Effect of Wall Thickness of 3D-Printed Models on Resisting Deformation from Thermal Forming In-Office Aligners

Tia DiGiovanni, Jace Hansen, Dr. Gregory Bennett, D.M.D.
University of Nebraska Medical Center College of Dentistry, Lincoln, NE

Background
- The increase in patient demand for orthodontic therapy over traditional fixed wire appliances has led to the exploration of 3D printing of metal aligners.
- In-office fabrication of metal aligners comes with significant economic benefits, but little is known about the mechanical and effective fabrication methods for models.

Objective
Evaluate the effect of wall thickness of 3D printed models on the accuracy of pressure-formed clear aligners.

Methods
- Two different wall thicknesses (3 mm and 1.5 mm) were completed for each model.
- The models were printed using a desktop 3D printer and were placed in a heated oven at 50°C for 1 hour.
- The models were then subjected to thermal forming and evaluated for deformation.

Results and Discussion
- The models with 3 mm wall thickness showed significantly less deformation compared to the 1.5 mm wall thickness models.
- The results indicate that increased wall thickness leads to better resistance to deformation.

UNMC College of Dentistry Research Day
February 23, 2024
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**Event Schedule**

All events will be held at the UNL East Campus Union - Great Plains Room.

### 57th Annual Frank M. Wentz Student Scientific Program

**Poster Viewing**

12:00 - 3:30 p.m.

- DH4 [See presenters.]
- D3 [See presenters.]
- Postgraduate [See presenters.]

**Judging Schedule**

- 12:00 - 2:00 p.m.: DH4 First Round Judging
- 12:00 - 2:00 p.m.: D3 First Round Judging
- 12:00 - 2:00 p.m.: Postgraduate Judging

- 2:00 - 3:30 p.m.: DH4 & D3 Final Round Judging

**Keynote Speaker**

3:30 - 4:30 p.m.

**Gerry Kugel, DMD, MS, PhD**

Dean, College of Dentistry

“Who Cares About Research?“

This presentation will showcase real-world examples where oral health research has contributed to the advancement of dental practice. Attendees will gain insight into how clinical research plays a vital role in translating new knowledge into better oral health outcomes.

**Awards Ceremony**

4:30 - 5:00 p.m.

DH4, D3 & Postgraduate Award Winners
#1  In-Vitro Study: Comparing the Effectiveness of Commercial Whitening Mouth Rinse and At-Home Mouth Rinse Composed of Hydrogen Peroxide and Sodium Bicarbonate
Emma Betts & Madisyn Gardient
Mentor: Todd Junge, RDH

#2  Effects of Disinfecting Suction Line Cleaners in the Dental Setting to Reduce Microbial Agents
Madison Frank & Jayce Vrbka
Mentor: Emily Lindquist, RDH

#3  The Effects of Coca-Cola and Kool-Aid on the Discoloration of UltraSeal XT™ Hydrophilic and 3M™ ESPE™ Clinpro™ Hydrophobic Sealants
Capri Dethlefs & Julia Raun
Mentor: Jaimee Shropshire, RDH

#4  A Study of Oral Mouth Rinses and Their Antimicrobial Effect on S. mutans
Ellie Buresh & Samantha Nelson
Mentor: Lindsay Mundil, RDH

#5  The Effect of “Healthy” Energy Drinks on Enamel Demineralization: An In Vitro Study
Sydney Samuelson & Allison Cuciti
Mentor: Emily Lindquist, RDH

#6  Effectiveness of Different Oral Hygiene Techniques for Orthodontic Patients with Fixed Retainers
Adanna Paden & Mikayla Kiefel
Mentor: Lindsay Mundil, RDH

#7  The Pivotal Role of Ergonomic Loupes in Dentistry: A Research Survey of Loupe Selection Among Dental Professionals
Ella Simonson & Emma Schock
Mentor: Dr. Upoma Guha

#8  The Effects of Advantage Arrest® SDF Gel and Riva Star® SDF/KI on S. mutans and P. gingivalis: An In-Vitro Study
Diana Acosta Delgado, Lulu Acosta Delgado & Jose Marquez
Mentor: Lisa Moravec, RDH

#9  In-Vitro Study Comparing the Effects of 3D Crest Whitening Strips on Stain Removal Compared to Light Emitting Diode (LED) Activated 3D Crest Whitening Strips
Wendy Barcenas-Soto & Jennifer Garcia
Mentor: Todd Junge, RDH

#10  The Effects of Vape Oil on Streptococcus Mutans Growth in the Oral Cavity: An In-Vitro Study
Taylor Beacom & Jamie Johnson
Mentor: Todd Junge, RDH

#11  Short Term Staining Effects of Chlorhexidine on Extracted Teeth
Rebecca Steffen & Georgina Dishman
Mentor: Amanda Dolen, RDH

#12  Assessment of Predoctoral Students’ Confidence in Pediatric Dentistry in US Dental Schools
Madyson Anglim & Anna Edet
Mentor: Dr. Sarah Lowman

#13  The Effect of Arthroscopic Temporomandibular Joint Discopexy for the Patient with Anterior Disc Displacement Without Reduction: A Retrospective CBCT Study
Yrwen Chen & Bailey Peckham
Mentors: Drs. Po-Jung Chen & Kavya Muttanahally

#14  The Evolution of Mental Health in Dental Students Over the Four Years of Dental School
Natalie Benoy & Therese Cooney

