



38th Annual

Scientific Day

April 17, 2019

Sheraton Midwest City Hotel at the
Reed Conference Center
Midwest City, Oklahoma

Sponsored by:



38th 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 next 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, Scientific Day evolved into what it is today – **the 38th Annual Scientific Day!**

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 all of 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, Heartland Dental and the J. Dean Robertson Society for their sponsorship of this event and our Student Research Program.

Please enjoy the outstanding projects presented here 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 38th
Scientific Day!**

Corporate Sponsors and Exhibitors

The following companies have provided additional funding to support this year's Scientific Day and will be exhibiting their company's products in the foyer. Please spend some time visiting the corporate sponsors to learn about their products and to thank them for their generosity.

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The University of Oklahoma College of Dentistry's
38th Annual Scientific Day**

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**Special Thanks to the Following for Generous Support of
The University of Oklahoma College of Dentistry's
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Oklahoma County Dental Hygienists' Society

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Oklahoma Dental Association

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Oklahoma Orthodontic Society

Oklahoma Section of the American College of Prosthodontists

Oklahoma Society of Oral & Maxillofacial Surgeons

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to the Following Area Businesses
for Door Prize Donations**



Health Nut Cafe
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(To win a door prize you have to be present at the luncheon)

Special Thanks to the Following Individuals

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Marc Arledge, D.D.S.	Amy Lemons, R.D.H.
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ISHMAEL ESSAY CONTEST JUDGES

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SCIENTIFIC DAY COMMITTEE

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REGISTRATION

Ms. Liz Bennie	Ms. Heidi Martin
Ms. Madeleine Hoefke	Ms. Camille McGinnis
	Ms. Diana Stone

University of Oklahoma College of Dentistry
38th Annual Scientific Day

Schedule of Events

- | | |
|---------------|--|
| 9:00 - 9:30 | Registration
<i>1st floor West Entrance</i> |
| 9:00 - 10:00 | Continental Breakfast
<i>2nd floor East Foyer</i> |
| 9:00 - 10:30 | Poster Presentations
<i>2nd floor Reed Ballroom ABC</i> |
| 10:30 | Poster Votes Due In Ballot Box
<i>2nd floor West Foyer</i> |
| 10:30 - 12:00 | Ishmael Essay Presentations
<i>2nd floor Reed Ballroom DEF</i> |
| 12:00 | CE Forms Available
<i>1st floor Registration Desk</i> |
| 12:00 - 1:30 | Awards Luncheon
<i>1st floor Exhibit Hall</i> |

Ishmael Essay Contest Finalist Presentations

Reed Ballroom DEF, 2nd floor, 10:30 - 12:00

- 10:30 a.m. Amy Dominguez (DH2)
Medical Emergencies Knowledge of Oklahoma Dental Hygienists
- 10:45 a.m. Hope McBride (DH2)
Education's Impact on Infection Control Practices of Dental Assistants
- 11:00 a.m. Taylor Swartz (DH2)
Autism in Dentistry
- 11:15 a.m. Amanda Akkari (DS3)
Opioid Prescribing Patterns Amongst Oklahoma Dentist: A Survey
- 11:30 a.m. Hannah Kraemer (DS2)
Sorption and Solubility of Antibacterial Nanofilled Dental Adhesives
- 11:45 a.m. Caytlin Nichols (DS2)
Assay for Lysine Decarboxylase Activity Associated with Gingivitis

POSTER PRESENTATIONS

Poster #	Presenter Name(s) & Title
# 1	PAIGE BUTLER (DH2) Oral Health Knowledge of OUHSC Nursing Students
# 2	AMY DOMINGUEZ (DH2) Medical Emergencies Knowledge of Oklahoma Dental Hygienists
# 3	KYESHA EDWARDS (DH2) Communication Techniques Used by Dental and Dental Hygiene Students
# 4	HOPE MCBRIDE (DH2) Education's Impact on Infection Control Practices of Dental Assistants
# 5	LAUREN MORF (DH2) Oklahoma Dental Hygienists and Students Addressing Sensitive Topics
# 6	DEVON ANDERSON (DH2) Linking Oral Health to Cancer
# 7	APRIL ARMSTRONG (DH2) Benefits of Using Intraoral Cameras in Dentistry
# 8	KARSEN BAKER (DH2) Preventing Caries in School-Aged Children
# 9	JENNA BATY (DH2) The Dental Hygienist's Role in Detecting Sleep Apnea
# 10	CAITLYN BLACKBURN (DH2); KATIE TAYLOR (DH2) Implementing Oral Health in Long-Term Care Facilities
# 11	EMILY BOOKER (DH2) The Effects of Probiotics on Oral Health
# 12	ASHLEY BROWN (DH2); CARLIE DOWERS (DH2) Implications of Oral Health Neglect in Long-Term Care Facilities

POSTER PRESENTATIONS

Poster #	Presenter Name(s) & Title
# 13	KELSEY CARSON (DH2); KAYLEE GANDY (DH2) Dental Care for Pediatric Patients in Oklahoma
# 14	CALLIE COOK (DH2) Non-Thermal Atmospheric Plasma Applications in Dentistry
# 15	TAYLOR COOK (DH2); JESSICA HORNE (DH2) Oral Health Considerations: Treating Chronic Mental Illness
# 16	HANNAH EVANS (DH2) Effectiveness of Motivational Interviewing in Oral Hygiene Instruction
# 17	BAILEY FARNI (DH2) Periodontal Disease in Companion Animals and Humans
# 18	JORDYN GRACE (DH2) It's All in Your Head: Alzheimer's and Periodontal Disease
# 19	LAUREN HAAKE (DH2) Diet: Are You Feeding a Disease?
# 20	KAYLIN HENDRIX (DH2); MCKENZIE MOORE (DH2) A Nation at Risk: Patient Management in the Opioid Epidemic
# 21	BRYN HOULTON (DH2) How to Treat Patients with Dental Anxieties
# 22	LAURIE LACOSS (DH2) The Oral Microbiome and the Implications of Phage Therapy
# 23	SHEA LINSE (DH2) Taking the Bite Out of BMI
# 24	SHANI MCGUIRE (DH2) A Review of the Environmental Impact of Amalgam and Cremation

POSTER PRESENTATIONS

Poster #	Presenter Name(s) & Title
# 25	LACI MORELAND (DH2) Taking Initiative: Increasing Oral Health Literacy Among New Mothers
# 26	IQRA SALEEM (DH2) Human Papilloma Virus and Its Association with Oral and Systemic Health
# 27	SYDNIE SEIBOLD (DH2) Oral Health of Children with Diabetes
# 28	RYANN SILLS (DH2) Periodontal Disease in Down Syndrome Patients
# 29	ABBIGAIL SMITH (DH2) Radiation and Clinical Considerations of Hand-Held X-Ray Devices
# 30	FARRIN SMITH (DH2); JACQUELINE MEE, (DH2) Vaping and Oral Health: The Untold Truth
# 31	DANIELLE ST. CLAIR (DH2); PAIGE TURNER (DH2) Prevention of Musculoskeletal Disorders: Utilizing Proper Ergonomics
# 32	TAYLOR SWARTZ (DH2) From 'Nope' to Hope: Sensory Solutions for Autistic Dental Patients
# 33	MICHELLE TUCKER (DH2); HOPELYNN YERIAN (DH2) Silver Alert SDF in the Geriatric Population
# 34	BAYLEE WARNKE (DH2) The Dental Professional's Role in Forensic Dentistry
# 35	BRANDI WILSON (DH2) Dental Mesenchymal Stem Cells: Treating Periodontal Disease
# 36	AMANDA WOODSIDE (DH2) Tobacco Use Among Dental and Dental Hygiene Students
# 37	FERNANDA ZAPIEN (DH2) Trauma Informed Care: Understanding the Impact of Trauma

POSTER PRESENTATIONS

Poster #	Presenter Name(s) & Title
# 38	TALA ZENDAH (DH2) Technological Advancements in the Dental Field: Pro or Con?
# 39	AMANDA AKKARI (DS3) Opioid Prescribing Patterns Among Oklahoma Dentists: A Survey
# 40	CHAU BANH (DS2) The Prevalence of Periodontal Disease Among Electronic Cigarette Users
# 41	MERIDITH CORWIN (DS3); BRYCE LAMER (DS4) Comparing Machined CAD/CAM Complete Dentures vs. Conventional Fabrication
# 42	HANNAH KRAEMER (DS2) Sorption and Solubility of Antibacterial Nanofilled Dental Adhesives
# 43	ELLA MILLER (DS2); CIARRA STAPLETON (DS2) A Study of the Gender Wage Gap Among Dentists in Oklahoma
# 44	CAYTLIN NICHOLS-EIDSON (DS2) Assay of Lysine Decarboxylase Activity Associated with Gingivitis
# 45	NEERAL PATEL (DS2) Clinical Accuracy of 3-D Printed Casts Compared to Traditional Casts
# 46	CRYSTAL RAJAN (DS2) Digital Image Enhancement and Detection of Simulated Proximal Caries
# 47	SAMAR REZAIE (DS2) Parotid Gland Enlargement in Patients with Dry Mouth and Diabetes
# 48	ZACK SIEGLER (DS4) Canal Transportation: Examination of Three Ni-Ti Rotary Systems
# 49	AAESHAH AL KANDERI (Postgraduate) Incidence of NPC Perforation in Relation to Implant Placement

POSTER PRESENTATIONS

Poster #	Presenter Name(s) & Title
# 50	PRASHAN SHANTHAKUMAR (Postgraduate) Maxillary Septa and Path of Posterior Superior Alveolar Artery Canal
# 51	GREG STEWART (Postgraduate) Noise Exposure Evaluation of a Dentist During Typical Work Week
# 52	NIAF AL GANA (Postgraduate) Surgical Periodontal Therapy: General Overview
# 53	KAMI CHERVILOV (Postgraduate); KEVIN RIPP (Postgraduate) Review of Implant-Supported Fixed Complete Denture Materials
#54	HAYDEN FULLER (Postgraduate) Palatally-Impacted Canines: Various Surgical Techniques
#55	MICHAEL HOOPER (Postgraduate); CLARK PLOST (Postgraduate) Chlorhexadine and Hydrogen Peroxide as Antiseptic Mouth Rinses
#56	NASIM LASEMI (Postgraduate) Crown Lengthening Procedure: Definition, Types and Indications
#57	AHMAD SEDEQI (Postgraduate) Surgical Management of Persistent Peri-apical Lesion: Case Report
#58	LARSON WAYMAN (Postgraduate); CHRISTOPHER CALDWELL (Postgraduate) Prevention and Management of Work-Related Pain Among Dentists
#59	JOSHUA WOODWARD (Postgraduate) Virtual Surgical Planning and In-House 3D Printing of Surgical Splints
#60	XIXI WU (Postgraduate) Management of Non-Restorable Tooth with Existing Diastema: Case Report

Title: Oral Health Knowledge of OUHSC Nursing Students

Presenter(s): Paige Butler, DH2

Advisor(s): Carolyn Hinckle

Abstract:

Background: Oral health not only affects the mouth but the entire body as a whole; this is why it is so important for nurses to be well educated on the matter. A nurse's responsibility is to take care of her/his patients, but they will not be able to effectively take full care of their patients if oral health is left out of their education or even just briefly taught.

Purpose: The purpose of this study was to determine knowledge of first- and second-year nursing students at OUHSC College of Nursing concerning oral-systemic health connection and general oral health knowledge.

Methods: A quantitative, nonexperimental study utilizing a 19-item questionnaire was given to the first- and second-year nursing students at the University of Oklahoma College of Nursing. An online survey was distributed to nursing students via email using the system, Qualtrics. The questions related to the nursing student's knowledge on oral health and the connection with systemic health (OUHSC IRB #9759).

Results: Forty-one nursing students completed the survey. The large majority (95%) of students agreed to the statement, "Fluoride helps prevent tooth decay," which was correct. Half of the students agreed to the statement, "A medium-bristled toothbrush is best for removing debris and plaque from the teeth," when in fact the statement is false. More than half (56%) of the students responded with "don't know" to the statement "Oral cancer is common on the dorsal of the tongue", which is false. One student disagreed to the statement "Inflammation is the common pathway for the oral-systemic link" while 17 (41%) students chose "don't know".

Conclusions: It is incumbent upon nursing programs throughout the country to make a concerted effort in including more oral health education in their curriculum. By this interdisciplinary collaboration between nursing and dentistry, people will see the importance of oral health, including their patients, and can result in better patient outcomes for everyone.

This study was supported by a grant from the J. Dean Robertson Society. This study was presented at the Oklahoma County Component of the Oklahoma Dental Hygienists' Association Meeting, 2019.

Title: Medical Emergencies Knowledge of Oklahoma Dental Hygienists

Presenter(s): Amy Dominguez, DH2

Advisor(s): Carolyn Hinckle

Abstract:

Purpose: Medical emergency readiness in the dental office vary depending on the amount of education received specifically BLS and practice management. The purpose of this research study is to determine the knowledge and preparedness of Oklahoma dental hygienists on management of medical emergencies.

Methods: This study is a quantitative, nonexperimental study utilizing a questionnaire. The population consisted of current Oklahoma dental hygienists who attended the ODHA meeting fall of 2018. The questions regarded what dental hygienist do in their offices pertaining to training in medical emergency practices.

Results: Out of the 90 ODHA members, 66 participants completed the survey. The median years of practice experience was 12 years and ranged from less than a year to 58 years. Of 66 participants who self-rated their confidence in assessing the patients' risk for having a medical emergency, the majority (60 of 66 [91%]) reports themselves as being confident to very confident. Confidence in the use of an emergency kit during an emergency was less with 2 of 3 (67%) confident to very confident and 1 of 3 (33%) reporting as feeling neutral or not confident. Of the 66 participants, 51(77%) reported encountering a medical emergency in practice, but only 45 (68%) reported having intervened.

Conclusions: Overall, most dental professionals have witnessed a medical emergency and intervened. Confidence in emergency management and education amongst the group was relatively high. Confidence in usage of emergency cart could use improvement with additional training and education, which could prevent tragedies from occurring.

This study was supported by a grant from the J. Dean Robertson Society. This study was presented at the Oklahoma County Component of the Oklahoma Dental Hygienists' Association Meeting, 2019.

Title: Communication Techniques Used by Dental and Dental Hygiene Students

Presenter(s): Kyesha Edwards, DH2

Advisor(s): Carolyn Hinckle

Abstract:

Background: Dental professionals express a lack of the ability to effectively and efficiently communicate with their patients.

Purpose: The purpose of this study is to determine dental hygiene and dental students' uses of patient-provider communication methods and their educational exposure to common interpersonal communication techniques.

Methods: This was a quantitative, non-experimental study that utilized a 14-item questionnaire. The survey consisted of questions regarding knowledge and utilization of communication techniques. Two-hundred and fourteen students that were enrolled in Fall 2018 semester at University of Oklahoma College of Dentistry received the survey electronically using Qualtrics Survey Software. Fifty-four students returned completed surveys. The population consisted of 25 (46.3%) second-year dental hygiene students and 29 (53.7%) dental students.

Results: The interpersonal communication technique subcategory of 'use simple language' was reported most of the time by 88.5% of the students. The second most reported technique of 'limit 2-3 concepts at a time' was selected as most of the time by 83.9%. Patient-friendly materials, aids, and 'use a video (DVD, YouTube)' had the highest number of students (79.6%) state they "never" used this techniques. Another subcategory of interpersonal communication 'ask patient whether they would like a family member to accompany' had the second highest number of students (55.8%) report they "never" used this technique.

Conclusion: The students reported receiving an ample amount of knowledge on communication techniques, yet they still indicated never using many techniques and only using very few most of the time. These results almost mirror the research of previous studies of practicing dentists and dental hygienists. There is a need for interventions in dental schools to address the lack of exposure and practice of communication techniques.

This study was supported by a grant from the J. Dean Robertson Society. This study was presented at the Oklahoma County Component of the Oklahoma Dental Hygienists' Association Meeting, 2019.

Title: Education's Impact on Infection Control Practices of Dental Assistants

Presenter(s): Hope McBride, DH2

Advisor(s): Carolyn Hinckle

Abstract:

Background: The Centers for Disease Control and Infection provide guidelines specific to infection control in the dental office. At the time of this study, training and education of these guidelines was not mandatory in the education of Oklahoma dental assistants.

Purpose: This research study was conducted to explore the correlation between amount and type of training received for infection control practices in the dental office and the actual implementation of such practices by Oklahoma dental assistants. Also assessed was the level of satisfaction in previous training and the desire for more training in infection control.

Methods: A 22-question survey was distributed to dental assistants taking coronal polishing certification courses at the University of Oklahoma College of Dentistry in the summer of 2018. The survey was quantitatively analyzed and open-ended questions were qualitatively reviewed.

Results: One hundred eight participants (N=108) completed and returned the survey. Those who reported having received previous training in infection control were more likely to answer in accordance to the CDC guidelines, with a few notable outliers. Those who had received no or minimal previous training were more likely to put unsure or non-compliant answers. Only 60 participants (55%) were "very satisfied" with previous training. The majority (77%) of participants expressed some level of desire for more training in infection control.

Conclusions: Based on the results of this study it would appear that further training would be welcomed by Oklahoma dental assistants. Though 92% of participants expressed some level of satisfaction in their previous training, 77% expressed a desire for more training. Implementing a standardized training requirement could provide universal competency in infection control and could yield better patient outcomes.

This study was supported by a grant from the J. Dean Robertson Society. This study was presented at the Oklahoma County Component of the Oklahoma Dental Hygienists' Association Meeting, 2019.

Title: Oklahoma Dental Hygienists and Students Addressing Sensitive Topics

Presenter(s): Lauren Morf, DH2

Advisor(s): Carolyn Hinckle

Abstract:

Introduction: Dental hygienists and dental hygiene students are in a position where they are able to recognize certain systemic problems by the condition of a patient's oral health. Dental hygienists strive for not only patients' oral health, but their overall health and safety.

Purpose: The purpose of this research is to study how dental hygienists communicate about sensitive topics with their patients.

Methods: This research was a quantitative, non-experimental study that utilized a paper survey to determine the current communication techniques used to discuss topics that are sensitive in nature. The population consisted of Oklahoma dental hygienists attending the annual ODHA meeting and second-year dental hygiene students at the University of Oklahoma College of Dentistry.

Results: Fifty-eight dental hygienist and 45 dental hygiene students completed and returned the survey. Regarding frequency of discussion of sensitive topics, the discussion of alcohol use between hygienists and students was statistically significant, yielding a p-value of <.0001. Regarding comfort level of discussion, recreational drug use (p-value of .0359), prescription drug use (p-value of .0416), and eating disorders (p-value of .0010) were analyzed as statistically significant comparing the hygienists and the students.

Conclusions: It is essential to incorporate additional training and education regarding dental hygienists' communication on sensitive topics. Implementing proper training will equip dental hygienists with the tools to address sensitive topics with their patients.

This study was supported by a grant from the J. Dean Robertson Society. This study was presented at the Oklahoma County Component of the Oklahoma Dental Hygienists' Association Meeting, 2019.

Title: Linking Oral Health to Cancer

Presenter(s): Devon Anderson, DH2

Advisor(s): Carolyn Hinckle

Abstract:

Purpose: This literature review will inform dental professionals on the link between patients' oral health and their possible risks for cancer.

Background: Over 38% of men and women in the US will be diagnosed with cancer during their lifetimes. The link between oral health and risks of various types of cancers has been reported in the past decade. Published studies suggest correlations between the bacterium found in the oral cavity and those associated with such cancers as head and neck, stomach, pancreatic, and esophageal. While the results illustrate a correlation, most researchers do not commit to a definitive conclusion about the relationship between the diseases.

Significance: Dental professionals have a duty to recognize any potential threats to their patients' overall health that could be associated with their oral disease. Promoting oral health will decrease potential risks of systemic disease and knowledge of the association between the two will be beneficial.

Conclusion: Dental professionals who stay informed of the relationship of oral disease and systemic disease, particularly cancer, will have greater potential for preventing these diseases. It is the dental professional's responsibility to stay abreast of the oral-systemic link as more research is being conducted.

This study was presented at the Oklahoma County Component of the Oklahoma Dental Hygienists' Association Meeting, 2019.

Title: Benefits of Using Intraoral Cameras in Dentistry

Presenter(s): April Armstrong, DH2

Advisor(s): Carolyn Hinckle

Abstract:

Purpose: The purpose of this literature review is to educate dental professionals and explore the uses and benefits of intraoral cameras in Dentistry.

Background: Approximately 90 million Americans are health illiterate. Dental professionals effectively communicating with patients builds trust and in turn increases patients' health literacy and acceptance of and compliance to dental treatment. Intraoral cameras not only provide a visual to enhance communication, but they also increase detectability for many oral conditions such as dental caries and cancer. These devices are easy to use, take up very little time, and provide high-resolution visual images.

Clinical Significance: Benefits of intraoral cameras include: patient education, increased patient acceptance and compliance, detection of dental caries, detection of oral cancer, teledentistry, documentation, comparison photos, and as scanning devices in CAD/CAM technology.

Conclusion: Intraoral cameras cultivate positive communication between the patient and the dental team resulting in joint-decision making. This in turn increases patient case acceptance because the patient feels well informed and involved in the decision-making process. While intraoral cameras cannot replace visual examinations, they can increase detection of many oral conditions and should be utilized in all dental examinations.

This study was presented at the Oklahoma County Component of the Oklahoma Dental Hygienists' Association Meeting, 2019.

Title: Preventing Caries in School-Aged Children

Presenter(s): Karsen Baker, DH2

Advisor(s): Carolyn Hinckle

Abstract:

Purpose: Dental caries affects 60-90% of children and is one of the most prevalent diseases in children today. Preventing dental caries in children can be easily achieved by preventive agents utilized in the home and in the dental office. The purpose of this literature review was to determine what measures that can be done to prevent dental caries in school aged children.

Background: Preventive agents such as fluoridated water, fluoride, toothpaste, varnish, and sealants are all therapies intended on preventing and arresting tooth decay. Understanding the significance of each agent and how it works in reducing the risk of childhood caries will help dental professionals in their attempts to decrease dental caries. Education is an important part in reducing the amount of caries found in children. To educate parents and caregivers on the importance of preventable agents is effective in preventing carious lesions on children's primary teeth.

Conclusions: It is imperative that the dental hygienists educate the child, parent, and caregiver on the importance of oral hygiene and how to prevent dental caries. It is of the upmost responsibility of the hygienist to monitor and review the caries risk in order to give the proper therapeutic treatment for the child's risk of developing dental caries.

This study was presented at the Oklahoma County Component of the Oklahoma Dental Hygienists' Association Meeting, 2019.

Title: The Dental Hygienist's Role in Detecting Sleep Apnea

Presenter(s): Jenna Baty, DH2

Advisor(s): Carolyn Hinckle

Abstract:

Purpose: The purpose of this literature review was to investigate the roles of dental hygienists in the detection of sleep apnea.

Background: Obstructive sleep apnea (OSA) is considered the most common undiagnosed sleep disorder. OSA is an instability affecting the upper airway. This condition was first seen in medical literature in 1965. Severity and treatment options differ from each patient. Dental hygienists need to know how to detect, screen, and refer patients to have a definitive diagnosis made.

Clinical implications: Dental professionals are recognizing their role in the diagnosis and treatment of OSA. Dental hygienists can play an important part in assisting the dentists in these endeavors. Signs and symptoms in the oral cavity can be detected during the hygienists' routine head and neck examinations. Referring patients for a polysomnography may result in an oral appliance or another form of dental treatment.

Conclusion: Oral health providers play an important role in detecting, screening, and referring patients for varying conditions, especially OSA. It is important to get these patients individualized treatment to help treat their condition to give the patient a better quality of life.

This study was presented at the Oklahoma County Component of the Oklahoma Dental Hygienists' Association Meeting, 2019.

Title: Implementing Oral Health in Long-Term Care Facilities

Presenter(s): Caitlyn Blackburn, DH2; Katie Taylor, DH2

Advisor(s): Tina Tuck

Abstract:

Purpose: To educate nursing staff at long-term facilities extra and intra oral cancer screening techniques, proper oral hygiene, and proper care for removable prosthetics.

Background: Research indicates roughly 80% of residents in long-term care facilities (LTC) need assistance with routine oral hygiene practices. Studies indicate LTC staff often do not feel confident in providing oral health care because of minimal training in the subject. Although 96% of certified nursing assistants reported receiving training, only 16% felt confident in carrying out the training.

Risks: An estimated 43% of Oklahoma adults over the age of 65 have lost ≥ 6 teeth due to decay or periodontal disease. According to the CDC, Oral cancer incidence for adults over the age of 60 ranges from 34% to 40%.

62% of LTC residents have unsatisfactory levels of oral hygiene

LTC residents have higher rates of gingivitis (66-74%)

32%-49% of residents have periodontal disease

Interventions: Educate nursing staff in the following areas:

- Oral Cancer Screening Techniques
- Proper Oral Hygiene
- Care of Removable Prosthetics
- Correlation between Poor Oral Hygiene and Caries/Disease

Conclusion: It is essential that nursing staff in long-term care facilities are equipped with the knowledge to manage resident's oral health needs. Oklahoma needs oral health educators to train LTC staff for routine care and provide preventive services within the facility.

Title: The Effects of Probiotics on Oral Health

Presenter(s): Emily Booker, DH2

Advisor(s): Carolyn Hinckle

Abstract:

Purpose: The purpose of this literature review was to explore a new method of treating and preventing a multitude of oral diseases by the use of probiotics.

Background: With antibiotic resistance becoming an increasing problem around the world, a new method of treating oral conditions is needed. Not only is a new method to treat diseases needed but preventing them from occurring altogether would be beneficial.

Clinical Significance: The oral cavity consists of thousands of different bacteria. Probiotics are advantageous due to their ability to enhance the favorable bacteria in the oral cavity. This promotes the prevention of certain oral diseases from occurring.

Significance/Conclusions: Dental professionals play a key role in prevention and treatment of certain oral diseases. With the suggestion of probiotic use and patient compliance, the likelihood of certain disease occurring and being treated with the risk of antibiotic resistance occurring has the potential to decrease immensely.

This study was presented at the Oklahoma County Component of the Oklahoma Dental Hygienists' Association Meeting, 2019.

Title: Implications of Oral Health Neglect in Long-Term Care Facilities

Presenter(s): Ashley Brown, DH2; Carlie Dowers, DH2

Advisor(s): Tammie Golden

Abstract:

Purpose: To examine the implications of periodontal disease and oral health neglect for residents in long-term care facilities (LTCFs)

Background: Periodontal disease is highly prevalent in elderly patients in LTCFs and exacerbates conditions including cardiovascular disease, respiratory ailments, diabetes and rheumatoid arthritis among others. Oral health care is a low priority in most long-term care facilities. An individual with periodontal disease, 20 natural teeth with pockets less than or equal to 5mm, is equivalent to having an open wound the size of an adult's palm. If periodontal disease was given the same priority as wound management by medical professionals, treatment would be considered, however the disease remains largely neglected.

Findings: Periodontal disease has been linked to systemic diseases, early onset dementia and aspiration pneumonia. Impaired oral health can affect eating and nutrition, impacting quality of life issues. Inter-professional collaboration with medical and dental health care providers can elevate status of importance of oral health and help reduce risks for disease. Hiring dental health professionals to work in LTCFs could increase standard of care and help nursing assistants achieve realistic goals and expectations for care of their patients.

Conclusion: Inadequate oral care in LTCFs is a problem worldwide. More research needs to be conducted regarding education of caretakers, their influence and contribution to oral health and quality of life for residents in LTCFs.

Title: Dental Care for Pediatric Patients in Oklahoma

Presenter(s): Kelsey Carson, DH2; Kaylee Gandy, DH2

Advisor(s): Tina Tuck

Abstract:

- Purpose: The purpose of this community project was to educate parents about the oral health needs for Head Start Children.
- Background:
 - Dental disease is the most common chronic illness for children.
 - 21.7% of children have untreated active caries in at least one permanent or primary tooth
 - Research indicates children in Head Start programs suffer greater oral health issues than those attending other preschool programs.
 - 534,653 children in Oklahoma are enrolled in SoonerCare
 - Approximately 80% of dentists do not accept SoonerCare insurance.
 - In populations with lower income status, dental caries are high and dental knowledge is low.
 - A 2017 report by the Oklahoma Health Care Authority reported 37,662 children had received care. This report alone indicates a deficiency in services being provided for lower income populations.
 - Utilization of school-based dental clinics in New Jersey has been used to address access to care issues for Head Start students.
- Methods:
 - Conduct a needs assessment
 - Pre/Post survey of parental knowledge of oral health issues for children
 - Pre/Post survey of parents to determine oral health habits for their children
 - Survey parents to determine current ability to access oral health care for their children
- Interventions:
 - Teach parents about dietary issues related to dental health
 - Teach parents about effects of untreated tooth decay
 - Teach parents about gingivitis/periodontitis
 - Assist parents in accessing care for their children
- Conclusions:
 - Further education of parents regarding oral health programs is critical.
 - Oral health education programs alone do not address caries risks or rates.

Title: Non-Thermal Atmospheric Plasma Applications in Dentistry

Presenter(s): Callie Cook, DH2

Advisor(s): Lindsey Hays

Abstract:

Purpose: To investigate the applications of non-thermal atmospheric or cold plasma for dental and sterilization practices.

Introduction: Non-thermal atmospheric plasma (NTP) is composed of Argon gas that is distributed at room temperature. While the majority of lasers currently used in dentistry can damage living tissue, non-thermal atmospheric plasma causes no damage to living tissues, and provides most of the benefits of a traditional laser. NTP generates no heat, allowing clinicians to feel more confident about soft tissue therapies as well as patient comfort. The development of NTP has created a wide range of uses for lasers that can have a significant impact on sterilization practices along with direct patient care.

Clinical significance: NTP has a wide range of applications and is becoming the laser of choice for dental therapies that require eradication of bacteria. Potential applications include acceleration of osseointegration of implants, increased wound healing for medically compromised patients, adjunctive non-surgical periodontal therapies, elimination of microorganisms in root canals, treatment of *C. Albicans* on dentures, rapid sterilization of dental instruments, and tooth bleaching procedures.

Conclusion: Although further research needs to be conducted, NTP lasers are a recent advancement in laser dentistry. Non-thermal atmospheric plasma could be more effective than some of the current disinfection practices used and may be incorporated into autoclave manufacturing in the near future. Laser therapies are common in dental practices and this new technology is taking laser implementation to a new level resulting in higher quality patient care.

Title: Oral Health Considerations: Treating Chronic Mental Illness

Presenter(s): Taylor Cook, DH2; Jessica Horne, DH2

Advisor(s): Lydia Snyder

Abstract:

Purpose: The purpose of literature review is to examine oral health considerations in treating individuals with chronic mental illness, pharmacological effects and barriers to care.

Background: According to Healthy people 2020 mental disorders are among the most common causes of disability. Approximately 43.6 million of U.S. adults suffer from any mental illness. This group is often neglected because of ignorance, fear, stigma, misconception, and negative attitudes. Common oral conditions of individuals with mental illness include but are not limited to xerostomia, sialorrhoea, dental caries, extracted teeth, malocclusion, periodontal disease, edentulous areas and oral cancer.

Clinical Implications: Dental professionals need to be well-educated regarding the oral health considerations associated with chronic mental illness. Socioeconomic status, poor health, low oral health literacy, and lack of perceived need of care are all factors that affect access to dental care.

Conclusion: Individuals with chronic mental illness have a significantly increased chance of experiencing oral health problems than the general population. Further research needs to be conducted and more efforts put forth to improve oral health of these individuals.

Title: Effectiveness of Motivational Interviewing in Oral Hygiene Instruction

Presenter(s): Hannah Evans, DH2

Advisor(s): Carolyn Hinckle

Abstract:

Purpose: The purpose of this literature review was to highlight the importance and effectiveness of utilizing motivational interviewing when giving oral hygiene instructions to dental patients.

Background: Motivational interviewing is an emerging counseling method that health professionals have started to incorporate into their discussions with patients. Studies over motivational interviewing show that it is effective in various settings where patients are encouraged to incorporate change in their behaviors, such as tobacco cessation. In dentistry, it is shown to be a very efficient and effective method utilized when giving patients oral hygiene instructions. MI techniques help dental professionals guide the patient through the stages of change to get to the point where they are ready to take action.

Significance: Motivational interviewing is important in dentistry because it can change how patients respond to oral hygiene instruction and improve their behaviors. It is a technique that can be easily learned and taught in schools so that emerging dental professionals can be on the forefront of knowledge in communicating with their patients. Finding what encourages the patient to perform effective oral hygiene procedures is key to success. Dental professionals must be interested in the patients' values, interests, and thoughts to promote positive lifestyle habits such as oral self-care.

Conclusion: Motivational interviewing should be taught in schools and utilized by dental professionals when treating their patients. It has shown to be effective in multiple studies with a wide range of people.

This study was presented at the Oklahoma County Component of the Oklahoma Dental Hygienists' Association Meeting, 2019.

Title: Periodontal Disease in Companion Animals and Humans

Presenter(s): Bailey Farni, DH2

Advisor(s): Marla Holt

Abstract:

Purpose: The purpose of this literature review was to: (1) describe periodontal disease in humans and popular companion animals (dogs and cats); (2) determine if the transmission of periodontal pathogens between these companion animals and humans is possible; and, (3) explore preventive measures utilized in veterinary dentistry.

Background: Periodontal disease is a pathogenic, irreversible inflammatory condition that affects the periodontium, alveolar process, gingiva, and cementum. The disease similarly affects companion animals and humans with varying levels of clinical manifestations among the different species. Advancements in identifying key periodontal pathogens has led researchers to explore the potential for zoonotic transmission between humans and their companion animals.

Significance: Results of these studies indicate a possible connection between common mammalian periodontal pathogens and the potential for zoonosis to occur. Similar to humans, preventive measures utilized on companion animals may be warranted in the treatment of periodontal disease.

Conclusion: More research needs to be conducted to determine the relationship between common periodontal pathogens in companion animals compared to those in their human counterparts. Similarly, the efficacy and plausibility of invasive preventive measures utilized in veterinary dentistry should be explored further.

Title: It's All in Your Head: Alzheimer's and Periodontal Disease

Presenter(s): Jordyn Grace, DH2

Advisor(s): Melissa Stutzman

Abstract:

Purpose: The purpose of this literature review is to educate dental professionals on the current research linking Alzheimer's disease and periodontal disease.

Background: Alzheimer's disease is a form of dementia that includes cognitive impairment. Alzheimer's disease is currently affecting around 37-million people worldwide and it has been projected that by 2050 Alzheimer's disease will affect more than 113 million people around the world. Alzheimer's disease not only affects the person with the disease, but also the person's family members, friends, and caretakers. Currently, there is no cure for either periodontal disease or Alzheimer's disease.

Clinical Implications: Recent studies about microbiota, amyloid plaques, and inflammatory cytokines have suggested that there is a link between periodontal disease and Alzheimer's disease. Patients with Alzheimer's disease tend to have less ability and less interest in their oral health care resulting in higher incidences of bleeding on probing, use of dentures, oral pathology, and xerostomia.

Conclusions: Through further research and educating dental professionals, the vicious cycle that is periodontal disease and Alzheimer's disease could potentially be resolved.

Title: Diet: Are You Feeding a Disease?

Presenter(s): Lauren Haake, DH2

Advisor(s): Donna Wood

Abstract:

Purpose: To educate dental professionals on the link between nutrition and oral health, and discuss the usage and importance of nutritional counseling as a tool to arrest or prevent the development of dental diseases.

Background: It has long been known that nutrition has a hand in the pathogenesis of chronic disease, but unfortunately dental caries and periodontal disease often fail to be acknowledged amongst these chronic diseases. Dental caries and periodontal disease, in theory, are preventable to some extent as dietary factors play a role in their etiology. However, due to both perceived barriers and lack of knowledge, dental professionals infrequently provide patients with nutritional counseling to prevent the development of these diseases.

Significance: The excessive consumption of particular nutrients has been found to directly promote the carious processes. Conversely, the insufficient intake of other nutrients has been found to impair the body's ability to fight disease, such as periodontal disease. With strong evidence behind these claims, it is imperative that dental professionals address nutrient intake with patients in regards to risk of developing disease.

Conclusion: Due to high prevalence, and the evidence supporting nutritional factors in the pathogenesis, nutritional counseling is a key tool in the warfare against oral health disease. Dental professionals avow to provide patients with a standard of care. Neglecting to provide patients with information regarding nutrition and oral health due to lack of personal knowledge is a violation of one's professional responsibility and code of ethics.

This study was presented at the Oklahoma County Component of the Oklahoma Dental Hygienists' Association Meeting, 2019.

Title: A Nation at Risk: Patient Management in the Opioid Epidemic

Presenter(s): Kaylin Hendrix, DH2; McKenzie Moore, DH2

Advisor(s): Lindsey Hays

Abstract:

Purpose: To educate dental professionals on recognizing and preventing opioid abuse and the importance of adhering to safe prescribing practices.

Background: In 2017, prescription opioids were responsible for 59.8% of drug overdose related deaths, which represents a 45% increase from 2016. In 2015, Oklahoma providers wrote 101 opioid prescriptions per 100 persons compared to the U.S. rate of 70 per 100 persons. Synthetic opioids such as hydrocodone and oxycodone are responsible for the majority of overdose deaths than any other type of drug, and are the more popular drugs among prescription opioid abusers and diverters. Short-term, small doses can be beneficial in the management of moderate to severe pain, however large doses or in combination with other drugs or alcohol, could result in respiratory distress and death.

Clinical Significance: Patients who have a history of opioid abuse present with higher Decayed/Missing/Filled Teeth (DMFT) scores and a higher incidence of periodontal disease. Recognition of opioid use in patients is critical to patient management. Considerations for type and amount of anesthetic, post-op pain management, disease prevention and addiction potential should be addressed. Research has shown that NSAIDs may treat post-operative discomfort as effectively as opiates in most patients. According to the American Dental Association, NSAIDs should be the first line therapy for acute pain management.

Conclusion: Due to the opioid crisis, dental professionals should access the Prescription Drug Monitoring Program (PDMP), conduct a thorough social and health history and educate every patient on the risks of consuming opioids prior to prescribing them to their patients. Clinicians must also be able to recognize the signs and symptoms of opioid abuse and modify treatment as necessary. If opioids are warranted to treat post-operative pain, dental professionals should be conservative when prescribing to avoid possible abuse, misuse, and addiction among patients.

This study was presented at the Oklahoma County Component of the Oklahoma Dental Hygienists' Association Meeting, 2019.

Title: How to Treat Patients with Dental Anxieties

Presenter(s): Bryn Houlton, DH2

Advisor(s): Carolyn Hinckle

Abstract:

Purpose: The purpose of this literature review was to educate and inform dental professionals about the different ways to treat patients with dental anxieties.

Background: Anxiety is your body's natural response to stress. It is a feeling of fear about what is going to occur next in a certain situation. A reported 9-20% of American's suffer from dental anxiety to the degree that it keeps them from going to the dentist.

Clinical Significance: Dental patients need to be comfortable with discussing their anxiety with their dental professionals and trust them to assist them in overcoming their distress. Delaying dental treatment because of dental anxiety only exacerbates the dental patients' outcomes from not seeking dental care.

Conclusion: Dental professionals need to be aware of strategies to utilize for patients who present with dental anxieties. They need to be knowledgeable about techniques that will ease anxious patients' distress.

This study was presented at the Oklahoma County Component of the Oklahoma Dental Hygienists' Association Meeting, 2019.

Title: The Oral Microbiome and the Implications of Phage Therapy

Presenter(s): Laurie LaCoss, DH2

Advisor(s): Lindsey Hays

Abstract:

Purpose: To investigate the link between the oral microbiome and systemic disease as well as phage therapy considerations.

Introduction: The characterization of genes within various bacteria, viruses, and yeast present in an individual's oral cavity is defined as the oral microbiome, and represents up to 6 billion microbes across 700 species. These flora form a symbiotic relationship between microbial residents and a healthy human host. Each person holds a unique microbial "fingerprint" on their skin, within their gut and oral cavity. The oral biome plays a role in systemic diseases such as cardiovascular disease, rheumatoid arthritis, adverse pregnancy outcomes, stroke, pneumonia and diabetes. With technological advances on the rise, linking certain strains to specific systemic diseases will be common practice and incorporate techniques such as genomic screening, phenomics, and phage therapy.

Clinical Implications: Antibiotic resistance in the last decade has been increasing and the need to seek out alternative treatments is essential to combat resistant strains of bacteria. The bacteriophage could be one solution. Phage therapy also has a possible use against biofilms that cause disease. Research is exploring multiple uses for naturally occurring phages, bioengineered phages and lab purified phages.

Conclusion: Research shows association between the oral microbiome and systemic diseases, yet no definitive evidence that one causes the other. Phage therapy is gaining ground in the healthcare industry with the discovery of antibiotic resistant bacteria. Current animal studies show a lot of promise but the need for phage therapy to be more accepted as an alternate treatment is vital. Being able to bring more research to the forefront in this ground-breaking treatment could not only save lives, but may also be used in tandem with antibiotic treatment or even replace the need for antibiotics altogether.

Title: Taking the Bite Out of BMI

Presenter(s): Shea Linse, DH2

Advisor(s): Donna Wood

Abstract:

Purpose: To educate dental professionals of the risks associated with overweight and obese body mass indices in children and adults.

Background: In America, more than 2 in 3 adults and 1 in 6 children are considered to be overweight or obese, as determined by body mass index. Body mass index (BMI) is considered one's weight (in kilograms) divided by their height (in meters squared). A BMI of 25-29.9 kg/m² is classified as "overweight", and a BMI \geq 30 kg/m² is considered "obese". Poor nutrient selection, coupled with a lack of exercise, have attributed to high body mass index scores.

Clinical Implications: BMI is relevant to dental professionals because of the nutrient selection that is associated with being overweight. Excessive intake of carbohydrates, combined with deficient oral hygiene habits, can not only lead to weight gain, but also systemic diseases, and a decline in oral health. The clinical oral implications include a greater risk for higher plaque indices, increased gingival inflammation, larger periodontal pocket depths, and attachment loss. These occurrences are not as prevalent in individuals who are considered to be in the normal BMI range. In overweight and obese children, caries were found to be more prevalent.

Conclusion: Due to the high population of overweight and obese individuals, dental professionals will provide care for patients in these categories. Nutritional counseling, as part of a treatment plan for adults, should be utilized to prevent the periodontal and systemic implications of a high BMI, and an increased incidence of caries in children. An emphasis in healthy food choices and meticulous homecare can improve the oral and systemic health of patients.

This study was presented at the Oklahoma County Component of the Oklahoma Dental Hygienists' Association Meeting, 2019.

Title: A Review of the Environmental Impact of Amalgam and Cremation

Presenter(s): Shani McGuire, DH2

Advisor(s): Lindsey Hays

Abstract:

Purpose: To investigate the environmental impact of amalgam restorations during cremation.

Background: Dental amalgams have been used for well over a century in the United States. Although the use of amalgam has drastically decreased during the past decade, the vast majority of Americans have multiple amalgam restorations. While deemed safe and stable in the oral environment, vaporization of amalgam materials incinerated during the cremation process poses a danger to the environment and the food chain. While research shows that amalgam remains the most effective dental restorative material, current cremation laws do not fully consider the environmental impact.

Significance: Cremation has risen 50% worldwide. The US is the only industrialized nation that does not require mercury filters in crematoriums, nor does it set standards for the incineration of amalgams or other implanted devices. While the amount of mercury vaporization from crematoriums is relatively small in comparison to other manufacturing industries, the location of crematoriums play a large role in human exposure. Mercury exposure can have toxic and long-term developmental effects on children.

Conclusion: Laws and regulations of crematorium protocol do not consider dental amalgam and other implanted medical devices as medical waste, resulting in environmental mercury exposure. Despite controversy, dental amalgams are still considered the most effective restorative material. The solution is not to discontinue the use of amalgam, but to update the disposal practices similar to that being implemented in dental practices. Future legislation may incorporate removal of amalgams prior to cremation or implement proper filtration in crematoriums to ensure that the risk of environmental contamination is minimized.

Title: Taking Initiative: Increasing Oral Health Literacy Among New Mothers

Presenter(s): Laci Moreland, DH2

Advisor(s): Lindsey Hays

Abstract:

Purpose: To increase oral health literacy and Early Childhood Caries disease awareness among new mothers for improved quality of life in infants and young children.

Background: Early Childhood Caries (ECC) is the presence of one or more decayed, missing, or filled tooth surfaces in primary teeth in children under six years of age. In less developed countries and among disadvantaged groups in developed countries, the prevalence of Early Childhood Caries has been reported to be as high as 70%. It is the most prevalent chronic disease of childhood and is considered multifactorial resulting from a combination of risk factors such as dietary intake of high fermentable carbohydrates, cariogenic microorganisms, and a variety of social and behavioral factors.

Significance: Studies suggest that adequate dental treatment and oral hygiene education during pregnancy can reduce or delay Early Childhood Caries in infants. ECC can affect a child's well-being, learning ability, and quality of life. The associated pain from dental caries has a negative impact on children's emotional status, sleep patterns, and ability to learn or perform their usual activities. Oral health has been recognized as an essential component of general health and quality of life; therefore, both oral disease prevention and oral health promotion should be included as an integral part of chronic disease prevention and general health promotion programs.

Conclusion: Increasing oral health literacy among expectant and new mothers will improve oral health among infants and children. Measures should be taken in educating mothers about the etiology and prevention of Early Childhood Caries. Opportunities to intervene may be explored through health care settings for expectant mothers or mothers of young children to aid in improved oral health literacy.

Title: Human Papilloma Virus and Its Association with Oral and Systemic Health

Presenter(s): Iqra Saleem, DH2

Advisor(s): Sarah Justus

Abstract:

Purpose: The purpose of this literature review was to highlight the important information about the prevention, diagnosis, transmission, and oral and systemic manifestations of Human Papilloma Virus.

Background: Human Papilloma Virus is the most common sexually transmitted disease in the world. Over 200 types have been identified. At least nine of those strains are known to cause cancer. Transmission occurs through sexual intercourse or oral sex. Lesions associated with Human Papilloma Virus may occur in the oral cavity, the genital area, or the skin. Vaccines are available to prevent Human Papilloma Virus-associated cancers and warts.

Significance: Clinical manifestations of Human Papilloma Virus have been detected and documented intraorally. Increased knowledge of these oral manifestations will allow dental professionals to be more involved in the identification and diagnosis of the disease. Dental professionals can also provide additional education of both the oral manifestations and the disease.

Conclusions: Dental professionals have the opportunity to provide education, diagnosis, and resources to patients with Human Papilloma Virus. With evidence regarding the link between Human Papilloma Virus and its oral manifestations, it is imperative for dental professionals to be aware of the disease so that they can play a key role in prevention, identification, and diagnosis.

This study was presented at the Oklahoma County Component of the Oklahoma Dental Hygienists' Association Meeting, 2019.

Title: Oral Health of Children with Diabetes

Presenter(s): Sydnie Seibold, DH2

Advisor(s): Melissa Stutzman

Abstract:

Purpose: This poster presentation will provide dental professionals with information about recognizing and managing oral manifestations of diabetes in pediatric patients.

Background: Diabetes has become one of the most prevalent childhood diseases. Maintaining metabolic control is significantly harder for diabetic children as compared to diabetic adults. Oral manifestations of diabetes present unique challenges that may require alterations in dental care. Dental professionals must have a high level of understanding of the disease process, symptoms, and management strategies in order to meet the needs of pediatric patients with diabetes.

Clinical Significance: Research shows that children with poor metabolic control have a higher occurrence of gingivitis, periodontitis, caries, and reduced salivary flow. The risk of permanent damage to tissues in the oral cavity is increased when glycemic control is not maintained. Early recognition and treatment of dental diseases in addition to effective patient and parent education improves oral outcomes in children.

Conclusion: Pediatric diabetic patients should be evaluated and treated at a high level to manage the increased risk for damaging oral manifestations of the disease. It is imperative for dental professionals to provide detailed patient-specific education and oral hygiene instructions for both the pediatric patient and parent.

Title: Periodontal Disease in Down Syndrome Patients

Presenter(s): Ryann Sills, DH2

Advisor(s): Sarah Justus

Abstract:

Purpose: The purpose of this literature review was to inform dental professionals of the increased susceptibility to periodontal disease in patients with Down syndrome and encourage personalized and collaborative treatment involving the provider, the patient, and the caregiver.

Background: Down syndrome is the most common chromosomal disorder and continues to grow in prevalence. In 1982, the average life expectancy for an individual diagnosed with Down syndrome was thirty-five. Today, the average life expectancy is age sixty. A majority of individuals with Down syndrome experience periodontal complications and often present with a rapid, destructive periodontal disease that mimics aggressive periodontitis.

Clinical Implications: Down syndrome patients present with unique systemic and orofacial manifestations that exacerbate periodontal disease and create unique oral health challenges for both the patient and the caregiver. Dental professionals must become familiar with this disorder and introduce proper clinical and at-home preventive measures in order to offset these risk factors.

Conclusions: With the increasing life-span and prevalence of Down syndrome, dental professionals must remain aware of periodontal implications and prepared to deliver appropriate treatment. It is imperative that dental professionals are capable of educating and collaborating with caregivers in order to provide optimal, comprehensive care for these individuals.

This study was presented at the Oklahoma County Component of the Oklahoma Dental Hygienists' Association Meeting, 2019.

Title: Radiation and Clinical Considerations of Hand-Held X-Ray Devices

Presenter(s): Abbigail Smith, DH2

Advisor(s): Tammie Golden

Abstract:

Purpose: The purpose of this literature review is to examine clinical considerations and radiation exposure to clinicians while utilizing hand held x ray devices.

Background: X-ray machines in dental offices have traditionally been wall mounted or brought in on a mobile cart. The clinician was able to leave the room during imaging, to eliminate exposure of radiation to themselves. Hand-held x-ray devices were created in 1990 for use in field hospital settings, as well as dental missions and out of clinic operations.

Significance: The maximum suggested amount of scatter radiation for a clinician is 20mSv (millisieverts) for the body as a whole, 500mSv for the hand, and 150mSv for the eye lenses over a period of 5 years.

Findings: A survey conducted in 2018 by Lingtag, at Old Dominion University of 566 dental hygienists, 67 participants (11.8%) said they had used a portable x-ray device. Of those, only 14 wore a lead apron for protection. The positioning of the PID was also tested. Due to the weight of the device, operators were unnecessarily exposed because incorrect angulation was utilized. In another 2012 study at Dankook University COD Cheonan, Korea, the battery power of the hand-held device was tested. As the battery power decreased, the kvp was increased to obtain improved image quality. As kvp increased, so did the exposure to the patient and clinician. In 2015, British Institute of Radiology conducted a study of positioning and operator error. When the device was held at a perpendicular angle to the ground, exposure was greatest on palm of left hand because the backscatter shield was not as effective.

Recommendations: When clinicians are using hand-held x-ray devices, recommendations are to wear lead aprons with thyroid collar for protection and in some instances, lead gloves.

Conclusion: More research could be conducted regarding safety and training of dental and medical professionals when utilizing these devices.

Title: Vaping and Oral Health: The Untold Truth

Presenter(s): Farrin Smith, DH2; Jacqueline Mee, DH2

Advisor(s): Tammie Golden

Abstract:

Purpose: Investigate the harmful effects of vaping and its relationship to oral health

Background: E-cigarettes or electronic cigarettes work by utilizing different types of liquid that vaporize when inhaled. In 2016 the National Center for Biotechnology Information (NCBI) ascertained e-cigarettes have the potential to create a negative environment in the oral cavity. E-cigarettes currently are viewed as an alternative to traditional smoking as well as smoking cessation.

Findings: Lack of awareness exists in regards to negative health outcomes and use of e-cigarettes. The FDA and CDC published data from the 2018 National Youth Tobacco Survey showing a rapid rise in use of e-cigarettes. From 2017-2018 e-cigarette use in high school students increased by 78%, putting the total number of middle and high school students currently using at 3.6 million. NCBI conducted a study that indicated e-cigarettes can increase risk of developing periodontitis. U.S. Consumer Product Safety Committee reported 2,035 incidences of explosions and burns from 2015 to 2017 resulting in some facial and head trauma.

Significance: Dental health care professionals need clear guidance on making recommendations to patients and should make decisions based on best evidence available. Ideally, e-cigarettes are to be used as a temporary smoking cessation tool, not as a replacement for traditional smoking.

Conclusion: More research/longitudinal studies are needed to better understand the risks and hazards associated with use of e-cigarettes.

Title: Prevention of Musculoskeletal Disorders: Utilizing Proper Ergonomics

Presenter(s): Danielle St. Clair, DH2; Paige Turner, DH2

Advisor(s): Abbie Gustafson

Abstract:

PURPOSE:

To explore the reduction of musculoskeletal disorders through the implementation of proper ergonomics by the use of saddle stools and dental loupes.

BACKGROUND:

Ergonomics is an applied science that focuses on the arrangement and design of products, so that when properly utilized, people are safe and efficient. When ergonomics is neglected, musculoskeletal disorders often arise. According to Gupta et al, the reported reasons for early retirement among dental professionals are musculoskeletal disorders (29.5%), followed by cardiovascular disease, neurotic symptoms, tumors, and diseases of the nervous system.

CLINICAL IMPLICATIONS:

There are a multitude of significant tools that can be utilized in the dental profession to help maintain neutral spine alignment including the saddle stool and dental loupes. Operators who utilize conventional seating in their practice exhibit higher occurrence of shoulder flexion than those who utilize the saddle stool. Use of dental loupes decreases perceived pain in the cervical neck, keeps a constant cervical range of motion, and low load cervical vertebral flexion.

CONCLUSION:

While dental loupes are becoming more widely utilized in recent years, saddle stools have not been routinely implemented by dental professionals. The utilization of the saddle stool and dental loupes are only two of the many advances that aid in proper ergonomics, both having shown to enhance proper ergonomics and self-reported musculoskeletal disorders, including perceived pain. Although these tools have been shown to be beneficial, more research needs to be conducted in an effort to encourage their implementation into the daily life of dental professionals.

Title: From 'Nope' to Hope: Sensory Solutions for Autistic Dental Patients

Presenter(s): Taylor Swartz, DH2

Advisor(s): Melissa Stutzman

Abstract:

Purpose: To educate dental professionals regarding incorporation of the sensory adapted dental environment (SADE) as a best practice for effective treatment of patients with Autism Spectrum Disorder (ASD)

Background: In recent years ASD has become an increasingly prevalent genetic and neurologic condition in the United States. ASD presents with a variety of manifestations that often include difficulties with social communication, limited activities of interest, and repetitive behaviors. The emotional and behavioral instability exhibited by many ASD individuals can transform seeking primary dental care into a daunting task for both the patient and the team of dental professionals.

Significance: Implementing principles of SADE is a highly effective and cost-efficient method to improve dental care for ASD patients. Creating a sensory-friendly dental environment decreases the potential for over-stimulation during a dental appointment. This, in turn, reduces the likelihood of stress-induced behavioral outbursts often associated with ASD patients.

Conclusion: SADE includes simple adjustments to the dental environment and alternative communication methods that lead to improved interpersonal and clinical outcomes.

Title: Silver Alert SDF in the Geriatric Population

Presenter(s): Michelle Tucker, DH2; Hopelynn Yerian, DH2

Advisor(s): Staci Wekenborg

Abstract:

Purpose: This literature review will provide dental professionals with information about the use of silver diamine fluoride in the geriatric population.

Background: Oral diseases affect an estimated 3.9 billion people worldwide. Caries and periodontal disease are more common than other chronic health conditions, with untreated caries in the permanent dentition being the most prevalent health condition in the world. The increasing prevalence of dementia in the geriatric population is a potential barrier to quality dental care. Individuals suffering from dementia typically have a higher prevalence of dental caries than individuals without the condition. This population of patients may become very restless when removed from their normal environment. In addition, they are not always able to tolerate the loud noises and long procedure times associated with restorative treatments.

Significance/Clinical Implications: Due to the inability of geriatric patients with dementia to withstand long procedure times, dental professionals must find alternative options to treat these patients. Dental professionals should be educated regarding the precise guidelines and develop an understanding of the administration of SDF, as a long term-caries management plan with the aim of providing dental service to geriatric patients.

Conclusion: SDF is a very quick, cost-effective, painless, and drill-free procedure without the use of local anesthetics. Dental professionals can better treat the geriatric population by utilizing SDF to assist in caries management inside and outside the dental office.

This study was presented at the Oklahoma County Component of the Oklahoma Dental Hygienists' Association Meeting, 2019.

Title: The Dental Professional's Role in Forensic Dentistry

Presenter(s): Baylee Warnke, DH2

Advisor(s): Marla Holt

Abstract:

Purpose: The purpose of this literature review is to educate dental professionals about forensic dentistry.

Background: Forensic dentistry or odontology is the proper usage of dental procedures used in both criminal and civil law in a judicial system. Forensic dentistry's accuracy relies on evidence-based methods. It can help identify human remains, including both those associated with individual deaths and mass casualties, as well as possible signs of neglect or abuse.

Significance: There are very few specially trained dental professionals available to serve on disaster response teams. About 44% of cases involving crime are closed and labeled as unidentified persons. These teams and individuals are important because they can provide notification to victim's loved ones sooner and help identify the cases that might otherwise be deemed unidentifiable. Dental professionals have a responsibility to use forensic science to report or testify in cases of abuse or neglect.

Conclusion: Dental professionals are knowledgeable about dental anatomy, charting, radiology, and dental materials. This knowledge can be applied to forensic dentistry with the proper training. It is important that dental professionals apply their education to different types of situations that would involve forensic dentistry should any related situation arise.

Title: Dental Mesenchymal Stem Cells: Treating Periodontal Disease

Presenter(s): Brandi Wilson, DH2

Advisor(s): Tammie Golden

Abstract:

Introduction: Periodontal disease, including gingivitis and periodontitis, is one of the most common conditions affecting 90% of the population worldwide. Periodontitis, the leading cause of tooth loss in adults, is characterized by irreversible loss of alveolar bone and tooth supporting structures. Treatments are aimed at halting the disease progression. Recent research in cell sheet engineering showed promising results for autologous transplantation and regeneration of periodontal structures.

Purpose: To investigate the regeneration of periodontal tissues with dental mesenchymal stem cells (DMSCs) and cell sheet engineering

Findings: Multiple systematic reviews have shown evidence supporting positive results of periodontal regeneration with dental mesenchymal stem cells. The harvesting of DMSCs poses no ethical concerns as they are derived from extracted permanent and deciduous teeth.

Significance: Tissue regeneration may be a viable treatment option for patients with periodontal disease and aid in prevention of tooth loss.

Conclusion: Before widespread clinical application occurs, autologous DMSC banks may be needed to supply the demand for stem cells required for future procedures. Further clinical trials should be conducted with allogenic sources to determine the specific number of stem cells required for procedures to be successful.

Title: Tobacco Use Among Dental and Dental Hygiene Students

Presenter(s): Amanda Woodside, DH2

Advisor(s): Carolyn Hinckle

Abstract:

Purpose: The purpose of this literature review was to investigate the extent of tobacco use, its effect, and tobacco cessation knowledge among dental and dental hygiene students.

Background: It's estimated that by 2030, tobacco will be the leading cause of death worldwide. Dental professionals carry the responsibility of educating their patients on the tremendous oral and systemic risks associated with smoking. All forms of tobacco including cigarettes, water pipes (hookah), smokeless tobacco (dip), and cigars have proven to be a risk for the development of oral and pharyngeal cancer.

Significance to Dentistry: Healthcare workers are typically perceived as being role models for patients. This gives them the platform, even as students, to encourage and assist tobacco users in their pursuits to quit. The credibility of dental professionals is lacking if they are a user of these products, admitted or not.

Conclusions: Though tobacco use among students of dentistry is far from being an epidemic, it is still an issue that needs to be addressed, especially in countries outside of the United States where tobacco use rates are higher among this population. Tobacco cessation support and additional education should be available to students of dentistry the same way it is to patients in order to create an environment of trust. This environment of trust will certainly lead to decreased tobacco use in both populations, therefore decreasing tobacco use rates worldwide and its subsequent health problems.

This study was presented at the Oklahoma County Component of the Oklahoma Dental Hygienists' Association Meeting, 2019.

Title: Trauma Informed Care: Understanding the Impact of Trauma

Presenter(s): Fernanda Zapien, DH2

Advisor(s): Lindsey Hays

Abstract:

Purpose: With the sudden rise in abuse survivors coming forward to share their experience, the dental team needs to be ready to handle a situation when a patient reports a history of a traumatic event or of being in a current abusive situation.

Background: Trauma is a widespread, harmful and costly public health problem. Trauma Informed Care means treating a whole person, taking into account past trauma and the resulting coping mechanisms when attempting to understand current behaviors. Trauma encompasses a broad range of events that have an adverse physical, mental, emotional, behavioral or social impact on a patient's life.

Significance: Traumatic exposure cuts across age groups, gender, socioeconomic status, race, ethnicity, geography and sexual orientation. A trauma-informed practice is based on four key components: realizing the widespread impact of trauma, recognizing the signs and symptoms of abuse, responding by integrating knowledge of trauma into policies and practices, and actively seeking to resist re-traumatization by re-telling the experience. Providers need to understand how **trauma** can affect treatment, engagement, and the outcomes of patient care.

Conclusion: Recognizing that the substantial prevalence of traumatic exposure its the impact on health and well-being is dramatically underestimated, health and social service providers are gradually realizing the value of adopting **Trauma Informed Care** principles into their practice. Given that patients who have multiple traumatic experiences tend to have shorter life-spans, more disease, and more emotional distress, providers need to recognize the full impact of trauma and develop an approach that is non-judgmental, compassionate and ready to respond accordingly.

Title: Technological Advancements in the Dental Field: Pro or Con?

Presenter(s): Tala Zendah, DH2

Advisor(s): Carolyn Hinckle

Abstract:

Purpose: The purpose of this literature review was to examine the pros and cons of the use of the advancements in technology in the dental profession.

Background: A mixture of case studies, qualitative analysis, literature reviews, and systemic reviews were reviewed to determine how new forms of technology were affecting the practice of dentistry. Case studies involving 3D scanners, laser technology, and other advances were examined. They reported many advantages which benefit both the patient and the dental practitioner.

Clinical implications: Overall, technology goes boils down to personal preference. Some people like taking new adventures, while others like to play it safe with that they know works. The same could be said about the advancements in dental technology. Overall, these advancements aim to aid and make our work in the dental office easier. They make dental work easier and faster only after one has learned and practiced. Otherwise, these new advancements may falsely seem to only take longer, or make things worse.

This study was presented at the Oklahoma County Component of the Oklahoma Dental Hygienists' Association Meeting, 2019.

Title: Opioid Prescribing Patterns Among Oklahoma Dentists: A Survey

Presenter(s): Amanda Akkari, DS3

Advisor(s): Mary Hamburg

Abstract:

Even though the opioid crisis has been a growing topic the past few years, and more effort has been put forth regarding dentists' prevention and identification of opioid abuse and diversion, there are still gaps in our knowledge regarding prescribing practices among Oklahoma dentists. Our study aimed to investigate opioid prescribing patterns among Oklahoma practicing dentists, as well as practitioners' knowledge of guidance for known addicts, neither of which have been previously investigated in Oklahoma. A survey was established using a previous design tested survey, and was reviewed with a statistician and set up in Qualtrics. We used the 2018-2019 ODA member dentist directory for our pool and included all current and active ODA members, excluding retired dentists. A total of 1076 dentists were sent an invitation via email. Our study sample size was 161, excluding those who did not consent to take the survey. We sent the invitation to our pool two times over a two month period. At the end of the two month period, data was analyzed by the statistician. A total of 161 (15% of invited) dentists completed the survey. Non-participating dentists did not access the survey (n=892; 83%), refused to consent to participate in the study (n=7; 0.6%), or provided an inactive email address (n=16; 1.4%). Our results indicated that Oklahoma dentists are following the current ADA guidelines that are aimed specifically to minimize dentists' opioid prescribing patterns, by checking the PMP website. However, according to our results a large majority of dentists in the state of Oklahoma are prescribing opioids for pain management. It may take some time for more dentists to start shifting towards using non-opioid analgesics to manage acute pain. Continuing education courses aimed specifically to the dental professional could be very beneficial in teaching the practitioner ways to recognize a drug-seeking patient, and how to confront known addicts, as well as learning the proper ways to dispose of opioids in order to better educate patients. Additionally, more resources through the state and communities need to be created and advertised, in order to help dentists treat addicts safely.

This study was supported by a grant from the J. Dean Robertson Society.

Title: The Prevalence of Periodontal Disease Among Electronic Cigarette Users

Presenter(s): Chau Banh, DS2

Advisor(s): Karen Luce, Chris Aston

Abstract:

Objectives: Use of Electronic Nicotine Devices (ENDs), also known as electronic cigarettes, is a popular alternative to conventional cigarette use. While smoking tobacco is well established as a major risk factor of periodontitis, the effects of ENDs on the periodontium are largely unknown. The aim of this study was to investigate whether an association exists between use of ENDs and periodontal disease.

Methods: A total of 633 patient records were reviewed from the University of Oklahoma Health Sciences Center College of Dentistry. All records were from patients aged 18-50, screened between June 1st 2017 and April 23rd 2018. Demographic information regarding age, race/ethnicity, and gender was collected, as well as data regarding use of ENDs and other types of tobacco products, and diagnosis (health, gingivitis, or mild, moderate or severe chronic periodontal disease). Aggregated data were analyzed using Pearson chi-squared tests of cross-tabulations.

Results: The majority of patients indicated no tobacco use (64.3%); 31.3% reported using cigarettes, and only 5.5% reported using ENDs. Smokers were more likely to use ENDs (10.6%) than non-smokers (3.2%). Smokers were more likely to have periodontal disease than non-smokers ($p = 0.0024$). This was also true of END users ($p = 0.046$). The association was still significant when adjusted for smoking ($p=0.042$). Smokers, who also used ENDs, were more likely to have gingivitis ($p = 0.0002$) or severe periodontal disease ($p = 0.11$).

Conclusion: This study suggests that periodontal disease may be more prevalent in END users than non-users. Data must be considered with caution due to the small number of END users, and tobacco use as a confounding factor.

This study was supported by a grant from the J. Dean Robertson Society. Statistical analysis was supported via funding provided by National Institutes of Health / National Institute of General Medical Sciences grant 1U54GM104938.

Title: Comparing Machined CAD/CAM Complete Dentures vs. Conventional Fabrication

Presenter(s): Meredith Corwin, DS3; Bryce Lamer, DS4

Advisor(s): Mariam Gawargi, Nancy Jacobsen

Abstract:

Computer Aided Design/Computer Aided Manufacturing (CAD/CAM) has revolutionized the way dentistry is executed. The primary objective is to determine if differences exist between machined vs. conventional dentures. The secondary objective is to determine if a denture wax-tryin has a significant clinical impact on either denture set. Preliminary impressions, final impressions, and jaw relations were obtained for both patients in this pilot double-blinded study (n=2; OUHSC IRB #9336). The same master casts were used to scan and machine dentures using Avadent Digital Denture Solutions, and subsequently to flask and process conventionally in Lucitone 199 or E21. For one patient, a wax try-in was excluded. At delivery, and 7-day follow-up, the patients and PI scored the dentures on a Likert scale of 0-4, where 0 was very unsatisfied and 4 was very satisfied, on criteria of esthetics, phonetics, occlusion, lip support, comfort, fit, vertical dimension of occlusion, retention, and extensions. The mean assessment score for the conventional denture was 3.48 (after delivery adjustments) and 3.14 for the machined dentures for the patient given the wax-tryin. The machined set was preferred by the patient solely due to darker acrylic shade and lighter-weight, though the conventional set scored higher on retention, stability, extension, and occlusion. For the patient not given the wax-tryin, the mean value for the conventional set was 3.07, and 3.75 for the machined. The machined dentures had better outcomes for speech, esthetics, and occlusion and was preferred by the patient for esthetics and speech. The wax-tryin positively affected the outcome of the conventional dentures for retention, stability, extension, and occlusion. It did not however, affect the outcome of the machined dentures. Despite this positive effect, machined dentures were still favored by patients over conventional due to esthetics and or speech. A larger study is needed to further study the differences.

This study was supported by a grant from the Delta Dental of Oklahoma Foundation.

Title: Sorption and Solubility of Antibacterial Nanofilled Dental Adhesives**Presenter(s):** Hannah Kraemer, DS2**Advisor(s):** Fernando Esteban Florez, Sharukh Khajotia**Abstract:**

Dental adhesives are susceptible to hydrolytic degradation in the oral cavity. The objective of this study was to assess the water sorption (SOR) and solubility (SOL) of experimental adhesives containing nitrogen-doped titanium dioxide nanoparticles (N_TiO₂). **Methods:** Specimens (n=15/group; d=6.0 mm, t=0.5 mm) of unaltered Clearfil SE Protect [CSP], OptiBond Solo Plus [OSP], Adper Scotchbond [ASB], and Adper Single Bond Plus [SBP], and experimental adhesives (OSP with 25 or 30% [v/v] of N_TiO₂) were fabricated. Specimens were placed in a desiccator (37°C) and weighed (Mettler-Toledo, Inc.) in 24-hour intervals until a constant mass (m_1) was obtained according to ISO specification 4049. Specimens were then immersed in sterile ultra-pure water (10mL/specimen; pH 7.2, 37°C) for 1, 2, 3, 4, 5, 6, 7, 15 and 30 days. After each immersion period, specimens were air-dried (30 min), washed (sonicated water-bath, 1 min, 25°C), blotted dry and weighed (m_2). Following the 30-day immersion period, specimens were placed in the desiccator (37°C) containing fresh silica gel and weighed (24-hour intervals) until a constant was obtained (m_3). WS and SL over the 30-day immersion period was calculated using the following formulae: $WS = \frac{m_2 - m_3}{V}$, $SL = \frac{m_1 - m_3}{V}$. Data was analyzed using General Linear Models and SNK *post hoc* tests ($\alpha=0.05$). **Results:** Mean SOR and SOL values ranged from 0.07 (CSP) to 0.28 (SBP), and from -0.006 (CSP) to 0.112 (30% N_TiO₂), respectively. Experimental materials displayed WS mean values that were significantly lower when compared to SBP and OSP ($p<0.0001$), and SL mean values that were significantly lower than SBP ($p<0.0001$). No significant differences were found for SOR and SOL between the two experimental materials investigated ($p>0.05$). **Conclusions:** The addition of either 25 or 30% of N_TiO₂ to OSP rendered experimental materials with similar WS and SL properties when compared to four different commercial dental adhesive resins, as hypothesized.

This study was supported by a grant from the J. Dean Robertson Society.

Title: A Study of the Gender Wage Gap Among Dentists in Oklahoma

Presenter(s): Ella Miller, DS2; Ciarra Stapleton, DS2

Advisor(s): Kay S. Beavers

Abstract:

The pay inequality between genders is becoming more of a concern with limited supporting information in these broad statistics. While these statistics give us a general idea of the extent of the issue, this study provides us with a review and comparison of gender-based wage discrepancies among dentists in the state of Oklahoma. We considered the number of hours per week worked, the type of practice, years of experience, education level, etc. This study was conducted using a 12-question online survey that will be distributed to Oklahoma Dental Association members, which encompasses 80 percent of Oklahoma's licensed dentists. The purpose of this study is to provide specific insight into the factors that may contribute to the gender-based wage-gap between Oklahoma dentists. We hope this information will facilitate some advocacy for female dentists to correct a potential wage inequity.

This study was supported by a grant from the Delta Dental of Oklahoma Foundation.

Title: Assay of Lysine Decarboxylase Activity Associated with Gingivitis

Presenter(s): Caytlin Nichols-Eidson, DS2

Advisor(s): Martin Levine

Abstract:

Periodontal disease is caused by microbial biofilms, plaques that accumulate at gingival margins and extend apically into a small gingival crevice in the absence of oral hygiene. The crevice base is sealed by dentally attached (DAT) cells that must constantly divide and utilize lysine in traces of gingival crevicular fluid (GCF) resulting from mastication. Saliva lacks enough lysine for DAT cell division. When oral hygiene is restricted in gingivally healthy adults, biofilms containing lysine decarboxylase (Ldc-E) from *Eikenella corrodens* (EC) convert GCF lysine to cadaverine, and impair the DAT cell barrier to bacterial products. Inhibiting Ldc-E activity could slow disease development. LdcE binds lysine at an activation site and a catalytic site. Activation only occurs when the lysine concentration exceeds 0.4 mM, enabling EC to keep some lysine for itself. An *in silico* study, detected a putative lysine activation site within LdcE's N-terminal region. This site also bound quaternary or protonated tertiary amines more strongly, nilotinib being second strongest. Aims were to develop an assay for identifying drugs that alter Ldc-E activity, determine whether nilotinib activates or inhibits, and compare the results with tranexamic acid (TA), a known Ldc-E inhibitor. Ldc-E was obtained from cell surface extracts of early stationary phase EC. Ultra-high performance liquid chromatography coupled with tandem mass spectrometry (UHPLC-MS/MS) detected cadaverine and deuterated cadaverine in assays containing 0 to 25 mM lysine. Deuterated cadaverine, an internal standard, was added to all assays, and the ratio of cadaverine peak area to internal standard peak area indicated how much cadaverine was produced in each assay. Compared with controls, nilotinib (13 µg/mL) increased and TA (8 µg/mL) reduced LdcE cadaverine production. uHPLC-MS/MS can therefore identify drugs that alter Ldc-E activity. Displacing lysine with nilotinib at the activation site only activates the enzyme.

Title: Clinical Accuracy of 3-D Printed Casts Compared to Traditional Casts

Presenter(s): Neeral Patel, DS2

Advisor(s): Phoebe Vaughan, Sharukh Khajotia

Abstract:

Objectives: In dentistry, impressions and patient casts are quite important, especially because it allows us to work on a patient's mouth even when they are not present, which increases efficiency. Poly(vinyl siloxane) [PVS] impressions are widely accepted for making definitive casts for restoration fabrication. The objective of this study was to analyze differences in dimensions of casts produced from PVS impressions and by additive manufacturing (3-D printed).

Methods: Maxillary and mandibular arches of ten subjects (OUHSC IRB# 9504) of age 18-50 years with class I dentition were measured using a digital caliper to obtain three intra-oral measurements of the first molars (#s 3 and 30): mesiodistal crown length [A], cervical-occlusal crown height [B], buccolingual crown width [C], and two measurements of the arches: arch width [D] and arch perimeter [E]. Traditional casts were prepared from PVS impressions (Aquasil XLV Ultra Fast Set, medium and light body; Dentsply Caulk) using Silky-Rock Violet (Whip Mix), and digital impressions were sent to International Dental Arts, Inc. for printing using Vida (EnvisionTEC) and Form 2 (Formlabs) printers. Casts were measured, and differences in casts' dimensions from intra-oral measurements were compared using General-Linear-Models and post-hoc Student-Newman-Keuls (SNK) tests ($\alpha=0.05$; SAS software).

Results: Mean values of differences in A, B, D and E were not statistically different among cast types ($p>0.05$) and arches (maxillary vs. mandibular; $p>0.05$). Mean values of differences in C were statistically higher for mandibular casts ($p<0.0001$), but not cast types ($p>0.05$).

Conclusions: Crown length, crown height, arch width and arch perimeter dimensions of casts produced from PVS impressions and by additive manufacturing differed similarly from the intra-oral measurements. Crown widths differed more from intra-oral measurements in mandibular casts of all types than in maxillary casts but not among cast types.

This study was supported by a grant from the J. Dean Robertson Society.

Title: Digital Image Enhancement and Detection of Simulated Proximal Caries

Presenter(s): Crystal Rajan, DS2

Advisor(s): Farah Masood, Ji Li

Abstract:

Objective: To compare the diagnostic accuracy of the three digital image enhancement filters (DEJ filter, Invert filter and Edge enhancement filter) for detection of interproximal simulated caries in posterior teeth.

Methods: For this in-vitro study, carious lesions were stimulated with round burs of two different sizes at the approximate contact point on one of the interproximal surfaces (either mesial or distal) of 70 extracted teeth. Half of the simulated carious lesions were created with # ¼ round carbide bur and the other half of the lesions were created using # ½ round carbide bur. Total of 35 lesions were created per bur size. Teeth were mounted into stone plaster blocks. Periapical images of each plaster block were obtained using Dexis Platinum intraoral sensor with standardized technique.

Original images and images enhanced with three filters (DEJ, Invert and Edge enhancement) were saved. All images were inserted and randomized in a Powerpoint presentation. Two observers evaluated all the images, twice, one week apart, for detection of the simulated interproximal caries at the approximate contact point area of each tooth. Images were evaluated using a three point rating scale (1: no caries, 2: caries noted, 3: unsure).

Data Analysis: Once the data was gathered from the 2 observers, descriptive statistics were generated for the entire dataset. A Chi-square test was used to compare the sensitive among different groups. A Kappa coefficient was calculated to evaluate the intra-rater and inter-rater agreement. A 2-sided 0.05 alpha level will be used to define the statistical significance level.

This study was supported by a grant from the J. Dean Robertson Society and the Oklahoma Center for the Advancement of Science and Technology.

Title: Parotid Gland Enlargement in Patients with Dry Mouth and Diabetes

Presenter(s): Samar Rezaie, DS2

Advisor(s): Lida Radfar

Abstract:

Sialadenosis (also known as Sialosis) is an asymptomatic bilateral parotid gland enlargement that is non-inflammatory and non-neoplastic. Enlargement of the parotid gland is more profound in diabetic patients than other conditions causing sialadenosis. Sialadenosis generally involves glandular hypertrophy, produced either by adipose infiltration or by acinar hypertrophy. In addition to glandular enlargement, there is glandular dysfunction. An autonomic neuropathy, seen as a demyelinating polyneuropathy, seems to be the common underlying basis for this. Retrospective data of 163 patients who presented to the Oklahoma Medical Research Foundation (OMRF) with dry eyes and mouth during 2007-2012 was analyzed. The results reveal that there is a positive correlation between Stimulated parotid saliva and parotid enlargement (Spearman rank Correlation coefficient = 0.66). Pearson's correlation for unstimulated whole saliva and enlarged parotid showed a poor negative correlation (-0.08) and a poor positive correlation with enlarged submandibular gland (0.01). Additional analyses reveal that there is a poor correlation between sialadenosis and immunoglobulins IgA, IgG, and IgM as analyzed by Pearson's correlation. This further verifies that sialadenosis is non-inflammatory and non-neoplastic in etiology. Future study should focus on the level of long term glycemic control in diabetes mellitus and the presence of sialadenosis.

This study was supported by a grant from the J. Dean Robertson Society.

Title: Canal Transportation: Examination of Three Ni-Ti Rotary Systems

Presenter(s): Zack Siegler, DS4

Advisor(s): Suhair Jambi, Stefan Wilhem, Ji Li, Sharukh Khajotia

Abstract:

Objectives: The objective of this study was to measure transportation of three different Ni-Ti rotary systems after three instrumentations of simulated J-shaped canals in resin blocks.

Methods: Twenty-seven endodontic resin blocks with J-shaped canals (Endo Training Bloc; Dentsply Maillefer, Switzerland) were divided into three groups of nine blocks each and instrumented with one of the following Ni-Ti file groups: ProFile Vortex Blue (G1), ProTaper Universal (G2) and ProFile Vortex (G3) [all products from Dentsply Tulsa Dental Specialties, USA]. Digital images were taken of the blocks pre-instrumentation (I0) and following 1st, 2nd, and 3rd instrumentations (I1 - I3). Images of instrumented blocks were superimposed over pre-instrumentation images and transportation was measured on the right and left sides of the canals along a superimposed grid from 1 - 9mm in 1 mm increments.

Results: The results of the statistical analysis demonstrated that the interaction between file group (G1-G3) and side (Left-Right) was statistically significant ($p=0.0174$). The interaction between time point (I0 - I3), side (Left-Right) and position (1 - 9mm) was also statistically significant ($p<0.0001$).

Conclusions: Up to three instrumentations did stastically increase transportation in the simulated canals, and transportation occurred in different locations on the right and left side of the canals depending on the file used to instrument the canals. These results suggest that the ProFile Vortex Blue, ProTaper Universal, and ProFile Vortex affect transportation differently at different positions and sides along the canal.

This study was supported by a grant from the J. Dean Robertson Society.

Title: Incidence of NPC Perforation in Relation to Implant Placement

Presenter(s): Aaeshah Al Kanderi, Postgraduate

Advisor(s): Fernando Suarez Lopez del Amo, Tapan Koticha, Yacoub Al Sakka, Farah Masood

Abstract:

Objective: To investigate the incidence of nasopalatine canal (NPC) perforation in relation to virtual immediate implant placement in the central incisors' region.

Materials and Methods: A search through The University of Oklahoma- College of Dentistry patients' records was conducted. Records of interest included cone beam computed tomography (CBCT) scans of the upper central incisors' region. Immediate implants were placed virtually. Canal related and implant related measurements were performed. Extent of the perforation, if detected, location, and measures to overcome it were assessed. Statistical analyses were performed to identify factors associated with higher incidence of NPC perforation.

Results: 217 cases fulfilled the inclusion criteria. 82% of the studied NPC had Y- shape with an average length of 12.81 mm and angulation of 106.15 degrees to the palatal plane. Ridge width palatal to the root of the central incisor increased from 1.39 mm at the coronal third to 3.25 at the apical third. Similar trend was noted for ridge width palatal to the implant. Only 8% of cases showed NPC perforation. The perforation occurred at mid-third of the implant or at the mid and apical third in 33% and 22% of the cases, respectively. A statistically significant association was found between incidence of perforation of NPC and bone width palatal to the implant and canal angulation. Only 27.78% of cases with perforation could be overcome by placing shorter implant. In the remainder, the perforation could not be overcome.

Conclusions: Within the limitations of this study, 8% perforation rate of the NPC could be expected in relation to immediate implant placement. Bone width palatal to the roots of the central incisor at mid and apical third as well as canal angulation appears to influence the rate of perforation. Therefore, anatomical structures such as NPC need to be thoroughly evaluated prior to immediate implant placement.

Title: Maxillary Septa and Path of Posterior Superior Alveolar Artery Canal

Presenter(s): Prashan Shanthakumar, Postgraduate

Advisor(s): Farah Masood, Tapan Koticha, Fernando Suarez Lopez del Amo, Ji Li

Abstract:

To retrospectively evaluate the prevalence, location, and orientation of maxillary sinus septa and also to assess the path and location of posterior superior alveolar artery canal (PSAAC) using Cone-beam computed tomography (CBCT). IRB approval obtained. Based on the inclusion criteria, 170 CBCT scans of the maxilla were evaluated from the existing database at the University of Oklahoma Health Science Center College of Dentistry. CBCT scans were acquired between 2005 – 2017. The scans were assessed for prevalence, orientation, and location of the maxillary sinus septa. Descriptive statistics were conducted from SAS 9.4. Also on the CBCT scans, path of the PSAAC was traced in a posteroanterior direction. When the PSAAC was considered longer than 20 mm and traceable, following measurements were taken: distance from the lower border of the PSAAC to the buccal alveolar crest, distance from the lower border of the PSAAC to the maxillary sinus floor and diameter of the artery. All observations were done by one trained evaluator.

Prevalence of sinus septa was 16.9% among all the sinuses. PSAAC was identified in 62.4% of the sinuses. For the right and left sinuses, distance from the lower border of the PSAAC to the buccal alveolar crest was 12.71 mm and 13.16 mm, distance from the lower border of PSAAC to maxillary sinus floor was 6.84 mm and 5.90 mm, and vessel diameter values were determined to be 1.12 mm and 1.20 mm, respectively.

The results from this study suggest that CBCT is an important tool in the treatment planning process to evaluate relevant anatomy and pathology prior to surgery. Lack of proper understanding of sinus septa and PSAAC may result in complications during the lateral window sinus augmentation surgery.

Title: Noise Exposure Evaluation of a Dentist During Typical Work Week

Presenter(s): Greg Stewart, Postgraduate

Advisor(s): Phoebe Vaughan, Margaret Phillips

Abstract:

Exposure to noise and resulting noise-induced hearing loss (NIHL) is a concern in many occupations including the dental profession. Exposure from professional tools such as handpieces and high volume evacuators can result in noise levels ranging from 76-105 A-weighted decibels (dBA). This study aimed to evaluate the personal exposure of a dental professional by assessing noise exposure over a 5-day work week. The Quest Technologies Q400 Noise Datalogging Dosimeter was utilized as a personal noise dosimeter by attaching the microphone boom to the professional's shirt collar near the ear on the side closest to exposure. Dental work during the exposure week consisted of direct restorations, consultations, crown and bridge preparations, implant placement and laboratory work, all of which are consistent with a typical dental work week. OSHA occupational noise exposure regulations specify an 8-hour allowable average exposure limit of 90 dBA. The average 8-hour time weighted average (TWA) for the week was 59.2 dBA with a range of 46.9-65.2 dBA. While exposure for the week was below the 8-hour OSHA exposure limits it is notable that peak level, which is the highest instantaneous and unweighted level that occurred during the runtime, exceeded the OSHA limit of 140 dB for 4 out of the 5 days assessed. Further evaluation to specify the dental work associated with peak levels exceeding OSHA limits may be warranted.

Title: Surgical Periodontal Therapy: General Overview

Presenter(s): Niaf Al Gana, Postgraduate

Advisor(s): Mohammed Felemban

Abstract:

Periodontal disease is chronic multifactorial inflammatory process that is due to a dysbiotic plaque biofilm with a special characteristic of progressive destruction of the tooth attachment apparatus. Features of periodontitis include loss of periodontal tissue support which is evident clinically as clinical attachment loss and radiographic signs of alveolar bone loss with the presence of periodontal pocketing and gingival bleeding. Eventually, this process will negatively affect function and esthetics of patients.

Thorough disruption and removal of the plaque biofilm is important and necessary to have successful treatment results. Non-surgical treatment may reduce the need for additional therapy while other situations require surgical periodontal therapy, which can be a resective or regenerative approaches. The primary aims of periodontal surgery is access for professional cleaning that include scaling and root planning and to establish contours that allow adequate plaque control. Surgical treatment has demonstrated better performance in terms of pocket reduction and preservation of teeth that are associated with deep residual pockets that have furcation and intrabony defects. Resective periodontal therapy include any treatment modalities directed to eliminate periodontal defect such as infrabony defects by removal of some portion of the periodontal structure such as bone, gingiva, or tooth root. However, regenerative periodontal therapy or guided tissue regeneration is defined as regenerating the lost periodontal structures through differential tissue responses. The decision making between resective or regenerative therapy depending on the type, size and location of the periodontal defect.

This summary is aimed to give an understanding of surgical periodontal therapy and how they can help treat periodontal defects and improve patient outcomes.

Title: Review of Implant-Supported Fixed Complete Denture Materials

Presenter(s): Kami Chervilov, Postgraduate; Kevin Ripp, Postgraduate

Advisor(s): Phoebe Vaughan

Abstract:

Background: Completely edentulous patients often seek fixed dental prostheses for tooth replacement. With proven success of dental implants, mechanical advantages, and cost-savings potential, implant-supported fixed complete dentures (IFCD) have been demonstrated as a viable option for the restoration of entire edentulous arches. The advent of CAD-CAM, improved digital workflows, and new material options have drastically expanded the restorative possibilities for IFCD.

Types of studies reviewed: A literature search was conducted on Pubmed using different combinations of keywords. Articles published in peer-reviewed journals from 2010-2019 were considered for inclusion. The bibliographies of the relevant articles were also searched and considered if they met the inclusion criteria.

Results: CAD-CAM frameworks have proven advantages over cast metal frameworks. While acrylic processing over a cast metal framework has been used successfully for many years, there are newer material options that provide enhanced esthetics and better wear resistance. Recent clinical retrospective studies have proven the viability of monolithic zirconia IFCD. Further research needs to be conducted regarding the practicality of newer fiber reinforced composite materials that have been approved for use for frameworks. The increased efficiency of digital workflow has also increased the ability to predictably design individual retrievable crowns that are cemented on a variety of frameworks.

Practical implications: Dentists should consider many factors when choosing materials for IFCD. Potential masticatory force, opposing dentition, esthetic demands, and reparability of prosthesis all need to be weighed for each patient prior to fabrication of IFCD.

Title: Palatally-Impacted Canines: Various Surgical Techniques

Presenter(s): Hayden Fuller, Postgraduate

Advisor(s): Tapan Koticha

Abstract:

Maxillary permanent canines are the second most commonly impacted tooth in the dentition with an incidence of 1-3.5%. Canine impaction is suspected when an individual fails to present with eruption of one or both permanent canines beyond age 14-15. If suspected, impaction can be confirmed with conventional radiography or CBCT. The impaction can be palatal or labial to the ideal eruption location. Palatal impaction has been reported to be 2-3 times more prevalent than labial impaction.

Ideally, treatment of impacted canines would occur when a patient is 10-13 years of age. The treatment of choice at this stage is relatively simple and includes extraction of the primary canine with concomitant expansion of the dental arch. However, the condition is not always identified at this time, and if diagnosis is delayed, surgical treatment is recommended.

Indications for choice and timing of surgical treatment is influenced by numerous factors including the location, angle, and depth of palatal impaction; all of which can vary greatly among individuals. Indications for various surgical techniques have been described in the literature and include the use of combined surgical/orthodontic methods versus surgical methods alone, the use of para-marginal versus marginal incisions, and the use of open- versus closed-flap techniques. This report will discuss these various techniques and associated indications for the management of palatally-impacted canines.

Title: Chlorhexadine and Hydrogen Peroxide as Antiseptic Mouth Rinses

Presenter(s): Michael Hooper, Postgraduate; Clark Plost, Postgraduate

Advisor(s): Phoebe Vaughan

Abstract:

In the dental profession, chlorhexidine is recognized as a primary agent for plaque control and is considered to be the gold standard for infection prevention. Like chlorhexidine, hydrogen peroxide also is a robust oral antiseptic that can be utilized in clinical dentistry. Despite its extensive use, there is limited research regarding the antiseptic effect hydrogen peroxide has on tissue-cell viability, morphology, and growth factors involved in the healing process. This review seeks to aid the general dental professional in determining patient case selection for the proper use of chlorhexidine and/or hydrogen peroxide as oral antiseptics. A literature review of peer-reviewed scientific journals was conducted. In-vitro studies, clinical studies and systematic reviews discussing evidence-based indications and considerations when prescribing chlorhexidine and/or hydrogen peroxide as an oral antiseptic were included. PubMed and Medline database searches were performed to collect 23 articles discussing chlorhexidine and hydrogen peroxide as oral antiseptics. Articles pertaining to any other antiseptics were excluded. Chlorhexidine and hydrogen peroxide were found to both be effective oral antiseptics when used in the appropriate clinical situation. General dentists should clinically utilize and prescribe these oral solutions on an evidence-based, individualized basis depending on the patient and the desired treatment outcome.

Title: Crown Lengthening Procedure: Definition, Types and Indications

Presenter(s): Nasim Lasemi, Postgraduate

Advisor(s): Mohammed Felemban

Abstract:

Crown lengthening procedures are indicated for functional or esthetic demands. Esthetic crown lengthening can elongate the clinical crown in cases of altered passive eruption or where there is a discrepancy at the gingival margin level of adjacent teeth. Functional crown lengthening is necessary when the restorative margin will violate the biological width or if there is inadequate remaining tooth structure for retention of restoration.

Biological width is defined as the apicocoronal dimension of junctional epithelium and supracrestal connective tissue attachment. Recently this term has been updated to supracrestal attached tissues. Restorative margins placed within the biologic width has been associated with recession and crestal bone loss. It is recommended by Nevins & Skurow (1984) to have at least 3mm distance between the restorative margin and alveolar bone crest, to have adequate space for a healthy biological width. Once the surgery has been undertaken for a future fixed restoration, adequate time has to pass to allow the bone and soft tissue to stabilize. Wise (1985) measured such remodeling and concluded that the definitive crown should not be made until ≥ 20 weeks after surgery. Their data showed 0.9mm apical movement of the gingival crest within the first 20 weeks, which stabilized thereafter.

It is also important to take into account the contraindications to crown lengthening. Osteotomy may create an unfavorable crown to root ratio. Bone will also be removed at the adjacent teeth, which may compromise their prognosis. This surgery may also expose furcation entrance of multirrooted teeth, which will be difficult to maintain oral hygiene. When crown lengthening is contraindicated, alternative treatment options should be considered, for example extraction and implant placement, orthodontic extrusion, etc.

It is important for restorative dentists to recognize the need for crown lengthening and treat before delivery of final restoration.

Title: Surgical Management of Persistent Peri-apical Lesion: Case Report

Presenter(s): Ahmad Sedeqi, Postgraduate

Advisor(s): Tapan Koticha, Mohammed Felemban

Abstract:

Persistent apical lesion occurs when root canal treatment has not adequately eliminated intraradicular infection. Surgical root canal therapy is often the indicated treatment when nonsurgical retreatment has failed or cannot be performed. Surgical root canal therapy involves resecting a portion of the root apex and preparing and filling a cavity in the root-end. The purpose of the retrograde filling is to seal the canal in order to prevent passage of bacteria or their toxins from the canal space into periradicular tissues.

A 64 years old male presented to the clinic initially for implant placement at site #30. Upon clinical and radiographic examination, persistent periapical (PA) radiolucency was detected on mandibular second premolar. The tooth is root canal treated (RCT) and restored with post and core and full coverage crown. Due to the close proximity between the PA lesion and the future implant's site, endodontics consultation was recommended. Upon further endodontic consultation, apicectomy and retrograde root canal filling was recommended. On the day of surgery, full thickness flap was reflected to gain access. Site #30 was prepared and 4.8 x 12 mm bone level taper implant was placed following manufactural protocol achieving torque ≥ 35 Ncm. An apical window was created to access the apical lesion associated with #29. Following root tip apicectomy was performed, ultrasonic tip was used to access the root canal and sealed with Mineral Trioxide Aggregate (MTA). Apical defect was filled with Freeze Dried Bone Allograft (FDBA). Four months post-operatively, fistula was present indicating persistent peri-apical infection. Incision and drainage were performed in conjunction with systemic antibiotic. Following controlling the acute infection. The site was re-accessed, degranulation of apical site a retrograde seal was re-applied to induce the desired seal. The site was grafted using deproteinized bovine bone minerals (DBBM).

This case report is to present persistent peri-apical lesion management through apicectomy and retrograde filling.

Title: Prevention and Management of Work-Related Pain Among Dentists

Presenter(s): Larson Wayman, Postgraduate; Christopher Caldwell, Postgraduate

Advisor(s): Phoebe Vaughan

Abstract:

Neck and back pain is a widespread issue among practicing dental professionals. The majority of dentists report some type of musculoskeletal discomfort or disorder directly related to the profession. With dentists practicing longer, and retiring later, it is important that the profession has a sound understanding of the etiology of neck and back pain associated with the profession, as well as preventative measures and solutions. To establish a correlation between musculoskeletal disorders and practicing dental professionals, we reviewed literature and discussed preventative measures and management solutions with a licensed physical therapist with advanced training in orthopedics. Our findings revealed the dental profession requires a specific exercise routine in comparison to the general population due to the physical demand of their every day to day work. Also, this study revealed a need for greater attention on the subject so that dental professionals can be well informed of how to prolong their career and maintain a healthy lifestyle.

Title: Virtual Surgical Planning and In-House 3D Printing of Surgical Splints

Presenter(s): Joshua Woodward, Postgraduate

Advisor(s): Kevin Smith

Abstract:

The success of orthognathic surgery is dependent on accurate planning and precise execution. Traditionally, orthognathic surgery has been planned using stone model surgery with fabrication of dental splints in a wet lab. Virtual surgical planning techniques as detailed by Xia (J Oral Maxillofac Surg 67:2093-2106, 2009) have gained popularity in recent years. A program-wide transition at the University of Oklahoma Oral and Maxillofacial Surgery program to virtual surgical planning from traditional model surgery was conducted in 2018. The purpose of this case report is to illustrate the use of virtual surgical planning for one case using Dolphin software and in-house 3D printing at OU. A 16-year-old patient with history of cleft lip and palate and associated maxillary hypoplasia was planned for orthognathic surgery with virtual surgical techniques. This VSP process has enabled our program to eliminate third-party workflow and keep our planning in-house, with maintenance of accuracy and significant benefits in cost.

Title: Management of Non-Restorable Tooth with Existing Diastema: Case Report

Presenter(s): Xixi Wu, Postgraduate

Advisor(s): Mohammed Felemban, Yacoub Al Sakka

Abstract:

Midline diastema is defined as the gap or space between the maxillary central incisors. Management of midline diastema has been well documented in the literatures depending on the etiology. However, some patients find the midline diastema esthetically pleasing. Patients' opinion should be taken into consideration during planning to rehabilitate the esthetic zone.

A 74 years old female referred to OU Graduate Periodontics Clinic by restorative dentist for fractured upper right central incisor. Her chief complaint was "I want to replace my broken tooth and I want to keep the space between my teeth". Upon clinical evaluation, horizontal crown fracture at the level of gingival margin, adequate papilla fill and thick gingival phenotype. Radiographic examination revealed adequate interproximal bone, a relatively straight root tip, and no peri-apical pathology. The CBCT analysis revealed adequate bone apical and palatal to the root to engage for an immediate implant. Immediate implant placement with immediate provisional was planned. Tooth # 8 was extracted with minimal soft and hard tissue trauma. A surgical guide was used to perform the osteotomy to place 4.1 x 12 mm bone level tapered implant, achieving primary stability ≥ 35 Ncm. Provisional crown was fabricated on temporary abutment using bis-acryl material (Integrity®). The gap between the implant and the buccal wall was grafted using deproteinized bovine bone minerals (DBBM). The crown was finished and polished and torqued to 15 Ncm and sealed with composite. Final impression was made 3 months following implant placement to fabricate screw retained implant supported porcelain fuse to metal (PFM) crown.

This case report is to present preserving the midline diastema following implant placement in the esthetic zone.