated that over ninety percent of people by age fifty will experience herpes simplex labialis and Epstein Barr virus. These viruses can be detected and treated by dental professionals since they manifest in the oral cavity. Dental professionals need to be aware of the treatment options for these viruses as they are best treated with a multifaceted approach. Antivirals remain the gold standard of treatment; however, prescriptions are required, often making them inaccessible during a narrow treatment window. Significance to Dentistry: The ability to help patients who suffer from these lifelong latent infections experience relief is crucial as a dental professional. The problem is that there are minimal treatment options available for these viruses and a combination therapy approach is often most effective. Patient education is also a crucial factor in early detection, treatment, and prevention of spread of the virus. Conclusions: There is a need for further research for a cure and better treatment options for herpes simplex labialis, as well as Epstein Barr virus. Easier access to reliable treatment options would shorten symptoms and reduce the duration of outbreaks, making patients more likely to seek care. Research is underway to investigate vaccines and other antiviral therapies to eliminate the painful outbreaks all together. In the meantime, dental professionals should assess the need for patient education and be more proactive in making recommendations to patients with the disease.

#22

Title: Determinants of oral health in the foster care system

Presenter(s): Haley Mages (Dental Hygiene Student, Class of 2025); Taylor Roberts (Dental Hygiene Student, Class of 2025)

Advisor(s): Ashley Clark

Abstract:

Purpose: The purpose of this literature review is to explore the impact of foster care status on oral health outcomes among children and adolescents, as well as feasible solutions to this problem. Background: Research has shown that foster children face higher rates of dental decay, periodontal disease and other oral health issues compared to their peers. Several studies have indicated determinants that may contribute to poorer oral health outcomes to include lack of dentists accepting Medicaid, frequent relocations, lack of foster parent education, and more. As a result of the increased need displayed by this population, studies have assessed possible solutions including social worker implemented preventive measures and oral health education requirements for foster parents. Significance: Between the United States and the European Union, there is nearly one and a half million children in the foster care system. One study found that children in foster care are 1.54 times more likely to experience dental diseases than a child who has not experienced foster care. Another study found a mean decayed, missing, and filled teeth (DMFT) sum of 3.43 and .95 for foster children and non-foster children respectively. Conclusion: Critical gaps remain in research on the specific oral health needs of foster children, and the way foster care status impacts oral health over time. More research is needed in the United States to raise awareness and develop policies to meet the needs of this population, including longitudinal cohort studies, and retrospective studies using the DMFT scale to determine the extent of dental need in this population. Understanding the impact of foster care status on oral health outcomes is critical for dental care providers, government agencies, and foster parents to develop targeted interventions and policies to improve dental care for this vulnerable population.

#23

Title: Dental practices: effects of the cosmetic industry

Presenter(s): Jade Petersen (Dental Hygiene Student, Class of 2025); Sen Naulak (Dental Hygiene Student, Class of 2025)

Advisor(s): Tiffany Dougherty

Abstract:

Purpose: The cosmetic industry has grown astronomically in size, but to what extent this has affected dentistry needs further analysis. The purpose of this literature review is to explore and analyze the body of research surrounding the cosmetic industry and its significant influence on dental practices. Background: The cosmetic dentistry market has experienced substantial growth, driven by changing sociocultural norms, technological advancements, and increasing patient demand for aesthetic treatments. This literature review explores the impact of these developments on dental practices and professionals, synthesizing a range of studies to examine trends in patient behavior, treatment demands, and the role of dentists in an evolving cosmetic landscape. Significance: Key findings suggest that sociodemographic factors, such as gender and socioeconomic status, significantly influence the demand for aesthetic dental treatments, with women being more likely to seek cosmetic procedures. Additionally, the review highlights advancements in treatment options, such as the use of Botox in dentistry and the growing interest in enzyme-based whitening agents, which have raised patient awareness and demand for new procedures. Furthermore, innovations in dental materials and CAD/CAM technology have revolutionized cosmetic restorations, although these developments present challenges related to cost and the need for ongoing professional education. The review also considers the influence of social media in shaping patient perceptions of dental aesthetics, emphasizing its role in spreading awareness of available cosmetic treatments. Conclusion: Overall, the review underscores the need for dental professionals to stay informed about rapidly evolving trends and technologies to meet patient expectations and maintain high standards of care.

#24

Title: Teeth whitening and the use of charcoal in dentistry

Presenter(s): Paige Resler (Dental Hygiene Student, Class of 2025); Katelyn Wilson (Dental Hygiene Student, Class of 2025)

Advisor(s): Tammie Golden

Abstract:

Introduction: Activated charcoal is one of the most popular products for whitening due to its therapeutic claim of being all natural. The popularity of whitening in dentistry today makes charcoal a competitive and viable option. Currently, activated charcoal is not approved by the ADA due to lack of evidence that supports its safety and effectiveness. Background: Activated charcoal is a fine, powder-like substance made from coconut shells, oxidized wood, and other organic compounds created specifically for medicine. These products are heated at 1,100-1,600 degrees Fahrenheit to create activated charcoal; this process absorbs the impurities and toxins. In dentistry, some benefits to using activated charcoal are reduction of superficial stains, management of bad breath, antimicrobial effects, and light polishing. Significance: Activated charcoal produces more effective results when used regularly in high concentrations, however, using it excessively can make teeth more susceptible to damage while also preventing proper remineralization. Compared to other whitening products, toothpaste that contains charcoal produces fewer effective results with more abrasion activity. While highly abrasive, charcoal in dentistry has presented strong evidence of better antimicrobial effects compared to non-charcoal products. Dental professionals suggest that if one is using activated charcoal paste that they do so no more than once a week and discontinue use if sensitivity arises. Conclusion: Multiple products are on the market containing activated charcoal including mouthwashes, infused toothbrushes, paste, and floss. It is imperative to be aware of the abrasive nature of charcoal and make informed decisions when recommending its use.

#25

Title: Flexural strength and antibacterial properties of experimental nanofilled orthodontic adhesives

Presenter(s): Jaspal Dhesi (Pre-doctoral Dental, Class of 2027)

Advisor(s): Fernando Esteban Florez; Rochelle Hiers; Sharukh Khajotia

Abstract:

Purpose: To characterize the biaxial flexural strength (BFS) and antibacterial (BIO) properties of experimental flowable orthodontic adhesive resins containing different ratios of silanized and non-silanized nitrogen and fluorine co-doped titanium dioxide nanoparticles (NF_TiO2). Methods: Solvothermal synthesized NF_TiO2 was surface-modified with (3-Aminopropyl)trietoxysilane (APTES) before being functionalized into Opal Bond Flow (30% v/v, ratios investigated=1:1, 1:5, 1:10 silanized/non-silanized [v/v]). Unaltered Opal Bond Flow (OBF) served as the control material. Disk-shaped specimens (diameter=6.0mm, thickness=0.5mm) for BFS (n=12/group) and for BIO (n=18/group) were fabricated and photopolymerized (40 sec/specimen; 385-515nm, 1,000mW/cm2; VALO) prior to testing. Maximum force for BFS was assessed using a Universal Testing Machine (Instron 68TM-5, crosshead speed=1.27 mm/min, 25°C) and BIO was tested by growing Streptococcus mutans biofilms (UA159-ldh, 24hours, 37°C, microaerophilic conditions) on the surfaces of specimens and then measuring their bioluminescence in terms of relative light units (RLUs) with a Biotek Synergy HT multi-well plate reader. Control group specimens (n=18) treated with 2% chlorhexidine gluconate (CHX) served as a positive control for BIO. Experimental data for BFS and BIO were analyzed using one-factor General Linear Models and post hoc Student-Newman-Keuls tests (α=0.05; SAS Software). Results: Mean BFS force values ranged from 0.074± 0.017kN (Control Group) to 0.087 ± 0.009 kN (30%,1:1 silanized/non-silanized NF_TiO2). BIO values ranged from 2,828 ± 717 RLU (CHX control) to 34,371±8,021 RLU (OBF Control). Conclusion: No significant differences ($p > 0.05$) were observed for mean BFS. Significant differences ($p < 0.05$) were observed for mean BIO. The topical application of CHX produced the strongest bioluminescence reductions observed. Nanofilled experimental materials with varying ratios of silanized/non-silanized nanoparticles were demonstrated to have similar mechanical properties but superior antibacterial properties when compared to unaltered OBF, as hypothesized. These results indicate that the nanotechnology proposed holds promise for the development of materials with long-term antimicrobial properties in fixed orthodontic therapy.

Funding for this project was provided by the J. Dean Robertson Society and Student Research Program 2024-25.

This study was presented at the 2025 American Association for Dental, Oral and Craniofacial Research annual meeting.

#26

Title: The effect of delayed treatment on patient's periodontal health

Presenter(s): Ghazel Elliot (Pre-doctoral Dental, Class of 2025)

Advisor(s): Staci Wekenborg; Susan Shelden; Shelly Short

Abstract:

Purpose: The focus of the research is to investigate the clinical consequences of missed dental appointments, specifically evaluating how these absences correlate with the incidence of new carious lesions and changes in periodontal health over time. The aim is to provide evidence-based insights into the true cost of no-show appointments, not just in dollars lost, but in terms of worsening oral health outcomes. Methods: A quantitative, non-experimental, retrospective study was used to analyze patient records extracted from axiUm within the academic year of 2021 and 2022. Results: Patients who rescheduled their missed appointments within three months had an average of 2 new carious lesions detected at their annual exam. Those who delayed their appointments for three to six months exhibited an average of 3 new carious lesions, and patients who postponed their dental visits for more than six months also had an average of three new carious lesions. Periodontal health was inconclusive due to the inconsistency in periodontal charting. This gap in documentation highlights the need for greater accuracy and consistency in charting to ensure that periodontal diagnoses align with the clinical findings. Conclusions: The findings highlight a significant rate of patient loss, underscoring the need for continued efforts in patient education. It is crucial that we reinforce the importance of regular preventive care procedures, not only for maintaining optimal oral health but also for their impact on overall systemic well-being. Ensuring the accurate documentation of periodontal charts during a patient's initial examination is essential. Establishing a precise baseline allows for more effective monitoring of periodontal health over time, enabling clinicians to accurately track changes in periodontal status during annual exams and make timely adjustments to treatment plans. By improving patient awareness and maintaining meticulous records, we can enhance the quality of care and promote better long-term oral health outcomes.

Funding for this project was provided by the J. Dean Robertson Society and Student Research Program 2024-25.

#27

Title: Mechanical and Antibacterial Properties of Hydrogen-Peroxide-Modified Nanofilled Dental

Presenter(s): Leslie Garcia (Pre-doctoral Dental, Class of 2027)

Advisor(s): Fernando Esteban Florez; Rochelle Hiers; Sharukh Khajotia

Abstract:

Purpose: To characterize the biaxial flexural strength (BFS) and antibacterial properties (BIO) of experimental adhesive resins containing different ratios of nitrogen and fluorine co-doped titanium dioxide nanoparticles (NF_TiO2) that were surface-modified by 6% hydrogen peroxide and an aminosilane. Methods: Solvothermal synthesized NF_TiO2 was surface-modified by hydroxylation using 6% hydrogen peroxide before being silanized using (3-amino)triethoxysilane (APTES). Experimental adhesives were formulated using ratios (silanized:non-silanized) of hydroxylated NF_TiO2 (30% v/v,1:1, 1:5, 1:10). UnalteredPeak Universal Bond (PUB) and OptiBond Solo Plus (OSP) adhesives served as control groups. Disk-shaped specimens (diameter=6.0mm, thickness=0.5mm) for BFS (n=12/group) and for BIO (n=18/group) were fabricated and photopolymerized (40 sec/specimen; 385-515nm, 1,000mW/cm; VALO). Maximum force for BFS was assessed using a Universal Testing Machine (Instron 68TM-5, crosshead speed=1.27 mm/min, 25°C) and BIO was tested by growing Streptococcus mutans biofilms (UA159-ldh, 24 hours, 37°C, microaerophilic conditions) on the surfaces of specimens and then measuring their bioluminescence in terms of relative light units (RLUs) with a Biotek Synergy HT multi-well plate reader. Experimental data for BFS and BIO were analyzed using one-factor General Linear Models and post hoc Student-Newman-Keuls tests (α=0.05; SAS Software). Results: Mean BFS force values ranged from 0.044±0.007 kN (OSP, Control Group) to 0.052±0.009 kN (30%v/v ,1:1 NF_TiO2) and mean BIO values ranged from 17,080.67±2,649.31 RLU (30% NF_TiO2, 1:10) to 41,602.33±11,159.74 RLUs (PUB, Control Group). Conclusion: No significant differences ($p > 0.05$) were observed for mean BFS, indicating that the incorporation of nanoparticles did not adversely impact the mechanical properties of materials investigated. The surface-modification by hydroxylation was observed to result in experimental materials with initial antimicrobial properties that were significantly ($p < 0.05$) stronger when compared to Peak Universal Bond, which is a chlorhexidine-containing and FDA-approved material, as hypothesized.

Funding for this project was provided by the J. Dean Robertson Society and Student Research Program 2024-25.

This study was presented at the 2025 American Association for Dental, Oral and Craniofacial Research annual meeting.

#28

Title: The dynamics of time and expertise on radiographic findings

Presenter(s): Paria Iranpour (Pre-doctoral Dental, Class of 2027)

Advisor(s): Farah Masood

Abstract:

Purpose: This study aimed to explore the relationship between radiographic viewing time and evaluator experience and its influence on interpreting incidental findings on panoramic X-rays. Methods: IRB approval was obtained. A total of thirty panoramic images from the University of Oklahoma College of Dentistry patient database were evaluated by participants with varying levels of clinical expertise, including general dentists and orthodontists. Each participant assessed two randomized image sets under different time constraints—30 seconds per image in the first session and 60 seconds in the second session. Results: Collected data indicated that participants identified a greater number of findings and demonstrated improved accuracy in the second session with extended viewing time. However, due to limited sample size (n=3), statistical validation was not performed, and conclusions regarding experience-based differences remain inconclusive. Furthermore, variations in evaluation focus were observed between general dentists and orthodontists, suggesting that specialization may influence diagnostic priorities. Conclusion: While extended evaluation time appeared to enhance the detection of finer structural details, the potential risk of overdiagnosis or misinterpretation necessitates further research. Future studies with a larger participant pool could provide valuable insights for standardizing radiographic interpretation training in dental education.

Funding for this project was provided by the J. Dean Robertson Society and Student Research Program 2024-25.

#29

Title: Analysis of p53 patterns to assess malignant transformation in dysplasia

Presenter(s): Angela Jarjoura (Pre-doctoral Dental, Class of 2026); Leyann Adi (Pre-doctoral Dental, Class of 2026)

Advisor(s): Ronald Faram; Kathleen Higgins

Abstract:

Purpose: Oral squamous cell carcinoma remains a major global health concern, with high incidence, morbidity, and mortality due to frequent late-stage diagnoses. Malignant transformation potential in oral epithelium is typically assessed using conventional histopathological grading, which evaluates cytological and architectural atypia. However, these methods yield variable risk predictions due to subjective interpretation and variability in malignant transformation among histologically low-risk lesions. Methods: This study examines the utility of p53 immunohistochemical (IHC) staining in identifying high-risk lesions for invasive disease, regardless of histologic grade. Twenty-five tissue samples were classified into five cases of mild, moderate, and severe dysplasia, hyperplasia, and lichenoid mucositis. Consecutive H&E evaluations quantified intra-observer variability, while p53 IHC staining categorized lesions based on wild-type or abnormal patterns. Results: Results showed only moderate agreement between original and subsequent weekly diagnoses, with the greatest discrepancies in mild, moderate, and hyperplasia cases. Additionally, 20% of low- and high-risk lesions exhibited abnormal p53 staining. Notably, 60% of these abnormal patterns were in histologically low-risk lesions (mild dysplasia, hyperplasia), while only 40% were high-risk (severe dysplasia). Although statistical significance was not established ($p = 0.287$), findings suggest that p53 alterations may occur in early dysplastic stages, independent of histologic grade. Conclusion: Given the observed intra-observer variability in oral epithelial dysplasia grading, p53 IHC staining may serve as a valuable adjunct to traditional diagnostics, improving early identification of high-risk lesions. Further longitudinal studies are needed to validate p53 as a prognostic biomarker for malignant transformation.

Funding for this project was provided by the J. Dean Robertson Society and Student Research Program 2024-25.

#30

Title: Testing the radiographic accuracy of proximal caries detection utilizing filters

Presenter(s): Sara Jarjoura (Pre-doctoral Dental, Class of 2027)

Advisor(s): Farah Masood

Abstract:

Purpose: This study evaluated whether enhancement of radiographs with filters will improve caries detection, and how lesion size and depth affect diagnostic accuracy. Methods: Simulated carious lesions of two sizes were drilled randomly on one proximal side of twenty sound, extracted, and de-identified posterior teeth. The radiographs were saved in three image formats: no filter / unenhanced, inversion, and edge enhancement. Four evaluators analyzed each tooth across two sessions for the presence, size, and depth of simulated carious lesions. Results: Minimal difference was found in the number of true and false-positive diagnoses among the three image types. Intra-rater agreement was higher with enhanced images, and re-evaluation significantly improved accuracy. Inversion tended to overestimate while edge enhancement often underestimated lesion severity. Conclusion: Image enhancement filters can be a helpful adjunct in caries detection but should not be used alone, as they may skew lesion size and extension. Using filters after initially diagnosing, re-assessing radiographs, and being educated and experienced will help clinicians most confidently and accurately detect carious lesions.

Funding for this project was provided by the Delta Dental of Oklahoma Foundation and Student Research Program 2024-25.

#31

Title: Decreasing Open Chair Time Through Best Practice Management Systems

Presenter(s): Manas Kommareddi (Pre-doctoral Dental, Class of 2025)

Advisor(s): Staci Wekenborg; Susan Shelden; Shelly Short

Abstract:

Purpose: This study aims to determine the best practice management systems implemented within private practices that aid in decreasing open chair time. Methods: This is a quantitative, non-experimental study that utilizes an electronic questionnaire sent to dentists currently practicing in the United States of America. Results: Ultimately, it was determined that no-show appointments negatively impact clinic time. We have a guiding expression that production lost today is production lost forever. The statistical analysis provided insights into how respondents manage open chair time, improve patient communication, and utilize technology to enhance operational efficiency. The higher rate of dental software usage indicated that digital tools are becoming integral to practice management, which aids in scheduling, patient tracking, and reducing administrative struggles. The variation in communication methods emphasized the importance of a multifaceted approach. Conclusion: Practice management is vital for patient retention, satisfaction, and efficient practice operations. Dental practices can foster lasting relationships that promote loyalty and patient compliance by ensuring effective communication and follow-up with patients. Effective practice management promotes efficient financial operations and patients' oral health. Therefore, as the dental industry progresses, prioritizing effective practice management will be crucial for practitioners aiming to provide exceptional care while sustaining an efficient and successful practice.

Funding for this project was provided by the J. Dean Robertson Society and Student Research Program 2024-25.

#32

Title: Characterization of experimental adhesives containing surface-modified nanoparticles

Presenter(s): Steven Lin (Pre-doctoral Dental, Class of 2027)

Advisor(s): Fernando Esteban Florez; Rochelle Hiers; Sharukh Khajotia

Abstract:

Purpose: To determine the biaxial flexural strength (BFS) and antibacterial (BIO) properties of experimental dental adhesive resins containing different ratios of silanized and non-silanized nitrogen and fluorine co-doped titanium dioxide nanoparticles (NF_TiO2). Methods: NF_TiO2 synthesized via solvothermal reactions was surface-modified with APTES (aminosilane) before being dispersed (30% v/v; ratios investigated=1:1(BA),1:5(BB),1:10 (BC) non-silanized:silanized nanoparticles) into OptiBond Solo Plus (parental monomer). Unaltered adhesives, Peak universal Bond (AD, Chlorhexidine-containing) and OptiBond Solo Plus (CD), served as control groups. Disk-shaped specimens(diameter=6.0mm, thickness=0.5mm) for BFS (n=12/group) and BIO (n=18/group) were fabricated and photopolymerized (40 sec/specimen; 385-515nm, 1,000mW/cm; VALO) prior to testing. Maximum force for BFS was assessed using a Universal Testing Machine (Instron 68TM-5, crosshead speed=1.27 mm/min, 25°C)and BIO was tested by growing Streptococcus mutans biofilms (UA159-ldh, 24 h, 37°C, microaerophilic conditions) on the surfaces of specimens and then measuring the bioluminescence of biofilms in terms of relative light units (RLUs; Biotek Synergy HT multi-well plate reader). Experimental data for BFS and BIO were analyzed using one-factor General Linear Models and post hoc Student-Newman-Keuls tests (α=0.05; SAS Software). Results: Mean BFS force values were AD 72.41±17.57, BA 60.54±25.30, BB 56.94±12.62, BC 67.32±15.50,CD 41.30± 8.62 and BIO values were AD 47484.00±21194.66, BA 29201.44±6153.79, BB 23910.89±7861.19,BC 7921.78±2110.93, CD 29474.67±8530 RLUs. Conclusion: All nanofilled experimental materials investigated displayed antibacterial properties that were significantly superior when compared to those from Peak universal Bond (AD, Chlorhexidine-containing),whereas higher ratios of non-silanized nanoparticles rendered materials with stronger antibacterial functionalities. Nanofilled experimental materials were demonstrated to have comparable mechanical properties to those from commercially available dental adhesive resins, thereby demonstrating the strong translational potential of the technology proposed, and as hypothesized.

Funding for this project was provided by the J. Dean Robertson Society and Student Research Program 2024-25.

This study was presented at the 2025 American Association for Dental, Oral and Craniofacial Research annual meeting.

#33

Title: A retrospective analysis of oral lesions in Native American patients

Presenter(s): Trenton McAreavey (Pre-doctoral Dental, Class of 2026)

Advisor(s): Kathleen Higgins; Ronald Faram

Abstract:

Purpose: This study aims to delineate the spectrum of oral lesions in this population subgroup, focusing on the prevalence of malignant lesions. This comprehensive retrospective analysis reviewed 141 oral biopsies from Native American patients that were received at the University of Oklahoma College of Dentistry Oral Pathology Department over 10 years. Methods: The following information was obtained from pathology reports stored on FileMaker, the University's biopsy database software: date received, histologic diagnosis, age, race, and gender. The biopsied lesions were classified into three categories: benign, premalignant, and malignant. Results: From 2013 to 2023, the OU Oral Pathology department received a total of 15,567 cases. Among these cases, only 141 (0.9%) came from patients who identified as Native American. The majority of the oral biopsies were classified as benign (127 cases, or 90%), followed by premalignant (7 cases, or 5%) and malignant (7 cases, or 5%). Conclusion: This study highlights underreporting or misreporting ethnicity in medical paperwork, as only 141 cases from AI/AN individuals were identified in the database over a decade. Based on current population data, it is more likely that over 100 biopsies from Native Americans should have been received each year by the pathology department. The limited data of our analysis revealed a higher occurrence of malignant lesions (5%) among Native Americans compared to other retrospective studies conducted in the U.S. (1.97%) and previous studies at this institution (1.8%). The increased malignancy rate may be attributed to lesions with concerning clinical presentations being referred to the dental school for a quicker turnaround time. Given the higher prevalence of untreated dental issues and tobacco use among AI/AN populations compared to the general U.S. population and considering Oklahoma's significant Native American presence, there is a need for further research using a larger sample size.

Funding for this project was provided by the J. Dean Robertson Society and Student Research Program 2024-25.

#34

Title: Detecting and locating MB2 canal in maxillary molars using AI

Presenter(s): Jinyoung Park (Pre-doctoral Dental, Class of 2027)

Advisor(s): Sharukh Khajotia; Farah Masood; David Shadid

Abstract:

Background: Endodontic treatments fail for various reasons, including the persistence of bacteria, inadequate or overextended root fillings, improper coronal seals, complications from instrumentation, and untreated canals. In one study of 1,100 teeth with failed endodontic treatments 42% failed due to missed detection of canals. In another study, even with the aid of Cone-Beam Computed Tomography (CBCT) technology, only 33% of second mesio-buccal (MB2) canals were visualized. MB2 canals are often overlooked due to calcifications or complex root anatomy. Purpose: The objective of this pilot study is to explore various deep learning architectures for the development of an AI model to detect and localize MB2 canals in CBCT images of maxillary first molars. Methods: The development of a machine learning (ML) model involves multiple steps: data acquisition, screening, preprocessing, training, testing, and validation. An open-source CBCT dataset from PhysioNet (329 CBCT scans from 169 patients) that is publicly available and has informed consent and IRB approval (GLMC20230502) will be used. The dataset will be screened to meet the inclusion criteria: both genders, ages 18–65 years, endodontically untreated maxillary first molars with MB2 canals. Images will be preprocessed to transform raw CBCT scans into a usable format for ML. Each image will be annotated in 3D with labeled canals (palatal, distobuccal, MB1 and MB2) and verified by an Endodontist. The training step will involve fine-tuning the parameters in an advanced AI algorithm (MedSAM2; Medical Segment Anything Model 2) with the help of 70% of the dataset. Fifteen percent of the dataset will be used for testing, and the remaining 15% will be used for the validation step. Conclusion: The anticipated outcome of this pilot study is successful completion of all of the steps in the development of an AI model to detect and localize MB2 canals in CBCT images of maxillary first molars.

Funding for this project was provided by the J. Dean Robertson Society and Student Research Program 2024-25.

#35

Title: Release of monomers and by-products from adhesive-resins after esterase exposure

Presenter(s): Hareem Shoaib (Pre-doctoral Dental, Class of 2027)

Advisor(s): Sharukh Khajotia; Rochelle Hiers; Fernando Esteban Florez

Abstract:

Purpose: The objective of this pilot study is to determine the effect of 14-day immersions of experimental adhesive-resins in selected salivary esterases on the release of monomers and biodegradation by-products. Methods: Six experimental adhesive-resin formulations were synthesized with varying UDMA:TEGDMA monomer ratios (65:25, 70:20, 75:15) and two silanated barium-silicate filler particle sizes (0.7μm, 2.0μm). Disk-shaped specimens (n=112/resin) were fabricated, polymerized and monomer-extracted (ultrapure water, 37°C). Specimens were UV-sterilized (8kJ/cm2) and immersed (14 days): 0.1U/ml cholesterol esterase (CE), 0.1U/ml pseudocholinesterase (PCE), PCE+CE, or D-PBS (Control). Solutions were replenished every 48h and stored (-20°C, n=7/specimen/esterase solution) until analysis. Eluted monomers (UDMA, TEGDMA) and biodegradation by-products (TEGMA, TEG, MA, UA) in the solutions will be quantified using HPLC with ultraviolet-visible spectroscopy and mass spectrometry (HPLC-UV/Vis-MS). Spectra of unpolymerized resins (n=10/resin) were obtained with a heated diamond crystal ATR (Golden-Gate) and Fourier-Transform Infrared (FTIR) spectrometer (Nicolet-IS50; 37°C). Specimens were polymerized (40s/specimen) before acquiring post-polymerization spectra. Degree of conversion values were calculated using two methods: 1) comparison with EHEMA standard curve (DC), and 2) two-frequency method and tangent-baseline technique (PC). Results: Mean DC values obtained in this study ranged from 60.1±38.8% for the 75:15 UDMA:TEGDMA ratio resin with 2.0μm filler size to 72.6±1.9% for the 65:25 ratio resin with 0.7μm filler size. No statistically significant differences were found among mean DC values (p=0.5289). Mean PC values obtained in this study ranged from 65.7±0.6% for the 65:25 UDMA:TEGDMA ratio resin with 2.0μm filler size to 73.6±12.3% for the 75:15 ratio resin with 2.0μm filler size. Statistically significant differences were found among mean PC values (p=0.0259). PC values were comparable to those of selected commercial products (50-80%). Analysis of the immersion solutions with HPLC-UV/Vis-MS is in process. Conclusion: Experimental adhesive-resins whose degree of conversion values are comparable to those of commercial adhesive-resins were successfully synthesized and tested.

Funding for this project was provided by the J. Dean Robertson Society and Student Research Program 2024-25.

#36

Title: Histological comparison of analytical methods using bone cores

Presenter(s): Sara Aldarkazanly (Pre-doctoral Dental, Class of 2027); Priyan Daji (Pre-doctoral Dental, Class of 2027)

Advisor(s): Ronald Faram

Abstract:

Purpose: Analyzing the microstructural properties of bone provides critical insights into its health and functionality, enabling researchers and clinicians to evaluate disease progression and treatment efficacy. Autogenous dentin grafting has recently been utilized in alveolar ridge preservation, and understanding the rates of osseointegration is crucial for clinicians to predict the timing for future implant placement. Traditional histological analysis methods, however, often rely on manual techniques that are time-consuming, require significant expertise, and may introduce variability in results. This study aims to measure the accuracy and functionality of HALO compared to ImageJ, informing of the best practices for histological analysis in bone research, ultimately enhancing understanding of bone health and disease. Methods: Bone cores containing autogenous dentin grafts were taken from seven adult patients prior to implant placement. These cores were manually analyzed using the ImageJ software and whole slide images were assessed autonomously using the Histopathology and Analytical Laboratory Operations (HALO) software. Results: Five bone core samples were harvested from sites in which autogenous dentin grafts were placed post extraction. ImageJ was found to be more time and labor intensive as it requires manual quantification for each slide. As random sections of a slide were analyzed with ImageJ, there proved to be greater variability. In contrast, HALO proved to be more efficient and accurate as it analyzed a whole slide image of the bone cores in a fraction of the time it would take with ImageJ due to its proprietary Artificial Intelligence technology. Conclusion: ImageJ had increased variability of remaining dentin and was more laborious when compared to HALO. The HALO platform which allows for automated quantification proved to be more efficient than ImageJ. More research needs to be conducted to fully realize the capabilities of HALO in assessing parameters such as osteocyte density, trabecular thickness, and bone volume fraction.

Funding for this project was provided by the J. Dean Robertson Society and Student Research Program 2024-25.

This study was presented at the 2025 American Association for Dental, Oral and Craniofacial Research annual meeting.

#37

Title: Antibiotic Prophylaxis for preventing Infective Endocarditis in pediatric dental patients

Presenter(s): Cameron Loper (Pre-doctoral Dental, Class of 2027); Jordan Baskette (Pre-doctoral Dental, Class of 2027)

Advisor(s): Tim Fagan; Divesh Sardana

Abstract:

Purpose: To assess the effectiveness of antibiotic prophylaxis (AP) in preventing infective endocarditis (IE) and/or bacteremia in high-risk pediatric dental patients. Methods: The PICOS (Population-Intervention-Control-Outcome-Study Design) framework was applied to define the eligibility criteria. Six electronic databases and grey literature were searched for randomized clinical trials (RCTs), case-control studies, and cohort studies (S) involving pediatric patients (under 18 years) (P) who received antibiotic prophylaxis (AP) prior to any dental procedure (I), compared to those undergoing the same procedures without AP (C), to prevent infective endocarditis (IE) and/or bacteremia (O). After removing duplicates, two reviewers screened the studies, and data were extracted using a piloted proforma. The risk of bias for the included studies was assessed with the Cochrane Risk of Bias 2.0 tool for RCTs and the Newcastle-Ottawa Scale for case-control and cohort studies. The Grading of Recommendations Assessment, Development, and Evaluation (GRADE) methodology was used to evaluate the certainty of evidence, rated as high, moderate, low, or very low, with GRADEpro GDT software. Results: A total of 1,980 records were identified from six databases, with 1,774 screened after duplicates were removed. Forty-six articles were reviewed in full, but only three met the inclusion criteria. The Cohen's Kappa Coefficient for full-text screening was 0.33, indicating fair agreement. Due to the limited number of studies and outcome variability, a meta-analysis was not conducted. Conclusion: Three studies found antibiotic prophylaxis (AP) effective in reducing bacteremia and preventing infective endocarditis (IE). Two studies showed reduced bacteremia with AP but did not conclusively link this to a decreased IE risk. One study found AP ineffective in reducing bacteria and preventing IE. The GRADE assessment rated the evidence for antibiotic prophylaxis in preventing IE in high-risk pediatric dental patients as low due to the small number of studies included and limitations in study design.

Funding for this project was provided by the J. Dean Robertson Society and Student Research Program 2024-25.

This study was presented at the 2025 American Association for Dental, Oral and Craniofacial Research annual meeting.

#38

Title: Gummy smiles diagnosis and treatment approaches: A systematic review

Presenter(s): Dorna Akhavain (Advanced Education in General Dentistry, Class of 2025); Sharice Davis (Advanced Education in General Dentistry, Class of 2025)

Advisor(s): Mary Hamburg

Abstract:

A slight showing of the gums when smiling is often linked to a youthful and attractive appearance, with the typical amount being around 1 to 2 mm. In contrast, a "gummy smile" refers to an excessive display of the upper gingiva during smiling, which may also be visible when the lips are at rest, in more severe cases. Properly addressing a gummy smile requires determining its root cause, as this will dictate the treatment approach and potential outcomes. Various factors can contribute to this condition. A comprehensive diagnosis involves an array of assessments, including facial and lip analysis, as well as examining lip line, interlabial distance, and the visibility of teeth at rest. Additionally, a thorough periodontal examination is essential, and in some cases, imaging techniques like radiographs and cephalometric analysis may be necessary, especially when diagnosing VME. The aim of this systematic review is to examine the most common causes of a "gummy smile" as well as to describe the most effective treatment options and their long-term effectiveness. Articles selected from PubMed, Google Scholar, and published written literature show that the most common causes of a gummy smile are a short upper lip, altered passive eruption, vertical maxillary excess (VME), dentoalveolar extrusion, and gingival overgrowth. There are numerous treatment options available, with the most effective, based on research and clinical studies, being gingivectomy, crown lengthening, Botox injection, orthodontics and orthognathic surgery. Long-term effectiveness varies with each treatment method.

#39

Title: AI intraoral image analysis: Enhancing early diagnosis of oral cancer

Presenter(s): Lorraine Byrd (Advanced Education in General Dentistry, Class of 2025); Clement Hsu (Advanced Education in General Dentistry, Class of 2025)

Advisor(s): Mary Hamburg

Abstract:

Oral Squamous Cell Carcinoma (OSCC) remains an ongoing global health concern, contributing significantly to disease burden and mortality. Delayed diagnosis critically impacts patients as 5-year survival rates vary greatly by stage. Conventional diagnostic methods rely on visual examination and biopsy confirmation. These methods are often limited by the clinician's experience and the patient's ability to access specialized care. This study explores the potential of artificial intelligence (AI) in detecting early signs of oral cancer by analyzing intraoral images, aiming to enhance early diagnosis and improve treatment outcomes. To evaluate AI's effectiveness in OSCC detection, an experimental simulation of AI-based diagnosis was conducted using labeled intraoral images. Trained human analysis found difficulty distinguishing OSCC from benign, premalignant, and reactive lesions without a biopsy and detailed patient history. This highlights the need for AI-driven systems capable of analyzing lesion morphology, texture, and growth patterns to improve diagnostic precision. Our research focuses on developing and training an AI model using a dataset of intraoral images to differentiate malignant, premalignant, and benign oral lesions. Automating image-based detection through AI could serve as a valuable diagnostic tool for dentists, oral pathologists, and oncologists, enabling earlier intervention and improving survival rates. Future research will emphasize model validation, dataset expansion, and real-world clinical implementation.

#40

Title: Clinical outcomes and implications of zirconia versus titanium implants

Presenter(s): Kishan Gajera (Advanced Education in General Dentistry, Class of 2025); Sriteja Gummadi (Advanced Education in General Dentistry, Class of 2025)

Advisor(s): Mary Hamburg

Abstract:

Titanium implants have become a mainstay as a restorative option for edentulous spaces in dentistry and zirconia implants have emerged as a promising "metal-free" alternative option. This meta-analysis references nine systematic reviews to compare the clinical implications of using zirconia implants as opposed to the traditional titanium options. The nine systematic reviews were selected using keyword searches through PubMed and Google Scholar. The systematic reviews, although containing data from various study lengths, collectively reported zirconia implants having survival and success rates comparable to that of titanium implants. Similarly, marginal bone loss identified with zirconia implants was comparably similar to the marginal bone loss seen in titanium implants. The studies reflect on zirconia's reduced bacterial adhesion as opposed to titanium as well as its favorable biocompatible properties with patients who have metal sensitivities. Furthermore, zirconia implants showed superior soft tissue response which proves beneficial in cases involving aesthetic demands. The studies did however indicate zirconia's reduced fracture resistance and tensile strength that could be deemed problematic in select cases. In addition, not enough research has been conducted to make any conclusions on longevity. Based on the systematic reviews referenced, with proper case selection, zirconia implants are a reasonable alternative to titanium implants due to similar survival rates, success rates, and marginal bone loss present. Additional research is necessary to be conducted and reviewed to further substantiate these findings.

#41

Title: Radiographic outcomes of alveolar ridge preservation: Autogenous tooth graft/allograft

Presenter(s): Prita Dhaimade (Graduate Periodontics, Class of 2025)

Advisor(s): Robin Henderson

Abstract:

Purpose: This study evaluated the radiographic changes in alveolar ridge dimensions following tooth extraction and ridge preservation using autogenous tooth graft (ATG) with platelet-rich plasma (PRP) compared to freeze-dried bone allograft (FDBA) with PRP. Methods: A prospective, parallel-arm randomized controlled trial was conducted, including 28 patients, with 14 in each group (IRB# 16008). Following tooth extraction, patients underwent ridge preservation using either ATG with PRP (test group) or FDBA with PRP (control group). Cone-beam computed tomography (CBCT) scans were obtained at 2 weeks and 16 weeks postoperatively. A standardized radiographic stent with radio-opaque markers was used to assess vertical ridge height and horizontal ridge width at 2mm and 4mm below the crest. Results: Both groups exhibited some degree of bone resorption over 16 weeks. However, the ATG group demonstrated less resorption compared to the FDBA group. The mean vertical ridge height reduction was 0.72mm in the ATG group, whereas the FDBA group showed a greater reduction of 1.40mm. Horizontal ridge width resorption was also more pronounced in the FDBA group. At 2mm below the crest, the ATG group had a mean reduction of 1.06mm, while the FDBA group experienced 2.28mm of resorption. At 4mm below the crest, width reduction was 0.57mm in the ATG group compared to 1.23mm in the FDBA group. Notably, in cases where the initial buccal wall thickness was less than 1mm, the ATG group had an average resorption of 1.21mm, whereas the FDBA group experienced nearly double the loss at 2.59mm. Conclusion: ATG with PRP demonstrated superior preservation of alveolar ridge dimensions compared to FDBA with PRP, with significantly less vertical and horizontal bone resorption. These findings suggest that ATG provides better structural stability and may serve as an effective alternative to allografts for ridge preservation and implant site preparation.

Funding for this project was provided by the Delta Dental of Oklahoma Foundation and Advanced Student Research Program 2024-25.

#42

Title: Crown lengthening: A solution to supracrestal tissue attachment violation

Presenter(s): Tanay Chaubal (Graduate Periodontics, Class of 2026)

Advisor(s): Robin Henderson

Abstract:

Purpose: Crown lengthening (CL) is a surgical procedure that is frequently indicated for the treatment of excessive gingival tissue, inadequate clinical crown height, or infringement of supracrestal tissue attachment (SCTA). This case report presents a patient who was referred to Graduate Periodontics for CL for teeth #29 and #30, to expose adequate tooth structure and provide an optimal restorative environment. Methods: On clinical examination, 29 and #30 exhibited probing pocket depth of 2-3mm, clinical attachment level of 0mm, and keratinized tissue of 4-5mm. Radiographic assessment revealed infringement of SCTA on #29 and 30. The established diagnosis was restoration margins placed within the supracrestal attached tissues in relation to #29 and #30. The treatment consisted of CL, utilizing a combined approach of soft tissue removal and osseous recontouring to provide optimum clinical crown height and correction of the violation of SCTA for a functional outcome. Upon administration of local anesthesia, a full-thickness flap was raised utilizing internal bevel incision on lingual aspect, sulcular incision on buccal and lingual aspect of #29-#30, and square distal wedge incision distal to #30. Osseous resection was performed to achieve adequate SCTA while preserving the integrity of the periodontal tissues. The flap was approximated with 4-0 chromic sutures and covered by Coe-Pak. Results: The minimum healing phase for final prosthesis is 6 weeks for functional CL and 6 months for esthetic CL. The final prosthesis was placed 5 months postoperatively after refining the preparation margins. Conclusion: This case highlights the importance of CL in providing the necessary tooth structure for successful restoration and correction of violation of SCTA, as well as the significance of proper treatment planning, surgical technique, and post-operative care. CL remains a valuable procedure in the management of complex restorative cases, improving both function and esthetics.

#43

Title: Restoring periodontal health: Case report on free gingival graft outcomes

Presenter(s): Abhilasha Patil (Graduate Periodontics, Class of 2026)

Advisor(s): Robin Henderson

Abstract:

Purpose: Inadequate keratinized gingiva is associated with increased plaque accumulation, gingival inflammation, bleeding on probing, and compromised esthetics. Free gingival grafts (FGGs) are a well-established surgical technique used to increase keratinized tissue width, enhance periodontal stability, and manage mucogingival deficiencies. Beyond soft tissue augmentation, FGGs play a crucial role in improving oral hygiene by creating a resilient gingival environment that facilitates effective plaque control. Methods: This case report presents the management of a 75-year-old female who reported bleeding, pain, and discomfort while brushing her lower anterior teeth. Clinical examination revealed probing depths of 1–2 mm, clinical attachment loss of 2–3 mm, and RT2 recession on teeth #22–27, with plaque accumulation and bleeding on probing. A free gingival graft was performed to augment the keratinized tissue and improve patient comfort during oral hygiene practices. Results: A partial-thickness flap was reflected from #23–26, and a 20 mm × 10 mm free gingival graft was harvested from the upper right palate premolar-molar region. The donor site was secured with 4-0 chromic gut sutures using a crisscross technique, and a stent was provided for patient comfort. The graft was sutured to the recipient site using 5-0 nylon sling and simple interrupted sutures. Sutures were removed after two weeks, and the patient was followed up at 2 and 6 months. Post-operative clinical examination revealed clinical attachment gain of 3–4 mm, increase in keratinized tissue width from 1-3 mm to 5-6 mm with no bleeding on probing. Conclusion: Postoperative outcomes demonstrated increased gingival thickness and stability, reduced inflammation, and improved patient compliance with oral hygiene. This case highlights the dual benefits of FGGs in promoting periodontal health and long-term oral hygiene maintenance.

#44

Title: Expanded mesh free gingival graft - A case report

Presenter(s): Jose Silverio (Graduate Periodontics, Class of 2025)

Advisor(s): Edwin Sutherland

Abstract:

Background: The Expanded Mesh Free Gingival Graft (EM-FGG) is an innovative modification of the conventional free gingival graft (FGG). This technique, presented by Alexander De Greef et al, utilizes a mesh approach designed to increase the width and enhance the adaptability of the harvested tissue at edentulous sites. Methods: A 73-year-old female patient presented for the planning of stage II implant surgery at sites #19 and #20, specifically for the uncovering of recently placed dental implants. Due to inadequate keratinized peri-implant tissue in the mandibular left posterior region, a Free Gingival Graft was recommended to enhance keratinized tissue, increase vestibular depth, and improve soft tissue thickness. This approach aims to prevent potential biological complications, enhance patient comfort, and facilitate better plaque control. Results: Following an evaluation of the edentulous ridge and existing keratinized tissue, a 27mm graft harvest was necessary to improve the peri-implant tissue adequately. The expanded mesh technique was selected for grafting at the edentulous site to remain within the ideal harvest site—ranging from the maxillary first molar to the first premolar. The expanded mesh technique was applied, increasing the graft dimensions to 30mm × 8mm. At the 2-month post-operative follow-up, healing demonstrated complete integration, and the patient was deemed ready for the uncovering of the dental implants. After stage II uncovering and the 3-month FGG post-operative appointment, the patient is now ready to restore the implants. Conclusion: The Expanded Mesh Free Gingival Graft technique proved to be a viable modification for increasing the width of keratinized tissue in edentulous sites. The expanded mesh approach facilitated graft survival and improved tissue adaptation.