#15  A Retrospective Study of the College of Dentistry’s Smoking Cessation Program
Kinsley England & Claire Janecek
Mentor: Dr. Peter Giannini

#16  Three-Dimensional Characterization of the Morphology of the Temporomandibular Joint in the Arthroscopic Discopexy Relapse Cases: A Pilot Study
Gage Fenski & Josh Madsen
Mentor: Dr. Po-Jung Chen

#17  Clash of Two Collagens: Membrane vs. Wound Dressing for the Coverage of Single-Tooth Ridge Preservation Sites
Delaynie Field & Delaney Glazier
Mentors: Drs. Amy Killeen & Paula Schlemmer

#18  Reliability of ORADIII Application in Rendering Diagnosis, A Retrospective Study
Juan Gonzales & Gabriel Crocker

#19  Evaluation of Dental Students’ Mental Health and Its Effect on Teeth Relation and Position
Peyton Halverson & Lauren Peterson
Mentor: Dr. Amanda Wobido

#20  Effectiveness of the Summer Health Professions Education Program: Fourteen Years of Program Outcomes for UNMC Participants
Gisselle Hernandez & Kimberly Pierre

#21  Analysis of Occlusal Clearance of Crown Preparations made by Predoctoral Dental Students at the UNMC College of Dentistry
Lucas Jarecke & Luke Wordekemper
Mentor: Dr. Gregory Bennett

#22  Examining Admissions Trends of the Pre-Doctoral Program at the UNMC College of Dentistry: Rural vs Urban
Payton Kidder
Mentor: Dr. Merlyn Vogt

#23  Evaluating Student Shade Matching Ability
Carter Kocian & Tyler Lutt
Mentor: Dr. Upoma Guha
#24 Experience and Comfort Levels of Orthodontists in Treating Patients with Special Needs
Morgan Lashley & Emily Swanson
Mentors: Drs. Meenakashi Vishwanath & Jennifer Kallio

#25 Restoring Single Implants via Digital Workflow
Jordan Tice & Megha Mathur
Mentor: Dr. Makena Sundine

#26 The Effect of Time on Retention of General Pathology Course Material Amongst Second, Third, and Fourth-Year Dental Students at UNMC College of Dentistry
Ellie Petersen & Jonathan Mitzel
Mentor: Dr. Peter Giannini

#27 Impact of Pre-Dental Anatomy Experience on Dental School Anatomy Performance and Knowledge Retention
Riley Nitsch & Hannah Janecek
Mentor: Dr. Shayla Yoachim

#28 TBD
Nicholas Peterson

#29 Investigation of the Impact of the Snowplow Technique on Microleakage of Permanent Posterior Teeth
Elizabeth Dressler & Ryan Rawlings
Mentor: Dr. Mark Beatty

#30 Assessment of UNMC SHPEP’s Efficacy in Preparing Participants for Dental School Application
Trent Nguyen & Alec Redwine

#31 SonicFill™ 3 Bulk-fill Versus Incremental Layering: Void Formation and Knoop Microhardness
Trent Roth & Adam Mackley

#32 Nebraska Dentists’ Views on Cannabinoids for Treatment of Orofacial Pain
Baylor DeVries & Sierah Samway
Mentor: Dr. Joseph Bavitz

#33 Assessing Risk Factors in High Risk Fall Patients in a Predoctoral Dental Clinic
Khoi Mai & Harrison Sanny
Mentor: Dr. Sarah Lowman

#34 Radiographic Bone Loss and Probing Depths in Relation to Tooth Loss: A Seven-Year Retrospective Study
Bobbie Fowler & Laura Shaw
Mentors: Dr. Jeffrey Payne, Dr. Kavya Muttanahally & Kaeli Sampson

#35 Examining Surgery Wait Times and Treatment Effects in Adult Patients with Disabilities
Ella Majerus & Lydia Sigler
Mentors: Dr. Jennifer Kallio, Dr. Corinne Van Osdel & Kaeli Sampson

#36 Evaluation of the Patient Perceptions of Quality of Care at UNMC College of Dentistry
Delaney Springer & Emma Wilkinson
Mentor: Dr. Amanda Wobido

#37 How Noncognitive Traits of Grit and Resilience Coincide with Academic Performance of Dental and Dental Hygiene Students
Taylor Steiner & McKenzie Nutter
Mentor: Dr. Merlyn Vogt

#38 Can Inflammatory Markers Identify Periodontal Health Changes Following Extraction? A Pilot Study
Jacob Stewart & Ben Wetovick
Mentors: Drs. Richard Reinhardt & Amy Killeen

#39 Dental Students’ Attitudes on Educational Debt and Initial Post-Graduation Career Plans
Jaspreet Grewal & Harinderjit Kaur
Mentors: Drs. Julie Marshall & Jim O’Meara

#40 Examining Associations Between Classes of Medications and Tooth Loss in Periodontal Maintenance Patients
Nicholas Stolze
Mentor: Dr. Jeffrey Payne

#41 In Vitro Tensile Strength Comparison of Denture Liners to 3-D Printed Denture Resin
Merina Joseph & Mahima Kinra
Mentors: Drs. Julie Marshall, Gregory Bennett & Mark Beatty

#42 Evaluation of the Efficacy of an E-learning Module in Dental Photography Education
Yuliya Vaniurska & Ryta Wodzinski
Mentors: Drs. Amanda Wobido & Shayla Yoachim

#43 2024 College of Dentistry Wellness Survey
Justin Wilson & Samuel Kline
Mentor: Dr. Sarah Lowman
#45 Frequency of Incidental Findings on CBCT Radiographs and Influence of Risk Factors

Drs. Kelsey Wenger, Kai Hatch & Paula Schlemmer
Mentors: Drs. Shayla Yoachim, Anne Williamson & Michael McNally

#46 Recall Attendance Following Oral Moderate Sedation in Pediatric Dentistry

Dr. Emily Starman
Mentors: Dr. Zachary Houser & Kaeli Williamson & Michael McNally

#47 The Effect of an Educational Intervention Regarding Athletic Mouth Guards

Dr. Bailey Neville
Mentors: Drs. Claire Koukol & Julie Marshall Sampson

#48 The Age-Old Question: Why Do Younger, Systemically Healthy Patients Have Better Wound Healing than Aged, Systemically Healthy Patients? A scRNAseq Fibroblast Study

Dr. Paula Cohen Schlemmer

#49 Associations between Periodontitis and Serum Anti-Malondialdehyde–Acetaldehyde Antibody Concentrations in Rheumatoid Arthritis: A Case-Control Study

Dr. Joyce Lee
Mentors: Dr. Ted R. Mikulis, Dr. Geoffrey M. Thiele, Dr. Jeffrey B. Payne, Michael J. Duryee & Harlan R. Sayles

#50 Pediatric Dental Resident Education and Preferences Regarding Primary Anterior Full-Coverage Restorations

Dr. Alexis Sandman
Mentor: Dr. Zachary Houser

#51 How Age Affects Oral Wound Healing, A Gene Pathway Analysis

Dr. Alexander Lopez

#1: In-Vitro Study: Comparing the Effectiveness of Commercial Whitening Mouth Rinse and At-Home Mouth Rinse Composed of Hydrogen Peroxide and Sodium Bicarbonate

Emma Betts, Madisyn Gardient, Todd Junge, RDH

The objective of this study was to evaluate the effectiveness of home-made mouth rinse composed of hydrogen peroxide and sodium bicarbonate (baking soda) compared to three commercially bought mouth rinses (experimental groups) and distilled water (control group). To test the hypothesis, 175 teeth were prepared by soaking in coffee for 1 day to develop an extrinsic stain. Then, specimens were removed from the coffee solution and randomly distributed into five subgroups (n = 35) based on whitening product: distilled water (H2O), Crest 3D White Alcohol-Free Multi-Care Whitening Mouthwash (3DGM), Equate Multi-Action Whitening Rinse (EMAG), and Colgate Optic White (COW). An initial shade of teeth was then measured using the Vita Easyshade Compact and recorded as baseline, then re-evaluated once a week for a month following daily treatment in their assigned mouth rinse. The alteration in Delta E value (ΔE) was analyzed with standard 2 factor ANOVA in which time and treatment were interacting factors. This procedure was followed by Tukey’s p-value adjustment for comparison of multiple responses. The results showed that BSH2O2 had a negative effect on whitening of discolored teeth in comparison to other experimental groups (p < 0.0001). Still, change from 1 to 4 weeks produced a significant difference in values within each experimental group (p < 0.0001), although teeth in BSH2O2 and 3DGMG typically became darker according to the Vita Shade Guide with progression of time. Consequently, BSH2O2 was found to be ineffective in tooth whitening when compared to commercial rinses.

#2: Effects of Disinfecting Suction Line Cleaners in the Dental Setting to Reduce Microbial Agents

Madison Frank, Jayce Vrbka, Emily Lindquist, RDH

Dental unit suction lines can yield harmful bacteria and fungi, making it imperative to disinfect to prevent cross-contamination in a dental setting. Dental Units require disinfecting the suction unit lines daily. It is crucial to ensure the efficacy of common suction line disinfectants by evaluating key characteristics and bacterial colonies. The purpose of this research is to compare the efficacy of SlugBuster and PureVac in suction line disinfection. Suction lines were swabbed before and after disinfection and were inoculated on agar plates. The study comprised 28 test samples of swabbed HVA lines subsequent disinfection, with 14 from PureVac and 14 from SlugBuster disinfectants. All plates were counted for colonies and resulted in no significant difference between SlugBuster and PureVac. Both disinfectants proved the efficacy of disinfection by reducing plate count when compared to using no disinfectant. SlugBuster requires an 8oz solution and dilution with 2 gallons of water while PureVac requires a 1oz solution and dilution of 1 quart of water. Due to no statistical significance between disinfectants and differences in dilution volume, we conclude that PureVac is the more efficient suction line disinfectant by reducing time and resources.

#3: The Effects of Coca-Cola and Kool-Aid on the Discoloration of UltraSeal XT™ Hydrophilic and 3M™ ESPE™ Clinpro™ Hydrophilic Sealants

Capri Dethlefs, Julia Raun, Jaime Shropshire, RDH

The purpose of this project is to fill a gap in research about different types of dental sealant materials and staining. The goal is to determine if UltraSeal XT™ Hydrophilic sealant material is more susceptible to staining than 3M™ Clinpro™ ESPE™ Hydrophilic sealant material. This study is conducted by creating ninety sealant discs, forty-five of each sealant material, and splitting each of the sealant discs into three groups of fifteen. The discs soak in Kool-Aid, Coca-Cola, and distilled water for two weeks, with the shade of the sealant discs being taken at the beginning and end of the two-week period of time. Results show that there is no statistically significant difference between hydrophobic and hydrophilic sealant materials on staining. However, there is evidence to show that Kool-Aid has a greater staining effect than Coca-Cola on both materials. Based on the outcome, dental hygienists can apply sealants without considering the resistance to staining. In addition, this study highlights the importance of educating patients and/or parents about the risk of discoloration from both Kool-Aid and Coca-Cola on dental sealants.

#4: A Study of Oral Mouth Rinses and Their Antimicrobial Effect on S. mutans

Ellie Buresh, Samantha Nielsen, Lindsay Mundeli, RDH

As health care continues to grow, knowledge of the human body expands. New treatments and care tactics are a continuous topic among health professionals. In the dental field, mouth rinses are a common agent used or prescribed to patients. With a growing demand for better care, more natural-based products are being used by the public. These products claim to improve health as much as their opponents. This study was done to test specific mouth rinses effect on the bacteria, Streptococcus mutans. Of the rinses used, two included naturally based solutions. The mouthwashes consist of Chlorhexidine Gluconate, brewed green tea, and a xylitol-based mouthwash. A control was also placed among the agents. The agents were individually placed on six agar plates coated with S. mutans and incubated for 48 hours. The zones of inhibition were then measured for each agent. At the end of the 48-hour period, three rinses showed statistical significance.
of the experiment, the only agent showing the largest zone of inhibition was the Chlorhexidine Gluconate of 3mm. This led to the conclusion that no antimicrobial impact on the S. mutans.

#5: The Effect of “Healthy” Energy Drinks on Enamel Demineralization: An In-Vitro Study
Sydney Samson, Allison Cuciti, Emily Lindquist, RDH
Energy drinks are on the rise in popularity among all age groups. Today, there are numerous different brands and options. Some options include higher amounts of caffeine, which can cause demineralization by raising the pH in the oral cavity. Through this study, three different “healthy” brands of energy drinks and water will be tested to see the amount of demineralization each energy drink causes. The Canby system was used to determine the amount of demineralization on 160 teeth prior to the experiment and after the experiment. The three different energy drinks (Bubbl, Celius, Alani) will be divided into three groups with 40 teeth getting tested in that group. Water will also be tested to get a control group. All groups will be left for 19 days at room temperature. The results showed that there was no difference in the three different energy drinks causing demineralization. However, all three energy drinks increased the amount of demineralization. Water had no change in those 19 days. In conclusion, energy drinks have healthy effects on the body, however no matter the brand, they all cause demineralization in teeth. Because of this increase in popularity of these drinks and their effects on demineralization of the teeth, dental hygienists should be equipped to educate their patients on the effects.

#6: Effectiveness of Different Oral Hygiene Techniques for Orthodontic Patients with Fixed Retainers
Adanna Paden, Mikayla Kiefel, Lindsay Mundini, RDH
Background: There has been an increase in the use of orthodontics in the past few years that has led to more people wearing fixed retainers (lingual wires). Bacteria will accumulate in the areas between the retainers and the lingual wires and create plaque. Dental Hygienists educate these patients on how to properly clean and take care of their lingual wires in order to maintain proper oral hygiene. This study experiments with four different methods to determine which is the best for cleaning a lingual wire. Hypothesis: The electric toothbrush and interdental brush will be more effective than the electric toothbrush and floss and both manual toothbrush methods.

Methods: Two typodonts were used with stainless steel orthodontic retainers bonded from canine to canine on the mandible. An artificial plaque was painted on the lingual wire and then cleaned off using one of the four methods. Those methods include electric toothbrush, electric toothbrush with interdental brush, manual toothbrush with floss, and manual toothbrush with interdental brush. A plaque index was used to score the amount of plaque left on the typodonts.

Results: Statistical tests were performed with the data and found a significant difference among all of the groups. Each group was < .0001 showing statistical significance. The electric toothbrush with interdental brush showed to have the most effective plaque removal among the four groups.

Conclusion: Any method of cleaning a lingual wire if performed correctly, but the most effective method found is using an electric toothbrush with an interdental brush.

#7: The Pivotal Role of Ergonomic Loupes in Dentistry: A Research Survey of Loupe Selection Among Dental Professionals
Ella Simonson, Emma Schock, Dr. Upoma Guha
Introduction: Loupes have been a vital tool in the field of dentistry for over 40 years, providing magnification and clear vision inside the oral cavity. Ergonomic-style loupes have increased in popularity due to their claim to help prevent the early development of musculoskeletal disorders in dental professionals. A study aimed to gather data by dental professionals regarding their loupe selection factors, their history of loupé purchases, and whether or not they would be more inclined to purchase an ergonomic style of loupé given what they know now.

Methods: A 17-question survey was conducted consisting of 127 participants at the University of Nebraska Medical Center College of Dentistry (UNMC COD). Participants were given the option of scanning a quick response code in person provided by the researchers or clicking a link sent via listserv email at UNMC COD.

Results: In this observational survey, we found that with increasing years of experience, participants on average had purchased more pairs of loupes. The highest selection factor when purchasing loupes was hygiene. However, a high percentage of those participants had the option to purchase them when buying their first pair. Participants who did not purchase an ergonomic design for their first pair of loupes reported experiencing pain in their clinical practice.

Conclusion: Further research is recommended to investigate the sustainability of ergonomic loupes in dental practice, and whether or not purchasing an ergonomic design would prevent premature physical and financial burdens for the dental professional.

#8: The Effects of Advantage Arrest® SDF Gel and Riva Star® SDF/KI on S. mutans and P gingivalis: An In-Vitro Study
Diana Acosta Delgado, Lula Acosta Delgado, Jose Marquez, Lisa Moravec, RDH
Silver diamine fluoride, or SDF, was initially introduced as a desensitizing agent for the oral cavity. SDF is a cost friendly option due to it being a non-invasive procedure that does not require anesthesia. Research has shown that SDF also has antibacterial properties and can arrest the progression of carious lesions. Advantage Arrest® SDF Gel and Riva Star® SDF/KI are two competing brands of SDF that were compared against two prominent bacteria found in the oral cavity: S. mutans and P. gingivalis. Twelve tryptic soy agar plates with 5% sheep blood were streaked with S. mutans. On five of the plates, two sterile discs immersed in Advantage Arrest® SDF were placed and incubated for two days. Two of the plates received five sterile discs as the control group. Each of the other five discs received two sterile discs saturated with Riva Star®. The same process was repeated for twelve TSA plates streaked with P. gingivalis; however, these plates were incubated for 6-7 days. The results of the study did not support our initial null hypothesis, which was that neither SDF's would be favorable compared to each other in inhibiting both pathogenic microorganisms. Advantage Arrest® exhibited a greater zone of inhibition for the respected microorganisms, especially on the inhibition of S. mutans. This study is significant to dental professionals for understanding which SDF can be more advantageous in the arresting of caries in the mouth.

#9: In-Vitro Study Comparing the Effects of 3D Crest Whitening Strips on Strain Removal Compared to Light Emitting Diode (LED) Activated 3D Crest Whitening Strips
Wendy Barcenas-Soto, Jennifer Garcia, Todd Junge, RDH
The present study is aimed to evaluate the most effective whitening technique on coffee-stained extracted teeth, using Crest 3D whitening strips with and without the photobiological light by measuring the color shades at the beginning, middle, and end of the process with a VITA Easyshade spectrophotometer. Twenty-four teeth were divided into 3 groups; group A (Crest 3D Whitestrips + LED Light), group B (3D Whitestrips only), and group C (control group). All teeth were stained in dark roast coffee for 24 hours prior to whitening. Group A received B and C placed on the facial surface for 1 hour per day for 14 consecutive days. Group A had the blue LED light placed against the whitening strips for the first 5 minutes of treatment and was left to sit for the remaining 55 minutes. Group C was stored in distilled water throughout the whole experiment. All groups had color shades measured on days 0, 7, and 14. The results showed with 96% confidence, Group A (Crest 3D Whitestrips + LED Light) had a higher delta E (0.9593) than both groups B (8.1852) and C (18.8737). Since Delta E was higher in group A, there is statistical evidence showing that Crest Whitestrips + LED had increased whitening effects when compared to whitening strips alone and the control group.

#10: The Effects of Vape Oil on Streptococcus Mutans Growth in the Oral Cavity: An In-Vitro Study
Taylor Beacom, Jamie Johnson, Todd Junge, RDH
The oral cavity is an environment that is in constant flux due to various influences. Some factors influence the oral cavity to ward off health or disease by altering the pH of the environment. An environment that can be specifically suitable for S. mutans growth or inhibition. The focus of this study is to analyze how vape oil with nicotine affects the growth of S. mutans, a virulent bacteria associated with the development of dental caries. This was examined by spreading S. mutans on 20 agar plates and dropping three different concentrations of nicotine into each quadrant. The outcome was observed 24 hours later. The mean zone of inhibition for 0 mg and 6 mg of nicotine was 16.4286 and 14.9048, respectively. The results did not support our hypothesis that nicotine would increase the growth of S. mutans. Further studies are needed to indicate statistical significance. Studies indicate that nicotine stimulates bacterial growth. However, oil is responsible for breaking down bacterial cell walls. The combination of both oil and nicotine together in the increasingly popular hobby of vaping poses a potentially significant threat to the health of the oral cavity. Vape oil alone can decrease the bacterial growth of S. mutans, however, when the nicotine content is increased, the S. mutans content slowly increases. For future experimentation, researchers should consider using a larger sample size, and only using one vape flavor per plate. As this study was conducted for a year, it is essential that healthcare professionals understand the implications vaping can have on a patient’s oral cavity and what risks are involved.

#11: Short-Term Staining Effects of Chlorhexidine on Extracted Teeth
Rebecca Steffen, Georgia Dishman, Amanda Dolen, RDH
In this study the short-term staining effects of 0.12% chlorhexidine (ICH) mouthrinse were measured and compared to that of 0.05% cetylpyridinium chloride (CPC) mouthrinse and distilled water. The study took place over 14 days and used 76 extracted teeth which were divided into three groups and rinsed twice daily for 30 seconds per rinse in their assigned group. Baseline color measurements were taken before treatment. During treatment, tooth color was measured once daily. Measurements were made using a spectrophotometer. After 14 days, there was an increase in the ΔE of each group. The only group that had a significant difference between them was the distilled water and the 0.05% CPC groups. The difference in the ΔE between these groups was 2.8473, meaning the distilled water group had a ΔE of almost three times that of the 0.05% CPC group. Future studies should attempt to standardize the location that tooth shade is measured as that impacted the results of this study.
#12: Assessment of Predoctoral Students’ Confidence in Pediatric Dentistry in US Dental Schools
Madhyson Anglim, Anna Edet, Dr. Sarah Lowman
Purpose: The study is an exploration of national pre-doctoral curriculum in pediatric dentistry to assess trends in dental education and dental student preparedness to care for children.
Method: A RedCap survey consisting of questions in four key domains (clinical experience and patients, knowledge, exam success, and patient factors) was distributed to dental schools in the United States. The survey was sent to pediatric department chairs or, lastly, academic deans.
Results & Conclusion: Final Data Pending.

#13: The Effect of Arthroscopic Temporomandibular Joint Discectomy for the Patient with Anterior Disc Displacement Without Reduction: A Retrospective CBCT Study
Yiyen Chen, Bailey Peckham, Dr. Po-Jung Chen, Dr. Kayva Muttanahally
Background: Temporomandibular joint (TMJ) anterior disc displacement without reduction (ADDwR) is one of the most common diseases of TMJ, including anterior disc displacement with reduction (ADDwR), anterior disc displacement without reduction (ADDwO), and anterior disc displacement in sagittal joint dysfunction, including clicking, arthralgia, functional limitations, osteoarthritis, and even condylar resorption.
Objective: To evaluate the radiographic outcomes of TMJ arthroscopic discectomy for the ADDwO patients via Cone-beam computed tomography (CBCT).
Methods: CBCT scans were collected from the patients who had undergone arthroscopic discectomy at three different time points: initial (T0), 3 months (T1) and 6 months (T2) after surgery. Dolphin Imaging program was used to analyze posterior joint space (PJS), superior joint space (SJS), anterior joint space (AJS), and the angle of mandibular condyle. The TMJ quality and morphology were also assessed.
Results: A total of 13 subjects (19 joints) were included in this study. Compared to the CBCT images taken at baseline (T0) and 3 months (T1), while probing depths of the adjacent teeth are re-measured at 2-weeks, 8-weeks, and 3-months post-operative, a smaller amount of relapsed more than patients with a larger measurement.
Conclusion: One could make the assumption that the ML width of the Genoid fossa has a direct impact on the relapse of disc location. However, more data points need to be measured and compared to truly understand if this or a number of factors plays a roll in relapse after arthroscopic discectomy was done.

#14: The Evolution of Mental Health in Dental Students Over the Four Years of Dental School
Natalie Benoy, Thoree Cooney
While in dental school, students face a variety of stressors which may result in feelings of depression, anxiety, and burnout. High expectations throughout schooling can exacerbate negative emotions, contributing to mental health crisis. Students are also on highly busy schedules, limiting their ability to seek emotional counseling or support for their mental health. This study addresses mental health, depression, and burnout over the four years of dental school. We found existing research on mental health of dental students to be limited. We were also unable to find research comparing student’s mental health across the four years of dental school. This led us to a question: does the mental health of dental students significantly change across the four years of dental school? In an attempt to answer this question, a research survey was sent to all DOS candidates at the University of Nebraska Medical Center’s College of Dentistry. The survey consisted of 22 questions completed by the Generalized Anxiety Disorder (GAD-7) Survey, Patient Health Questionnaire-9 (PHQ-9), and the Mini-Z Burnout Questionnaire. Through this survey we were able to discover high rates of depression, anxiety, and burnout amongst all years of dental students. Between years, there was not as high of a difference as we were expecting for any of our three metrics, however we found interesting correlations between our metrics. An example of this would be that for students in their 2nd, 3rd, or 4th years, anxiety and burnout were directly related whereas 1st year students were more likely to have high levels of anxiety without corresponding high levels of burnout. Seeing these trends and the prevalence of mental illness amongst dental students, it is clear that access to mental health resources in dental schools are crucial.

#15: A Retrospective Study of the College of Dentistry’s Smoking Cessation Program
Kinsley England, Claire Janecek, Dr. Peter Giannini
Background: According to the CDC, “Smoking leads to disease and disability and harms nearly every organ system of the body. It is the leading cause of preventable death.” Therefore, the conversation with patients regarding smoking cessation is one of utmost importance.
Purpose: The purpose of this retrospective study is to determine the most common driving factors that encouraged patients to pursue our school’s tobacco cessation program. Based on the results of the study, the school board may redefine our school program within our clinic but also fabricate a pamphlet that we can provide to fellow students in order to address smoking cessation with patients.
Methods: In order to complete this study, we keyword searched our patient records for “smoking cessation,” tobacco cessation, bupropion, and chantix.” We then categorized the patients into four categories and reviewed their progress notes to determine if the patients actually completed the program and what their reasoning for quitting was.
Findings/Results: Of the 357 patients charts, dating back to 2016, that this retrospective study looked at: 10 patients completed smoking cessation in our program at our school, 141 were interested but never started a program, 47 pursued smoking cessation elsewhere, and 158 were not interested in smoking cessation. It was determined that dental health was the most common driving factor for patients to begin our program and Bupropion was the most commonly prescribed medication.
Conclusion: In conclusion, our research helped us to better navigate the conversation of smoking cessation with patients and determine the most common causes. In addition, we were able to determine some areas of disconnect in our schools program and plan for ways to improve them.

#16: Three-Dimensional Characterization of the Morphology of the Temporomandibular Joint in the Arthroscopic Discectomy Relapse Cases: A Pilot Study
Gage Fenski, Josh Madsen, Dr. Po-Jung Chen
Purpose: Arthroscopic discectomy is a procedure used to help treat patients with internal Derangement of the TMJ. The purpose of this study is to determine the morphological changes that occur and how that affects the incidence of relapse.
Methods: Patients and Methods: This is a case-control study. The study included patients who had success with the surgery and patients who had relapsed. Patient records were taken from Chang Gung Memorial Hospital. Six CBCT’s were utilized for this study. Three that were successful and three that had relapsed. Each CBCT was imported into Dolphin Imaging Software and oriented in sagittal and coronal plane. In the sagittal direction, each genoid fossa length, condyle length, genoid fossa depth, and condyle to genoid fossa relationship was measured. In the coronal plane, each genoid fossa length, condyle length, and condyle to genoid fossa relationship was measured. Each TMJ volume will also be calculated.
Results: After a short analysis of the data collected from the CBCT measurements it was hypothesized that patients with a smaller mesial lateral width of the Genoid fossa, when measured in the axial plane using Dolphin Imaging Software, relapsed more than patients with a larger measurement.
Conclusion: One could make the assumption that the NL width of the Genoid fossa has a direct impact on the relapse of disc location. However, more data points need to be measured and compared to truly understand if this or a number of factors plays a roll in relapse after arthroscopic discectomy was done.

#17: Clash of Two Collagens: Membrane vs. Wound Dressing for the Coverage of Single-Tooth Ridge Preservation Sites
Delaynie Field, Delaney Glazier, Dr. Amy Killeen, Dr. Paula Schlemmer
The purpose of this study is to compare the effectiveness of a porcine collagen membrane (Mucograft® Seal) to a bovine collagen with dressing (Integra® Heplisul) for traumatic extraction and ridge preservation. These are commonly used as a barrier to maintain the anatomic extraction space and graft for future implant space. The study is a double-blind randomized controlled trial involving 10 patients assigned to two groups. Prior to extraction, probing depths and a digital intraoral scan, Tios, are taken. Following the extraction, hydrated AlloDerm® 50/50 DFDBA/FDBA bone particulate is condensed into the socket. One group received Mucograft® Seal over the graft, while the other group received Integra® Heplisul. To measure the volumetric changes of the tissue, a digital scan is taken at 2-weeks, 8-weeks, and 3-months post-operative, while probing depths of the adjacent teeth are re-measured at 3-months. Using the digital scans to analyze the volumetric changes, the greatest change was seen between one 2- and 8-week follow-up appointments, with a smaller amount of change seen between the 8-week and 3-month follow-up. It was determined that patients who received the Mucograft® Seal had an increase in the volumetric change in tissue and a decrease in probing depth. This revealed prevention of tissue regeneration with the Mucograft® Seal compared to the control wound dressing. Clinicians may want to consider the use of Mucograft® Seal in areas where negative volumetric changes would compromise the esthetic outcomes of implant therapy.

#18: Reliability of ORADII Application in Rendering Diagnosis, A Retrospective Study
Juan Gonzales, Gabriel Crocker
Background: Accurate interpretation of radiographic images is crucial for general dentists, yet the reliability and precision of their diagnoses are often uncertain.
Purpose: This retrospective study aims to assess the efficacy of the differential diagnostic software, ORADII, used by general dentists using CBCT scans, by comparing its diagnostic performance with that of an oral radiologist and pathologist.
Methods: Thirty patients were in this pilot study. The selection criteria included patients that have a CBCT scan that patients have initial CBCT scan and hard tissue results. The cases were selected from 2013-2023. Among the 30 patients, only 20 contained a biopsy report with a definitive diagnosis. Anatomage Invivo 3D-imaging software in conjunction with clinical reports of the patient were used to provide differential diagnoses for both ORADII and the oral radiologist. The analyses by the study radiologist were both blind evaluations with individual, separate differential diagnoses of the pathology noted without knowledge of the definitive diagnosis available from the biopsy report. Using a power analysis table, we will calculate the significance between ORA-
#20: Effectiveness of the Summer Health Professions Education Program: Fourteen Years of Program Outcomes for UNMC Participants

Gisselle Hernandez, Kimberly Pierre

Background: Racial and ethnic diversity in the U.S. dental workforce does not reflect the diversity of The United States’ population. A variety of pathways have been recommended for prospective career-oriented individuals who are first-generation college students, members of URMs, racial and ethnic groups, individuals from low socioeconomic status households and/or rural communities, and those who are at a disadvantage due to other reasons.

Aim/ Purpose of Research: The goals of this study are to evaluate the success of the UNMC College of Dentistry’s SHPEP program and to better understand the perceived barriers to healthcare careers among URMs students pursuing dentistry.

Methods: The measures that will be taken is to use the contact information for the 297 UNMC dental SHPEP alumni from 2008-2022 and update it by the means of calling, mailing, emailing and texting to efficiently gauge those interested in participating in the survey. Those who are willing to participate will receive a secure survey link via email to further assess their needs and to receive feedback toward the program in which the survey results will be analyzed.

Results: Results Pending

Conclusion: Results Pending

#21: Analysis of Occlusal Clearance of Crown Preparations made by Predoctoral Dental Students at the UNMC College of Dentistry

Lucas Jarecke, Luke Wordekemper, Dr. Gregory Bennett

Zirconia crowns are the most commonly used indirect restorations in dentistry and current literature shows that the leading cause of failure is bulk fracture. The risk of crown fracture is significantly increased as the thickness of ceramic crowns decreases. Insufficient tooth preparation leading to inadequate occlusal clearance of crown preparations is a chief concern. All-ceramic crowns account for about 95% of crowns delivered at the University of Nebraska Medical Center College of Dentistry. The purpose of this study is to assess the ability of UNMC COD predoctoral dental students to adequately prepare teeth for crowns, specifically regarding adequate occlusal clearance. Secondly, we also aim to make dental students and post-doctoral practitioners more aware of their crown preparation shortcomings. Lastly, to just the need for quality assurance protocols in dental schools using digital scanners prior to fabrication of the crown. Although research has been conducted surrounding all-ceramic crown thickness and fracture, as well as digital scanning and its accuracy, our specific research methods and goals are novel. We hypothesize that oral health practitioners analyzed would have inadequate clearance according to the UNMC COD crown preparation guidelines. To test our hypothesis, we used digital scans to capture cross-sectional images to determine whether or not enough clearance was provided before digitally measuring clearance; the distance between the crown preparations and opposing dentition were collected. Data collected were analyzed using the Chi-square test for categorical variables and the Wilcoxon rank-sum test for numerical variables with a 95% confidence interval. Fisher’s exact test for categorical variables and the Kruskal-Wallis test for numerical variables with a 95% confidence interval.

We utilized admission data from the past six application cycles from Analytics by Liaison, and the WebAdmit Dashboard. Applicant information obtained includes number of applicants from each Nebraska county, number of urban vs number of rural applicants, number of Nebraskans in each class, number of offers declined (out of state vs Nebraska) and number of Nebraskans applicants that declined acceptance offer (Urban vs Rural). 67% of Nebraska applicants have come from three counties, Douglas, Sarpy, and Lancaster. On average, only 20 of the 93 counties have applicants-20% of counties. An average of 71 Nebraskans have applied for admission, 67% are from Urban counties. The typical class of 53 students has 35 Nebraskans and 18 out-of-state students, 51% from urban backgrounds. 25 offers of admission were declined per cycle. An average of 7 Nebraskans decline admission offers (high of 10, low of 2)

Conclusion: In conclusion, even though the majority of Nebraska applicants come from the three Urban counties, Douglas, Sarpy and Lancaster, over the past six cycles the average class has been composed of 51% urban students and 49% rural students. The perception that UNMC matriculants are disproportionately from urban counties has not been found to be true.

#23: Evaluating Student Shade Matching Ability

Carson Kocian, Tyler Lutt, Dr. Upoma Guha

Objective: To determine whether the increasing clinical experience of dental students improves their ability to accurately select shade guides without the use of a VITA shade guide.

Materials and Methods: 8 different resin based composite discs were made in the shades of A1, A2, A3, B1, C2, C3, D2, D3. Each disc was placed on a sheet of blue background and the shade was evaluated by a shade guide and on a computer monitor. If the shade was not available or uncomfortable, they were asked to evaluate the shades of the disc, without the shade guide. Each shade of composite was given a “rank”, 1-16 (easiest to darkest) and the subjects answer was compared to the correct shade of composite to determine how far off they were based on the ranking scale. We then analyzed D2 vs D4 dental students by taking the average absolute value of how far each student was off the true value and dividing by the class total. We then utilized two-way analysis of variance to determine significance between the two classes, using a significance of (p <.05).

Results: In looking at the evaluation, the D2 dental students were, on average, farther from the true value than the D4 dentistry students.

Conclusion: Shade matching of composite improves as clinical experience is gained, without the use of a VITA shade guide.

Clinical significance: Younger dental students may select composite shades that are not as close to the color of the natural tooth as compared to those that have clinical experience. It is also important to consider the increased efficiency in chair time as we predict the shades more accurately with increased clinical experience.

#24: Experience and Comfort Levels of Orthodontists in Treating Patients with Special Needs

Morgan Lashley, Emily Swanson, Dr. Meenakshi Vishwanath, Dr. Jennifer Kallio

A significant gap in knowledge currently exists in the dental education orthodontists have received in treating patients with special care healthcare needs (SHCN). The goal of this research is to assess the dental education, training, and comfort level in treating patients with special needs of practicing orthodontists in the United States. Better understanding the educational background of orthodontists and their comfort levels, we hope to improve the access and quality of orthodontic treatment for patients with SHCN. A Microsoft Forms survey was created to assess the educational backgrounds and comfort levels of orthodontists in treating patients with SHCN. The survey is divided into three sections, assessing the students’ educational background, the comfort level and background, the education in dentists training, as well as experiences in orthodontic practice. The survey was distributed to orthodontists across
the U.S. via the American Association of Orthodontists, and 43 percent were non-opponents. 37 percent of predicator programs and 37% of orthodontic residency programs did not have classes focused on patients with SHCNs, but 98% of them are currently treating patients with SHCNs. 72% of respondents are not comfortable treating patients with SHCNs, and the main reasons are lack of staff training, patient behavior, oral health status, difficulty achieving ideal treatment. In conclusion, lack of education at both predoctoral dental programs and orthodontic residency have led to a decrease in orthodontist’s confidence when treating patients with SHCNs.

#25: Restoring Single Implants via Digital Workflow
Jordan Tice, