COLLEGE OF DENTISTRY

The UNIVERSITY *of* OKLAHOMA HEALTH SCIENCES CENTER

42nd Annual

Scientific Day

April 11, 2023

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

Sponsored by:

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42nd 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 42nd Annual Scientific Day!** Today's event is being held in person for the first time since Scientific Day 2019. The Scientific Day Committee was able to provide a comparable experience for the presenters, their mentors, the judges and the attendees in 2021 and 2022, in spite of the pandemic. Even though attendee feedback for those meetings was favorable, we are excited to return to a face-to-face meeting format!

The evolution of Scientific Day is due to the dedication and support of everyone here today. 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 the Director of the National Institute of Dental and Craniofacial Research, Rena D'Souza, DDS, MS, PhD as the Inaugural Keynote Speaker. We are honored that she is present today to support our students and their research projects.

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 42nd Scientific Day!

Keynote Speaker: Dr. Rena D'Souza

Dr. Rena D'Souza is the Director of the National Institute of Dental and Craniofacial Research, National Institutes of Health. She is deeply committed to the organization's mission — advance fundamental knowledge about dental, oral, and craniofacial health and disease and translate these findings into prevention, early detection, and treatment strategies that improve overall health for all individuals and communities across the lifespan.

As the director of NIDCR, Dr. D'Souza oversees the institute's annual budget of over $500 million, supporting basic, translational, and clinical research in areas of oral cancer, orofacial pain, tooth decay, periodontal disease, salivary gland dysfunction, and the craniofacial development and the oral complications of systemic diseases.

Prior to becoming NIDCR's director, Dr. D'Souza served at the University of Utah as Assistant Vice President for Academic Affairs and Education for the Health Sciences. She held the Ole and Marty Jensen endowed chair in the School of Dentistry that she led as inaugural dean. As a clinician-scientist, D'Souza has been strongly committed to discovery and mentoring throughout her academic career. She is past president of the American Association for Dental Research (AADR) and the International Association for Dental Research (IADR).

Dr. D'Souza is an internationally recognized researcher and has authored over 150 publications and book chapters in the areas of craniofacial development, matrix biology and tissue regeneration for over 30 years. She is a Fellow of AAAS and also of AADR. She received the 2010 Presidential Award for Research Excellence from the Texas A&M Health Science Center and was inducted into the German National Academy of Sciences in 2012. Columbia University College of Dental Medicine's awarded Dr. D'Souza the Birnberg Research Medal in 2016. She also received the IADR Distinguished Scientist Award in Pulp Biology Research in 2002 and the Irwin D. Mandel Distinguished National Mentoring Award in 2017.

Dr. D'Souza is active on several trans-NIH committees and maintains an active research laboratory in the National Institute of Child Health and Human Development (NICHD), NIH.

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(To win a door prize you must be present at the awards ceremony)

Special Thanks to the Following Individuals

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University of Oklahoma College of Dentistry

42nd Annual Scientific Day

Schedule of Events

7:30 – 9:00 a.m.	Poster Presentation Judging *Closed session*
9:00 – 9:30 a.m.	Registration and Continental Breakfast
9:00 – 10:40 a.m.	Poster Presentations
10:45 a.m. – 12:00 p.m.	Keynote Address – *Dr. Rena D'Souza*
12:00 – 1:00 p.m.	Lunch (Boxed Lunch Provided)
1:00 – 2:30 p.m.	Ishmael Essay Contest Finals
2:30 – 3:00 p.m.	Break
3:00 – 4:10 p.m.	Awards Ceremony
4:10 p.m.	Student Checkout and non-faculty check out for CE credit

Ishmael Essay Contest Finals

1:00 – 2:30 p.m.

1:00 p.m. Victoria King (DH2)
Acceptability of Therapy Dogs by Dental Professionals

1:15 p.m. Jessica Venard (DH2)
Impact of Covid-19 on Dental and Dental Hygiene Students

1:30 p.m. Morgan Wong (DH2)
Factors Affecting Dental Hygiene Employment Patterns

1:45 p.m. Alexandra Ahearn (DS2)
Characterization of Experimental RMGICs with NF_TiO2 Nanoparticles

2:00 p.m. Katherine Sullivan (DS2)
Impact of Different Denture Base Resins on Physical Properties

2:15 p.m. Monica Wang (DS3)
Two Months Esterase Exposure Degrades Adhesive Resin Topographies

POSTER PRESENTATIONS

Poster #	Presenter Name(s) & Title
# 1	FNU FATIMAH (DH2) The use of glycine-air polishing devices by Oklahoma dental hygienists
# 2	RACHEL HILL (DH2) Attitudes and opinions of Oklahoma dentists on dental therapy
# 3	SHAYLEE JOHNSON (DH2) Oklahoma dental hygienists knowledge and education of nitrous oxide
# 4	VICTORIA KING (DH2) Acceptability of therapy dogs by dental professionals
# 5	ASHLEY LARA (DH2) Dental professionals' knowledge and use of silver diamine fluoride
# 6	EMMA MCINTOSH (DH2) Most common biopsied lesions at OU College of Dentistry
# 7	HANNAH SYKES (DH2) Pregnancy protocols in dental practices in the state of Oklahoma
# 8	JESSICA VENARD (DH2) Impact of Covid-19 on dental and dental hygiene students
# 9	MORGAN WONG (DH2) Factors affecting dental hygiene employment patterns
# 10	MCKENZIE BEDFORD (DH2) Marijuana: oral health effects
# 11	KAYLI BENNETT (DH2) Salivary diagnostics: a new era in disease recognition
# 12	AMISHA BHATT (DH2) Holistic strategies to reduce anxiety and fear in dental office

POSTER PRESENTATIONS

Poster #	Presenter Name(s) & Title
# 13	MALLI COLE (DH2); LAINEY JESTIS (DH2) Reducing anxiety and stress in the dental office: a new approach
# 14	KACIE COMBS (DH2); CARLY COX (DH2) Sleep apnea affects the whole body
# 15	ABBIE COULTER (DH2) Role of dental professional in screening for oral cancer
# 16	KARMEN CREACH (DH2) Therapeutic uses of botulinum toxin in the dental office
# 17	ALLY DAVIS (DH2) Laser assisted periodontal therapy by the dental hygienist
# 18	KELSEY DOBBINS (DH2) Periodontitis and its relationship with cardiovascular diseases
# 19	SYDNEE DUNCAN (DH2) Impact of COVID-19 on patient communication
# 20	KATIE ELCYZYN (DH2) Systemic health and periodontal disease
# 21	JANELY FRANCO (DH2) The effects of genetics on oral health
# 22	GRAYCEN GUTHRIE (DH2) The effects of xylitol on oral and systemic health
# 23	EMILY HARWELL (DH2) Periodontitis and its effects on Alzheimer's disease and dementia
# 24	AREICY HAUSBURG (DH2); MADISON BROWN (DH2); SARA SCHULTHEIS (DH2) Probiotics and the oral cavity: alternative roads to health

POSTER PRESENTATIONS

Poster #	Presenter Name(s) & Title
# 25	ALYSSA HUDSON (DH2) Oral health in long-term care facilities
# 26	ADDISON MULLIN (DH2) Factors affecting the clinical dental hygiene employment shortage
# 27	GRACIE NIMROD (DH2) Environmental sustainability in dentistry
# 28	HOLLY PARKER (DH2) The use of mesenchymal stem cells in regenerative dentistry
# 29	MADISON PARRETT (DH2) Oral health considerations in Alzheimer's disease
# 30	GRACE REED (DH2); LIZZY TATUM (DH2) How deaf patients are impacted by dental care
# 31	ELLA ROBERTS (DH2) The importance of blood pressure in the dental care setting
# 32	KENDALL SCHNOEBELEN (DH2) Dental loupes: Will they save you from musculoskeletal disorders?
# 33	JENNIFER TSAI (DH2) Green tea and the oral cavity
# 34	MORGAN TUPAS (DH2) The benefits of myofunctional therapy in dentistry
# 35	JESE VALERIANO (DH2) Olfactory dysfunction, oral health, and quality of life
#36	ABBEY WARREN (DH2) The guardian's understanding of tooth decay and caries in children

POSTER PRESENTATIONS

Poster #	Presenter Name(s) & Title
#37	PAIGE WILLIAMS (DH2) The effects of vaping on oral health
# 38	JASMINE WILSON (DH2) Effects of herbal rinses compared to chlorhexidine in the oral cavity
# 39	JERRI WILSON (DH2) The link between periodontal disease and cognitive impairment
# 40	ALEX WOODS (DH2) Access to dental care among low-income and underserved populations
# 41	OLIVIA YOUNG (DH2) Essential oils and dentistry: a natural approach to dental anxiety
# 42	ALEXANDRA AHEARN (DS2) Characterization of nanofilled cements with metaloxide nanoparticles
# 43	MUBARIKA ALI (DS2) Characterization of experimental nanofilled flowable composite resins
# 44	RILEY CRISMON (DS2) Determining the anatomical contour of the cemento-enamel junction
# 45	JULIA DAUGHERTY (DS2) Detection of simulated occlusal caries in different light conditions
# 46	MANAS KOMMAREDDI (DS2); GHAZALEH FAZEL (DS2) Economic impact of no-shows at the OUCOD student program
# 47	NILOOFAR NAGHDI (DS3) A retrospective study of oral lichen planus patients
# 48	KATHERINE SULLIVAN (DS2) Impact of denture base resin fabrication method on physical properties

POSTER PRESENTATIONS

Poster #	Presenter Name(s) & Title
# 49	MONICA WANG (DS3) Two-month esterase exposure degrades adhesive resins' topographies
# 50	JOSEPH ACQUAVIVA (DS2); HANNAH SHELTON (DS3) Workforce analysis: dental providers for vulnerable Oklahoma children
# 51	DORNA AKHAVAIN (DS3) Access to dental care for Oklahoma's pregnant & postpartum women
# 52	JOHN CORBETT (Postgraduate) Management of acute necrotizing periodontitis in a severe AIDS patient
# 53	JUNIOR CRUZ (Postgraduate); AZIZ PRADHAN (Postgraduate) Comparing two types of overdentures as options for edentulous arches
# 54	SONALI DEMLA (Postgraduate); KURREN VIRK (Postgraduate) Methods to obtain Google reviews in a dental office
# 55	SARAH FITA (Postgraduate) Correction of mucogingival defects by modified tunneling and biologics
# 56	TYLER HENDRICKS (Postgraduate) Augmentation in alveolar ridge defects for dental implants
# 57	FRANK KAJIWARA (Postgraduate) GTR with PRP "sticky bone" and PPP membrane
# 58	SANDRA PEROZO (Postgraduate) Customized allogenic block graft using 3D printed templates
# 59	MADHUMATI RAMACHANDRAREDDY (Postgraduate) Surgical management of a grade III furcation using PRF and sticky bone
# 60	SHIYAMALI SUNDARARAJAN (Postgraduate) Guided bone regeneration and implant placement
# 61	THANH TRUONG (Postgraduate) Dental care for head & neck cancer patients with radiation therapy

#1

Title: The use of glycine-air polishing devices by Oklahoma dental hygienists

Presenter: Fnu Fatimah, DH2

Advisor: Donna Wood

Abstract:

Purpose: Numerous studies have determined that a subgingival air polisher is a safe and effective alternative to traditional methods, such as ultrasonics, hand instrumentation, and sodium-based air polishing devices. This method has been shown to significantly enhance efficacy, efficiency, and patient acceptance. The purpose of this study was to assess the use of a glycine-based subgingival air polisher among dental hygienists in Oklahoma.
Methods: A research survey containing 20 questions was distributed during the OKDHA Annual Session in Broken Arrow, Oklahoma on September 16, 2022. Ninety-nine participants completed the survey, giving a 69% response rate. The results were analyzed using descriptive statistics, and correlation between survey questions were examined utilizing Fischer's exact test.
Results: The survey results indicated that only a small percentage of dental hygienists in Oklahoma used both the supra and subgingival air polisher frequently: 67% of the participants used the supragingival air polisher rarely or never, 17% used it monthly, 7% used it weekly, and 8% used it daily; while 88% of the participants used the subgingival air polisher rarely or never, 6% used it monthly, 2% used it weekly, and 3% used it daily. Most participants ranked efficacy as the most important factor of an air polisher (73%), followed by time efficiency (49%), operator fatigue (47%), patient safety (43%), implant care (40%), microbial effects (30%), and patient acceptance (30%). Additionally, 35% rated their knowledge regarding subgingival use of an air polisher as below average, 26% as poor, 18% as good, 14% as above average, and 7% as excellent.
Conclusion: This study suggests that dental hygienists in Oklahoma require further training and education to incorporate subgingival air polishing devices more readily into their daily practice.

Funding for this project was provided by the J. Dean Roberson Society and the 2023-23 Student Research Program.

#2

Title: Attitudes and opinions of Oklahoma dentists on dental therapy

Presenter(s): Rachel Hill, DH2

Advisor(s): Leah Jack

Abstract:

Purpose: A shortage of dentists throughout the United States exists challenging the demand for care. A solution to this problem could be achieved by adding midlevel dental providers, like dental therapists and dental hygiene therapists. The purpose of this study is to evaluate the knowledge, attitudes, and perceptions of Oklahoma dentists regarding midlevel dental providers.

Methods: This survey was a nonexperimental, descriptive survey design. Using a stratified technique, every 3rd dentist was chosen for a sample size of N=779. The survey consisted of 21 questions that included demographic, multiple choice, and Likert questions. The statistical analysis included frequency distribution, t-tests and ANOVA.

Results: An overall response rate of 7% was achieved. Respondents had a negative response to dental therapy and 32.56% strongly disagreeing dental therapy was needed in Oklahoma. Of the participants, 30.23% strongly disagreed that a midlevel dental providers could be a solution to access to care in Oklahoma. Over half of the respondents had negative opinions on Oklahoma adopting legislation for a dental therapy model, with 34.88% strongly disagreeing and 17.44% disagreeing. Responding dentists had negative views on their levels of comfort with midlevel providers. They did not want to hire a dental therapist and were not comfortable having them perform procedures on their patients. The majority of participants indicated they worked in solo practice (48.98%) and only 8.16% stated they worked in community/public health. The community/public health dentists were the only group to show statistically significant levels of agreement with almost every question asked.

Conclusion: Overall, responding Oklahoma dentists did not discern a need for a midlevel dental provider and had unfavorable views towards midlevel providers. The findings of this survey support the need for additional research with a more diverse population.

Funding for this project was provided by the Delta Dental of Oklahoma Foundation and the 2022-23 Student Research Program.

#3

Title: Oklahoma dental hygienists knowledge and education of nitrous oxide

Presenter(s): Shaylee Johnson, DH2

Advisor(s): Kimberly Graziano

Abstract:

Purpose: The purpose of this study is to determine the dental hygienists' level of knowledge, training, and safety practices associated with the administration and delivery of nitrous oxide in a dental office. A list of current licensed dental hygienist was obtained from the Oklahoma Board of Dentistry.
Methods: A cross-sectional non-experimental, simple descriptive survey was administered electronically through the OU Health Sciences Center Qualtrics system. The survey was sent to 2593 Oklahoma dental hygienists with an 11.6% response rate. The study received Institutional Review Board approval, #14998. The survey contained 20 questions that included Likert type scale and open-ended questions. They were quantitatively and qualitatively reviewed by a statistician.
Results: Some responses were discarded due to incomplete data which resulted in N=291**.** Of the N=291, 85% stated they either had no training or outdated training on nitrous oxide. Over half stated their employer had standard operating procedures to minimize exposures. Eighty-five percent stated they were unsure or had no nitrous oxide exposure monitoring in their offices. Forty-eight percent stated they did not check the delivery system for leaks while over half stated they understood the risks of prolonged exposure as a clinician.
Conclusion: The overall results showed that most respondents had out of date training or did not take additional training other than what was provided during their hygiene education. Most did not monitor the system properly for leaks, even though most stated they understood the risk of prolonged nitrous oxide exposure. More research should be done on the long-term exposure effects for the clinician as it could help mandate proper system function, leak testing, and recurrent training for clinicians who administer nitrous oxide.

Funding for this project was provided by the J. Dean Roberson Society and the 2022-23 Student Research Program.

#4

Title: Acceptability of therapy dogs by dental professionals

Presenter(s): Victoria King, DH2

Advisor(s): Donna Wood

Abstract:

Purpose: The use of therapy dogs has been studied in various healthcare facilities regarding their ability to improve the mental and physical wellbeing of patients. However, research on their use in dentistry is scarce, and the study of the acceptability of therapy dog use by dental professionals is even less common. Therefore, the acceptability and use of therapy dogs as an anxiety management tool by dental professionals is the focus of the current research.
Methods: The protocol for this research was approved by the Institutional Review Board at the University of Oklahoma Health Sciences Center (IRB number 14949). This research was a mixed methods, non-experimental study using a survey. The same surveys were distributed to dental professionals both in person at the Oklahoma Dental Hygienists' Association annual conference and emailed to licensed dentists in the state of Oklahoma resulting in a sample of 207 participants. The survey measured acceptability for the use of therapy dogs in dental settings using a five-point Likert-scale, multiple choice questions, and open-ended questions.
Results: Over half of dental professionals surveyed (59%) were extremely or somewhat comfortable with the use of therapy dogs in the overall dental clinic. While the majority (65%) indicated they were comfortable with the use of therapy dogs in the waiting area, only half (51%) were comfortable with the use of therapy dogs in the treatment room. Analysis of the qualitative responses showed dental professionals expressed concerns for infection control/ cleanliness, accidents/injuries to dogs and humans, increased fear/anxiety, and allergies.
Conclusion: Dental professionals generally accept the use of therapy dogs in dental clinics. The use of therapy dogs was more accepted by practitioners in the waiting area than the treatment room.

Funding for this project was provided by the J. Dean Roberson Society and the 2022-23 Student Research Program.

#5

Title: Dental professionals' knowledge and use of silver diamine fluoride.

Presenter(s): Ashley Lara, DH2

Advisor(s): Ashley Clark

Abstract:

Purpose: Silver diamine fluoride (SDF) is an affordable bactericidal liquid that is used to treat dentinal hypersensitivity and carious lesions. The purpose of this study was to evaluate dental professionals' knowledge and use of SDF.

Methods: A 16- item survey created to evaluate dental professionals' familiarity, perceptions, and usage of SDF was electronically distributed to 703 licensed dentists and dental hygienist in the state of Oklahoma. Red Cap, a survey research software program, collected and organized responses, considered frequencies for each survey item, and looked for statistical relationships among variables using cross response analysis.

Results: The response rate was 12% (n=84). Majority of the respondents (87%) were familiar with SDF. Eighty-one percent of respondents agreed that the application of SDF is within the scope of practice of RDH. Over half the respondents agreed that SDF is an alternative to removing tooth structure (63%), less expensive (79%), and easy to apply and time efficient (86%). Sixty-five percent of respondents fear that patients and their parents would not accept treatment of dental caries with SDF due to the permanent black staining of the carious lesions. The respondents' years of practice were related statistically ($p < 0.0002$) to their knowledge of SDF. Of the respondents 74% reported that the advantages of SDF outweigh the disadvantages to the patients.

Conclusions: SDF has been proven to be an alternative product for treating dental caries. Dental professionals' knowledge and use of SDF was significant and would be useful when treating the underserved populations. Further research is needed to find additional products as effective as SDF without permanent black staining. Additional research can be done to reach a broader sample to evaluate their perceptions'.

Funding for this project was provided by the J. Dean Roberson Society and the 2022-23 Student Research Program.

#6

Title: Most common biopsied lesions at OU College of Dentistry

Presenter(s): Emma McIntosh, DH2

Advisor(s): Robin Graham

Abstract:

Purpose: Dental professionals are some of the first people who identify intraoral and extraoral lesions. The purpose of this research is to identify the most common lesions biopsied at the OU College of Dentistry biopsy service to provide dentists and dental hygienists with valuable information regarding common lesions in Oklahoma.
Methods: This research was conducted as a quantitative, retrospective study with information collected from the University of Oklahoma Biopsy Service. A student version of the software called Filemaker was created to prevent the alteration of any biopsy forms within the system. In total, there were 41,284 forms in Filemaker from the start of the biopsy service in 1972, and 6,007 forms from January 2016 to January 2021. Query searches to determine the most common lesions biopsied were completed for the two time frames and compared.
Results: The first time frame looking at the total number of lesions showed that the most common lesions were irritation fibroma (13.6%), epithelial hyperplasia (10.7%), dentigerous cyst (8.9%), pyogenic granuloma (8.3%), and mucocele (5.8%). From the years 2016 to 2021, the most common lesions biopsied were irritation fibroma (20.3%), epithelial hyperplasia (14.2%), papilloma (6.8%), mucocele (6.8%), and dentigerous cyst (5.4%).
Conclusion: This study shines light on the importance of educating dental professionals in the identification of lesions of the head and neck during intraoral and extraoral exams. Oral health care providers are the members most trained in the head and neck region that see patients on a regular basis. Results from this study can be used to create differential diagnoses in the clinic setting and motivate providers to send patients to acquire proper biopsies for malignancy to be ruled out. Further research could be made identifying trends regarding specific lesions including location, gender predilection, and clinical presentation.

Funding for this project was provided by the J. Dean Roberson Society and the 2022-23 Student Research Program.

#7

Title: Pregnancy protocols in dental practices in the state of Oklahoma

Presenter(s): Hannah Sykes, DH2

Advisor(s): Staci P. Wekenborg

Abstract:

The purpose of this study was to evaluate the knowledge of dental hygienists and the protocols implemented in dental practices when treating a pregnant patient. This study was a quantitative and qualitative, non-experimental study. A survey was distributed to 140 dental hygienists at the OKDHA annual session in September 2022. The survey contained 27 multiple choice and two free-response topics. The results of the survey were qualitatively and quantitatively analyzed. Most dental hygienists felt they were properly educated in their dental hygiene programs on how to treat a pregnant patient. The majority of the dental hygienists and dental practices are following protocols recommended by the American Dental Association for treating pregnant patients. This study provided insight on the protocols dental hygienists and dental practices follow when treating pregnant patients. From this study, no significant difference was found in the perceptions of education or followed protocols for treating a pregnant patient when comparing dental hygienists that have practiced for fewer than 10 years to those having practiced for 10+ years.

Funding for this project was provided by the J. Dean Roberson Society and the 2022-23 Student Research Program.

#8

Title: Impact of Covid-19 on dental and dental hygiene students

Presenter(s): Jessica Venard, DH2

Advisor(s): Sarah Justus

Abstract:

Purpose: The purpose of this research is to examine the educational and emotional impact of Covid-19 on dental and dental hygiene students at an Oklahoma dental school.
Methods: An anonymous 38-item survey was created electronically through Qualtrics and emailed to 335 dental and dental hygiene students attending an Oklahoma dental school. Descriptive statistics were analyzed through Qualtrics, and Fisher's exact and Chi-square tests were utilized to conduct data comparisons.
Results: 106 students completed the online survey, yielding a 31.6% response rate. 34 students (39.53%) agreed and 32 students (37.21%) strongly agreed to feeling they missed out on educational experiences as a result of the Covid-19 pandemic. A majority (75.6%) reported feeling anxiety regarding the uncertainty of the Covid-19 crisis and a lack of social connection. Between group comparisons determined an association between type of program (dental and dental hygiene) and agreement with feelings of missing out on clinical education ($p=0.0001$), along with concern about completing their degree program on time due to the Covid-19 pandemic ($p=0.0003$).
Conclusion: Overall, the results of this research conclude that dental and dental hygiene students agree that the Covid-19 pandemic impacted their education and emotional well-being. The outcomes of this study reveal the importance of clinical education and social connection for dental and dental hygiene students, as well as the students' ability to adapt to the online-learning method.

Funding for this project was provided by the J. Dean Roberson Society and the 2022-23 Student Research Program.

#9

Title: Factors affecting dental hygiene employment patterns

Presenter(s): Morgan Wong, DH2

Advisor(s): Sarah Justus

Abstract:

Purpose: The purpose of this research study is to identify factors influencing dental hygienists' employment patterns and attitudes.
Methods: A 49-item survey was delivered to 2,407 Oklahoma Registered Dental Hygienists through email using Qualtrics. Descriptive statistics were used, and the data were analyzed by Chi-square and Fisher's Exact tests to make group comparisons.
Results: 281 dental hygienists completed the survey, yielding an 11% response rate. Of the 254 currently working dental hygienists in Oklahoma, 27% reduced their working hours in the past 3 years; 50% reduced their hours due to physical burnout, while 37% worked less hours due to mental burnout. For the participants that responded, "not working currently" (n=27), 37% voluntarily left their position due to career change, and 25% voluntarily left due to mental burnout. This study compared participants by age, employment setting, and gender with plans to leave the profession in the next 5 years. A positive association between age (<40 years versus 40 years and older) and planning to leave the profession was found ($p<0.0001$). Of the individuals who are planning to leave the profession in the next 5 years, 16% were younger than 40 years of age, and 37% were 40 years and older ($p=0.0002$). Among those aged <40 years, 40% reported mental burnout as their primary reason for planning to leave; however, only 13% of those 40 and older reported mental burnout. No association was found when comparing employment setting and gender with plans to leave the profession.
Conclusion: The results from this study show the main influence on dental hygienists' deciding to leave the profession was burnout and job dissatisfaction. With oral health awareness increasing and concerns of a shortage of dental hygienists in the workforce, it is important for dental professionals to understand reasons why dental hygienists are leaving the profession and develop a strategy to help improve the current shortage.

Funding for this project was provided by the J. Dean Roberson Society and the 2022-23 Student Research Program.

#10

Title: Marijuana: oral health effects

Presenter(s): McKenzie Bedford, DH2

Advisor(s): Tammie Golden

Abstract:

Intro: The legalization of marijuana is making it more readily available to the population for recreational and medicinal purposes. The use of marijuana can cause several oral health issues that are continually being studied. Change in oral flora, xerostomia to list a few, can put the periodontium at risk. Dental health professionals need to be educated regarding the consequences this drug may have on oral health. The purpose of this literature review is to investigate the oral health effects of marijuana and its effect on the periodontium.

Background: It is estimated that around 147 million people are using marijuana for recreational purposes with the number continuing to augment. Xerostomia, one of the most common side effects of the drug, is reported to affect at least 69% of users. Gingival enlargement, hyperplastic tissue, erythroplakia, leukoplakia, and increased risk for periodontal disease are several other oral manifestations. Helpful effects of marijuana are anti-inflammatory and anti-bacterial properties. The use of CBD (marijuana) contained mouthwashes have a similar effect as chlorhexidine rinse. Other uses include treating patients undergoing chemotherapy and improving quality of life for HIV patients who suffer from “wasting” syndrome. In addition, marijuana is also known for its beneficial anti-anxiety properties.

Implications: Providers may find patients do not always share their use of marijuana on a medical history, making it difficult to provide adequate treatment. Obtaining an honest health history is important and making patients comfortable with communication regarding drug use may increase compliance as a result.

Conclusion: The effects marijuana has on the periodontium is constantly being examined however more research could be conducted to highlight the relationship with marijuana, CBD and its connection to the reduction of inflammation in the oral environment.

#11

Title: Salivary diagnostics: a new era in disease recognition

Presenter(s): Kayli Bennett, DH2

Advisor(s): Lindsey Hays

Abstract:

Introduction: Many medical professionals are unaware of the clinical applications of salivary diagnostics, their significance, or how salivary diagnostics might be used in dentistry. Modern research and technology have increased the use of salivary diagnostics and identified specific biomarkers for the detection of systemic diseases. The use of salivary diagnostics in dentistry can assist clinicians in achieving a common objective: improve the oral and systemic health of patients, advance dentistry to the forefront of healthcare, and enhance interprofessional collaboration.

Clinical Significance: Advances in technology and research have increased the use of salivary diagnostics in dentistry for the detection of HPV, COVID-19 infections, diabetes, cardiovascular disease, GERD, and Alzheimer's disease, all of which have significant oral health implications. Early detection can alleviate long-term health effects and aid in preventative oral health measures. In recent years, dentistry has become more aligned with other healthcare professions, making salivary diagnostics an important tool for interprofessional collaboration and comprehensive patient care.

Conclusion: Although the full implementation of salivary diagnostics requires more research from clinicians in all fields, it is evident that testing saliva samples is an efficient and effective method for identifying common diseases. It can be beneficial to clinical practice and provide important information about the health of patients. The use of salivary diagnostics will enable patients to significantly participate in decision making and self-care, which will be advantageous to patient compliance and better oral health outcomes. Salivary diagnostic testing may facilitate positive behavioral changes and assist the patient in understanding the significance of comprehensive care, in addition to enabling the clinician to provide patients with a higher standard of care.

#12

Title: Holistic strategies to reduce anxiety and fear in dental office

Presenter(s): Amisha Bhatt, DH2

Advisor(s): Tammie Golden

Abstract:

Introduction: According to Beaton et al. (2014), 36% of people in the United States have a fear of the dentist or dental settings (Beaton et al., 2014). According to Deva Appukuttan (2016), fear is the emotional response to danger of perceived threat which can lead to a fight or flight reaction, especially in dental settings (Appukuttan, 2016). General fear and anxiety towards dental treatment positively correlates with the avoidance of dental care. This leads to a vicious cycle of delayed dental visits, dental problems and emergent dental treatment. (Appukuttan2016) The purpose of this literature review is to examine holistic strategies to alleviate patient stress and fear in the dental office.

Background: Treating patients who suffer from anxiety presents a challenge for both the patient and the dental professional. It is essential to find solutions to reduce or prevent fear that is associated with routine dental treatment. Some non-traditional methods of reducing dental anxiety are techniques such as: aromatherapy, music therapy, virtual reality and muscle relaxation.

Clinical Findings: Severe anxiety is often treated by pharmacological methods which can include conscious sedation or general anesthesia, both with multiple risks and contraindications. When treating moderate anxiety, studies have shown the use of aromatherapy with lavender, music therapy, and music relaxation to be effective in reducing salivary cortisol levels (Appukuttan, 2016).

Conclusion: Pharmacological interventions still have their place in dentistry especially for treating severe anxiety. The use of non-traditional strategies is becoming more widely accepted however more research needs to be conducted to determine how often dental offices implement these methods. The use of multiple forms of holistic approaches seems to be the best options for success.

#13

Title: Reducing anxiety and stress in the dental office: a new approach

Presenter(s): Malli Cole, DH2; Lainey Jestis, DH2

Advisor(s): Lindsey Hays

Abstract:

Purpose: To investigate a new method in reducing stress and alleviating dental anxiety in dental settings.
Introduction: Dental anxiety and mental health issues can have a negative effect on overall oral health. There are several barriers to mental and oral healthcare, such as education, socio-economic status, and stigmas. One in five adults have a mental health related condition and dental anxiety is reported in 50-80% of patients. Research suggests that implementing a therapy dog into dental settings can create positive emotions and decrease dental anxiety. This growing trend could improve the dental experience and facilitate patient compliance.
Clinical Significance: Studies have shown that patients suffering from mental health conditions have a higher incidence of dental disease. Furthermore, anxiety prevents patients from seeking routine care. Research shows a decline in the use of anxiolytics as a result of therapy dog intervention, which has shown to be well-received. Therapy dogs as a part of the dental team provide a calming and positive environment for both patients and clinicians alike, potentially resulting in a more relaxed patient interaction and a lower stress dental setting.
Conclusion: It is clear that there is a significant correlation between mental health and oral health. In order to improve the oral health related quality of life, dental professionals can support oral health by motivating patients, providing oral health education, and implementing therapy dog services. The vast majority of patients reported positive dental experiences in settings where the addition of therapy dogs to the dental team are employed. Therapy dog models for dental offices have been developed and should be considered as a new approach to alleviate anxiety and stress related to the dental office.

#14

Title: Sleep apnea affects the whole body

Presenter(s): Kacie Combs, DH2; Carly Cox, DH2

Advisor(s): Lindsey Hays

Abstract:

Purpose: To bring awareness to the bidirectional relationship between sleep apnea and overall health.
Background: Diagnosis of sleep apnea is increasing in recent years. Patients with this condition have a higher probability to fall asleep during inappropriate times, have difficulty concentrating, and experience a lower quality of life. Sleep apnea can lead to several chronic long-term health effects, including a higher risk of cardiovascular disease, oral disease and sleep-related accidents.
Clinical significance: Sleep apnea is prevalent in as many as 18 million Americans alone. Research suggests early diagnosis and treatment may reduce the risk of developing chronic diseases. Intraoral signs include: redness of the soft palate and oropharynx, narrow palate, enlarged tongue, bruxism, mouth breathing, and nighttime xerostomia. Studies suggest a strong link between severity of oral disease and systemic health, including sleep apnea, making oral health an important piece of the puzzle. Since patients often visit the dentist more frequently than a medical doctor, the dental team can be crucial to recognition, education and even treatment for sleep apnea.
Conclusion: A dental hygienist is a professional in promoting good oral health, implementing preventive measures and educating about the oral-systemic link. Sleep apnea questionnaires can be implemented into health histories, as well as, extra/intra-oral exams. Dental hygienists can also educate patients on the systemic health effects of sleep apnea and oral management of patients who are utilizing C-PAP machines. Education, and even treatment options for sleep apnea are becoming more prevalent in dental offices, making the dental team a vital component to comprehensive healthcare.

#15

Title: Role of dental professional in screening for oral cancer

Presenter: Abbie Coulter, DH2

Advisor(s): Tammie Golden

Abstract:

Purpose: It is estimated that close to fifty-four thousand Americans will be diagnosed with oral or
oropharyngeal cancer this year. Oral cancer statistics for oral cavity and oropharyngeal cancer in the U.S. for 2023 are 54,540 new cases and 11,580 deaths. Increasing awareness and improving dental professional's diagnostic ability is vital in playing a valuable role in screening for oral cancer. The purpose of this literature review is to examine the role of dental professionals to determine if thorough screenings for oral cancer are being conducted consistently and identify possible barriers.

Findings: Some studies have shown that less than 50% of oral healthcare providers are discussing risk factors for oral cancer with their patients. Not all practitioners are consistent with what they look for and how they communicate with their patients during exams, as a result, many patients are unaware that they are being screened for oral cancer. Even though dental professionals have the knowledge to perform the exams, there is concern over comfort level and lack of interest with regard to communication with patients. The use of a semi structured interview technique using ISAC intervention can aid in early detection by sticking to the structured regimen. ISAC stands for inform, screen, advise and connect patient for referral. Other diagnostic tools being utilized to improve detection are fluorescent lights that show discrepancy between color changes in the oral epithelium.

Conclusion: Choosing to practice oral cancer examinations and/or educating for risk factors was perceived as a behavioral issue rather than being limited to lack of knowledge. (Jafer, 2019) More research needs to be conducted regarding attitudes and behaviors of dental professionals and what motivates those to consider this important step in patient care.

#16

Title: Therapeutic uses of botulinum toxin in the dental office

Presenter(s): Karmen Creach, DH2

Advisor(s): Sarah Justus

Abstract:

Purpose: The purpose of this literature review is to explore the therapeutic uses of botulinum toxin in the dental office.
Background: Botulinum toxin is a neurotoxic protein produced by the bacterium, *Clostridium botulinum.* Currently, there are 7 serotypes of botulinum toxin in production. Intraoral botulinum toxin is administered similarly to oral anesthesia, and it is a powerful and effective way to treat a variety of conditions, such as eyelid spasms, excessive salivation, TMJ pain, and migraine headaches. Studies show that administration is safe with no serious side effects. The administration of botulinum toxin can be performed on people of all ages, including infants, adolescents, and adults.
Significance: Despite public stigma and the common perception that botulinum toxin is used only for cosmetic purposes, it has been discovered that botulinum toxin can be used therapeutically to promote oral health. Studies have shown that the symptoms experienced by patients suffering from eyelid spasms, excessive salivation, TMJ pain, and migraine headaches are reduced using botulinum toxin. Therefore, dental professionals are in a key position to manage disorders of the head and neck with botulinum toxin.
Conclusion: Current research has revealed the effectiveness of the treatment of excess salivation, TMJ pain, and migraine headaches with botulinum toxin. Therefore, through administration of botulinum toxin, dental professionals could expand their scope of practice to include this therapeutic service.

#17

Title: Laser assisted periodontal therapy by the dental hygienist

Presenter: Ally Davis, DH2

Advisor(s): Lydia Snyder

Abstract:

Intro: Periodontal diseases present as one of the main threats to public oral and general health. Periodontitis is very prevalent across the globe and, if left untreated, can lead to tooth loss, with a significant impact on quality of life (Lazic, 2023). Traditional non-surgical periodontal therapy has always been the standard procedure to treat chronic periodontitis. Photonic therapy lasers have been used in periodontics since the 1980s (Theodoro et al., 2021). In recent years, the use of lasers as an adjunctive procedure in periodontal therapy has emerged as a promising alternative to traditional non-surgical periodontal therapy alone. This literature review aims to determine if the use of lasers by dental hygienists during periodontal therapy benefits the patient.

Findings: Multiple studies looked at variables to determine if using lasers during non-surgical periodontal therapy was beneficial to the patient. The most common variables used in the experimental studies were plaque index, bleeding upon probing, gingival recession, clinical attachment levels, and pocket depths. The data from the studies used in this literature review showed improvements in the control groups, who only received the traditional therapy, but also showed improvement in the experimental groups that received laser therapy. Both groups showed improvements, however the improvement in the group that received laser therapy was significantly better than that of traditional treatment alone.

Conclusion: The use of lasers in periodontal therapy has shown great potential. Although traditional non-surgical periodontal therapy remains the gold standard for treating periodontitis, studies show that laser use increases the benefit to the patient without any knowledge of harm done. Further research is needed to understand their benefits and limitations fully. The future of lasers in dentistry is bright.

#18

Title: Periodontitis and its relationship with cardiovascular diseases

Presenter(s): Kelsey Dobbins, DH2

Advisor(s): Kathryn Gerdts

Abstract:

Purpose: This Literature Review is an evaluation of the clinical, experimental, and epidemiology studies that have proven the direct and indirect relationship of periodontitis and cardiovascular disease, such as, vascular dysfunction, atherosclerotic diseases, and hypertension.
Background: A large body of evidence has shown the effects of periodontal inflammation and its association with extra-oral co-morbities. Periodontitis can produce an exaggeration of systemic diseases while also coexisting with or be the source of some diseases. Periodontitis has proven to create an increased count of neutrophils and pro-inflammatory cytokines. The increased neutrophil count and low-grade inflammation produced from chemical mediators have been theorized to enter the blood stream causing systemic inflammation. Cardiovascular disease and Periodontitis have both been associated with chronic inflammation.
Significance: The systemic inflammation produced by periodontitis has been linked to endothelial disruption, vascular inflammation, hypertension, and atherosclerotic diseases.
Conclusion: It has been clinically proven that periodontitis has an association with the pathogenesis of cardiovascular diseases. Additional research continues to develop the supporting notion that periodontitis has a direct and indirect impact on systemic health creating the oral systemic link.

#19

Title: Impact of COVID-19 on patient communication

Presenter(s): Sydnee Duncan, DH2

Advisor(s): Tina Tuck

Abstract:

Purpose: This literature review examines the impact of COVID-19 on communication with patients in the dental setting.
Background: Since the emergence of COVID-19, healthcare providers have had to make many adjustments in the way they communicate with patients. Before the formulation of a vaccine, the community relied on social distancing and physical interventions like wearing face masks to prevent the spread of the disease. While the use of these interventions is essential to reduce the spread of disease, it is important to examine what effects they have on communications between clinician and patient.
Significance: The increased use of face masks in the dental setting has been proven to have sound dampening qualities that creates a barrier when communicating with patients. This is especially difficult for patients with hearing loss, but has also been proven to affect patients with normal hearing as well. Wearing face masks when communicating with patients has impacted how patients recognize the emotions of their healthcare providers. The impact masks have on emotional recognition has been shown to create a perceived lack of empathy by healthcare providers. While teledentistry has provided a unique strategy for communicating with patients, it has been shown that the practice of teledentistry is low.
Conclusion: Based on the research and evidence available, COVID-19 has had a significant impact on patient communication. While the interventions to prevent the spread of the virus are necessary, it is important as dental professionals to be aware of the impact COVID-19 when communicating with patients.

#20

Title: Systemic health and periodontal disease

Presenter(s): Katie Elcyzyn, DH2

Advisor(s): Tammie Golden

Abstract:

Introduction: Studies have shown a connection between periodontal disease and systemic diseases such as cardiovascular disease, diabetes and Alzheimer's disease. Periodontal disease is the dysbiosis or imbalance of the oral microbiota that causes tissue destruction, inflammatory response and inflammation of the oral tissues. Microbial pathogens cause periodontal disease to progress and destroy oral tissues and alveolar bone. This process of inflammation has been linked to all different sites throughout the body. Research suggests that the health of the oral cavity plays a necessary role in prevention of systemic diseases. The purpose of this literature review is to investigate the impact of oral disease on systemic health.

Findings: A Porphyromonas gingivalis or (P.gingivalis) in vitro study orally inoculated healthy mice as well as hypercholesterolemic E deficient mice to determine impact of periodontal pathogens in oral cavity on vascular reactivity. Results revealed that all mice had evidence of periodontitis infection. All mice had vascular responsiveness whether healthy or not.

Significance: There is a low level of awareness of the connection with inflammation and the oral systemic link. Oral health education is vital in preventing inflammation in the oral cavity and throughout the entire body, thus reducing risk of disease.

Conclusion: More research could be conducted to explore the long term systemic health benefits of treating periodontal disease in the dental office and what methods of diagnostics are most beneficial.

#21

Title: The effects of genetics on oral health

Presenter(s): Janely Franco, DH2

Advisor(s): Robin Graham

Abstract:

Purpose: The purpose of this literature review is to evaluate how genetics contribute to the overall health of an individual such as physical characteristics, malocclusions, and the minerals in saliva a person produces.
Background: There are specific genetics that contribute to the alignment of teeth, which can also determine how much bacteria can accumulate between gum tissue and every tooth. Research has identified that DNA methylation influences inflammatory genes, which can increase the risk of periodontal disease at an early stage.
Significance: There are also specific genes, for example EFCAB4B that has been shown for Italian descent to speed up the inflammatory process of periodontal disease. It was also found that rare genetic diseases contribute to physical deformities such as skeletal malocclusions. Dentogenesis imperfecta is a predisposing factor to developing an anterior open bite and cross bite malocclusion. Current research reports that IL1A gene contributed to oral disease such as periodontal disease. The finding of this specific gene is helpful in preventing oral disease in the future. It was found that aggressive periodontitis was linked to an autosomal recessive gene disorder. Research has identified that the main etiological bacteria that contributes to caries production is streptococcus mutans. Caries is a transmissible disease through saliva and cannot be reversed through mechanical or chemical means.
Conclusion. Overall, genetics contribute to the development of the oral cavity. Having good oral hygiene and attending routine appointments can help reduce the risk of oral disease and help establish a good oral health.

#22

Title: The effects of xylitol on oral and systemic health

Presenter: Graycen Guthrie, DH2

Advisor: Julie Schneberger

Abstract

Purpose:
This literature review identifies the correlation between xylitol and preventing dental caries.
Background:
Xylitol is a 5-carbon sugar alcohol that is commonly used as a sugar-sweetener substitute in candy and chewing gum. Not only is xylitol used in confections, but also doubles as an anti-microbial substance for healthcare. Xylitol can also be used to prevent dental caries.
Significance:
Xylitol works in the oral cavity and inhibits the adherence of *Streptococcus mutans* bacteria to the tooth surface and, increases salivary flow. Xylitol has many vehicles for delivery for systemic health including nasal spray, supplements, toothbrush, toothpaste, and candies. The nasal spray can be beneficial for patients experiencing signs of chronic rhinitis from seasonal allergies. Since xylitol is not fully digested in the digestive system, it can be a good option for obese patients that experience Type II Diabetes. Xylitol does not affect glucose or insulin levels in the bloodstream. However, there is no evidence that supports that xylitol can prohibit weight loss. Xylitol can be beneficial for bone health for osteoporosis patients. Taking supplements or eating candies can achieve increased bone strength. There have been no found adverse effects for patients taking xylitol except when ingested too much in one setting it can cause gastrointestinal disturbances. Xylitol has similar characteristics as fluoride, but xylitol does not decrease the critical caries development pH level of 5.5. Xylitol should be recommended to patients with high compliance, because of the amount and time the patient would need to ingest xylitol to achieve positive effects.
Conclusion:
Xylitol has many benefits for oral and systemic health including the prevention of dental caries. It can be used in candies, chewing gum, supplements, and nasal spray. For many patients, xylitol would benefit their overall health as well as systemic health.

#23

Title: Periodontitis and its effects on Alzheimer's disease and dementia

Presenter(s): Emily Harwell, DH2

Advisor(s): Alli Carter

Abstract:

Purpose: The purpose of this literature review is to show the effects of periodontitis on Alzheimer's disease (AD) and dementia.
Background: AD, a form of dementia, is a type of chronic progressive brain disease that starts with unnoticeable changes in the brain and develops into memory loss. There is no cure for AD or dementia, however, there is a preventive relationship between periodontitis and brain disease. Studies have shown the presence of periodontal bacteria such as Porphyromonas gingivalis, Treponema denticola, Tannerella forsythia, Veilonella spp, Firmicutes spp, and Actinobacteria in human brain matter of individuals with these diseases. It is reported that oral bacteria enter the central nervous system through the bloodstream and spread throughout the brain. Proper oral hygiene is vital in reducing the spread of this bacteria.
Significance: There is a strong relationship between AD and dementia with clinical aspects of periodontal disease. The links associated with the relationship include probing depths, bleeding on probing, clinical attachment loss, and plaque index. Studies found that the presence of specific bacteria in the oral cavity showed a decline in cognitive function.
Conclusion: Research indicates a positive correlation between periodontitis with AD and dementia. The increasing levels of bacteria associated with periodontal disease in the oral cavity lead to neurodegeneration. Further research aims to determine more details about the specific path the bacteria are taking in order to design preventative therapies to reduce the chances of developing the disease.

#24

Title: Probiotics and the oral cavity: alternative roads to health

Presenter(s): Areicy Hausburg, DH2; Madison Brown, DH2; Sara Schultheis, DH2

Advisor(s): Ashley Clark

Abstract:

Purpose: The purpose of this literature review is to determine the effects of probiotic use in prevention of adverse oral health outcomes.

Background: Oral microbiota is a widely researched topic as it can vastly affect the symbiosis of the oral microbiome and overall health of the host. Probiotics are live microorganisms that promote the health of its host by competing with other existing bacteria. Oral diseases such as caries, periodontal disease, candida, and halitosis are associated with specific pathogenic microorganisms. With over 500 bacterial species existing in the oral cavity, many researchers have focused on strains of bacteria found in probiotics that can limit the prevalence of these oral diseases.

Significance: There are numerous probiotic options that directly target specific harmful bacterial strains. Dental professionals have seen a shift in consumer interest involving the use of clean and natural remedies to restore and maintain a healthier oral microbiome. Methods of delivery are accessible through everyday products such as milk, yogurts, lozenges, and mouth rinses.

Conclusion: Oral probiotics are a solution to providing natural alternative therapies to patients with antibacterial issues that plague the mouth.

#25

Title: Oral health in long-term care facilities

Presenter(s): Alyssa Hudson, DH2

Advisor(s): Tiffany Dougherty

Abstract:

Purpose:

The purpose of this literature review is to discuss the importance of oral health in the geriatric population, specifically those living in long-term care facilities. Understanding the connection of oral health to one's overall health can help providers identify how to improve or maintain the oral health of long-term care facilities residents. This can be accomplished through education, professional collaboration, and creating access to care.

Background: The challenges facing proper dental care in long-term care facilities are prevalent and nationwide. These obstacles most commonly present as a lack of oral health education and training in providers of these patients. This unfortunately has resulted in poor or declining oral health for residents and that unintentional neglect most commonly leads to poor overall health.

Clinical Significance: The role of a dental hygienist can help improve the oral health of residents in long-term care facilities through oral health education, professional collaboration, and accessible dental cleanings. These strategies have the ability to significantly advance the care received by residents' in order to lower the incidence of periodontal disease and dental caries.

Conclusion: It is essential for health care providers in these long-term care facilities to practice optimal oral hygiene practices and understand the link to the overall health of their residents. Dental hygienists can play a crucial part in aiding those fellow healthcare providers by being active partners in the health of long-term care facilities residents. Focusing on the oral health of these residents will ideally improve their quality of life and overall health outcomes.

#26

Title: Factors affecting the clinical dental hygiene employment shortage

Presenter(s): Addison Mullin, DH2

Advisor(s): Julie Schneberger

Abstract:

Purpose: This literature review studies the different factors contributing to the recent dental hygiene shortage throughout the COVID-19 pandemic along with possible interventions to address the issue.

Background: The dental hygiene shortage has had a negative impact on the dental field and quality of patient care. In efforts to evaluate this issue, various research studies were reviewed to compare factors contributing to burnout within the dental hygiene setting. Each study surveyed a different population of dental hygienists to determine stress levels, coping mechanisms, job satisfaction, and experiences faced during the pandemic that could have influenced job turnover.

Significance: Many hygienists faced a variety of distinctive stressors throughout the pandemic such as issues with childcare, fear of safety, physical exhaustion, lack of time in work schedule, and more that had a negative influence on job satisfaction and led to increased feelings of burnout within the clinical setting. This had a direct impact on the dental field and caused many hygienists to either temporarily or permanently leave the practice. This then led to a shortage of clinically working hygienists available.

Conclusion: The results indicated that the factor that seemed to have the largest impact on the dental hygiene job market in recent years was related to stress due to the COVID-19 pandemic. Further research is suggested following the conclusion of the pandemic to compare trends in data regarding the dental hygiene job market. Researchers also suggest interventions be placed by employers to aid in job satisfaction along with the addition of stress reduction practices within educational programs to benefit the mental health of hygienists and decrease feelings of burnout.

#27

Title: Environmental sustainability in dentistry

Presenter(s): Gracie Nimrod, DH2

Advisor(s): Tiffany Dougherty

Abstract:

Purpose: This literature review aims to identify and examine recent research findings on environmental sustainability to gain a comprehensive insight into possible changes to mitigate waste in the dental industry.

Background: This topic has a brief history, as we have seen an increased awareness and growing concern about global pollution and waste generation. The health industry is becoming known for its contribution to pollution and waste generation. The dental industry specifically sees a significant amount of waste generated from single-use plastics (SUPs), which comprise a large amount of pollution we see today within the dental industry.

Clinical Significance: This literature review will identify the quantifiable evidence of waste generation from single-use plastics (SUPs), the perception of ethical waste management and environmental sustainability in dentistry, the barriers the dental industry faces in approaching environmentally sustainable practices, and lastly, the approaches to improve waste management and environmentally sustainable practices within the dental industry.

Conclusion: The final product of this review will give a scope into what issues are at hand when examining environmental sustainability and some of the actions currently being taken to combat unethical waste generation and management within dentistry.

#28

Title: The use of mesenchymal stem cells in regenerative dentistry

Presenter(s): Holly Parker, DH2

Advisor(s): Tiffany Dougherty

Abstract:

Introduction: The periodontium's primary function is to support and protect teeth, nerve, and blood vessels from stress of mechanical loading. It can be affected by periodontitis, an inflammatory condition. Periodontitis can cause irreversible damage if left untreated. Research is being conducted to determine if tissue engineering, by use of mesenchymal stem cells (MSCs), is beneficial toward periodontal regeneration of cementum, alveolar bone, and periodontal ligament. Various subpopulations of MSCs are being studied to determine their ability to aid in regeneration of the periodontium.

Purpose: To explore alternative methods in regenerative dentistry using mesenchymal stem cells.

Findings: Research is being conducted on the effects of MSCs in periodontal defects, alveolar bone height, clinical attachment levels, and endodontic therapy. By using clinical and radiographic assessments, results are showing positive evidence that MSCs can be beneficial in regenerative dentistry.

Conclusion: Stem cell research is showing promising results in regenerative dentistry in animal models. The subpopulations of mesenchymal stem cells are demonstrating unique traits that would be beneficial to specific periodontal defects. Expanding the limitations of human clinical trials would be valuable in identifying the full potential of MSCs. The standardization of protocols may lead to more conclusive results in the continued research of stem cells.

#29

Title: Oral health considerations in Alzheimer's disease

Presenter: Madison Parrett, DH2

Advisor(s): Tammie Golden

Abstract:

Intro: Recent statistics from 2022 state 6.5 million Americans aged 65 and above, are living with Alzheimer's disease and by 2060 the projected increase is 13.8 million. Survival rate of Alzheimer's is four to eight years after diagnosis and the disease is the 7th leading cause of death in America. Alzheimer's can influence oral health negatively and understanding the risk factors in developing adverse events can be helpful for dental professionals to treat patients with this disease. The purpose of this literature review is to examine oral health in Alzheimer's disease and explore strategies to help manage the progression of this disease.

Findings: Oropharyngeal dysphagia is a common side effect in Alzheimer's. A study from a long term care facility in Brazil stated nearly 92 % of patients with severe disease experienced dysphagia compared to 16.7% of individuals with mild or moderate disease. Another study of 255 patients were studied for their ability to swallow measuring a variety of volumes and textures of foods and fluids. Results indicated that liquids involving a large bolus viscosity improved the safety of swallowing. NMES or neuromuscular electrical stimulation and electromyographic biofeedback is a method of therapy that focuses on muscle contractions and nerve stimulation to improve swallowing abilities and has proven beneficial. Collaboration and education from dental professionals to families and care-takers of individuals with Alzheimer's is vital to impact maintenance of optimal oral hygiene. Reduction of risk to developing periodontal disease, dysphagia and harmful pathogens is linked to arresting progression of the disease.

Conclusion: The use of NMES and biofeedback seems hopeful in improving quality of life for some individuals suffering from Alzheimer's and has shown to reduce the risk of developing aspiration pneumonia. Future research could be conducted to determine its usefulness in managing side effects of this disease.

#30

Title: How deaf patients are impacted by dental care

Presenter(s): Grace Reed, DH2; Lizzy Tatum, DH2

Advisor(s): Ashley Clark

Abstract:

Purpose: The purpose of this literature review is to evaluate the effectiveness of solutions proposed for the problems that deaf patients face within the dental office.
Background: Deaf patients face many challenges when seeking dental care such as poor communication which can lead to heightened amounts of anxiety. Proper communication with deaf patients is crucial for the success of dental care. Unfortunately, it is common for dental professionals to lack the training on how to properly communicate with deaf patients which can greatly impact their quality of care.
Significance: Deaf patients face barriers when visiting a dental professional and it is important for dental professionals to acknowledge these barriers. Oftentimes, dental professionals do not have proper training in treating deaf patients and are unaware of all the barriers they face. Research shows that proper verbal and non-verbal communication between both the patient and the dental professional is crucial and helps ease the patient's anxiety. Communication is an ongoing process that may feel repetitive but is necessary.
Conclusion: There is a great need for future research to be done on how dental professionals can accommodate the needs of their patients and ways to educate patients on the importance of oral health. Studies show that there are inequalities in all patients' access to care and oral health status. By learning more about the challenges patients face and how to overcome them, the dental team can provide quality care to all patients. It is the job of dental professionals to do what they can to help patients and by learning small ways to communicate with deaf patients, providers can more effectively do their job and promote good oral health.

#31

Title: The importance of blood pressure in the dental care setting

Presenter(s): Ella Roberts, DH2

Advisor(s): Robin Graham

Abstract:

Purpose: The purpose of this literature review is to discuss how important blood pressure is related to the dental care setting.
Background: Blood pressure is the measure of two numbers: systolic, which reads how much pressure the blood is exerting against the artery walls when the heart is beating while diastolic is pressure against the walls when the heart is at rest. These numbers are key when it comes to a patient's overall health and can impact dental procedures. There are many factors that can lead to an adverse reading such as stress, white coat syndrome, or a medical ailment. Many patients are often undiagnosed with hypertension and if dental professionals acquired blood pressure readings at each appointment this could help diagnose and increase the prognosis of those with hypertension.
Significance: In a survey, it was concluded that 79.5% of dentists were aware that patients with high blood pressure had an increased risk for complications but only 13.3% measured blood pressure for all patients. 73% of patients who visited their dental care provider were referred to their physician regarding undiagnosed hypertension.
Conclusion: Many dental professionals are aware of the risks and complications associated with hypertension but often do not take the step of taking a blood pressure reading on all patients. This is a concern since many patients often go undiagnosed. Dental professionals should take the time to take these readings for each appointment not only to better serve the patient's dental care but also their overall health.

#32

Title: Dental loupes: Will they save you from musculoskeletal disorders?

Presenter(s): Kendall Schnoebelen, DH2

Advisor(s): Tina Tuck

Abstract:

Purpose: This literature review will examine the effect dental magnification loupes have on preventing musculoskeletal disorders (MSDs) in dental professionals.
Background: The prevalence of MSDs in the dental hygiene profession is currently between 64 and 93%. While any body part may be subject to MSDs, the neck and shoulder remain the most common areas based on the need for hygienists to position their bodies to see the oral cavity. Without loupes or when using loupes that are not properly fitted to an individual, changes to neutral sitting positions may occur.
Significance: According to OSHA, MSDs are the most common causes of time missed from work. Hygienists who experience MSD issues may reduce their hours or even leave the field. Dental magnification loupes were designed to aid the dental professional in maintaining proper ergonomics while also improving visualization. Research had been conducted to test whether the addition of loupes into everyday practice helps to maintain proper ergonomics therefore lowering the chance of developing MSDs.
Conclusion: Research has suggested that wearing dental magnification loupes may aid clinicians in achieving and maintaining their ergonomics. Not all dental loupes are the same and many factors must be considered when using them. Every clinician is different so every pair of loupes must be fit according to the individuals own measurements including eye width, declination angle, frame size, and working distance. New innovations in loupes have introduced prismatic lenses which allow the wearer to sit fully upright without having to bend at the neck or the trunk. Further research needs to be conducted using larger sample sizes, longer duration, and a correlation of types of loupes and types of MSDs.

#33

Title: Green tea and the oral cavity

Presenter: Jennifer Tsai, DH2

Advisor(s): Kathryn Gerdts

Abstract:

Purpose: The purpose of this literature review is to understand the beneficial effects green tea has on the oral cavity. Green tea provides beneficial components to limit caries formation, prevent periodontal disease progression, and provides a fluoride regimen.
Background: Green tea has been around for many years and is a popular drink of choice. Strong evidence from in vitro studies suggest that tea-derived polyphenols may have an influence on the pathogenesis of several oral diseases. Among all tea polyphenols, EGCG has demonstrated its role in inhibiting disease progression.
Significance: The oral cavity is the beginning to the rest of the human body. What goes in can affect a variety of physiological systems. Maintaining a healthy oral cavity can decrease the chance of developing systemic health issues. Dental hygienists have the knowledge to educate patients and provide options for disease prevention. A chronic disease affecting children today is early childhood caries, particularly in socially disadvantaged groups. Green tea is not only healthy and non-toxic but is easily accessible and economically friendly as a preventative product for children.
Conclusion: As an anti-inflammatory aid, green tea has been suggested to improve periodontal health, prevent bone resorption, and limit growth of certain periodontal-related bacteria.
Swishing with green tea mouthwash for one minute, twice a day, can lower the saliva's pH to a non-favorable condition for *S. mutans*. Incorporating green tea before meals and during breaks is a simple habit that can improve overall oral health.

#34

Title: The benefits of myofunctional therapy in dentistry

Presenter: Morgan Tupas, DH2

Advisor(s): Tammie Golden

Abstract:

Intro: Myofunctional therapy consists of a series of exercises targeting orofacial muscles in an attempt to establish proper posture and function. Therapy is utilized to treat ankyloglossia (tongue tie), obstructive sleep apnea and tongue thrust. Myofunctional therapy also plays an important role in proper eating, swallowing and speaking habits. The purpose of this literature review is to
explore the effectiveness of myofunctional therapy in dentistry.

Findings: One study demonstrated that 23.4% of women and 49.7% of men have sleep disordered breathing, a multifactorial disease. Myofunctional therapy has played a significant role in improving muscle tone and alleviating upper airway collapse and evidence has shown a positive correlation between therapy and improvement of breathing. Patients with severe or moderate sleep apnea showed greater improvement vs. those with only mild apnea. Treatment for snoring was decreased by 50% after myofunctional therapy according to one study. (Carrasco-Llatas et al., 2021) Ankyloglossia was best treated when combined with lingual frenectomy and myofunctional therapy. Tongue thrust cases often involve a team approach with dentist, orthodontist, pediatrician and speech pathologist getting involved. In all cases, compliance is key with exercises and techniques for optimal success.

Conclusion: Myofunctional therapy should be considered as part of comprehensive care in dentistry and can be useful when treating the patient as a whole as it is non- invasive and poses little risk to the patient. More research could be done to look at the benefits and alternative methods myofunctional therapy has to offer.

#35

Title: Olfactory dysfunction, oral health, and quality of life

Presenter(s): Jese Valeriano, DH2

Advisor(s): Lindsey Hays

Abstract:

Background: Olfactory dysfunction has many implications on human health. Olfactory disorders can range in severity from partial to complete loss of smell. Causes of olfaction vary which leads to complications when diagnosing. Loss of olfaction can be exacerbated due to certain risk factors such as age and chronic inflammation. More than ten million people suffer from chronic allergies leading to loss of olfactory function. In the elderly population, it is estimated that 50 million people age 65 and over have decreased olfactory function.

Significance to Dentistry: Patients suffering from olfactory dysfunction can have a multitude of health and dental considerations including: xerostomia, halitosis, increased plaque retention, tooth decay, periodontal disease, and depression. Among healthcare professionals, olfactory dysfunction is often overlooked as a significant factor in overall health. Dental professionals treat patients on a more regular basis than primary care physicians. Thus, it is important for dental hygienists to be able to recognize olfactory dysfunction and how to properly refer patients to get the proper care. Treatment of olfaction is minimal, but has been achieved through olfactory training, neurotransmitter regulation, and the use of systemic or topical steroids.

Conclusion: Olfactory dysfunction is difficult to diagnose and treat. Awareness of symptoms and proper education for patients and dental professionals can assist in living healthy and fulfilled lives. Research suggests that olfactory dysfunction has a direct link to the quality of oral health, making this disorder a top concern for dental professionals. With increasing numbers of patients dramatically affected by olfactory dysfunction, dental hygienists can play a key role in detection and management of the disorder. It is vital for dental professionals to recognize symptoms of olfactory dysfunction, as well as educating themselves and patients about the loss of these senses.

#36

Title: The guardian's understanding of tooth decay and caries in children

Presenter(s): Abbey Warren, DH2

Advisor(s): Tina Tuck

Abstract:

Purpose: This literature review explores the correlation between a child's overall health, the health belief model of the caregiver, and the child's oral health status.

Background: The most common prevalence of early childhood caries (ECC) is between the ages of 3-4 years old and varies with race, cultural beliefs, and nationality. ECC is considered a multifactorial disease associated with conditions such as carcinogenic organisms, social factors, and diet. Parents need to understand the importance of oral in primary teeth leads to the child's oral health when they develop their adult teeth. Inadequate care of primary teeth could lead to childhood caries and expensive dental treatment.

Significance: A diet high in sugary foods, carbohydrates, and acidic foods, such as lemons and oranges, can lead to caries. Autoimmune disease and diabetes mellitus are a couple of conditions that effect oral care. The child's oral health and the caregiver's understanding of dental care were found to be related. Community traits, cultural and health beliefs, as well as economic and societal issues, are social determinants that have an impact on the caregiver's understanding.

Conclusion: Factors influencing ECC include excessive sugary foods and beverages, prolonged breast feeding, poor oral hygiene, and lack of oral health literacy. Children learn much of their oral hygiene home care from their caregivers and carry it into their adult life. Factors include income, socioeconomic status, cultural and health beliefs, and oral health literacy effect the likelihood of children developing ECC.

#37

Title: The effects of vaping on oral health

Presenter(s): Paige Williams, DH2

Advisor(s): Robin Graham

Abstract:

Purpose: This literature review will attempt to compile research that has been done to determine the oral health risks of vaping. Studies included in this review covered in-vitro cancer studies, a case study of oral squamous cell carcinoma, periodontal measurements, plaque biofilm composition, biomarker research, and perceptions of oral health risk in young adults.
Background: It has long been known that tobacco use and smoking contribute to many adverse oral health outcomes. However, the effects of using electronic nicotine delivery systems (ENDS) or nicotine-free vaping devices have not received as much research due to being relatively new technology within the past 2 decades.
Significance: Preliminary studies suggest that vaping has a cytotoxic and potentially cancer-causing effect. Some periodontal studies found vaping to cause harm to the periodontium, while others did not find that to be the case. The general findings of these studies are that ENDS users have increased amounts of inflammatory mediators and certain pathogenic bacteria that contribute to undesirable damage to host tissues. It is still unknown whether vaping can be correlated to worsened periodontal health independent of other contributing factors such as conventional smoking or poor oral hygiene.
Discussion: While vaping is a relatively new behavior with small amounts of research, the initial results of these studies show vaping may have a detrimental effect on oral health. Dental professionals have a responsibility to their patients to fully educate them about their oral habits and any risk for disease caused by their habits. Further research should be done in each of these areas to educate providers and patients about the oral effects of vaping.

#38

Title: Effects of herbal rinses compared to chlorhexidine in the oral cavity

Presenter(s): Jasmine Wilson, DH2

Advisor(s): Robin Graham

Abstract:

Purpose: The purpose of this study is to compare the effectiveness of herbal rinses to chlorhexidine in the oral cavity.
Background: Chlorhexidine is recommended by dental professionals for people with mild gum disease when used as an addition to daily tooth brushing and flossing. Previous studies have shown long term use of chlorhexidine can cause staining, increased calculus formation, altered taste perceptions, and contains alcohol. Herbal mouth rinses do not contain alcohol and have become a cheaper alternative for people with periodontal diseases. The oils in herbal rinses help in plaque reduction, gingivitis, cleansing, and acts as a breath freshener.
Significance: Chlorhexidine cannot be used as a long-term therapy because of side effects such as increased calculus build up, staining, and altered taste. Chlorhexidine can also be a contraindication to current and former alcoholic because of the alcohol content in chlorhexidine. Herbal rinses are easier to acquire through consumer stores and is less likely to cause contraindications and side effects.
Conclusion: Studies have shown positive effects of herbal extracts and reduction of periodontal disease, but chlorhexidine is still the most effective clinical rinse that is provided. Herbal rinses can be used for long term routine to prevent side effects and can potentially be used as a therapeutic agent for chronic periodontitis.

#39

Title: The link between periodontal disease and cognitive impairment

Presenter(s): Jerri Wilson, DH2

Advisor(s): Tina Tuck

Abstract:

Purpose: The purpose of this literature review is to discuss the importance of periodontal disease in patients with Cognitive Impairment
Background: Globally, dementia affects more than 50 million individuals. By 2050, the prevalence of dementia is predicted to triple because of a rise in the number of senior citizens. Although numerous approaches to dementia therapy and prevention have been researched, no successful approach has yet to be found. It may be possible to prevent dementia and lengthen the patient's healthy life span by identifying the risks and contributing factors for dementia.
Significance: It has been proposed that the biochemical changes in neurodegenerative illnesses can be related to the molecular pathogenic pathways causing periodontitis. In theory, the cause of cognitive impairment includes persistent systemic inflammation brought on by periodontitis. This literature study sought to ascertain if periodontitis raises the possibility of cognitive loss brought on by age. It is now widely known that periodontal infections and their toxic byproducts, together with periodontal tissues producing inflammatory mediators, can reach the circulation, and have a significant impact on systemic disorders.
Conclusion: Despite clinical studies demonstrating the co-morbidity of periodontitis and Alzheimer's disease as well as the discovery of blood antibodies to periodontal bacteria in the disease, no research has been done to definitively establish the causal relationship between the two conditions. It is evident that maintaining good dental hygiene, whether self-performed or assisted, going to regular dental checkups, having a nutritionist on hand to create a diet plan specifically for the person's needs, and educating the caregivers about these people's needs would therefore help those with cognitive impairment maintain parity with their healthy counterparts.

#40

Title: Access to dental care among low-income and underserved populations

Presenter(s): Alex Woods, DH2

Advisor(s): Kathryn Gerdts

Abstract:

Purpose: The purpose of this literature review is to examine the factors that influence access to care within the dental field.
Background: The main points discussed in this literature review are the importance of childhood education, how access to care affects the elderly population, and if mobile dental clinics are a promising option for the rural populations. According to the most recent research, some factors that affect access to care include socioeconomic status, ethnicity, geographical location, education, and age. Patients who lack access to care are at a higher risk of gingivitis, carious lesions, and periodontal disease.
Significance: Children who are uninsured, do not have a medical home, or have low socioeconomic status are at a higher risk of developing dental caries. Furthermore, many older Americans lose their private dental insurance upon retirement and are at an increased risk of root caries. For those who lack access to care due to geographical location, mobile dental clinics are a promising option because of their low startup cost and portability. Access to dental care is the first step in prevention, treatment, and maintenance of common oral diseases.
Conclusion: Educating patients, finding ways to decrease access to care barriers, and utilizing interprofessional collaboration are some ways dental providers can better treat the increasing demand of oral healthcare needs. As well, researchers and policy makers are working to find ways to alleviate access to care barriers.

#41

Title: Essential oils and dentistry: a natural approach to dental anxiety

Presenter(s): Olivia Young, DH2

Advisor(s): Kathryn Gerdts

Abstract:

Purpose: The purpose of this literature review is to evaluate the application of essential oils as a method to reduce a patient's dental anxiety.
Background: Dental anxiety is a common problem that many patients face. Studies have reported the prevalence of dental anxiety ranges from 3-43%. While there are pharmacological solutions to patients' anxiety such as local and general anesthesia, and medications, these methods can have negative side effects and be expensive. Several studies have found evidence that essential oils are a non-pharmacological, safe, and cost-efficient treatment for patient's dental anxiety. One randomized controlled trial measured the impacts of lavender essential oil inhalation on salivary cortisol, and pulse rate in anxious patients pre, during, and post-dental treatment. Compared to the control group, the treatment group had significantly lower anxiety levels as measured by the patient's salivary cortisol and pulse rate.
Significance: It's important that dental professionals address patients' anxiety as it can have multiple negative effects on the patient's health, and their ability to receive the necessary treatment. Patients who are anxious are more likely to miss appointments, be uncooperative in the chair, have delayed wound healing, and make it difficult for the professional to provide treatment.
Conclusion: These studies initiate important considerations such as patient consent, individual scent preferences, and various application methods. Considering the research provided in this review, there is support for the use of essential oils as a safe, effective, and cost-efficient method to treat patients' dental anxiety.

#42

Title: Characterization of nanofilled cements with metaloxide nanoparticles

Presenter(s): Alexandra Ahearn, DS2

Advisor(s): Fernando Luis Esteban Florez

Abstract:

To characterize the color stability (CS), biaxial flexure strength (BFS), and antibacterial (BIO) properties of experimental resin-modified glass ionomer cements (RMGIC) containing nitrogen and fluorine co-doped titanium dioxide nanoparticles (NF_TiO_2). Experimental materials were formulated by manually dispersing NF_TiO_2 (20%, 25%, 30%, [v/v]) into a commercially available RMGIC (UltraCem, Ultradent Products, Inc.). Unaltered RMGIC served as the control group. Disk-shaped specimens (diameter=6.0mm, thickness=0.5 mm) were manually fabricated for CS (n=12/group), BFS (n=12/group), and BIO (n=18/group). CS was determined using a hand-held spectrophotometer (VITA Easyshade® V, VITA North America, USA) after specimen fabrication and after 500, 1,000, 2,500 and 5,000 thermocycles (5-55°C, 15s dwell time). BFS was determined using a Universal Testing Machine (Instron 68TM-5, crosshead speed=1.27 mm/min, 25°C). Antibacterial testing was performed by growing *Streptococcus mutans* biofilms (UA159-*ldh*, 37°C) on the surfaces of specimens for 24h and using a high-throughput bioluminescence assay. Experimental data for CS, BFS, and BIO were analyzed using General Linear Models and Student-Newman-Keuls tests (SAS Software). Values of CS (in ΔE_{00}) ranged from 1.40±0.56 (1,000 cycles, RMGIC + 10 or 20% NF_TiO_2) to 4.57±1.23 (5,000 cycles, control). BFS values ranged from 0.02 ± 0.01 kN (RMGIC+10 or 30% NF_TiO_2) to 0.05±0.01 kN (control). BIO values ranged from 3,152.17±838.84 RLU (RMGIC+10% NF_TiO_2) to 19,696.83±6,764.16 RLU (control). Differences ($p<0.0001$) were detected for CS, BFS, and BIO. Experimental materials with higher NF_TiO_2 concentrations were more color stable and more antibacterial when compared to unaltered RMGIC but had mechanical properties that were inferior.

Funding for this project was provided by the J. Dean Robertson Society and the 2022-23 Student Research Program.

This study was presented at the 2023 AADOCR General Session and Exhibition.

#43

Title: Characterization of experimental nanofilled flowable composite resins

Presenter(s): Mubarika Ali, DS2

Advisor(s): Fernando Luis Esteban Florez

Abstract:

To characterize the degree of conversion (DC), biaxial flexure strength (BFS) and antibacterial (BIO) properties of experimental flowable composites containing nitrogen and fluorine co-doped titanium dioxide nanoparticles (NF_TiO_2). Experimental materials were formulated using Bis-GMA and TEGDMA (ratios=50:50, 70:30, 80:20) and NF_TiO_2 (20%, 25%, 30%, [v/v]). Unfilled composites served as control groups. Drops of unpolymerized composites (n=2drops/each) were placed onto a heated (37°C) monolithic diamond crystal (ATR, Golden Gate) coupled to Fourier-transform infrared (FTIR) spectrometer (Nicolet IS50). Spectra of composites were obtained (500-4,500cm^{-1}; resolution 4cm^{-1}, 10 internal scans/spectrum) at the unpolymerized and polymerized (40sec/each; 385-515nm, 1,000mW/cm^2; VALO) states. Specimens (diameter=6.0mm, thickness=0.5mm) for BFS (n=12/group) and for BIO (n=18/group) were fabricated and photopolymerized. Degree of conversion values (in %) were calculated using the two-frequency method and tangent-baseline technique. BFS was determined (Instron 68TM-5) using a crosshead speed of 1.27 mm/min (25°C). BIO was determined by growing *Streptococcus mutans* biofilms (UA159-*ldh*, 37°C, 24h) on the surfaces of specimens and using a high throughput bioluminescence assay. Data for DC, BFS and BIO were analyzed using General Linear Models, two-way ANOVA and post hoc Student-Newman-Keuls tests (SAS Software). Values of DC ranged from 53.2%±0.80% (80:20+20%NF_TiO_2) to 70.7%±2.00% (70:30+20%NF_TiO_2). BFS ranged from 0.04±0.01kN (70:30+30%NF_TiO_2) to 0.07±0.02kN (80:20+30%NF_TiO_2) and BIO ranged from 97,527.33±51,042.61 (50:50+25%NF_TiO_2) RLUs to 212,469±108,626.41 RLUs (50:50). Differences ($p<0.0001$) were detected from the interaction between parameters of interest (nanoparticles*composition) for DC, BFS and BIO. Nanofilled materials were demonstrated to convert more and to display superior mechanical and antibacterial properties.

Funding for this project was provided by the J. Dean Robertson Society and the 2022-23 Student Research Program.

This study was presented at the 2023 AADOCR General Session and Exhibition.

#44

Title: Determining the anatomical contour of the cemento-enamel junction

Presenter(s): Riley Crismon, DS2

Advisor(s): Robin Henderson

Abstract:

The cemento-enamel junction (CEJ) is an anatomical landmark that plays an important role in all aspects of dentistry. However, the identification of this vital landmark is difficult for many practitioners due to nature, normal wear, and biologic issues. Previous studies have been done on various diseases and conditions regarding the CEJ; however, this study is focusing on the exact measurements of the CEJ that differentiate between the four anatomical sides of the tooth. This pilot study attempted to map the anatomical contour of the circumferential CEJ of each tooth type, with the goal of providing a predictable measurement of the CEJ around the tooth. This could act as a standardized tool to help clinicians be able to quickly and accurately identify the CEJ landmark, leading to more successful dental treatments and preservation of surrounding gingival tissues. To determine these measurements, 10 extracted teeth of each tooth type were utilized. Using a digital caliper, four different measurements were recorded: facial CEJ to mesial CEJ, lingual CEJ to mesial CEJ, lingual CEJ to distal CEJ, and facial CEJ to distal CEJ. These measurements were recorded for every extracted tooth. For both the maxillary and mandibular arches, the average differences between surfaces looked to be greater for anterior teeth, showing a larger amount of circumferential curvature of the CEJ, when compared to posterior teeth. Mandibular canines showed more curvature than the maxillary canines, while the maxillary incisors had a greater amount of curvature than the mandibular incisors.

Funding for this project was provided by the J. Dean Robertson Society and the 2022-23 Student Research Program.

#45

Title: Detection of simulated occlusal caries in different light conditions

Presenter(s): Julia Daugherty, DS2

Advisor(s): Farah Masood; Christopher Aston

Abstract:

Regarding radiographic caries, previous studies have shown an indirect relationship between ambient light and accuracy of detection. Additionally, a clinician's level of experience has been shown to have a direct relationship with accuracy of radiographic caries detection. To assess the accuracy of these conclusions, we recruited 8 volunteer raters, 2 from each of 4 different levels of experience and asked them to assess radiographs of 15 teeth under 2 different ambient light conditions: bright ambient light (550-900 lux), and dim ambient light (13-19 lux). Ten radiographs were of extracted teeth with simulated occlusal caries and 5 were of extracted teeth with no caries. Each rater assessed the 15 radiographs and then again at least 3 days later. Intra-rater reliability was estimated for both dim and bright viewing conditions. Percent intra-rater agreement averaged 56.7% for dim and 66.7% for bright conditions ($p= 0.08$); average kappa coefficient of agreement indicated fair agreement under dim and moderate agreement under bright conditions. Reliability did not improve with experience. Accuracy (%true positive, %true negative) only slightly improved in bright (62.5%, 58.8%) compared to dim (56.9%; 53.8%) conditions (bright vs dim: $p>0.4$). Furthermore, accuracy did not improve comparing more experienced raters to less experienced raters. However, the percent of "unsure" assessments increased with more experience (DS2: 3.3%, Faculty: 18.4%). Overall, diagnostic accuracy slightly improved in bright condition as compared to dim but it was not statistically significant. However, there was no association between experience and radiographic caries detection. A major limitation for these results is the small number of raters.

Funding for this project was provided by the Delta Dental of Oklahoma Foundation and the 2022-23 Student Research Program.

#46

Title: Economic impact of no-shows at the OUCOD student program

Presenter(s): Manas Kommareddi, DS2; Ghazaleh Fazel, DS2

Advisor(s): Susan W. Shelden; Shelly V. Short; Staci P. Wekenborg

Abstract:

The purpose of our non-experimental retrospective study was to explore the financial revenue loss associated with no-show appointments (cancelled/failed) within the student clinic program (student clinic) at The University of Oklahoma College of Dentistry (OUCOD). The guiding expression, *production lost today is production lost forever*, incited our purpose to conduct this study. The background leading to this study involves the awareness of no-show appointments within the field of dentistry and as a foundational research project, our motivation was to apply this knowledge within the academic environment at the OUCOD, which includes the Doctor of Dental Surgery and Dental Hygiene programs. Primarily private practices utilize practice management software, practice management advisors as well as dental financial consultants and/or dental CPAs to determine their financial loss from no-show appointments. Our research study introduced this model into an academic program setting which will assist the OUCOD, therefore, aiding student clinicians in understanding the significant financial impact of no-show appointments. We investigated patient records within the academic years of 2019 and 2021 to determine the revenue loss associated with main procedural codes: *D1110, D4910, D4346, D4342, and D4341*. Additional sub-type procedural codes expressed in tables 1-4: *D11102, D1110C, D1330.1, D4341M, D49101, D49101C, and D4910C* are directly associated with the main procedural codes. We didn't include data within the year 2020 due to the COVID-19 impact on clinic closures. By exploring the financial loss of no-show appointments tied to procedural codes listed above, we attempted to determine the financial impact experienced by the OUCOD through an economic analysis approach. We determined that the OUCOD is suffering a significant financial revenue loss per academic year. As the first of its kind at the OUCOD, we established a foundational base for further research in this area.

Funding for this project was provided by the J. Dean Robertson Society and the 2022-23 Student Research Program.

#47

Title: A retrospective study of oral lichen planus patients

Presenter(s): Niloofar Naghdi, DS3

Advisor(s): Ronald Faram; Kathleen Higgins

Abstract:

Lichen planus is an immune-mediated mucocutaneous chronic disease that affects the oral cavity. Oral lichen planus has a variety of presentations in the oral cavity and is considered a potentially malignant disorder by the World Health Organization.
The objective of this study was to collect the demographics, such as age and gender, and the malignant transformation rate of oral lichen planus patients diagnosed at the University of Oklahoma College of Dentistry Faculty Practice clinic. A keyword search for oral lichen planus and associated terms was performed in Axium, an electronic health record. The search was limited to the OU Dentistry Faculty Practice clinic patient charts. 289 patient charts were found and had a confirmed diagnosis of oral lichen planus. The mean age of the sampled patients was 65.363 which is higher than the mean age of 45 reported by the published data. Of the 289 patients, 211 of them were female (73.01%) and 78 of them were male (26.99%) patients. The female to male ratio was calculated at 2.7:1, where the national average is 3:2 female to male. The mean age of the reviewed sample was higher than the reported mean age in the previous studies and higher than the normal range. The malignant transformation rate was calculated at 1.7% which is higher than the reported transformation rate by the American Academy of Oral and Maxillofacial Pathology (1.09%). It has been reported that the mean age of oral lichen planus varies geographically. Further research is needed to elucidate why the female to male ratio is considerably higher as well as the average age of the patients with lichen planus seen at OU Dentistry. The malignant transformation rate is only slightly higher than other published data.

Funding for this project was provided by the J. Dean Robertson Society and the 2022-23 Student Research Program.

#48

Title: Impact of denture base resin fabrication method on physical properties

Presenter(s): Katherine Sullivan, DS2

Advisor(s): S. S. Khajotia

Abstract:

Objectives: To compare selected physical properties of denture base resins that are made using various fabrication methods.
Methods: Five commercially available denture base resins fabricated using either traditional, milled, or 3D-printing methods were tested in this study. Specimens were fabricated for wettability testing (12.0±1.0mm diameter, 2.5±0.5mm thick; n=8/resin) and for color stability, water sorption and solubility testing (50.0±1.0 mm diameter, 2.0±1.0mm thick; n=5/resin). Specimens were sequentially wet polished using P500, P1000 and P1500 SiC abrasive disks. Contact angle measurements were obtained (OCA15-Plus contact angle goniometer, 37±1°C, 60s). Contact angle values at drop placement ($\theta_{INITIAL}$) and after ~60s (θ_{FINAL}) were measured using SCA-20 software. Specimens were desiccated prior to immersion until conditioned mass *m1* was reached for sorption and solubility testing, as per ISO Standard 20795-1:2013. Specimens' weights were acquired after 7-day immersions in water at 37±1°C (*m2*), and then after specimens reached conditioned mass *m3*. The diameters and thicknesses of the specimens were measured at *m1*. Color stability was tested before immersion, after immersion, and after desiccation (Cannon EOS 80D camera, Lumecube lights, 5500K) by calculating ΔE using the CIDE2000 formula. All parameters were statistically analyzed using one-factor General Linear Models and *post hoc* Student-Newman-Keuls tests (α=0.05; SAS software).
Results: Statistically significant differences were found among the resins for parameters $\theta_{INITIAL}$ ($p=0.0029$), θ_{FINAL} ($p=0.0132$), color stability ($p=0.001$), water sorption ($p<0.001$), and solubility ($p<0.001$).
Conclusions: The 3D-printed resin and the two milled resins were superior in color stability and water sorption after seven-day immersion in water compared to the traditional resins tested. Differences in composition are theorized to be responsible for the differences in physical properties of the denture base resins tested.

Funding for this project was provided by the Delta Dental of Oklahoma Foundation and the 2022-23 Student Research Program.

#49

Title: Two-month esterase exposure degrades adhesive resins' topographies

Presenter(s): Monica Wang, DS3

Advisor(s): S. S. Khajotia

Abstract:

Objectives: Salivary esterases have been shown to degrade the interfaces of bonded resin restorations, but little is known about their long-term effects on adhesive resins' topographies. The objective of this study was to compare the effect of 30- and 60-day immersions in selected salivary esterases on the 3-D topographies of experimental adhesive resins.
Methods: Six experimental light-activated adhesive resin formulations were synthesized using varying Bis-GMA:TEGDMA monomer ratios (65:25, 70:20, and 75:15) and two sizes of silanated barium-silicate filler particles (0.7 and 2.0μm). Specimens (n=3/resin) were fabricated, polymerized, wet-polished, and monomer-extracted (ultrapure water, 37°C, 16h). Topographical scans (n=4/specimen) were acquired in air (MultiMode atomic force microscope; 75x75μm scans @1.0Hz) before immersion. Specimens were UV-sterilized (8kJ/cm^2) and immersed (60 days, 580μl/specimen, 37±1°C): 0.1U/ml cholesterol esterase (CE), 0.1U/ml pseudocholinesterase (PCE), PCE+CE, or D-PBS (Control). Solutions were replenished every 48h. Specimens were washed (5x; ultrapure H_2O; 15s/wash) before AFM scans were re-acquired after 30- and 60-days. Topographical parameters calculated were Mean surface roughness (Ra), Surface area (SA), Average Maximum Height (Rpm), Average Maximum Depth (Rvm) and Skewness (Sku). Data were statistically analyzed using three-factor General-Linear-Models and post-hoc SNK tests (α=0.05; SAS software).
Results: Statistically significant differences were observed for the formulation*duration*immersion solution interaction for all of the topographical parameters tested [Ra: $p=0.0041$; SA: $p<0.001$; Rpm: $p=0.0002$; Rvm: $p<0.0001$; Sku: $p=0.0198$].
Conclusions: Experimental adhesive formulations exhibited roughened topographies, regardless of immersion solution, over the two-month period. Immersion in the various esterase solutions for one- and two-months resulted in an increase in the roughness of all six experimental adhesive resins.

Funding for this project was provided by NIH/NIDCR grants 1R15DE028448-01 and 3R15DE028448-01S1, the J. Dean Robertson Society and the 2022-23 Student Research Program.

This study was presented at the 2023 AADOCR General Session and Exhibition.

#50

Title: Workforce analysis: dental providers for vulnerable Oklahoma children

Presenter(s): Joseph Acquaviva, DS2; Hannah Shelton, DS3

Advisor(s): David Ciesla; Marsha Beatty

Abstract:

Reports have indicated that dental caries is the most prevalent chronic disease in preschool children in the U.S. Research has shown dental caries before age six can lead to many deleterious effects such as discomfort and pain, learning difficulties, as well as a negative impact on the physical, social, and emotional aspects of life. Unfortunately, impoverished children of Oklahoma and those with special healthcare needs are often the most susceptible and the most likely to face challenges accessing oral healthcare services. This is primarily due to a lack of dental professionals in the state and unequal access to specialists, such as pediatric dentists, specifically in rural regions of Oklahoma. The aim of this research investigation was to determine the distribution of general and pediatric dentists throughout Oklahoma and the number of providers who accept Medicaid, thus evaluating the workforce capacity and extent of oral healthcare inequities in young and vulnerable pediatric populations. The workforce capacity was evaluated using information from the Oklahoma Board of Dentistry and the Oklahoma Health Care Authority (OHCA), along with U.S. Census data. Information obtained showed that there are 1,732 general dentists practicing in Oklahoma, along with 78 pediatric dentists, distributed unevenly throughout the state. Almost 56% of all dentists are located in the two metropolitan regions, Tulsa and Oklahoma City. The results showed 54% of general dentists and 74% of pediatric dentists in Oklahoma accept Medicaid. Discrepancies in accessing dental care for vulnerable populations can be attributed to numerous factors such as lack of accessibility, geographic barriers, socioeconomic status, ethnic minorities, and a lack of training. Through a thorough evaluation and analysis of the workforce capacity, viable strategies and solutions can be formulated to effectively address the problem of inadequate dental care accessibility for Oklahoma's highest-risk children.

Funding for this project was provided by the J. Dean Robertson Society and the 2022-23 Student Research Program.

#51

Title: Access to dental care for Oklahoma's pregnant & postpartum women

Presenter(s): Dorna Akhavain, DS3

Advisor(s): Marsha Beatty; David Ciesla

Abstract:

Oral health is essential to overall health, and it plays an important role in the health and well-being of pregnant women. Proper oral hygiene can help minimize the occurrence of several pregnancy complications and can decrease the transmission of caries-producing oral bacteria to infants and young children. But the 2020 Oklahoma Oral Health Report Card and the Pregnancy Risk Assessment Monitoring System (PRAMS), reveal that from 2012-2020, only 50% of our pregnant women had their teeth cleaned by a dentist or dental hygienist; in some years the rate was only 33%. Multiple factors impact any person's access to dental care including low oral health literacy, dental benefits coverage, income levels, geographic barriers, and the comfort level of dentists in treating those patients. This research was intended to examine oral health disparities and the use of various dental services among pregnant/postpartum women on Medicaid (SoonerCare) with the Oklahoma Health Care Authority (OHCA). However, the necessary data has not yet been received due to delays in finalizing a Data Use Agreement with OHCA. So, our research has focused on exploring the distribution of licensed general dentists and active Medicaid providers in the counties and regions of Oklahoma since they are the most likely providers of care for our target population. Data from the Oklahoma Board of Dentistry and OHCA showed 1,732 Oklahoma-licensed general dentists, and 938 (54%) were Medicaid providers. The largest concentrations were in the Oklahoma City and Tulsa metro areas, but 52 of 77 counties had <10 dentists, and some counties had none! Also, 78 dentists in TX, 37 in AR 37, 9 in MO, 7 in KS, 1 in IL, and 1 in TN were active SoonerCare providers, suggesting that dental care in neighboring states may be more accessible for some Oklahomans. Education on the role of perinatal oral health is critical and should be readily available to and through dentists, obstetricians, and other healthcare providers.

Funding for this project was provided by the J. Dean Robertson Society and the 2022-23 Student Research Program.

#52

Title: Management of acute necrotizing periodontitis in a severe AIDS patient

Presenter(s): John Corbett, Postgraduate

Advisor(s): Jaewon Kim; Robin Henderson

Abstract:

A 53-year-old male patient presented with areas of exposed and necrotic bone in the maxillary right posterior sextant. The patient was diagnosed with Necrotizing Periodontitis which was attributed to his severe immunodeficiency related to his Acquired Immunodeficiency Syndrome. At the initial visit the patient had an absolute CD4+ leukocyte count of 29 cells/μL. Despite the extreme infection risk due to the patient's immunocompromised state, surgical intervention was deemed necessary.

The patient required scaling and root planing in all four quadrants; extractions of teeth numbered 2, 3, 4, 5, 12, 13, 14, 15, 18, 19, 29, 30, 31; alveoloplasty in the maxillary right quadrant; bilateral lingual tori removal; and the removal of a block section of exposed necrotic bone in the maxillary right quadrant to accommodate partial dentures. The patient was given 500mg of Metronidazole three times a day for ten days starting one hour before the procedures and 200mg of Fluconazole single dose administered the day after the procedures. The patient was sequentially treated one quadrant at a time with two-month intervals between surgeries.

Throughout the treatment duration, the patient remained at an absolute CD4+ leukocyte cell count of fewer than 52 cells/μL. Despite this, all sites healed without complication, demonstrating how precisely prescribing 500mg of Metronidazole and 200mg of Fluconazole at 2-month intervals prevented adverse outcomes in a severely immunocompromised patient.

No guidelines exist for a prophylactic premedication regimen for a patient with severe Acquired Immunodeficiency Syndrome that prevents superinfection and permits ideal healing. This case demonstrates a protocol to safely and extensively treat severely immunosuppressed Acquired Immunodeficiency Syndrome patients.

#53

Title: Comparing two types of overdentures as options for edentulous arches

Presenter(s): Junior Cruz, Postgraduate; Romali Kamat, Postgraduate;
Aziz Pradhan, Postgraduate

Advisor(s): Mary Hamburg

Abstract:

Edentulism afflicts millions of people around the world and negatively affects quality of life in a number of ways. Based on factors such as patient expectations, finances, and anatomical parameters, a number of treatment options are available. Here we focus on implant supported overdentures as a restorative option for completely edentulous patients and specifically present two different types of this prosthesis: Atlantis Conus concept and locator overdenture. The Atlantis Conus overdenture utilizes custom made abutments with a specific taper and SynCone caps across at least four implants to create retention for the prosthetic. The locator overdenture consists of housing units within the denture to snap onto non-custom abutments screwed into the implants. In addition to presenting the treatment planning factors and specific qualities of these prosthetic options, we also present literature on treatment outcomes and possible complications associated with each prosthetic. Understanding the indications for each type of prosthetic as well as the associated risks and benefits will allow us to present the best guidance to our patients for successful treatment outcomes.

#54

Title: Methods to obtain Google reviews in a dental office

Presenter(s): Sonali Demla, Postgradutae; Kurren Virk, Postgraduate

Advisor(s): Mary Hamburg

Abstract:

This study explores the effectiveness of different methods of soliciting Google reviews from patients of two residents at the OU AEGD program. The objective was to determine which approach yielded the most reviews, allowing for future refinement of review solicitation methods. Three methods were employed, including verbal requests from residents where the patient could scan a QR code presented in-office, front desk team member requests with a QR code on a take-home business card, and automated text messages after the patient's appointment. Metrics were tracked using a website to evaluate patient engagement. The findings of this study have implications for dental offices seeking to improve their online reputation and increase the likelihood of prospective patients choosing their practice.

#55

Title: Correction of mucogingival defects by modified tunneling and biologics

Presenter(s): Sarah Fita, Postgraduate

Advisor(s): Tracey Whitley

Abstract:

Treating mucogingival defects has benefits in creating comfort with cleaning, eliminating sensitivity, decreasing caries risk, and enhancing aesthetics. Non-autogenous connective tissue grafts have an advantage of unlimited quantity and elimination of doner site morbidity. Platelet Rich Fibrin (PRF), a second-generation platelet concentrate, is obtained by centrifuging the patient's fresh collected blood sample. A centrifugation protocol of 700rpm for 3 minutes results in an Injectable form of PRF (I-PRF). The growth factors present in PRF provide a benefit in early wound healing and possible enhancement of root coverage.

A 64-year-old female patient presented to the clinic with multiple recession defects, along with a thin soft tissue phenotype. Soft tissue grafting was planned to be carried out in two surgical visits: one for each arch. In the maxilla, 3 vestibular incisions were placed, and a full thickness tunnel prepared. Periosteal release was completed to allow coronal advancement of the flap. Allogenic connective tissue graft (Puros® Dermis Allograft Tissue Matrix, Zimvie) was hydrated in saline and inserted into the tunnel. The graft and flap were coronally advanced and secured 2mm coronal to the CEJs via 6-0 nylon sling sutures. I-PRF was then injected under the flap and the vestibular incisions were sutured using 5.0 chromic gut.

This case report outlines the use of biologics and a non-autogenous tissue graft in treating multiple recession defects and altering thin phenotype through a modified tunnel technique in the maxilla.

#56

Title: Augmentation in alveolar ridge defects for dental implants

Presenter(s): Tyler Hendricks, Postgraduate

Advisor(s): Mary Hamburg

Abstract:

Dental Implants have revolutionized the dental industry and overall improved patients quality of life. Likewise, maintaining ideal tissues for long-term success should remain forefront in the treatment planning and maintenance phases. Here we review and report on the differences of conventional grafting materials (Autograft vs. Allograft) and their significance depending on ridge defects. Efficacy is evaluated over a 12 month random clinical trial and highlights risk and predictability. Ultimately, the gold standard of grafting needs biogenic properties that involve being osteoconductive and osteoinductive. New techniques are currently being utilized for defects such as the maxillary tuberosity and a synthetic collagen scaffold (OSSIX Volumax). Overall, systematic reviews have yet to prove that one material and technique is superior to others. Clinical judgment and assessment should be contemplated prior to surgery for the best long-term prognosis.

#57

Title: GTR with PRP "sticky bone" and PPP membrane

Presenter(s): Frank Kajiwara, Postgraduate

Advisor(s): Tracey Whitley

Abstract:

Guided tissue regeneration (GTR) is the reproduction of a lost or injured periodontium, in such a way that the architecture and function are completely restored. In recent years, Platelet-Rich Plasma (PRP) has been used successfully to enhance the clinical outcome obtained with GTR and bone grafts. The thought is that by increasing local concentrations of platelet growth factors with the application of PRP, the periodontal healing outcome would be enhanced. In addition, some studies suggest that Platelet-Poor Plasma (PPP) and PRP contain a similar profile of growth factors with a similar response on bone/cementum differentiation.

A 51-year-old female presented with an intrabony defect and class II furcation involvement on tooth #3. GTR using biologics (PRP/PPP) and bone graft was planned. On the day of the surgery, about 20 ml of blood was drawn from the patient using tubes with sodium citrate 3% (anticoagulant). After a single centrifugation of the tubes (2,000 RPM/5 minutes), PRP and PPP were collected. For the "sticky bone", PRP was mixed with FDBA + bovine bone and activated with $CaCl_2$ 10%. PPP was also activated with $CaCl_2$ for the biological membrane. A full thickness mucoperiosteal flap was reflected. A complete degranulation and SRP were completed using ultrasonic, hand instruments, and diamond burs. The intrabony & furcation defect on #3 were filled with the PRP "sticky bone" and covered with the PPP membrane. The flaps were replaced, secured with interrupted sutures, and primary closure was achieved. The patient was followed at regular intervals for 19 months. At 21 months, a second surgery for residual pocket elimination was made in the same site. Upon flap reflection, it was noted resolution of the furcation defect and the complete bone fill of the intrabony defect had been achieved.

This case report outlines the use of biologics for enhancing the guided tissue regeneration results in complicated intrabony defect cases.

#58

Title: Customized allogenic block graft using 3D printed templates

Presenter(s): Sandra Perozo, Postgraduate

Advisor(s): Jaewon Kim; Tracey Whitley

Abstract:

Resorption of alveolar bone has a significant impact on functional and esthetic outcomes of implant treatment. Several strategies exist to augment alveolar bone deficiencies. In severe defects, the use of an allogenic block bone graft has shown tremendous capacity for bone regeneration. However, block graft trimming is a time-consuming chairside task. Utilizing a customized block template is an alternative to minimize the surgical time.
A 42-year-old female presented with a severe atrophic mandibular right posterior ridge with a combined horizontal and vertical defect. An allogenic block graft was planned. 3D slicer program was used to extract a standard tessellation language (STL) file of the patient's anatomy, and Meshmixer program was used to create an adequate shaped donor block which precisely fit into the defect. Customized resin block templates were then fabricated using a stereolithographic (SLA) 3D printer. On the day of surgery, the measured bone defect was 42 x 14 x 4mm. The customized 3D printed templates were used as a guide to trim and re-shape the allogenic bone block to the desired shape. Access holes were prepared on both block grafts and they were fixed to the ridge. The periphery of the blocks was grafted with sticky bone (Platelet Rich Fibrin and FDBA) particles and covered with a resorbable collagen membrane and PRF Membranes. Release of the lingual flap was performed by detaching the mylohyoid muscle fibers. A buccal periosteal releasing incision was made to ensure tension free primary closure. A CBCT scan was taken 5 months after block grafting, which showed adequate horizontal and vertical alveolar bone volume for implant placement.
This case report presents the use of SLA printed customized block templates as a good option to use as a guide during block grafting procedures in patients with an atrophic mandibular ridge, with benefits such as shortened surgery time and efficient trimming for donor block.

#59

Title: Surgical management of a grade III furcation using PRF and sticky bone

Presenter(s): Madhumati Ramachandrareddy, Postgraduate

Advisor(s): Tracey Whitley; Robin Henderson

Abstract:

Furcation involvement is characterized by bone resorption and attachment loss in the interradicular space. Among the various treatment procedures available, regenerative approaches are aimed at furcation closure by forming new bone, cementum, and connective tissue attachment. One area of interest in periodontal regeneration is the use of autogenous biologic agents derived from the patient's own blood. The blood sample is centrifuged following a specific protocol and Platelet-rich fibrin (PRF) is obtained. PRF can be utilized in an injectable format (I-PRF) or flattened and used a membrane (PRF). The injectable form is combined with particulate bone graft to form "sticky bone" which is adaptable to various defects. The benefit of PRF is a high prevalence of growth factors that promote wound healing and regeneration.

A 42-year-old female presents with Grade II furcation involvement and mobility of tooth #19. Intraoral exam revealed pocket depths of 4-12mm. Radiographic evaluation revealed an intrabony defect on the mesial and a radiolucency at the bifurcation of tooth #19. On the day of surgery, intravenous blood was drawn from the antecubital fossa and centrifuged twice to prepare I-PRF & PRF. A full thickness mucoperiosteal flap was raised on the buccal and lingual surfaces and thorough root surface debridement was performed. Once all granulation tissue was removed, furcation involvement was determined to be Grade III. I-PRF was mixed with Freeze Dried Bone Allograft (FDBA) to prepare the sticky bone and grafted into the mesial & furcation defects. Both areas were then covered with PRF membranes. A periosteal release was completed to allow coronal advancement and tension free primary closure of the site using 4-0 PGA sutures.

This case report outlines the use of platelet rich fibrin and sticky bone in regeneration of furcation defects.

#60

Title: Guided bone regeneration and implant placement

Presenter(s): Shiyamali Sundararajan, Postgraduate

Advisor(s): Tracey Whitley

Abstract:

In the era of dental implants, to facilitate prosthetically driven positioning, bone augmentation has become a necessity for compromised ridges. Guided bone regeneration (GBR), block grafts, and distraction osteogenesis are the different methods of bone augmentation. Guided bone regeneration, which requires the use of membrane and bone graft material, has been in clinical practice for a very long time with a large body of evidence.

A 51-year-old female presents with the chief complaint of needing of implant in the maxillary left anterior region. Site #11 edentulous ridge had Siebert class I ridge defect requiring bone augmentation prior to implant placement, and GBR was planned. On the day of treatment, a full thickness mucoperiosteal flap was reflected. Cortical perforations were made at the edentulous site to ensure adequate blood supply to the bone graft material. A tenting screw was placed at the apicocoronal & mesiodistal midpoint to act as a scaffold & reference guide for the bone graft. A mixture of autogenous, DFDBA and Xenograft bone was placed around the tenting screw and covered with a resorbable collagen membrane. The mesiobuccal & distobuccal apical extent of the membrane was tacked using tacking screws. Periosteal release was completed to ensure tension free primary closure was achieved. The patient was followed up at regular intervals for 7 months, and a CBCT was taken to analyze the bone gain and implant placement was planned. On the day of implant placement, following full thickness flap reflection the tacking & tenting screws were removed and a Straumann NC SLA BLT 3.3 x 10mm implant was placed at 35Ncm. The patient is being followed up with regularly and should be ready to receive the implant crown after 3 months.

This case report outlines the use of guided bone regeneration to develop an atrophic maxillary ridge for successful prosthetically driven implant placement.

#61

Title: Dental care for head & neck cancer patients with radiation therapy

Presenter: Thanh Truong, Postgraduate

Advisor(s): Mary Hamburg

Abstract:

Dental management for patients undergoing radiation therapy (RT) as treatment for head and neck cancer is a complicated and controversial subject. This topic can become daunting for general practitioners who are exposed to a patient population that requires dental care before or after RT. Although there is an abundance in literature regarding the standard of care for patients who about to begin RT, there is limited data to help the practitioner formulate a standard restorative plan for patients who have already undergone radiation therapy specifically exposed to the maximum dosage at 60 Gray and are currently suffering from dental complications. It is generally understood that dental treatments are unique to each patient, and that standardized clinical trials are difficult to achieve in dentistry. As the dental management of these patients require multidisciplinary efforts, this article aims to highlight recently updated general guidelines to assist the practitioner. While severe complications after RT are low, the complexity of the complications can be severe. Thus, it is ultimately still up to the practitioners to apply clinical judgement to best manage these patients.