OU Health | College of Dentistry
The UNIVERSITY of OKLAHOMA

45th Annual Scientific Day

April 16, 2026

Champion Convention Center

737 S. Meridian Avenue

Oklahoma City, Oklahoma

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J. DEAN ROBERTSON SOCIETY

45th 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 45th 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 Nisha D'Silva BDS, MSD, PhD, an internationally renowned researcher and faculty person as the Keynote Speaker. We are honored that she is present today to support our students and their research projects. Her 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 45th Scientific Day!

Keynote Speaker: Dr. Nisha D'Silva

Oral Cancer: Dancing with Nerves

Biography:

Nisha D'Silva, BDS, MS, PhD, is the Donald Kerr Endowed Collegiate Professor of Oral Pathology at the University of Michigan School of Dentistry, Professor of Pathology at the Medical School, and Rogel Scholar at the Rogel Cancer Center. She is a dentist-scientist, and a Diplomate of the American Board of Oral and Maxillofacial Pathology, which is her area of clinical practice. Dr. D'Silva enjoys teaching dental students and residents. She also mentors PhD students, post-doctoral fellows, and junior faculty and is the recipient of multiple mentorship awards. Her translational research in oral and oropharyngeal cancers focuses on tumor progression and treatment resistance. She is the President of the American Association for Dental, Oral and Craniofacial Research. Dr. D'Silva has been the recipient of multiple National Institutes of Health grants and is currently funded by the National Institute of Dental and Craniofacial Research and by the National Cancer Institute. She is the author of over 110 scientific papers.

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University of Oklahoma College of Dentistry

45th Annual Scientific Day

Schedule of Events

7:15 a.m.	Presenters and Judges arrive
7:30 – 9:00 a.m.	Poster Presentation Judging *(Closed session)*
8:45 – 9:00 a.m.	Attendee Check-in
9:00 – 9:30 a.m.	Registration, Continental Breakfast, Vendor Fair
9:00 – 10:40 a.m.	Poster Presentations
10:45 a.m. – 12:00 p.m.	Keynote Address – Dr. Nisha D'Silva
12:00 – 12:50 p.m.	Lunch Break (Buffet lunch for registered attendees)
12:40 – 12:50 p.m.	Ishmael Finalists Check-in
12:50 – 2:20 p.m.	39th Annual Ishmael Essay Contest
12:50 p.m.	*Introduction – Dr. Onur Kadioglu*
12:51 p.m.	*Kathy Ly (DH2)*
	Acculturation and dental service utilization among first-generation American students
1:06 p.m.	*Rochelle Powell (DH2)*
	Ethical considerations in fluoride use within the dental hygiene practice
1:20 p.m.	*Joanna Rivera (DH2)*
	Is fluoride in or out?
1:35 p.m.	*Matilyn Flanagan (DS2)*
	Transitioning dental care: Perspectives of adolescents with special needs
1:50 p.m.	*Sara Jarjoura (DS3)*
	Digital quantification of p53 immunohistochemical patterns to diagnose epithelial alterations
2:05 p.m.	*Liesel Korber (DS3)*
	Ethical essay: Overtreatment in dentistry
2:19 p.m.	*Closing – Dr. Sharukh Khajotia*
2:20 – 2:30 p.m.	Snack Break
2:30 – 3:30 p.m.	Awards Ceremony
3:30 p.m.	Check-Out (for Students, CE Credit for Faculty and Non-Faculty)

POSTER PRESENTATIONS

Poster #	Presenter Name(s) & Title
#1	KATHY LY (DENTAL HYGIENE STUDENT); SILVIA VARGAS CRUZ (DENTAL HYGIENE STUDENT) Acculturation and dental care utilization in first-generation American students
#2	JOANNA RIVERA (DENTAL HYGIENE STUDENT); ROCHELLE POWELL (DENTAL HYGIENE STUDENT) Is fluoride in or out?
#3	AUBREY BALES (DENTAL HYGIENE STUDENT); ADDISON YOUDERIAN (DENTAL HYGIENE STUDENT) Exploring deer antler stem cells as a periodontal regenerative treatment
#4	ASHTON BRYANT (DENTAL HYGIENE STUDENT); PARIS WARRINER (DENTAL HYGIENE STUDENT) Serotonin synthesis and recurrent apthous stomatitis
#5	ABIGAYL CALDERON (DENTAL HYGIENE STUDENT); MUNIRA ELGREGHNI (DENTAL HYGIENE STUDENT) Prevention of carious lesions in minority pediatric patients
#6	AARON CARLSON (DENTAL HYGIENE STUDENT); GEZELLE VILOG (DENTAL HYGIENE STUDENT) Impact of intraoral cameras on patient education and compliance
#7	CHLOE CRAWLEY (DENTAL HYGIENE STUDENT); ASHLEY PINION (DENTAL HYGIENE STUDENT) Ozone therapy in dentistry
#8	KENZEE DANIELSON (DENTAL HYGIENE STUDENT); ROCIO QUIHUI (DENTAL HYGIENE STUDENT) Oral health of children with diabetes
#9	MESSENA DARTER (DENTAL HYGIENE STUDENT); KARLA MENDEZ SORIA (DENTAL HYGIENE STUDENT) Botox: Expanding the scope of practice
#10	HOPE DEAN (DENTAL HYGIENE STUDENT); ALLIE TWIST (DENTAL HYGIENE STUDENT) The dental effects of sleep apnea on pediatric patients
#11	KATHERINE DUNCAN (DENTAL HYGIENE STUDENT); ALEXANDRA JOYCE (DENTAL HYGIENE STUDENT) Non-nutritive sucking habits on developing dentition
#12	TATUM FIRANSKI (DENTAL HYGIENE STUDENT); CHRISTIANA RICHARDSON VEGA (DENTAL HYGIENE STUDENT) Periodontitis and Alzheimer's disease: Clinical and molecular links
#13	APRIL FOWLER (DENTAL HYGIENE STUDENT); ARRYONNA JAMES (DENTAL HYGIENE STUDENT) Autism in dentistry
#14	TIMOTHY GAITHER (DENTAL HYGIENE STUDENT); LAUREN ARRINGTON (DENTAL HYGIENE STUDENT) Exploring the link between periodontal disease and Alzheimer's Disease
#15	BAILEY HENDERSON (DENTAL HYGIENE STUDENT); SADIE STOSE (DENTAL HYGIENE STUDENT) Eating for two: How maternal diet influences oral health

#16 BAILEY HIGHTOWER (DENTAL HYGIENE STUDENT); LAUREN PAQUE (DENTAL HYGIENE STUDENT)
Calming smiles: Music therapy in pediatric dental anxiety

#17 TIANA JACQUEZ (DENTAL HYGIENE STUDENT); CASEY SILVA (DENTAL HYGIENE STUDENT)
The effects of socioeconomics on oral health

#18 DANIELA MARRUFO (DENTAL HYGIENE STUDENT); DALAA ALSHAMMAT (DENTAL HYGIENE STUDENT)
Treating autistic patients with dental anxiety

#19 MADELINE MULLENBERG (DENTAL HYGIENE STUDENT); ALEXA HOWE (DENTAL HYGIENE STUDENT)
Vaping's impact on oral and systemic health

#20 KAYLIE MURRY (DENTAL HYGIENE STUDENT); GRAYCEN SMITH (DENTAL HYGIENE STUDENT)
Scope of forensic odontology

#21 CARLY NICHOLS (DENTAL HYGIENE STUDENT); MAYA TURNER (DENTAL HYGIENE STUDENT)
Therapeutic effectiveness of botulinum toxin in dentistry

#22 EMILY ROTH (DENTAL HYGIENE STUDENT); KARLA VELASQUEZ (DENTAL HYGIENE STUDENT)
Musculoskeletal disorders: Prevention for the dental professional

#23 LISSETH SOTO-MONRRIAL (DENTAL HYGIENE STUDENT); ASHLEY GONZALEZ (DENTAL HYGIENE STUDENT)
Dental professionals recognizing and reporting child abuse

#24 KALENA XIONG (DENTAL HYGIENE STUDENT); LESLIE PHAM (DENTAL HYGIENE STUDENT)
The efficacy of probiotics in managing oral health

#25 SARA ALDARKAZANLY (PRE-DOCTORAL DENTAL)
Impact of repeated use on implant torque wrench precision

#26 NILAKSHI AMIN (PRE-DOCTORAL DENTAL)
Repeated sterilization effects on PTG file fatigue in curved canals

#27 JAYLEE BERRYHILL (PRE-DOCTORAL DENTAL)
Exploring general dentists' confidence in treating patients with special needs

#28 WILLIAM DUMIGAN (PRE-DOCTORAL DENTAL)
Efficiency of experimental bleaching gels containing peroxititanates and hydrogen peroxide

#29 NICHOLAS FENG (PRE-DOCTORAL DENTAL)
Build orientation affects flexural strength of 3d-printed denture base resins

#30 MATILYN FLANAGAN (PRE-DOCTORAL DENTAL)
Transitioning dental care: Perspectives of adolescents with special needs

#31 GHAZAL HESAMI (PRE-DOCTORAL DENTAL)
Mandibular growth during adolescence: A longitudinal multilevel modeling study

#32 CAROLINE JUDD (PRE-DOCTORAL DENTAL)
Trends in mandibular bone remodeling in patients with bruxism

#33 ABIGAIL LAM (PRE-DOCTORAL DENTAL)
Patient treatment acceptance of equivalently priced root canal versus extraction

#34 MOLLY MCCOWN (PRE-DOCTORAL DENTAL)
Experimental bleaching gels with low hydrogen peroxide concentrations and peroxititanates

#35 TIFFANY NGUYEN (PRE-DOCTORAL DENTAL)
A survey of the 2017 periodontal classification system adoption

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

#37 KATELYN PARKER (PRE-DOCTORAL DENTAL)
Cost feasibility of digital 3d-printed crowns for young permanent molars

#38 SAMANTHA POWER (PRE-DOCTORAL DENTAL)
Flexural properties of clear aligners at oral versus room temperatures

#39 NOAH SANDERS (PRE-DOCTORAL DENTAL)
Patient perceptions of dental outcomes related to delay of care

#40 HAREEM SHOAIB (PRE-DOCTORAL DENTAL)
Wettability, degree of conversion, and monomer/by-products released from adhesive resins

#41 GRANT SMITH (PRE-DOCTORAL DENTAL)
Plasma cell gingivitis - A retrospective review

#42 MONICA TANGARPOUR (PRE-DOCTORAL DENTAL)
Assessing barriers, knowledge, and educational gaps in dental sleep medicine

#43 CHRISTINE TRAN (PRE-DOCTORAL DENTAL)
Denture resin 3D-printing build orientation affects wettability and biofilm formation

#44 MIA WALKER HATFIELD (PRE-DOCTORAL DENTAL)
Correlation between pulp calcifications, systemic diseases, and medications: Retrospective study

#45 SARA JARJOURA (PRE-DOCTORAL DENTAL); LIESEL KORBER (PRE-DOCTORAL DENTAL)
Digital quantification of p53 immunohistochemical patterns to diagnose epithelial alterations

#46 RENA ZHANG (PRE-DOCTORAL DENTAL)
Peripheral giant cell granulomas associated with dental implants

#47 ALEXANDRA AHEARN (ADVANCED EDUCATION IN GENERAL DENTISTRY); SARAH MCPHAIL (ADVANCED EDUCATION IN GENERAL DENTISTRY)
A guide to the esthetic zone: Direct composite bonding techniques

#48 DAVID ALDAZ (ADVANCED EDUCATION IN GENERAL DENTISTRY); TRAVIS ALKIRE (ADVANCED EDUCATION IN GENERAL DENTISTRY); MARK DIRUSSO (ADVANCED EDUCATION IN GENERAL DENTISTRY)
In-house 3D printing for surgical guides: workflow, costs, and ROI

#49 JULIA DAUGHERTY (ADVANCED EDUCATION IN GENERAL DENTISTRY); RYAN ELLIOTT (ADVANCED EDUCATION IN GENERAL DENTISTRY)
The implications of increasing vertical dimension of occlusion

#50 GOVINDA ALLIN (ORAL AND MAXILLOFACIAL SURGERY)
Outcomes of allogenic cartilage in cleft rhinoplasty: A retrospective study

#51 ISAAC ELLISON (ORAL AND MAXILLOFACIAL SURGERY)
Myositis ossificans traumatica of the masseter: A case report

#52 SAMANTHA COLLINS (PEDIATRIC DENTISTRY)
Perspectives on dental care transition for adolescents with special needs

#53 JOHN GAVEL (PEDIATRIC DENTISTRY)
Workflow Feasibility of Digital 3D-Printed Crowns for Young Permanent Molars

#54 CHANDLER ROOF (PEDIATRIC DENTISTRY)
Factors influencing general dentists' willingness to treat special needs patients

#55 TANAY CHAUBAL (GRADUATE PERIODONTICS)
Prosthetically driven mandibular implant-supported overdenture using a surgical guide

#56 SERIFE OZDEMIR (GRADUATE PERIODONTICS)
Esthetic crown lengthening for gingival overgrowth: A digitally guided approach

#57 ABHILASHA PATIL (GRADUATE PERIODONTICS)
Periodontal phenotype modification prior to orthodontic treatment: A case report

#1

Title: Acculturation and dental care utilization in first-generation American students

Presenter(s): Kathy Ly (Dental Hygiene Student, Class of 2026); Silvia Vargas Cruz (Dental Hygiene Student, Class of 2026)

Advisor(s): Robin Graham; Sarah Justus-McMakin

Purpose: The purpose of this study is to measure the influence of acculturation on students at the University of Oklahoma who identify as the first individual in their family to be born in the United States from immigrant parents and their utilization of dental care services. Methods: This study employs a quantitative design using a 26-item Qualtrics survey distributed to first-generation American undergraduate and graduate students at the University of Oklahoma (OUHC IRB #18893). Eligibility was determined through participants self-identifying as the first individual in their family born in the United States to immigrant parents. Results: Of 57 responses received, 19 met all eligibility criteria and were included in the final analysis. Data was analyzed using descriptive statistics and the Wilcoxon test. Race-based analysis compared Hispanic (n=10) and Non-Hispanic Asian (n=8) participants, excluding one African American participant to avoid misrepresentation. No significant differences were found between racial groups, as all p-values were greater than 0.05. Insured participants demonstrated significantly stronger agreement that oral health is a priority (p=0.029965). Conclusion: Hispanic and Non-Hispanic Asian participants reported similar beliefs. Those with dental insurance were more likely to prioritize oral health in adulthood versus childhood. Limitations include a small, less diverse sample and reliance on self-reported data. Overall, the findings highlight the importance of culturally responsive education and improved access to dental care to reduce oral health disparities among first-generation students.

Funding for this project was provided by the J. Dean Robertson Society and Student Research Program 2025-26.

#2

Title: Is fluoride in or out?

Presenter(s): Joanna Rivera (Dental Hygiene Student, Class of 2026); Rochelle Powell (Dental Hygiene Student, Class of 2026)

Advisor(s): Ashley Clark

Purpose: This study aims to assess the relationship between dental hygienists' personal fluoride use and their professional perceptions, education practices, and clinical behaviors regarding fluoride therapy among licensed dental hygienists in Oklahoma. Methods: A quantitative, cross-sectional electronic survey of licensed dental hygienists in Oklahoma (N=203) was distributed through Qualtrics to assess fluoride knowledge, perceptions, personal fluoride use, and clinical fluoride education practices (OUHC IRB #1885). Descriptive statistics were calculated, and comparison between personal fluoride users (n=184) and non-users (n=19) were evaluated using Wilcoxon Rank-Sum tests (α=0.05). Results: Personal fluoride use was significantly associated with more favorable professional perceptions and preventive behaviors. Most dental hygienists who used fluoride strongly agreed that fluoride is an essential preventive tool in dentistry (79.9%), whereas 38.6% of non-users strongly disagreed. Recommendations provided to hesitant or skeptical patients also differed significantly with 73.4% of fluoride users recommending fluoride always or most of the time compared to 68.4% of non-users never recommending fluoride to patients. Preventive education and clinical practice were also significantly related. Dental hygienists who never provided fluoride education were more likely to never perform in-office fluoride treatment (60%), whereas those who provided education more than half the time often reported administering fluoride treatments one to four times per day (54.9%). Conclusion: This study demonstrates dental hygienists' personal fluoride use was closely associated with their professional perceptions, patient education, and preventive practices. These differences may influence consistency in fluoride recommendations and patient education. By examining these relationships, this study highlights the importance of preparing dental hygienists to communicate evidence-based information about fluoride in clinical practice despite growing public skepticism.

Funding for this project was provided by the J. Dean Robertson Society and Student Research Program 2025-26.

#3

Title: Exploring deer antler stem cells as a periodontal regenerative treatment

Presenter(s): Aubrey Bales (Dental Hygiene Student, Class of 2026); Addison Youderian (Dental Hygiene Student, Class of 2026)

Advisor(s): Sarah Justus-McMakin

Purpose: The purpose of this literature review is to examine the role of deer antler stem cells as a regenerative treatment option for alveolar bone loss in patients with periodontitis. Background: Periodontitis is the sixth most common disease in humans. While treatment aims to arrest the progression of this disease, it does not reverse or repair the effects of subsequent alveolar bone loss. Current research on deer antler stem cells explores the potential for wound and bone regeneration in patients with periodontitis. Recent studies highlight deer antlers' unique ability to annually regenerate completely in addition to their rapid wound healing rate. Significance: Studies have shown that conditioned antler stem cell mediums placed in rats with alveolar bone defects were effective in inducing regeneration, producing greater volume and maturity of bone, raised osteogenic markers, and reduced signaling of pro-inflammatory markers. Antler stem cell research has promising biomechanical properties that may improve the outcome of bone grafts in patients. Conclusion: Studies have explored the implementation of regenerative deer antler stem cells in rats and highlighted the potential improvement of regenerative bone growth in patients with periodontitis. Although still in preliminary animal research, these findings may direct future studies that could identify treatment with human trial research. Future findings may greatly impact opportunities in human development and the dental profession as an alternative regenerative process.

#4

Title: Serotonin synthesis and recurrent apthous stomatitis

Presenter(s): Ashton Bryant (Dental Hygiene Student, Class of 2026); Paris Warriner (Dental Hygiene Student, Class of 2026)

Advisor(s): Lindsey Hays

Purpose: This literature review aims to investigate the relationship between recurrent apthous stomatitis and serum serotonin levels. Background: Recurrent apthous stomatitis (RAS) is a prevalent oral disorder that globally affects around 5-66% of the population. The etiology of RAS is unknown; however, there are various factors that can influence its occurrence, most notably hormonal influences and immune-mediated responses. Apthous ulcers may present as single or multiple lesions, with major ulcerations presenting larger than 10mm. These ulcerations can be persistent, severely painful, slow to heal, and may lead to scaring of the oral tissues. A growing area of research is being conducted on the link between RAS and serotonin production. Significance: Physiological studies have demonstrated that patients with RAS tend to have lower levels of serum serotonin. Furthermore, genetic studies found that serotonin transporter polymorphs existed in most RAS cases, which provides evidence of a possible genetic predisposition for the condition. Recent research has discovered that a significant number of patients with RAS also have a disruption of tryptophan synthesis, which is the essential amino acid precursor to serotonin production in the human body. This discovery has led to alternative treatment options focusing on prevention rather than solely on symptomatic treatment. Discussion: The reviewed studies present strong evidence of the relationship between serotonin levels and RAS. Increased awareness of this association may broaden therapeutic applications. In addition to symptomatic therapies, dental professionals should make referrals to primary care physicians and assist in nutritional counseling to increase tryptophan rich foods to aid in the prevention of RAS.

#5

Title: Prevention of carious lesions in minority pediatric patients

Presenter(s): Abigayl Calderon (Dental Hygiene Student, Class of 2026); Munira Elgreghni (Dental Hygiene Student, Class of 2026)

Advisor(s): Julie Schneberger

Purpose: This literature review examines the roles of dietary factors, parental influence, and professional preventive interventions in the development and prevention of dental caries in the pediatric population, with an emphasis on children from low-income and minority households. Background: Dental caries remains one of the most chronic diseases among children ages five to 17 in the United States and worldwide (Ribeiro & Paste, 2023). Approximately two billion people globally have caries in permanent teeth, and 514 million children are affected in their primary teeth (Sugue, 2024). Research shows that parental oral health knowledge and habits significantly shape children's oral health outcomes (Kaushik & Sood, 2023). Additionally, because children make up 33% of the population living in poverty, a condition closely linked to higher caries rates, childhood dental decay continues to be a serious public health issue that disproportionately impacts low-income and minority populations (Vasireddy et al., 2021) Significance: A comprehensive understanding of the multifactorial nature of dental caries is necessary for developing equitable prevention strategies for children. Kaushik and Sood (2023) demonstrate that parental awareness influences children's oral hygiene behaviors, while Gokhale and Nuvvula (2016) emphasize the impact of parental supervision and socioeconomic status on caries risk. Dietary patterns, particularly frequent sugar intake, also contribute to caries development. Combined with preventive interventions such as dental sealants, which can prevent up to 80% of molar cavities (CDC, 2024), these factors support integrated approaches to prevention. Discussion: This literature review indicates that effective dental caries prevention requires integrated strategies that combine dietary modification, parental education, and clinical prevention. Low-income and minority children remain particularly vulnerable due to limited access to care. Promoting nutrient-rich diets, reducing sugar intake, and increasing the use of dental sealants can reduce caries while addressing socioeconomic inequities and improving long-term pediatric oral health outcomes.

#6

Title: Impact of intraoral cameras on patient education and compliance

Presenter(s): Aaron Carlson (Dental Hygiene Student, Class of 2026); Gezelle Vilog (Dental Hygiene Student, Class of 2026)

Advisor(s): Tiffany Dougherty

Purpose: The purpose of this literature review is to analyze research on the impact of intraoral cameras (IOCs) in modern dental practices. Current research focuses on the benefits associated with dental diagnosis, patient education and compliance. While it is also important to note IOC limitations to optimize their uses in patient care. Background: Historically, IOCs have not been as readily available as they are now. They were introduced in the late 1980s and were initially bulky, difficult to maneuver, pricey and limited to clinical utility. Advances in technology have since made these devices more accessible, compact, and user-friendly, allowing clinicians to capture high-resolution images of the oral cavity in real time. This evolution has expanded the role of IOCs beyond documentation to include patient education, treatment planning, and enhanced diagnostic accuracy. Significance: With the standard practice of IOC use, research has shown that the clear images support patient education and increase patient engagement. Dental professionals are therefore seeing an increase in the acceptance of treatment plans and ultimately an improvement in patient outcomes. Additionally, intraoral images can promote patient trust towards their provider, while also being both cost effective and time efficient. Conclusion: The current literature promotes the positive impact of IOCs in dentistry including: diagnosis of carious lesions, periodontal disease or gingival conditions, documentation of oral lesions or other anomalies, improvement in patient education, and increased compliance with treatment. While the literature does suggest that IOCs do offer value in the field of dentistry, it also suggests that more research needs to be done into the efficacy of relying only on intraoral images for diagnosis, as well as other areas IOCs could be used in to improve both the experience of the provider and the patient.

#7

Title: Ozone therapy in dentistry

Presenter(s): Chloe Crawley (Dental Hygiene Student, Class of 2026); Ashley Pinion (Dental Hygiene Student, Class of 2026)

Advisor(s): Lindsey Hays

Purpose: This literature review aims to evaluate and explore recent research on the use of ozone therapy in dentistry. Background: Ozone is a naturally occurring greenhouse gas formed in the atmosphere. While there are concerns about health and safety when exposed to high concentrations of ozone, the gas has quickly become a valuable tool in various healthcare settings. Dental ozone therapy is a less invasive clinical practice designed to minimize microbial load and promote oral health. Ozone has been applied in caries management, periodontal therapy, anxiety management, and pain management. Clinical Significance: Randomized clinical trials have demonstrated that ozone therapy improved periodontal measurements by 95% when used in combination with mechanical debridement as compared to debridement alone. Another clinical trial concluded that ozone therapy used as a postoperative pain management decreased post-op swelling and inflammation compared to a control group who did not receive ozone gas postoperative. Collectively, these findings suggest that ozone can be used as a beneficial adjunct due to its anti-inflammatory, antimicrobial, and immune stimulating properties. Conclusion: Overall, the studies exhibited impressive results that could be used in the future for regenerative dentistry. Using ozone gas may be considered as an efficient and effective way to decrease anxiety and regenerate the periodontium in less time than traditional approaches.

#8

Title: Oral health of children with diabetes

Presenter(s): Kenzee Danielson (Dental Hygiene Student, Class of 2026); Rocio Quihui (Dental Hygiene Student, Class of 2026)

Advisor(s): Julie Schneberger

Purpose: The purpose of this literature review is to examine the effects of Type 1 Diabetes Mellitus (T1DM) on the oral health of children and to identify strategies that may improve outcomes through interdisciplinary medical and dental care. Background: type 1 Diabetes Mellitus (T1DM) is a chronic systemic condition affecting a growing number of children in the United States. Poor glycemic control contributes to inflammatory dysregulation, altered salivary composition, and changes in the oral microbiome, increasing the risk for gingivitis, periodontitis, and dental caries. Research suggests a bidirectional relationship in which oral infections may further impair glycemic control, compounding systemic complications. Significance: The literature consistently demonstrates that children with poorly controlled T1DM experience increased periodontal inflammation, higher plaque accumulation, microbial imbalances, reduced salivary flow, and elevated caries risk. Genetic predispositions further intensify inflammatory responses, accelerating periodontal breakdown even in children with moderate glycemic control. While improved metabolic control and oral hygiene reduce some complications, diabetic children remain at heightened risk for long-term oral disease. Our findings showed children with T1DM had a DMFT score of 1 while children without T1DM had a DMFT score of 4. Discussion: Findings indicate that oral health complications in children with T1DM are driven by a combination of hyperglycemia-induced inflammation, microbial changes, salivary dysfunction, and genetic susceptibility. Early periodontal monitoring, routine dental care, and collaboration between medical and dental providers are essential for improving outcomes. Future research should incorporate longitudinal designs and interdisciplinary approaches to develop personalized preventive strategies. Strengthening integrated care models may significantly enhance both oral and systemic health in pediatric diabetic populations.

#9

Title: Botox: Expanding the scope of practice

Presenter(s): Messena Darter (Dental Hygiene Student, Class of 2026); Karla Mendez Soria (Dental Hygiene Student, Class of 2026)

Advisor(s): Lindsey Hays

Purpose: This review explores the benefits of Botox in dentistry and the potential advantages of expanding the dental hygienist's scope of practice to include administration. Introduction: Historically, Botox has been used as an esthetic treatment to reduce signs of aging. However, Botox can be an effective treatment option for many dental conditions, including temporomandibular disorders (TMD), trigeminal neuralgia, prominent gums, bruxism, pathological clenching, neuropathic pain and sialorrhea. Significance: Expanding Botox administration to trained dental hygienists may improve access to non-surgical management of bruxism, temporomandibular disorders, and chronic orofacial pain. With proper education and regulation, this expanded role supports patient comfort, interdisciplinary care, and professional growth while maintaining ethical, patient-centered practice. Botox may serve as an alternative treatment for patients due to its safety record, and its conservative, non-surgical, reversible, and minimally invasive approach. Discussion: By increasing more awareness of the therapeutic uses of Botox, dental professionals can educate patients and help shift the perception that Botox is used solely for cosmetic purposes. Implementing Botox treatment in different healthcare settings could significantly enhance awareness of its therapeutic applications and provide relief to patients as a part of comprehensive care.

#10

Title: The dental effects of sleep apnea on pediatric patients

Presenter(s): Hope Dean (Dental Hygiene Student, Class of 2026); Allie Twist (Dental Hygiene Student, Class of 2026)

Advisor(s): Tiffany Dougherty

Purpose: The purpose of this literature review is to explore the association between obstructive sleep apnea (OSA) in children and its impact on craniofacial development, oral health, and systemic health. It also highlights the vital role dental professionals play in detection, diagnosis, and referrals. Background: Studies show OSA and chronic mouth breathing have been linked to increased incidence of dental caries, xerostomia, malocclusion, and abnormal craniofacial growth. Mouth breathing has also been demonstrated to put children at risk for systemic conditions such as chronic allergies and sleep-disordered breathing. Additionally, disrupted sleep and reduced oxygenation associated with mouth breathing may contribute to behavioral and cognitive symptoms like those observed in ADHD. These can be useful indicators, ultimately leading to early detection for children suffering with OSA. Significance: Recognizing the associations between OSA and its adverse oral and health manifestations is essential for early diagnosis, interdisciplinary intervention, and the prevention of long-term developmental and health consequences. To avoid the negative impact of misdiagnosis, interdisciplinary collaboration along with parental involvement is key to protecting both the immediate and long-term health of children with OSA. Conclusion: This literature review highlights the critical need for early intervention and reinforces the fundamental role dental professionals have in observing signs and symptoms associated with pediatric OSA. Chronic mouth breathing in children is a common condition that may negatively affect proper development, as well as the overall well-being during critical stages of growth. With adequate training and thorough screenings, dental professionals are essential in the identification and diagnosis of OSA and chronic mouth breathing for pediatric patients.

#11

Title: Non-nutritive sucking habits on developing dentition

Presenter(s): Katherine Duncan (Dental Hygiene Student, Class of 2026); Alexandra Joyce (Dental Hygiene Student, Class of 2026)

Advisor(s): Sarah Justus-McMakin

Purpose: The purpose of this literature review is to examine the relationship between non-nutritive sucking habits (NNSH), specifically pacifier use and thumb sucking, and the development of malocclusion in children. This review also evaluates the role of parental education and early professional intervention in minimizing adverse dental outcomes. Background: Non-nutritive sucking habits are common self-soothing behaviors observed in infancy and early childhood. In early life, prolonged duration, increased frequency, and greater intensity of these habits have been associated with alterations in dental arch development, tooth positioning, and occlusion. Malocclusions commonly associated with NNSH include anterior open bite, increased overjet, overbite, and posterior crossbite. Significance: Studies show an association between prolonged pacifier use and digit sucking with increased prevalence of malocclusion. Studies also report high risk of anterior open bite and posterior crossbite with pacifier use. Intervention strategies, including behavioral modification, parental reinforcement, and orthodontic appliances, have shown effectiveness in cessation of NNSH. Evidence also supports early discontinuation of habits, before age three to four, helps to reduce long-term orthodontic complications. Conclusion: The findings of this literature review emphasize the importance of early parental education and proactive intervention in preventing malocclusion associated with NNSH. Dental professionals must assess habit duration and intensity, provide education, and implement cessation strategies. Early identification and counseling can reduce the need for complex orthodontic treatments. Preventive education and timely habit cessation are impactful approaches to improving long-term oral health outcomes.

#12

Title: Periodontitis and Alzheimer's disease: Clinical and molecular links

Presenter(s): Tatum Firanski (Dental Hygiene Student, Class of 2026); Christiana Richardson Vega (Dental Hygiene Student, Class of 2026)

Advisor(s): Emily Forthun

Purpose: The purpose of this literature review is to examine current research exploring the relationship between chronic periodontitis and Alzheimer's disease (AD). This study will evaluate periodontitis as a modifiable risk factor for neurodegeneration. Background: Alzheimer's disease is a progressive neurodegenerative disorder characterized by cognitive decline and chronic neuroinflammation. The World Health Organization noted that in 2021, Alzheimer's disease may have contributed to 60% of dementia cases worldwide. Emerging evidence suggests that oral health and neurological disorders may be linked biologically through shared inflammatory pathways and the blood-brain barrier. Additionally, severe periodontitis is marked by bacterial inflammation of the periodontium, with an estimated prevalence of 12.5% globally. Periodontal pathogens such as Porphyromonas gingivalis, inflammatory mediators such as cytokines, and amyloid plaques have all been noted in patients with Alzheimer's disease. Epidemiological studies have also shown increased prevalence of periodontitis, tooth loss, and oral inflammation among individuals with cognitive impairment and dementia. Significance: Since periodontitis is a preventable disease, understanding its potential role as a modifiable risk factor for Alzheimer's disease has important implications for dental professionals and interdisciplinary healthcare teams. Early periodontal intervention, preventive oral care and patient education may contribute to improved health outcomes and reduce risks of dementia in aging populations. Discussion: Current literature shows associations between periodontal disease, systemic inflammation, and cognitive decline. These associations appear complex and potentially bidirectional, as cognitive impairment can lead to decreased oral hygiene care and quality of care, which increases the risk of periodontal disease. Current literature is observational and existing diagnostic criteria reflect correlation rather than a confirmed causal relationship. Further longitudinal and interventional research is needed to clarify disease pathogenesis and determine if periodontitis is a modifiable risk factor for Alzheimer's disease. Future research is needed to integrate oral health with systemic disease prevention strategies.

#13

Title: Autism in dentistry

Presenter(s): April Fowler (Dental Hygiene Student, Class of 2026); Arryonna James (Dental Hygiene Student, Class of 2026)

Advisor(s): Ashley Clark

Purpose: The purpose of this literature review is to explore what special needs training dental professionals possess and what accommodations can be made for pediatric autistic patients. Background: 1 in 32 children are diagnosed with autism spectrum disorder (ASD) every year, with many experiencing dental anxiety. Accommodations like adjusting lighting and reducing noises can be made to decrease stress during dental appointments. Studies have reported dentists did not receive adequate formal education that prepared them to treat pediatric ASD patients and because of this they do not feel comfortable treating this population. Understanding the unique behavioral, sensory, and communication needs associated with ASD is essential for providing patient-centered dental care and improving overall oral health. Unfortunately, existing studies suggest only dental professionals who enter pediatric dentistry or special care dentistry are most likely to receive this special training. Significance: There is a growing disparity in oral healthcare access and outcomes among children with ASD. Studies suggest 68% of ASD children between the ages of two and fourteen years old were met with systemic barriers that prevented them from obtaining professional dental care. With increasing ASD prevalence, dental professionals are more likely to encounter patients who scream, cry, and refuse treatment. 87% of parents stated dentists are not able to manage their ASD child's actions, which may contribute to patient and provider distress. Reduced access to care and unmet oral health needs are the unfortunate outcomes to the many systemic barriers these children face. Discussion: Research shows the need for dental professionals to seek special needs education and to implement accommodations that would benefit this specific population. Dental professionals who are confident in treating ASD patients due to their continued education results in more anxiety-free successful dental appointments.

#14

Title: Exploring the link between periodontal disease and Alzheimer's Disease

Presenter(s): Timothy Gaither (Dental Hygiene Student, Class of 2026); Lauren Arrington (Dental Hygiene Student, Class of 2026)

Advisor(s): Robin Graham

Purpose: The purpose of this literature review is to explore the bacterial and immune responsive link between periodontal disease (PD) and Alzheimer's Disease (AD). Background: PD is most markedly a chronic inflammatory disease of the oral cavity that can have systemic repercussions. About four in 10 adults aged 30 years or more and 60 percent of adults aged 65 years or more had some level of PD in the U.S. (Centers for Disease Control and Prevention, 2024). AD is a neurodegenerative disease characterized by amyloid plaques found in the brain, ultimately resulting in cognitive decline (Fadzli et al., 2024). About one in nine adults aged 65 years or more have AD which is estimated to be almost seven million Americans in 2024 (Alzheimer's Association, 2024). Significance: Through research, PD is an associated risk factor for AD. Common periodontal pathogens, such as P. gingivalis, have been detected in neural tissue of AD patients with PD (Liu et al., 2023). These bacteria are known for inducing chronic inflammatory responses, which can result in neuroinflammation. Enzymes from these bacteria also influence the production and deposition of amyloid plaques, which are catalysts in the development of AD (Ryder, 2022). Discussion: Having a better understanding of the connections between these two diseases would further revolutionize the role dentistry plays in systemic health. Through effective communication and clinical application of this information, dental personnel could play a significant role not only in the interdisciplinary treatment of AD, but also in its prevention.

#15

Title: Eating for two: How maternal diet influences oral health

Presenter(s): Bailey Henderson (Dental Hygiene Student, Class of 2026); Sadie Stose (Dental Hygiene Student, Class of 2026)

Advisor(s): Tammie Golden

Purpose: The purpose of this literature review was to examine the importance of nutrition during pregnancy and study the role of essential nutrients and oral hygiene practices in supporting fetal development and maternal oral health. Background: Pregnancy is associated with increased oxidative stress in both the body and oral tissues. Dietary changes, pica practices, hormonal imbalances, and decreased routine oral hygiene during pregnancy are significant risk factors for the development of oral disease. Oxidative stress related to periodontal disease has been linked to adverse pregnancy outcomes, including preterm birth and preeclampsia. Nutritional deficiencies, particularly in vitamins A, C, D, E, as well as calcium and phosphate, may result in enamel defects such as hypo- mineralization, hypoplasia, and hypo-calcifications. Additionally, folate (Vitamin B9) requirements increase up to threefold during pregnancy, and adequate folic acid intake plays a critical role in preventing congenital malformations, including orofacial clefts. Significance: Understanding oral changes during pregnancy is essential for providing specialized care and appropriate nutritional counseling. Antioxidants help maintain oral health by balancing pH and neutralizing acids produced by bacteria in the oral cavity. Periodontal disease further elevates free radicals, increasing inflammation and oxidative stress, which are conditions already heightened during pregnancy due to increased metabolic demands. These factors highlight the importance of early monitoring and preventive interventions to protect both maternal and fetal health. Conclusion: A survey of U.S. Midwestern prenatal care providers stated 60% reported never including an oral evaluation for their pregnant patients. Enhanced education for both expectant mothers and dental care providers is essential for increasing awareness of oral health risks during pregnancy. Dental and prenatal professionals can work together to reduce complications and improve overall maternal and fetal well-being. Funding for this study, if any: None Was this study presented at another professional or scientific meeting? No

#16

Title: Calming smiles: Music therapy in pediatric dental anxiety

Presenter(s): Bailey Hightower (Dental Hygiene Student, Class of 2026); Lauren Paque (Dental Hygiene Student, Class of 2026)

Advisor(s): Hannah Brown

Purpose: This literature review examines the effectiveness of music therapy as a cost-effective and non-pharmacological intervention for reducing anxiety in pediatric dental patients. Background: Pediatric dental anxiety is a prevailing issue that is commonly influenced by negative media presentations and early observations of dentistry, which can create fear before children experience dental care. As a result, many pediatric dental practices rely on pharmacological interventions, such as nitrous oxide, sedation, and general anesthesia, which can be aggressive, costly, and even traumatic for the patient. Non-pharmacologic alternatives, such as music therapy, have become notable as accessible methods to reduce anxiety in pediatric patients during dental treatments. Significance: Dental anxiety developed early in childhood often continues into adolescence and adulthood, leading to avoidance of dental care and poor oral health outcomes. Identifying easily accessible, low-cost, non-invasive anxiety management strategies is crucial for improving early dental experiences, promoting positive attitudes toward dental care in childhood, and increasing the likelihood of long-term dental attendance without reliance on pharmacological interventions. Music therapy has the potential to benefit patients, parents, and dental professionals by improving comfort and cooperation during pediatric dental visits. Discussion: Current research suggests that auditory distractions, including but not limited to music, are associated with reduced physiological indicators of anxiety, especially when patients have the opportunity to choose what they want to listen to. However, findings remain limited and inconsistent, with evidence pointing towards other auditory distractions, such as stories and movies, being more effective than music alone. Additional research is encouraged to understand the impact of music therapy specifically and to better understand the role of patient autonomy in reducing dental anxiety in pediatric patients.

#17

Title: The effects of socioeconomics on oral health

Presenter(s): Tiana Jacquez (Dental Hygiene Student, Class of 2026); Casey Silva (Dental Hygiene Student, Class of 2026)

Advisor(s): Ren Reyes

Purpose: The purpose of this literature review is to explore the effects of socioeconomic status on the various components of oral health, focusing on the impact of dental visit frequency and health literacy. The role of health literacy and frequency of dental visits is explored in its shaping of oral health disparities, highlighting its implications for dental professionals to improve patient care and reduce inequalities. Methods: Socioeconomic disparities in oral health remain to be of considerable importance in the United States and worldwide. Lower socioeconomic status suggests a poorer prognosis in dental health. Patients who do not follow up with frequent dental visits have higher chances of having periodontal disease, dental caries, and oral cancer. Patients with lower health literacy are more prone to having periodontal disease and needing restorative treatment Results: Findings from this literature review demonstrate the impact that socioeconomic status has on oral health. It is important for dental professionals to uphold the value of health equity. This means providing individuals with dental care determined by their needs Conclusion: Initiatives such as school-based sealant programs, mobile dental clinics, and teledentistry have demonstrated to be a positive impact in minimizing the gap of dental health inequity. Therefore, prioritizing these initiatives would be beneficial to improving the oral health of those in need.

#18

Title: Treating autistic patients with dental anxiety

Presenter(s): Daniela Marrufo (Dental Hygiene Student, Class of 2026); Dalaa Alshammat (Dental Hygiene Student, Class of 2026)

Advisor(s): Tammie Golden

Purpose: The purpose of this literature review was to evaluate and compare different techniques used to reduce dental anxiety and improve treatment tolerance in patients with autism spectrum disorder (ASD). The studies in this review highlighted behavioral techniques and use of pharmacological interventions as used for more complex cases. Background: Autism spectrum disorder (ASD) is a neurodevelopmental condition characterized by challenges with social skills, repetitive behaviors, speech and nonverbal communication. As dentistry advances, new approaches have emerged to address dental anxiety in patients with ASD. Significance: ASD patients frequently experience heightened dental anxiety due to sensory sensitivities and communication challenges which can result in avoiding dental care and compromised oral health. Understanding effective anxiety-reducing techniques is crucial for improving access to dental care for ASD patients. By identifying the appropriate anxiety reducing technique, dental professionals can improve patient comfort, promote cooperation and reduce the need for more invasive treatment methods. Discussion: There are a range of techniques for managing dental anxiety in ASD patients, including the use of nitrous oxide, general anesthesia, animal-assisted therapy, virtual reality (VR), and picture exchange communication system (PECS). Findings suggest personalized, patient-centered approaches are most effective, with non-pharmacological techniques serving as valuable first-line options. Pharmacological interventions are reserved for patients with severe anxiety or limited ability to tolerate care. Understanding each approach could help dental professionals in reducing anxiety while also promoting safety and comfort for autistic patients.

#19

Title: Vaping's impact on oral and systemic health

Presenter(s): Madeline Mullenberg (Dental Hygiene Student, Class of 2026); Alexa Howe (Dental Hygiene Student, Class of 2026)

Advisor(s): Christina Tuck

Purpose: The purpose of this literature review was to evaluate current evidence regarding oral health outcomes associated with electronic cigarette use. Background: Electronic cigarettes deliver nicotine-containing aerosols composed of propylene glycol, glycerol, flavoring agents, and other potentially toxic substances directly to the oral cavity. Aerosol composition varies by device type, nicotine concentration, and user behavior, contributing to biological changes within the oral environment. Despite variability in study designs, sample sizes, and outcome measures, evidence consistently associated vaping with gingival inflammation, xerostomia, altered salivary flow, increased plaque accumulation, delayed wound healing, and elevated dental caries risk. Current research suggests electronic cigarette exposure disrupts oral microbial balance, impairs salivary function, and promotes inflammatory responses in periodontal tissues. Methods: The review examined peer-reviewed literature focusing on prevalence trends, risk perception, aerosol composition, and documented oral health effects among adult electronic cigarette users. Significance: Current evidence suggests electronic cigarette exposure may disrupt oral microbial balance, alter salivary function, and promote inflammatory responses within periodontal tissues. Studies consistently associate vaping with adverse oral health outcomes, including gingival inflammation, xerostomia, increased plaque accumulation, delayed wound healing, and elevated caries risk. The well-documented link between vaping and adverse outcomes demonstrates the critical need for dental professionals to routinely assess electronic cigarette use during patient evaluations. These findings provide evidence-based rationale for targeted patient education, early intervention protocols, and preventive strategies to mitigate emerging oral health complications in the vaping population. Conclusion: Continued research is needed to establish long-term health outcomes and dose-response relationships in vaping populations. Dental hygienists must remain at the forefront of screening, education, and evidence-based intervention to protect oral health in this rapidly growing patient demographic.

#20

Title: Scope of forensic odontology

Presenter(s): Kaylie Murry (Dental Hygiene Student, Class of 2026); Graycen Smith (Dental Hygiene Student, Class of 2026)

Advisor(s): Tiffany Dougherty

Purpose: The purpose of this literature review is to examine the role of forensic odontology in human identification, with a focus on bite mark analysis and its scientific limitations. The goal is to evaluate the reliability of bite mark evidence in forensic investigations and to explore other applications within forensic odontology that are considered more dependable. Also discussed are emerging technologies that may improve forensic dental practices in the future. Background: Forensic odontology is an important area of forensic science used to identify unknown individuals, especially when DNA or fingerprint evidence is unavailable. Teeth and dental restorations are extremely durable and often survive harsh conditions, making them valuable in criminal investigations and disaster victim identification. Historically, bite mark analysis was accepted in court based on the belief that every person's dentition is unique and that human skin could accurately record bite patterns. However, more recent research has challenged these assumptions and raised concerns about the validity of this method. Significance: The literature highlights several limitations of bite mark analysis, including distortion of the skin, lack of standardized methods, low inter-examiner reliability, and high false-positive rates. Multiple studies, as well as cases of wrongful convictions, show that bite mark evidence can lead to inaccurate conclusions. In comparison, other areas of forensic odontology such as dental record comparison, age, sex, and disaster victim identification are consistently shown to be more reliable. New technologies like artificial intelligence may help reduce subjectivity in the future, though further validation is needed. Discussion: Bite mark analysis should be used with extreme caution due to its limited scientific reliability. While forensic odontology remains valuable to the justice system, its strongest contributions come from evidence-based identification methods. Continued research and validated technological advancements are necessary to improve accuracy and reduce the risk of wrongful convictions.

#21

Title: Therapeutic effectiveness of botulinum toxin in dentistry

Presenter(s): Carly Nichols (Dental Hygiene Student, Class of 2026); Maya Turner (Dental Hygiene Student, Class of 2026)

Advisor(s): Robin Graham

Purpose: To review current literature on the therapeutic use of botulinum toxin (Botox) in dentistry and evaluate its effectiveness in managing bruxism, temporomandibular disorders (TMD), and salivary gland dysfunction. Background: Bruxism and temporomandibular disorders are common conditions associated with excessive masticatory muscle activity, often resulting in jaw pain, headaches, joint noise, limited mandibular movement, and dental wear. Salivary gland disorders such as sialorrhea and xerostomia also negatively impact oral health, function, and overall patient quality of life. Botulinum toxin is a neuromodulator that inhibits acetylcholine release at the neuromuscular junction, producing temporary muscle relaxation and modulation of glandular secretion. Although Botox has been widely utilized in medical and cosmetic fields for decades, its therapeutic application within dentistry is comparatively recent and continues to expand. Significance: The literature reviewed demonstrates that Botox can significantly reduce masticatory muscle hyperactivity, pain intensity, joint noise, and headache frequency in patients with bruxism and TMD. Additional findings indicate improved regulation of salivary flow, including decreased excessive salivation and preservation of gland function in inflammatory, neurologic, and radiation-induced conditions. Across studies, reported adverse effects were minimal, transient, and self-limiting, supporting the safety of properly administered treatment. Discussion: Based on current evidence, botulinum toxin represents a promising, minimally invasive adjunctive therapy in dentistry. While findings support its clinical effectiveness, limitations such as small sample sizes, lack of randomized control groups, subjective outcome reporting, and short follow-up durations restrict generalizability. Future large-scale, controlled trials are necessary to establish standardized dosing protocols, long-term safety profiles, and definitive clinical guidelines for broader integration into dental practice.

#22

Title: Musculoskeletal disorders: Prevention for the dental professional

Presenter(s): Emily Roth (Dental Hygiene Student, Class of 2026); Karla Velasquez (Dental Hygiene Student, Class of 2026)

Advisor(s): Lydia Snyder

Purpose: This literature review evaluates Musculoskeletal disorders (MSDs) affecting the dental profession and how to prevent them by utilizing a variety of methods. Methods: Dental professionals are at risk of developing MSDs such as carpal tunnel, tendonitis, tension neck, and vibration induced neuropathy. This is due to repetitive motions in awkward positions for extended periods of time. Studies show that the use of ergonomics, ergonomic equipment, and stretching practices reduce MSD prevalence. Results: These conditions can affect range of motion, grip strength, movement and coordination. These side effects and conditions decrease career longevity as well as the quality of life. They cause dental professionals to take more time off work, retire from clinical practice early or seek alternative career paths. Conclusion: Research findings have shown that the use of ergonomic equipment, instruments, positioning that enhances proper posture, and early ergonomic training decrease MSDs. Regular yoga practices, stretching, and regular physical exercise have shown a reduction in overall MSD related pain.

#23

Title: Dental professionals recognizing and reporting child abuse

Presenter(s): Lisseth Soto-Monrrial (Dental Hygiene Student, Class of 2026); Ashley Gonzalez (Dental Hygiene Student, Class of 2026)

Advisor(s): Ashley Clark

Purpose: The purpose of this literature review is to examine the knowledge and training of dental professionals reporting and identifying child abuse in the dental industry. Background: Approximately, 4.5 percent of children are found in a dental setting with lesions in hard and soft palate due to child abuse and neglect. Oral-facial manifestations in physical abuse can include bruising, abrasions/lacerations of lips, frenum, tongue, dental lacerations/dislocations, and more. Oral signs of sexual abuse have been found by bruising/petechiae in the soft or hard palate and on the floor of the mouth. Studies have shown that untreated caries, abscesses, halitosis, poor oral hygiene, aphtha lesions, and periodontal disease could all be main indicators of dental neglect. Multiple factors contribute to why dental professionals are not reporting or finding child abuse. It can mainly consist of lack of training, possible time constraints, fear of misreporting, or lack of evidence. Significance: Dentists and dental hygienists are legally and ethically bound to act when they suspect any signs of child abuse or neglect. In recognizing and further documenting findings or concerns, it can help protect vulnerable children experiencing any form of child abuse or neglect. In a survey of 210 dentists concluded that 43% of the participants did not report child abuse due to lack of knowledge of the reporting procedure, only 9% of dentists reported suspicious abuse. Conclusion: There are different forms of child abuse with a variety of oral-facial manifestations. Studies have shown the need for improvement in the education of child abuse for dental providers. Dental professionals have a duty to apply their knowledge and skills if they choose not to; they fall short of what the profession demands.

#24

Title: The efficacy of probiotics in managing oral health

Presenter(s): Kalena Xiong (Dental Hygiene Student, Class of 2026); Leslie Pham (Dental Hygiene Student, Class of 2026)

Advisor(s): Robin Graham

Purpose: The purpose of this literature review is to discuss the potential benefits of probiotics as an adjunctive approach in preventing oral disease progression. Background: Probiotics are beneficial microorganisms that help maintain a balanced oral microbiome by promoting the growth of healthy and beneficial bacteria while inhibiting pathogenic species. Oral microbial dysbiosis contributes to the development of dental caries through acidogenic bacterial activity and periodontal diseases through inflammatory processes. While many dental therapy adjuncts require clinical appointments or prescriptions, probiotic supplements designed to support gingival health are readily purchased over the counter. Significance: Emerging research on using probiotics suggests that using probiotics with Lactobacillus and Bifidobacterium strains as an adjunct to dental therapy may prevent dental caries and arrest severe periodontitis (Inchingolo et al., 2025; Mendonca et al., 2024). When used alongside scaling and root planning, probiotics demonstrate short-term improvements in probing depth, bleeding on probing, clinical attachment loss, inflammatory biomarkers, and reduction in Streptococcus mutans (Mendonca et al., 2024). Discussion: The use of probiotics as an adjunct to non-surgical periodontal therapy is relatively new with limited research. Current literature supports probiotics as a promising adjunct rather than a definitive periodontal therapy, underscoring the need for standardized, well-controlled clinical trials to clarify strain specific efficacy and long-term benefits. Evidence regarding dental caries prevention remains inconclusive as probiotics effects vary by strain, emphasizing the need for further research to determine their clinical role in caries management.

#25

Title: Impact of repeated use on implant torque wrench precision

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

Advisor(s): Robin Henderson

Purpose: The success and longevity of dental implants rely heavily on precise surgical techniques and the mechanical stability of implant components. One of the critical factors in implant stability is the application of torque, which ensures proper fixation of the implant in the bone and the secure attachment of prosthetic components at the implant-abutment interface. However, variability in torque delivery due to repeated use may induce inconsistencies, potentially leading to biomechanical instability and prosthetic failure. This study aims to evaluate the reliability, accuracy, and mechanical durability of torque wrenches over multiple applications, providing insights into their clinical performance and implications for implant longevity. Methods: Ten torque wrenches were selected from the Department of Implantology at the University of Oklahoma College of Dentistry. Each wrench underwent evaluation for consistency in torque application across 500 successive uses. Torque values were precisely measured using a calibrated torque testing apparatus before each trial to ensure measurement fidelity. The experimental protocol employed a torque range of 30-35 N·cm, simulating clinical application conditions. Results: Across 500 consecutive applications, all torque wrenches demonstrated consistent performance within the clinically acceptable range. The mean torque values remained between 34-35 N·cm, with minimal variation across repeated cycles. No clinically significant loss of torque accuracy was observed within the study interval. These findings indicated that the evaluated torque wrenches, maintained reliability under tested conditions, while highlighting the importance of ongoing monitoring to detect potential loss of accuracy over extended use. Conclusion: Maintaining accurate torque application is essential for the long-term success of dental implants. This study highlights the potential for torque wrenches to lose accuracy with repeated use, emphasizing the importance of routine calibration and timely replacement of worn instruments. Ensuring consistent torque application can help improve implant stability, reduce mechanical complications, and enhance overall treatment success.

Funding for this project was provided by the J. Dean Robertson Society and Student Research Program 2025-26.

#26

Title: Repeated sterilization effects on PTG file fatigue in curved canals

Presenter(s): Nilakshi Amin (Pre-doctoral Dental, Class of 2027)

Advisor(s): David Shadid; Khizar Abid; Catalin Teodoriu

Background: This study investigates whether autoclave sterilization affects the cyclic fatigue resistance of ProTaper Gold (PTG) NiTi rotary files of different sizes (S1, F2, and F3) under three standardized canal curvature angles (9.73°, 11.73°, and 13.7°). Methods: A total of 162 (n = 162) PTG NiTi rotary files (ProTaper Gold, Dentsply Tulsa Dental Specialties, USA) were used in this study. The files were equally divided into three experimental groups (n=54) based on canal curvature angles of 9.73° (n=18), 11.73° (n=18), and 13.7° (n=18). Each angle group was further subdivided into three subgroups according to sterilization status new/unused (control group) (n=6), sterilized once (n=6) and sterilized twice (n=6). Sterilization was performed using a SciCan Statim 2000 autoclave at 270°F and 32 psi. All files were mounted in a cyclic fatigue testing device and rotated at a speed of 835 rpm at their assigned curvature angle until fracture occurred. Following fracture, the elapsed time to fracture was analyzed using DasyLab software and the remaining length of the unfractured fragment was measured using a Keyence VR-6000 3D optical profilometer. Results: A combined modified S–N curve was produced for all file types. Results showed a consistent decrease in the number of cycles to failure as the bending angle increased, indicating an inverse relationship between bending stress and cyclic fatigue resistance. Overall, S1 files demonstrated the highest fatigue resistance, particularly under higher bending offsets, while F2 files showed intermediate performance and F3 files exhibited the lowest fatigue resistance. These findings suggest that file design and geometry play a significant role in fatigue resistance prior to failure. Conclusion: It can be concluded that sterilization significantly reduces cyclic fatigue resistance after the second autoclave cycle, while the first cycle shows no significant effect. All files confirmed that increasing the bending angle decreases fatigue life.

Funding for this project was provided by the J. Dean Robertson Society and Student Research Program 2025-26.

#27

Title: Exploring general dentists' confidence in treating patients with special needs

Presenter(s): Jaylee Berryhill (Pre-doctoral Dental, Class of 2028)

Advisor(s): Autumn Hurd

Purpose: Patients with special needs face greater limitations to receiving dental care comparatively to those without. This study explores general dentists' confidence levels and areas of deficiency in treating patients with special healthcare needs to provide adequate care. The goal of the study is to define areas where the dental profession can improve access to care for patients with special healthcare needs. Methods: Data collection by use of a cross-sectional survey was distributed electronically through the Oklahoma Dental Association to general dentists. The survey included an assessment of demographics, practice attributes, training and experience for patients with special needs, barriers for the dentist, confidence levels, and willingness to provide care. All participants completed the survey voluntarily and anonymously. Results: The 34 general dentists respondents reported half of participants receiving specific training for special healthcare patients in dental school and feel as if their training prepared them adequately. However, less than half of the dentists reported having inter-professional collaboration with behavior specialists or other providers to support management of patients. The main deficiency reported when treating patients with special healthcare needs was due to lack of training and education. Survey participants report low confidence levels when treating patients with special healthcare needs. Conclusion: The deficiency in training and knowledge for patients with special healthcare needs leads to a lack of confidence when treating these patients, often leading to referrals. Given the outcome, it is important to evaluate how the profession can overcome this deficiency to improve confidence in the ability to treat patients with special healthcare needs, thereby improving access to care for this vulnerable population.

Funding for this project was provided by the Delta Dental of Oklahoma Foundation and Student Research Program 2025-26.

#28

Title: Efficiency of experimental bleaching gels containing peroxititanates and hydrogen peroxide

Presenter(s): William Dumigan (Pre-doctoral Dental, Class of 2028)

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

Purpose: To characterize the bleaching efficacy of experimental hyaluronic acid (HA) bleaching gels containing low hydrogen peroxide (HP) concentrations and surface-modified nanoparticles. Methods: Nitrogen and fluorine co-doped titanium dioxide nanoparticles (d=6-15 nm) were synthesized and surface-modified into peroxititanates (N) using 35%HP before being suspended in distilled water (40 mg/ml) and stored at 25°C. Experimental hyaluronic acid gels (HA) containing 6% HP were synthesized and stored (5°C). Peroxititanates were manually incorporated (@ 5% wt/wt) into HA immediately before use. Bleaching protocols were composed of three bleaching sessions (B1, B2 and B3, 7 days apart), with light irradiation (L; 50 min/session, 405+/-15 nm, 350 mW/cm2) or without light irradiation. Bovine teeth (n=10/group) were subjected to prophylaxis and stored in distilled water (duration of study) before being randomly distributed into six groups: G1-HP35%+L (control-1), G2-HP35% (control-2), G3-HA6%+N+L, G4-HA6%+N, G5- HA6%+L, and G6-HA6%. Bleaching efficacy (WiD, ΔE and Δ) was determined (Vita EasyShade V) at baseline, after each bleaching session (B1, B2 and B3) and 17 days after B3 (CS). Data was statistically analyzed using Kruskal-Wallis (group*session) and Mann-Whitney U post-hoc tests with Bonferroni adjustment for pairwise comparisons. Friedman tests were used to assess within-specimen changes across sessions (CI=95%). Results: All formulations produced measurable whitening (WID, ΔE and ΔE00) at CS with statistically significant intergroup differences ($p<0.05$). 35%HP groups yielded the greatest whitening, ranking HP35%+L > HP35%. Among experimental 6%HP gels, bleaching efficacy ranked HA6%+ L > HA6%+N+ L > HA6% > HA6%+N. Mean ΔWiD values at CS ranged from ~4.9 (HP 35% + L) to ~1.8 (HA + N). Conclusion: Experimental HA bleaching gels containing 6%HP and peroxititanates demonstrated perceptible and acceptable bleaching efficacy, with light activation and nanoparticle incorporation enhancing early and sustained whitening, though high-concentration HP controls remained the most effective overall, as hypothesized.

Funding for this project was provided by the J. Dean Robertson Society and Student Research Program 2025-26.

This study was presented at the 2026 American Association for Dental, Oral and Craniofacial Research annual meeting.

#29

Title: Build orientation affects flexural strength of 3d-printed denture base resins

Presenter(s): Nicholas Feng (Pre-doctoral Dental, Class of 2028)

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

Purpose: To determine the effect of build orientation on the biaxial flexural strength of additively manufactured denture base resins. Methods: Three commercial denture base resins were tested: Formlabs Denture Base RP Resin (product F), NextDent Denture 3D+Resin (product N) and Rodin Denture Base (product R). Printing parameters were optimized using a calibration file. Disk-shaped specimens (n=12/resin) having dimensions of 6.0mm diameter and 0.5mm thickness were fabricated in an AnyCubic Photon D2 DLP 3D-printer in three build orientations: 0° (parallel to the build plate), 45° and 90°. Specimens of the latter two orientations were 3D-printed with supports. Specimens were washed (isopropyl alcohol, 5 min), post-cured in AnyCubic Wash and Cure 2.0 (25W, LED: 405 nm, 10 min) and immersed in ultrapure water (37±1°C, 24h) for monomer extraction. A biaxial flexure fixture (Instron 68TM-5, 100N load cell) was used to measure the Peak Force (PK) experienced by each specimen prior to fracture. Results: Results of two-factor General-Linear-Models and post-hoc SNK analyses (α=0.05; SAS software) demonstrated statistically significant interactions ($p<0.0001$) among mean PK values of all product - build orientation combinations. Mean PK values of the 45° (93.58N) and 0° (97.90N) orientations of product F were statistically significantly higher than the 90° orientation ($p<0.0001$; 49.88N). For product N, mean PK values of all orientations were statistically significantly different from each other ($p<0.0001$; 0°: 48.61N, 90°: 62.48N, 45°: 84.95N). Mean PK values of the 0° (50.11N) and 45° (43.06N) orientations of product R were statistically significantly higher ($p<0.0001$) than the 90° (25.32N) orientation. Conclusion: Biaxial flexural strength varied based on the composition of the additively manufactured denture base resins and the build orientation of the specimens, but a consistent trend was not observed.

Funding for this project was provided by the J. Dean Robertson Society and Student Research Program 2025-26.

This study was presented at the 2026 American Association for Dental, Oral and Craniofacial Research annual meeting.

#30

Title: Transitioning dental care: Perspectives of adolescents with special needs

Presenter(s): Matilyn Flanagan (Pre-doctoral Dental, Class of 2028)

Advisor(s): David Ciesla

Purpose: This study aimed to identify the challenges, priorities, and unmet needs experienced by adolescent patients with special healthcare needs during the transition from pediatric to adult dental care. With insight from their perspectives, strategies may be developed to enhance continuity and their access to oral health services. Methods: This study used a mixed-method design where ten adolescents participated in semi-structured interviews and completed a 5-point Likert-scale survey to explore their experiences as young adults with special healthcare needs that will be transitioning from pediatric to adult dental care (OUHC IRB #18341). Quantitative data was analyzed descriptively, and qualitative data was analyzed using thematic analysis to explore the perspectives and needs of the adolescents prior to transition. Results: Satisfaction with their current pediatric care was high (median: 5, IQR: 5,5). Feeling prepared and informed for transition was neutral (median: 3, IQR: 3,5). Belief about their needs being met in adult care had a mixed response (median: 4, IQR: 2,5). Completing critical treatment under pediatric provider was high (median; 5, IQR: 5,5). Confidence in support and resources for transitioning was generally positive (median: 4, IQR: 4,5). The four major themes identified from the qualitative data were: high satisfaction and emotional security in their pediatric care; limited cognitive engagement with the concept of transition; anxiety and uncertainty surrounding adult dental care; and desire for a supported transition process. Conclusion: Adolescents with special healthcare needs report high satisfaction with pediatric dental care but demonstrate limited preparedness for the transition to adult dental services. Findings highlight the importance of early, structured transition planning that preserves accommodations, supports continuity of care, and actively engages adolescents in the transition process.

Funding for this project was provided by the Delta Dental of Oklahoma Foundation and Student Research Program 2025-26.

#31

Title: Mandibular growth during adolescence: A longitudinal multilevel modeling study

Presenter(s): Ghazal Hesami (Pre-doctoral Dental, Class of 2027)

Advisor(s): Helder Jacob

Purpose: Quantifying condylar growth spurt and direction has significant clinical implications. The purpose of the study is to determine whether some aspects of the mandibular exhibit female adolescent growth spurts. Multilevel modeling procedures were used to statistically determine the presence of a spurt. The study also aimed to develop the dental student's ability to become familiar with cephalometric radiographs, digital tracing procedures, cephalometric superimposition using stable structures, and the assessment of systematic and random measurement errors. Methods: This preliminary study sample included 15 untreated females evaluated longitudinally from 10 to 16 years of age (OUHC IRB #18955). Lateral cephalograms (n= 68) were taken annually (minimum of four per patient). serial lateral cephalometric radiographs. To evaluate the horizontal and vertical movements of the individual landmarks relative to stable structures, the tracings were superimposed on the natural reference structures of the mandible. Polynomial regression was used to model the mixed-longitudinal growth changes that occurred. Results: Only two out of the 16 measures followed third-order, or cubic, polynomials, indicating that growth velocities increased initially and then decreased (i.e. there was peak velocity and a growth spurt). Other two measures presented marginally non-significant (trend) third-order polynomials. Condyle, which is the most important growth site of the mandible, showed a horizontal linear age effect but not quadratic and cubic terms. It also showed conventional linear growth, although suggesting a trend toward age-related change. Conclusion: Vertical condylar growth did not reach statistical significance, although the linear and quadratic components suggested a possible age-related trend, and the mandibular condyle showed a significant horizontal linear age effect, indicating a consistent increase in the horizontal direction during adolescence. The findings provide insight into mandibular and maxillary growth behavior and support the use of multilevel modeling for future longitudinal investigations.

Funding for this project was provided by the J. Dean Robertson Society and Student Research Program 2025-26.

#32

Title: Trends in mandibular bone remodeling in patients with bruxism

Presenter(s): Caroline Judd (Pre-doctoral Dental, Class of 2027)

Advisor(s): Farah Masood

Purpose: This study investigated bone remodeling in patients with history of bruxism on radiographs by evaluating changes in the mandibular cortex, angle of the mandible, and condyle. Methods: One hundred panoramic images of patients with history of bruxism and one hundred panoramic images without a history of bruxism were selected and analyzed (OUHC IRB #18657). The mandibular morphology in the three anatomical regions was assessed using established radiographic classification systems. Mandibular Cortical Index: C1: sharp and even margins on both sides of the mandible, C2: presence of semilunar defects or endosteal cortical residues, and C3: irregular, porous layer with heavy endosteal residues. Angle of the mandible: G0: a convex course of the cortex with no directional change or bone apposition at the angle; G1: a directional change as the cortical margin extends laterally but without apposition; G2: both directional change and generalized, inhomogeneous bone apposition; and G3: apparent directional change along with localized bone apposition at one or more sites. Morphology of condyles: rounded, flat, pointed, and angled. Associations were evaluated using chi-square tests for mandibular cortical index and condylar morphology, and Fisher's exact test for mandibular angle. Results: A statistically significant association was observed between bruxism and mandibular cortical index ($p=0.0082$). Evaluation of condylar morphology did not demonstrate a statistically significant association with bruxism ($p= 0.9493$). No significant association was found between bruxism and angle of the mandible classification ($p=0.1527$). Conclusion: Patients with a history of bruxism demonstrated a greater likelihood of exhibiting a notably porous and irregular mandibular cortex, whereas non-bruxism patients more commonly displayed even, smooth, and well-defined cortical borders. These findings contribute to the growing body of evidence supporting bone remodeling in patients with bruxism and suggest that evaluation of morphological characteristics of the mandibular cortex may serve as a useful radiographic indicator associated with this parafunctional behavior.

Funding for this project was provided by the J. Dean Robertson Society and Student Research Program 2025-26.

#33

Title: Patient treatment acceptance of equivalently priced root canal versus extraction

Presenter(s): Abigail Lam (Pre-doctoral Dental, Class of 2028)

Advisor(s): Staci Wekenborg; Shelly Short; David Shadid

Purpose: The purpose of this study was to evaluate how reducing the cost of root canal therapy to match the price of extraction influences patient acceptance of treatment at the University of Oklahoma College of Dentistry. Methods: A quantitative, non-experimental retrospective study was used to analyze patient records during a defined clinical period. This study was approved by the Oklahoma Health Sciences Center Institutional Review Board (#18786) Results: Out of 2322 teeth that were extracted, 2163 were excluded from the study as those patients were not given the option to choose a root canal treatment. Of the 2163 excluded, ten teeth were determined to have the option of root canal treatment; however, these cases would have required referral to an outside endodontist as the procedure was considered too advanced for the dental student clinic. All ten elected to have the tooth extracted at OUCOD. From the patients that were given the choice of either a root canal or extraction, 159 teeth were elected to be extracted, while 327 teeth received a root canal. When patients were presented with both options, 67.28% elected to proceed with root canal therapy. Conclusion: Based on the results of this study, one can conclude that more patients are willing to preserve their natural tooth through acceptance of root canal treatment when the price is equivalent to the alternative option of an extraction. Efforts to reduce financial barriers could allow an increase in patients being able to prioritize their long-term oral healthcare outcome over immediately affordable options.

Funding for this project was provided by the Delta Dental of Oklahoma Foundation and Student Research Program 2025-26.

#34

Title: Experimental bleaching gels with low hydrogen peroxide concentrations and peroxititanates

Presenter(s): Molly McCown (Pre-doctoral Dental, Class of 2028)

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

Purpose: To characterize the efficacy of experimental bleaching gels containing low hydrogen peroxide (HP) concentrations and surface-modified nanoparticles. Methods: Nitrogen and fluorine co-doped titanium dioxide nanoparticles (d=6-15 nm) were synthesized and surface-modified into peroxititanates (N) using 35%HP before being suspended in distilled water (40 mg/ml) and stored at 25°C. Experimental gels (C940) containing 6%HP were synthesized and stored (5°C). Peroxititanates were manually incorporated (5% wt/wt) into C940 immediately before use. Bleaching protocols were composed of three bleaching sessions (B1, B2 and B3, 7 days apart), with light irradiation (L; 50 min/session, 405+/-15 nm, 350 mW/cm2) or without light irradiation. Bovine teeth (n=10/group) were subjected to prophylaxis and stored in distilled water (duration of study) before being randomly distributed into six groups: G1-HP35%+ L (control-1), G2-HP35% (control-2), G3-C940+HP6%+N+L, G4-C940+HP6%+N, G5-C940+HP6%+L, and G6-C940+HP6%. Bleaching efficacy (WiD, ΔE and ΔE00) was determined (Vita EasyShade V) at baseline, after each bleaching session (B1, B2 and B3) and 17 days after B3 (CS). Data was statistically analyzed using Kruskal-Wallis (group*session) and Mann-Whitney U post-hoc tests with Bonferroni adjustment for pairwise comparisons. Friedman tests were used to assess within-specimen changes across sessions (CI=95%). Results: All formulations produced perceptible and acceptable whitening (WiD, ΔE and ΔE00) at CS with statistically significant intergroup differences ($p<0.05$). 35%HP groups yielded the greatest whitening color improvements, ranking HP35%+L > HP35%. Among experimental 6%HP gels, efficacy ranked C940+L > C940 > C940+N+L > C940+N. Mean ΔWiD values at CS ranged from ~8.0 (HP35%+L) to ~1.7 (C940+N). Conclusion: Experimental 6%HP gels containing peroxititanates demonstrated measurable bleaching efficacy, with light activation and nanoparticle inclusion enhancing early and sustained whitening, though high-concentration HP controls remained the most effective overall, as hypothesized.

Funding for this project was provided by the J. Dean Robertson Society and Student Research Program 2025-26.

This study was presented at the 2026 American Association for Dental, Oral and Craniofacial Research annual meeting.

#35

Title: A survey of the 2017 periodontal classification system adoption

Presenter(s): Tiffany Nguyen (Pre-doctoral Dental, Class of 2028)

Advisor(s): Tracey Whitley

Purpose: The 2017 World Workshop Classification (WWC) of Periodontal and Peri-implant Diseases and Conditions represents a significant update to the previous 1999 classification system. However, research on its implementation within private dental practices is limited. This study aims to investigate the awareness and application of the new classification among dental providers in Oklahoma, as well as identify barriers to implementation. Methods: An electronic cross-sectional survey was developed and administered using Qualtrics. Participants were recruited from the Oklahoma Board of Dentistry professional membership directories, targeting licensed general dentists, specialists, and dental hygienists. Unlicensed dental staff and practitioners outside of Oklahoma were excluded. Results: Statistical analysis demonstrated that awareness of the 2017 WWC differed significantly according to dental provider type ($P < 0.0001$) and years of experience ($P < 0.0001$). Both awareness and adoption of the new classification system were statistically significant across these groups, with dental hygienists, periodontists, and practitioners with fewer than 10 years of experience reporting the highest levels of awareness and implementation. Among the classification categories, those related to Periodontal Health and Periodontitis were most widely used in practice. Improvements in diagnostic and prognostic capability were not statistically significant across dentist type; however, they were significantly associated with years of professional experience ($P = 0.0008$). The most frequently reported barrier to implementation was prior training in, and continued reliance on, the previous classification system (54.1%). Conclusion: Awareness and adoption of the 2017 World Workshop Classification system vary significantly by provider type and years of professional experience. While the classification has been integrated into practice, its perceived impact on diagnostic and prognostic capabilities appears to depend more on clinical experience than provider type. These findings suggest that targeted continuing education and training may be necessary to facilitate broader adoption of the updated classification system across all dental provider groups.

Funding for this project was provided by the J. Dean Robertson Society and Student Research Program 2025-26.

#36

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

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

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

Purpose: To develop an artificial intelligence (AI) model for automated detection and localization of second mesiobuccal (MB2) canals in 3D Cone-Beam Computed Tomography (CBCT) images of maxillary first molars, addressing a primary cause of endodontic treatment failure. Methods: A ground truth dataset was created through manual segmentation of open-source CBCT images from PhysioNet using 3D Slicer software. The segmentation workflow involved automated tooth segmentation via DentalSegmentator plugin, thresholding to isolate root canal structures, and slice-by-slice manual tracing of remaining canals using a brush tool. The training data set consisted of 35 3D CBCT images, and validation and test data sets had 5 images each. Two pre-trained AI models were adapted and fine-tuned: SAM2 (Segment Anything Model 2, a foundation model for promptable image segmentation, base+ variant) and MedSAM2 (specialized for medical imaging with pre-training on diverse 3D medical datasets, based on SAM2's tiny variant). Both models were trained using bounding boxes as prompts on systems with dual RTX 4090 GPUs. The dataset was partitioned into three parts containing 2D slices: 14,700 slices were used for training, 2,100 slices were used for validation, and 2,100 slices were used for testing. Model performance was quantitatively evaluated using Intersection over Union (IoU) and Dice similarity coefficient metrics. The combination of Dice and Binary cross entropy was used as the loss function. Results: For the test set, SAM2 achieved an IoU score of 0.8276 and a Dice score of 0.8991, slightly outperforming MedSAM2 (IoU: 0.8195, Dice: 0.8929) which indicates marginally better segmentation accuracy. Conclusion: This study demonstrates the feasibility and potential of using SAM2 and MedSAM2 for detecting challenging anatomical structures like MB2 canals in maxillary molars. Fine-tuning these foundation models on a manually segmented CBCT dataset provides a promising pathway for developing clinical decision support tools to reduce missed canals and improve endodontic treatment outcomes.

Funding for this project was provided by the J. Dean Robertson Society and Student Research Program 2025-26.

This study was presented at the 2026 American Association for Dental, Oral and Craniofacial Research annual meeting.

#37

Title: Cost feasibility of digital 3d-printed crowns for young permanent molars

Presenter(s): Katelyn Parker (Pre-doctoral Dental, Class of 2028)

Advisor(s): David Ciesla

Purpose: Permanent first molars are highly susceptible to caries, developmental enamel defects, and early structural failure, often requiring full-coverage restoration. While stainless steel crowns remain clinically effective, esthetic concerns and workflow limitations have increased interest in digitally fabricated alternatives. Although pediatric dentists have expressed a desire for additional restorative options for severely carious or hypoplastic molars, the economic and operational feasibility of chairside digital solutions remains uncertain. This study evaluated the cost feasibility of a fully digital, chairside 3D-printed crown workflow for permanent first molars. Methods: A market-based, deterministic feasibility analysis was performed from the clinic perspective using publicly available equipment pricing and literature-derived workflow times. Capital costs for intraoral scanners, 3D printers, and ancillary equipment were annualized using straight-line depreciation over 12-, 36-, and 60-month periods. Variable costs included validated crown resins and consumables. Active and passive workflow times were modeled, and sensitivity analyses assessed the effects of utilization volume, depreciation horizon, and labor assumptions. Results: Scanner costs ranged from $5,000 to $43,000, and printer systems from $3,500 to $25,000, with total printer startup costs of $8,500 to $68,000. Per-crown non-labor costs decreased from $183 at 12 months to $49 at 60 months. A utilization threshold of approximately 250 crowns per year emerged as a conservative benchmark for feasibility across pediatric, group, and academic practices. Conclusion: The feasibility analysis demonstrates a fully digital workflow in pediatric dental offices is economically viable considering equipment lifespan and capital amortization. Feasibility is dependent on the utilization, existing digital workflows, and reimbursement variability. Though the turnaround time exceeds that of prefabricated crowns, the rapid cost dilution with continued use supports the practicality of this workflow in high-volume practice settings. Chairside 3D-printed crowns for permanent first molars are economically feasible under conservative assumptions, supporting further preclinical and clinical investigation in pediatric dentistry.

Funding for this project was provided by the J. Dean Robertson Society and Student Research Program 2025-26.

#38

Title: Flexural properties of clear aligners at oral versus room temperatures

Presenter(s): Samantha Power (Pre-doctoral Dental, Class of 2028)

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

Purpose: Proposed ANSI/ADA Specification No. 188 stipulates that flexural properties should be tested at room temperature, which may not simulate intraoral conditions. The objective was to determine the effect of testing flexural strength and flexural modulus of thermoformed clear orthodontic aligners at oral versus room temperatures. Methods: Specimens (n=24/product) of four sequential aligners—Invisacryl-A (product-A), ComfortTrack (product-B), Zendura-A (product-C), and Zendura-FLX (product-D)—with original thicknesses of 0.75-0.76mm were thermoformed, cut, measured (mean dimensions 50.8x13.2x0.5mm), and divided into two groups of 12 specimens each. Both groups were immersed in water at 37±1°C for 7d. The specimens were then tested using a 4-point bend fixture (Instron 68TM-5, 5kN load cell, support span 25.4±0.1mm, loading span 8.5mm, crosshead displacement rate 0.1mm/mm/min) until 5% strain in an environmental chamber. One group of aligners was tested at 37±1°C (OT) whereas the other group was tested at 23±1°C (RT). Flexural strength (FS) and flexural modulus (FM) were calculated per Proposed ANSI/ADA Specification No. 188. Results: Results of two-factor General-Linear-Models tests (α=0.05; SAS software) demonstrated statistically significant differences among the products ($p<0.001$). Mean FS values were statistically significantly lower ($p<0.001$) at OT versus RT. Mean FS values were highest for product-C at both temperatures (138±11 MPa @23°C and 123±6 MPa @37°C) and lowest for product-B at both temperatures (93±4 MPa @23°C and 81±9 MPa @37°C). For FM, statistically significant differences were observed among the products ($p<0.001$), but not between temperature groups ($p=0.8668$). Mean FM values were highest for product-A at both temperatures (22,569±6,031 MPa @23°C and 21,728±5,393 MPa @37°C) and lowest for product-C (8,546±932 MPa @23°C and 8,892±1,585 MPa @37°C). Conclusion: Flexural properties varied among the aligner products and the temperature at which they were tested. Flexural properties should be tested at 37±1°C to simulate intraoral performance of clear aligners, even though this results in lower mean FS values.

Funding for this project was provided by the J. Dean Robertson Society and Student Research Program 2025-26.

This study was presented at the 2026 American Association for Dental, Oral and Craniofacial Research annual meeting.

#39

Title: Patient perceptions of dental outcomes related to delay of care

Presenter(s): Noah Sanders (Pre-doctoral Dental, Class of 2026)

Advisor(s): Staci Wekenborg; Shelly Short

Purpose: The primary aim of this study was to determine average wait times for dental appointments and assess the patient's perception of their effect on oral health outcomes. Methods: Quantitative, non-experimental study that utilized a questionnaire distributed to new patients at The University of Oklahoma College of Dentistry. This study was approved by the Oklahoma Health Sciences Center Institutional Review Board (#19176). Results: Overall, the findings showed that while many respondents reported satisfaction with appointment wait times at OUCOD, a significant number faced long gaps in dental care and reported pain or worsening conditions linked to the delays. Financial concerns and high demand for appointments were significant factors influencing access to care. Conclusion: This study shows that many patients at the University of Oklahoma College of Dentistry student clinics are satisfied with appointment scheduling; however, delays in care still lead to negative oral health outcomes for many individuals. Common issues among those who experienced long wait times include pain, disease progression, and more complex treatments. Financial barriers and high patient demand continue to impact access to services. To tackle these issues, we need to make practical changes that improve scheduling efficiency, expand provider capacity where we can, and increase support for patients facing financial or insurance challenges. By understanding how wait times affect actual patients, this research offers insights that can help improve clinic operations and inform broader policy efforts. Improving timely access to dental care can reduce preventable complications, lower long-term costs, and improve overall health outcomes for communities across Oklahoma.

Funding for this project was provided by the J. Dean Robertson Society and Student Research Program 2025-26.

#40

Title: Wettability, degree of conversion, and monomer/by-products released from adhesive resins

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

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

Purpose: To determine the effect of 14-day immersions in selected salivary esterases on wettability, degree of conversion, and monomer and by-product release from experimental adhesive-resins. Methods: Six experimental adhesive-resin formulations (resins J-L) 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 UV-sterilized and immersed (14d) in the following solutions at 37°C: 0.1U/ml cholesterol esterase (C), 0.1U/ml pseudocholinesterase (P), P+C (B), or D-PBS (D; Control). Solutions were replenished every 48h and stored (-20°C, n=7/specimen/esterase solution) until eluted monomers (UDMA, TEGDMA) and biodegradation by-products (TEG, MA) were quantified using HPLC with UV/Vis-spectroscopy and mass-spectrometry. Wettability (n=12/resin) was measured at 37±1°C using a goniometer and contact angles (Θ; Laplace-Young equation) were calculated at drop placement. Spectra of resins (n=10/resin) were obtained with a heated FTIR-ATR spectrometer before and after polymerization (40s/specimen). Degree of conversion values were calculated using the two-frequency method and tangent-baseline technique (PC). Results: Mean TEGDMA values ranged from 222ng/ml (resin L, solution B) to 5,028ng/ml (resin J, solution D). Mean TEG values ranged from 0.00ng/ml (resin L, solutions B, D, P) to 77ng/ml (resin G, solution B). Mean MA values ranged from 33ng/ml for (resin G, solution P) to 3,845ng/ml (resin G, solution B). Mean UDMA values ranged from 726ng/ml (resin I, solution B) to 2,501ng/ml (resin H, solution D). Mean±SD Θ values ranged from 70.64±3.55° (resin J) to 79.25±9.45° (resin H). Statistically significant differences ($p<0.05$) were found among resins for mean TEGDMA, TEG and Θ values, and among immersion solutions for mean MA and UDMA values. Statistically significant differences were found among mean PC values ($p=0.0259$). Synthesis of resins was confirmed by PC values. Conclusion: Experimental adhesive-resins were successfully synthesized. Release of monomers and biodegradation by-products after 14-day immersion in esterase solutions varied by composition and immersion solution.

Funding for this project was provided by the J. Dean Robertson Society and Student Research Program 2025-26.

This study was presented at the 2026 American Association for Dental, Oral and Craniofacial Research annual meeting.

#41

Title: Plasma cell gingivitis - A retrospective review

Presenter(s): Grant Smith (Pre-doctoral Dental, Class of 2027)

Advisor(s): Katie Higgins; Ronald Faram

Purpose: The importance of this research stems from the fact that there are few reports in published literature that report associations of plasma cell gingivitis, and thus delineation of the spectrum and prevalence of the condition is a necessary field of novel research. Methods: This research was designed to be a retrospective review of pathology reports through our University of Oklahoma oral and maxillofacial pathology biopsy service (OUHC IRB #18747). Once appropriate cases that fit the histological and immunohistochemical profile of a plasma cell infiltrate were identified, the slides were then to be pulled, and additional stains were to be completed on the samples. This was then to be coupled with demographic information including age, sex, as well as the final diagnosis, relevant health history, and the location of where the lesion occurred intraorally. Results: Upon compilation of all of the relevant cases, there were twenty-seven found that fit the inclusion criteria of having a plasma cell infiltrate without any other obvious diagnosis. Upon initial evaluation of the data set a few trends were identified. Firstly, nineteen out of the twenty-seven cases identified (70 percent) were in women. Additionally, the average age of patients with this condition was fifty-three years old. Conclusion: With all of these findings from our retrospective study, we have gained a lot of understanding of plasma cell mucositis, however we have opened up just as many doors. In the study of such a poorly documented and little understood disease process, it is important that we first became privy to the demographic data and its full range of presentation from gingivitis to intraosseous lesion. Further research to genetically classify these lesions is needed.

Funding for this project was provided by the J. Dean Robertson Society and Student Research Program 2025-26.

#42

Title: Assessing barriers, knowledge, and educational gaps in dental sleep medicine

Presenter(s): Monica Tangarpour (Pre-doctoral Dental, Class of 2026)

Advisor(s): Sarah Justus-McMakin; Helder Jacob

Purpose: The purpose of this study is to assess practicing dentists' level of knowledge and practice of obstructive sleep apnea, identify barriers and effectiveness of educational practices, and explore interdisciplinary collaboration among practitioners. Methods: This quantitative, cross-sectional study surveyed 82 practicing dentists in Oklahoma across private, public, and academic settings (OUHSC IRB #18893). Using a 19-item questionnaire, data regarding demographics, continuing education (CE), clinical confidence, referral behaviors, and willingness to adopt artificial intelligence (AI) tools were collected. Responses were evaluated using descriptive statistics, Wilcoxon Rank-Sum tests, and Kruskal-Wallis tests. Results: Participants demonstrated high recognition of OSA physical signs and comorbidities but exhibited significant diagnostic knowledge gaps, with only 16% correctly identifying standard Apnea-Hypopnea Index criteria. Years of clinical experience did not correlate with screening confidence. In contrast, ≥5 hours of CE significantly increased clinical confidence and treatment capabilities (p=.0005). Primary barriers to offering OAT included insurance reimbursement (65%) and inadequate training (51%). Referral obstacles featured the absence of formal pathways (65%) and a lack of nearby specialists, which disproportionately hindered public health clinics (67%). Although 79% were previously unaware of AI screening tools, 74% expressed a willingness to implement them. Conclusion: The results of this study show that time in practice does not improve screening confidence, while formal continuing education does. Therefore, dental curricula must standardize sleep medicine education to bridge the gap between dentistry and medicine. Furthermore, policy interventions are urgently needed to establish referral networks for public health clinics to ensure that identified patients have access to life-saving care. Dentists are willing to screen for OSA and utilize AI tools; however, they are hindered by a lack of diagnostic precision and systemic barriers.

Funding for this project was provided by the J. Dean Robertson Society and Student Research Program 2025-26.

#43

Title: Denture resin 3D-printing build orientation affects wettability and biofilm formation

Presenter(s): Christine Tran (Pre-doctoral Dental, Class of 2027)

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

Purpose: To determine the effect of build orientation on wettability of water and biofilm formation on additively manufactured denture base resins. Methods: Three commercial denture base resins were tested: Formlabs Denture Base RP Resin (product F), NextDent Denture 3D+Resin (product N) and Rodin Denture Base (product R). Printing parameters were optimized using a calibration file. Disk-shaped specimens (n=12/resin; 6.0mm diameter, 0.5mm thickness) were fabricated in an AnyCubic Photon-D2 DLP 3D-printer in three build orientations: 0° (parallel to the build plate), 45° and 90°. Specimens of the latter two orientations were printed with supports. Specimens were washed (isopropyl-alcohol, 5min), post-cured in Wash and Cure 2.0 (25W, LED:405nm, 10min) and immersed in ultrapure water (37±1°C, 24h) for monomer extraction. Wettability (n=24/resin) of ultrapure water was measured at 37±1°C using a goniometer and contact angles (q; Laplace-Young equation) were calculated 60s after drop placement. Biofilm formation (BIO) in relative light units (RLUs) was assessed by measuring bioluminescence of S. mutans biofilms (UA159-ldh-renG+, 24h, 37°C, microaerophilic conditions) on the surfaces of specimens. Results: Two-factor General-Linear-Models and post-hoc SNK analyses (α=0.05; SAS software) demonstrated statistically significant differences among the resin-orientation combinations for mean q values ($p<0.001$). Mean±SD q values ranged from 69.7±8.7° (product N-0°) to 92.4±6.4° (product F-45°). Statistically significant differences were noted among build orientations ($p<0.0001$) for BIO, but not among products ($p=0.1276$). Mean BIO values for product F-0° (80,516RLU) were statistically significantly higher ($p=0.0102$) than for 45° (58,758RLU) and 90° (46,394RLU) orientations. Mean BIO values for product N-45° (67,887RLU) and 0° (66,888RLU) orientations were statistically significantly higher ($p<0.0132$) than 90° (42,085). Mean BIO values for 0° (61,468RLU), 45° (49,555RLU) and 90° (39,920RLU) orientations of product R were not statistically significantly different ($p=0.1381$). Conclusion: Wettability and biofilm formation varied based on composition of the 3D-printed denture base resins and build orientation, but a consistent trend was not observed.

Funding for this project was provided by the J. Dean Robertson Society and Student Research Program 2025-26.

This study was presented at the 2026 American Association for Dental, Oral and Craniofacial Research annual meeting.

#44

Title: Correlation between pulp calcifications, systemic diseases, and medications: Retrospective study

Presenter(s): Mia Walker Hatfield (Pre-doctoral Dental, Class of 2027)

Advisor(s): Farah Masood

Purpose: This retrospective case-control study evaluated the association between pulp canal and chamber calcification and hypercholesterolemia with statin use, autoimmune disease with glucocorticoid use, diabetes and diabetes medications, smoking status, age, and ethnicity. Methods: Two hundred subjects aged 30–64 were included and divided into a test group (n=100) and a control group (n=100; OUHC IRB #18658). Relevant medical conditions, medications, age, and ethnicity were documented in the test group. The control group represented those without relevant medical conditions or taking relevant medications. Two maxillary and two mandibular teeth per patient were graded for pulp canal calcification. The calcification system used is as follows; G0 is not pulp calcification, G1 is no calcification, G2 is moderate calcification, G3 is severe calcification, and G4 is complete calcification. Results: The data revealed more G2 and G3/G4 canals in the teeth in the test group than in the control group. The most prevalent systemic factors observed in the study were hypercholesterolemia and statin use. Smoking was not correlated with more severe pulp calcification ($p=0.2518$). A higher number of systemic diseases was correlated with more severe pulp calcification ($p<0.0001$). The overall age of the test group was higher than the control group. Conclusion: Based on a larger number of G2 and G3/G4 canals in the teeth of the test group, the systemic factors are correlated to a higher incidence of moderate-severe pulp calcification. High cholesterol and statin use is the highest contributing factor. One factor that impacts the observed trend is age of the subjects. There is evidence in research that increased age correlates to pulp calcification, presenting a confounding factor to the observed trend.

Funding for this project was provided by the J. Dean Robertson Society and Student Research Program 2025-26.

#45

Title: Digital quantification of p53 immunohistochemical patterns to diagnose epithelial alterations

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

Advisor(s): Ronald Faram; Katie Higgins

Purpose: While oral epithelial dysplasia is a precursor to cancer, histologic grading remains limited by observer variability and subjectivity. The tumor suppressor protein p53 has emerged as a molecular marker to assess malignancy risk, with key staining patterns proposed to refine prognosis. This study analyzes the relationship between histologic diagnoses, p53 staining patterns, and quantitative p53 expression using the HALO AI software. Methods: 35 slides representing cases of hyperplasia, chronic interface mucositis, mild dysplasia, moderate dysplasia, and severe dysplasia were used (OUHC IRB #18678). The slides were sectioned and stained with H&E and p53. An oral pathologist assessed the slides twice, one week apart, to make histologic diagnoses followed byp53 staining pattern diagnoses. Quantitative analysis was performed using HALO to calculate cell counts and strong, moderate, and light p53 stain H-scores. Statistical comparisons were done using Cohen's and Fleiss's Kappa, Kruskal-Wallis tests, and Dunn's tests. Results: . It was found that histologic diagnoses had only moderate inter-observer agreement. Low-risk histologic lesions correlated strongly with wild-type p53 patterns, but high-risk dysplasia had a much lower association with abnormal p53 staining. No significant difference in p53 H-scores were found across histologic grades; however, significant differences in strong and moderate p53 H-scores were observed when stratified by p53 staining pattern. Additionally, HALO detected greater numbers of lightly-stained cells than visual assessment could. Discordance was discovered between histologic grading and p53 expression, underscoring the heterogeneity of dysplastic lesions and highlighting a challenge in determining the risk of cancerous progression. Conclusion: Pattern-based analysis captures variation not reflected by conventional grading, and HALO-quantification of p53 staining severity can aid in prognostic determination by definingp53 expression levels. While pattern-based analysis using HALO serves as a valuable adjunct to histopathologic evaluation, it should not be used alone or as a replacement for traditional diagnostic assessment.

Funding for this project was provided by the J. Dean Robertson Society and Student Research Program 2025-26.

#46

Title: Peripheral giant cell granulomas associated with dental implants

Presenter(s): Rena Zhang (Pre-doctoral Dental, Class of 2028)

Advisor(s): Ronald Faram; Katie Higgins

Purpose: The purpose of the proposed research project is to investigate the clinicopathological features of Peripheral Giant Cell Granuloma (PGCG) by conducting a retrospective analysis of oral biopsy records obtained from the University of Oklahoma College of Dentistry Oral Pathology Department. A conventional PGCG is a reactive oral lesion often associated with local irritation, and although its occurrence is well documented, its relationship to dental implants remains unclear. Methods: This study analyzed the demographic distribution, anatomical predilection, and recurrence patterns of PGCG in relation to dental implants. This study reviewed pathology records from January 1, 2010, to December 31, 2025, to identify and categorize all biopsy-confirmed conventional PGCG cases (OUHC IRB #18652). Demographic data, lesion characteristics, and relevant clinical history were collected; no statistical analysis was performed due to insufficient sample size to delineate patterns of presentation and potential risk factors. Additionally, comparisons were made between implant-associated and conventional PGCG cases to better understand differences in clinical course and outcomes, aligning with many systematic reviews from the past. Results: Findings showed a higher prevalence among females and on the posterior mandible in conventional PGCG cases. Of 148 cases, 15 implant-related PGCG cases also followed the trend. Conclusion: Implant-associated PGCG accounted for a smaller subset of cases, the observed distribution and clinical characteristics aligned with previously reported trends. Implant-associated PGCG cases indicated a predilection for posterior regions and a frequent association with bone loss or prior surgical intervention. Many of the identified PGCG cases were associated with treatment or prosthetic factors which further reinforces the importance of identifying and eliminating local irritants during clinical management.

Funding for this project was provided by the Delta Dental of Oklahoma Foundation and Student Research Program 2025-26.

#47

Title: A guide to the esthetic zone: Direct composite bonding techniques

Presenter(s): Alexandra Ahearn (Advanced Education in General Dentistry, Class of 2026); Sarah McPhail (Advanced Education in General Dentistry, Class of 2026)

Advisor(s): Mary Hamburg

Advances in cosmetic dentistry and increases in the demand for aesthetic dental procedures have resulted in the development of several direct composite bonding techniques for restoring anterior teeth. Direct composite bonding is not only appealing to general dentists due to its minimally invasive and conservative nature, but also to patients due to its accessibility, comfortability, and efficiency. This review outlines four composite bonding techniques utilized by dental practitioners in the aesthetic zone of patients, comparing the materials, methodologies, and advantages and disadvantages of each treatment modality. These contemporary direct composite bonding techniques include free-hand placement, free-hand placement with a pre-fabricated matrix, injection molding with a custom silicone matrix, and injection molding with a 3D-printed window matrix. Selecting the most appropriate protocol for every case helps yield successful, aesthetic, and functional restorations. Therefore, these four techniques are summarized in order to provide an understanding of the latest advancements in anterior direct composite bonding and present a guide to assist dentists in selecting the best approach to achieve optimal and predictable results.

#48

Title: In-house 3D printing for surgical guides: workflow, costs, and ROI

Presenter(s): David Aldaz (Advanced Education in General Dentistry, Class of 2026); Travis Alkire (Advanced Education in General Dentistry, Class of 2026); Mark DiRusso (Advanced Education in General Dentistry, Class of 2026)

Advisor(s): Mary Hamburg

Purpose: The adoption of digital workflows in dentistry has accelerated the use of cone-beam computed tomography (CBCT) and guided implant surgery. Traditionally, surgical guides are fabricated by third-party laboratories, resulting in increased costs, longer turnaround times, and reduced flexibility. In-house 3D printing presents an alternative approach that may improve efficiency and cost-effectiveness in both residency programs and private practice. Methods: The goals of the study are to evaluate the workflow, materials, equipment costs, and return on investment (ROI) associated with in-house 3D printing of surgical guides. A standardized digital workflow is outlined, including data acquisition, virtual implant planning, guide design, printing, post-processing, and sterilization. Cost analysis includes initial capital investment (printer, software, and accessories), per-guide material costs, and ongoing maintenance, and is compared to average laboratory-fabricated guide fees. ROI is assessed based on guide volume, time savings, and educational or clinical benefits. Results: Preliminary analysis demonstrates that in-house production significantly reduces per-guide costs after the initial investment, with break-even points achievable within residency programs and moderate-volume private practices. Additional benefits include rapid turnaround, improved treatment planning control, enhanced resident education, and increased case acceptance. Conclusion: In-house 3D printing of surgical guides represents a scalable and financially viable solution that supports both clinical efficiency and educational objectives. Understanding workflow optimization and cost structure is essential for successful implementation in academic and private practice environments.

#49

Title: The implications of increasing vertical dimension of occlusion

Presenter(s): Julia Daugherty (Advanced Education in General Dentistry, Class of 2026); Ryan Elliott (Advanced Education in General Dentistry, Class of 2026)

Advisor(s): Mary Hamburg

Purpose: In an era where dental esthetics are highly valued, many patients present with concerns focused primarily on the appearance of their anterior teeth, often without awareness of the functional and structural condition of the posterior dentition. These patients frequently exhibit advanced anterior tooth wear with limited restorative space, creating a clinical challenge in achieving esthetic rehabilitation without compromising function. In such cases, increasing VDO is often proposed, but concerns remain regarding muscle hyperactivity, occlusal forces, and temporomandibular disorders. The purpose of this article is to clarify the clinical indications for VDO increase, discuss strategies to minimize associated risks, and present a representative clinical case in which controlled VDO modification was successfully used to create restorative space for anterior rehabilitation. Methods: A narrative synthesis was conducted using five publications, including systematic reviews published between 2012 and 2024. These reviews evaluated clinical outcomes related to increasing VDO in patients. Particularly, the articles address the clinical indications, contraindications, magnitude of change, patient adaptations, TMJ response, and the influence of restorative modality. Results/Conclusion: The literature suggests that VDO should not be altered solely due to tooth wear, aging, or facial changes, as adaptive mechanisms often maintain a functional occlusal relationship. Increasing VDO is most appropriate when restorative or functional limitations exist, including inadequate space, loss of anterior guidance, or occlusal instability. When indicated, moderate increases typically up to 5 mm inter-incisally are generally well tolerated, with temporary symptoms such as muscle fatigue, speech changes, and chewing discomfort resolving as patients adapt. The limitations of these articles show no strong association between controlled VDO increase and long-term development of temporomandibular disorders in asymptomatic individuals. Overall, the evidence supports a cautious, patient-centered approach guided by functional necessity and restorative demand rather than the assumption that a single correct VDO applies universally to all patients.

#50

Title: Outcomes of allogenic cartilage in cleft rhinoplasty: A retrospective study

Presenter(s): Govinda Allin (Oral and Maxillofacial Surgery, Class of 2027)

Advisor(s): Fabio Ritto

Abstract: Rhinoplasty in patients with cleft lip and/or palate is uniquely challenging due to congenital nasal deformity and insufficient native septal cartilage, which often results in alar collapse and impaired tip support. Autologous cartilage grafts have traditionally been used; however, they are associated with donor site morbidity and increased operative time. Cadaveric allogenic cartilage represents an alternative graft material that mitigates donor site risk and has shown promising structural stability. Owing to limited data regarding its use in cleft rhinoplasty, we evaluated outcomes and complication rates in patients who underwent cleft rhinoplasty using cadaveric allogenic costal cartilage. Methods: A retrospective review was conducted of patients who underwent cleft rhinoplasty with cadaveric allogenic rib cartilage at Oklahoma University between 2021 and 2025 (OUHC IRB #19202). Twenty-five patients met inclusion criteria with a minimum postoperative follow-up of six weeks. Demographic data and postoperative complications including infection, warping, resorption, displacement, and other rhinoplasty-related sequelae were recorded and analyzed. Results: The mean age was 18.4 years, with 9 male and 16 female patients. Nineteen procedures were primary rhinoplasties and six were revisions. Mean follow-up was 22.6 weeks (5.5 months). No patients demonstrated clinical evidence of graft warping, resorption, or displacement. One patient experienced graft exposure requiring revision. Other postoperative events included nasal bleeding in 3 patients (11.5%), columellar stitch abscess in 2 patients, and synechiae formation in 4 patients. Conclusion: In this cohort, cadaveric allogenic costal cartilage demonstrated excellent graft stability and an acceptable complication profile in cleft rhinoplasty. Rates of resorption, warping, and infection were absent. Observed complications were consistent with those described in rhinoplasty performed with autologous cartilage, with the exception of a higher rate of postoperative bleeding (11.5% vs. ~4.1% reported in standard rhinoplasty), which may reflect anatomic and vascular considerations in cleft lip/palate patients. Allogenic cartilage appears to be a safe and effective graft option for cleft rhinoplasty reconstruction.

#51

Title: Myositis ossificans traumatica of the masseter: A case report

Presenter(s): Isaac Ellison (Oral and Maxillofacial Surgery, Class of 2027)

Advisor(s): Fabio Ritto; Paul Tiwana

Myositis ossificans (MO) is a rare entity classically subdivided into myositis ossificans progressiva and myositis ossificans traumatica. Myositis ossificans progressiva is caused by an autosomal dominant gain-of-function mutation of the bone morphogenetic protein (BMP) activin A receptor type 1/activin-like kinase 2, resulting in diffuse heterotopic ossification that manifests in early life with progressive limitation of joint range of motion. In contrast, myositis ossificans traumatica follows crush or penetrating injury, in which mesenchymal stem cells are implanted into a local environment enriched with osteoinductive mediators, including overexpression of BMP-4. We report the case of a 49-year-old male who presented three years after a gunshot wound to the right cheek with progressive trismus, maximal incisal opening (MIO) of 24 mm, and cone-beam computed tomography demonstrating a 38.5 × 17.7 × 5.7 mm radiopaque mass within the right masseter muscle. Several intraoperative photos illustrate the surgical approach and excision, which was performed via modified rhytidectomy and maxillary vestibular approaches, with intraoperative identification of osseous union to the right zygoma. The lesion was excised and a right coronoidectomy was performed, resulting in immediate improvement of MIO to 45 mm. Intraoperatively, discontinuity of the parotid duct was identified and repaired with a Crawford tube, and a postoperative sialocele was successfully managed with aspiration, antisialagogue therapy (scopolamine), and a pressure dressing.

#52

Title: Perspectives on dental care transition for adolescents with special needs

Presenter(s): Samantha Collins (Pediatric Dentistry, Class of 2026)

Advisor(s): David Ciesla

Purpose: Adolescents with special healthcare needs (ASHCN) face unique challenges while transitioning from pediatric to adult care. This study explored legal guardians and adolescent perspectives on preparedness, confidence and perceived barriers related to transition. Methods: A mixed-methods design was used. Nineteen guardians and ten adolescents with special health care needs completed a self-administered survey and participated in semi-structured interviews (OUHC IRB #18341). Quantitative data were analyzed descriptively, and qualitative data were analyzed using thematic analysis to identify key transition-related experiences and concerns Results: Satisfaction with pediatric dental care was high (median = 5.0, IQR: 2.0-4.0). Preparedness for transition and confidence in adult care were neutral (median = 3.0, IQR: 3.0-4.0) with lower confidence reported by guardians. Completing dental treatment before aging out was strongly endorsed (median = 5.0, IQR: 4.0-5.0). Confidence in transition resources was moderate and differed between guardians (median = 3.5, IQR: 2.0-5.0) and adolescents (median = 4.5, IQR: 4.0-5.0). Qualitative analysis identified four primary themes: strong attachment to pediatric dental providers; perceptions that adult dental care settings lack the training and accommodations for ASHCN; structural and system-level barriers to transition; and differing guardian and adolescent perspectives on readiness, autonomy and responsibility for oral health care. Conclusion: Transition from pediatric to adult dental care for ASHCN is influenced by relational, clinical, and systemic barriers. In this sample, limited transition planning and adult provider availability may delay transition. Development of coordinated, patient-centered transition protocols, enhanced provider training, and expanded pediatric dental capacity may improve continuity of care and long-term oral health outcomes.

#53

Title: Workflow Feasibility of Digital 3D-Printed Crowns for Young Permanent Molars

Presenter(s): John Gavel (Pediatric Dentistry, Class of 2026)

Advisor(s): David Ciesla

Purpose: To evaluate the workflow-driven feasibility of a fully digital workflow for chairside fabrication of 3D-printed crowns, focusing on how workflow structure, active labor demands, and automation influence practical clinical adoption. Methods: A theoretical workflow model was developed using literature-derived timing data and manufacturer-reported process durations. The workflow was divided into operator-dependent steps (scanning, design oversight, finishing, and cementation) and machine-dependent phases (printing, washing, and post-curing). Total elapsed time and active labor time were modeled across provider experience levels and delegation scenarios. Predictive modeling assessed how workflow structure, automation, and staff allocation influence real-world feasibility within pediatric and academic clinical environments. Results: Modeled workflows demonstrated total elapsed fabrication times ranging from approximately 78 to 176 minutes, depending on provider experience. Operator-dependent time averaged roughly 30–45 minutes, while machine-driven post-processing accounted for a substantial portion of total duration but required minimal continuous clinician involvement. Delegation of post-processing steps to auxiliary staff reduced active labor costs without affecting total elapsed time, narrowing efficiency differences between inexperienced and experienced providers. Although overall fabrication time exceeded that of traditional prefabricated crowns, the majority of the workflow occurred during automated, unattended phases that did not require chairside engagement. Conclusion: Workflow feasibility of 3D-printed crowns is primarily governed by workflow structure rather than total elapsed duration. Active clinician time remains comparable to existing esthetic full-coverage options due to substantial automation. These findings suggest that digital crown workflows may be compatible with pediatric and academic practice environments when delegation and scheduling strategies are optimized.

#54

Title: Factors influencing general dentists' willingness to treat special needs patients

Presenter(s): Chandler Roof (Pediatric Dentistry, Class of 2026)

Advisor(s): Autumn Hurd; Safaa Suliman Ahmed

Purpose: Patients with special health care needs (SHCN) often face barriers to accessing dental care. The aim of this study was to identify factors associated with general dentists' willingness to provide care to patients with SHCN in Oklahoma. Methods: A cross-sectional survey was distributed electronically to all 1,306 general dentists who were current members of the Oklahoma Dental Association (ODA) at the time of distribution. The survey assessed demographics, practice characteristics, training and experience with SHCN, perceived barriers, comfort level, and willingness to provide care. Participation was voluntary and anonymous. Descriptive and inferential analyses were conducted to examine factors associated with willingness to provide care. Results: Thirty-four dentists completed the survey. While 66.7% agreed that general dentists have a professional obligation to treat patients with SHCN, significant barriers were reported. The most frequent challenges included lack of training (52.9%) and inadequate reimbursement (41.2%). Most respondents (94.1%) had no residency training, and 61.8% had never completed continuing education related to SHCN. Confidence levels varied, with higher confidence reported in treating neurodivergent patients compared to those with syndromic conditions. Conclusion: General dentists in Oklahoma demonstrate willingness and professional responsibility to care for patients with SHCN; however, limited postgraduate training and financial barriers restrict care provision. Addressing oral health disparities in this population requires enhanced hands-on education and policy reforms to improve reimbursement.

#55

Title: Prosthetically driven mandibular implant-supported overdenture using a surgical guide

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

Advisor(s): Tracey Whitley

Purpose: Mandibular implant-supported overdentures have become a predictable and cost-effective treatment modality for completely edentulous patients, significantly improving retention, stability, and patient comfort. The use of surgical guides enhances precision in implant placement by transferring prosthetically driven planning to the surgical field. This case report presents a 55-year-old male patient who was referred to Graduate Periodontics for implant placement in the region of #23 and #26 to receive a mandibular implant-supported overdenture using locator attachments. Methods: The patient had been wearing well-fitting maxillary and mandibular complete dentures for 2 years. However, the mandibular denture lacked retention. A dual-scan protocol was used to fabricate a surgical guide with fixation pins using BlueskyBio software, followed by 3D printing of the surgical guide using a Preform printer. Utilizing the surgical guide and pilot drills initial osteotomy was created to achieve ideal parallelism of the two implants. Subsequently, a full-thickness flap was raised, and sequential enlargement of the osteotomy was performed. Straumann SLA BLT 3.3X10mm implants were placed in #23 and #26 with a torque of 30N each. Simultaneous guided bone regeneration was carried out by placing freeze-dried bone allograft, which was covered by Biogide collagen membrane to compensate for thin buccal bone. Periosteal release of buccal and lingual flap was carried out with approximation of the flap margins achieved by 4-0 PTFE sutures. Results: The healing phase for osseointegration and guided bone regeneration is 6 months before uncovering the implants for the prosthetic phase. Conclusion: Mandibular implant-supported overdentures placed with the aid of a surgical guide represent a reliable and predictable treatment option for edentulous patients, offering superior functional and patient-centered outcomes.

#56

Title: Esthetic crown lengthening for gingival overgrowth: A digitally guided approach

Presenter(s): Serife Ozdemir (Graduate Periodontics, Class of 2027)

Advisor(s): Jaewon Kim

Purpose: Excessive gingival display and gingival overgrowth can compromise smile esthetics, often resulting in a “gummy smile.” Esthetic crown lengthening is a predictable surgical procedure used to establish appropriate gingival contours tooth proportions. The use of surgical guides enhances precision by transferring digitally planned gingival margins and bone levels to the surgical field. This case report presents a 22-year-old patient with severe gingival overgrowth who underwent esthetic crown lengthening using a surgical guide to achieve a balanced gingival architecture (OUHC IRB #18915). Methods: The surgical guides were designed using the BlueSkyBio software based on the patient’s CBCT imaging and intraoral scans. First, a gingivectomy guide was placed to excise excessive gingival tissue. A split thickness flap was then raised to remove underlying connective tissue, thereby reducing gingival thickness and creating a less protrusive gingival contour. Next, a crown lengthening guide was used to perform ostectomy and establish the planned bone levels. The flap was then readapted and stabilized with sutures. Lastly, Top Dam dental resin was placed at the gingival margins to prevent coronal rebound of the gingival tissues during healing. Results: The procedure resulted in improved gingival symmetry, appropriate tooth proportions, and reduction of excessive gingival display. Healing progressed uneventfully, with stable gingival margins and favorable esthetic outcomes at subsequent follow-ups. Conclusion: The use of surgical guides for esthetic crown lengthening enables accurate transfer of the planned gingival margins and bone levels to the surgical site, minimizing the risk of excessive or inadequate hard and soft tissue removal. Esthetic crown lengthening with digitally designed surgical guides can provide controlled gingival and osseous recontouring, resulting in improved smile esthetics and stable periodontal architecture.

#57

Title: Periodontal phenotype modification prior to orthodontic treatment: A case report

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

Advisor(s): Tracey Whitley

Purpose: Soft tissue phenotype modification prior to orthodontic treatment has been proposed as a clinically driven approach to reduce the risk of additional attachment loss associated with potentially deleterious tooth movements outside the buccal alveolar bone envelope. This approach is particularly relevant in patients presenting with mucogingival deformities and a thin periodontal phenotype. Methods: This case report describes the management of a 43-year-old female who presented to the Department of Periodontics and was referred by her orthodontist for periodontal evaluation prior to initiation of orthodontic therapy. Clinical examination revealed probing depths of 1–2 mm, clinical attachment loss of 2–3 mm, RT2 recession on teeth #22–27, and a thin periodontal phenotype. Based on the anticipated direction of tooth movement and the thin gingival phenotype, soft tissue augmentation was recommended. A connective tissue graft was performed in the mandibular anterior region (#22–27) to increase gingival thickness and enhance the periodontal phenotype. Using the Vestibular Incision Subperiosteal Tunnel Access (VISTA) technique, a 20 × 7 mm de-epithelialized free gingival graft harvested from the upper right palate was placed and stabilized using the Ronco suturing technique. Sutures were removed after two weeks, and the patient was followed up at 6 and 12 months. Results: Post-operative clinical evaluation demonstrated clinical attachment gain of approximately 1–2 mm, increased keratinized tissue width from 1–2 mm to 3–4 mm, and increased gingival thickness. During the 12 months following orthodontic treatment initiation, the augmented sites showed stable gingival margins, increased vestibular depth, and no additional recession despite orthodontic tooth movement. Conclusion: This case highlights the importance of interdisciplinary planning and the benefits of soft tissue phenotype modification prior to orthodontic therapy.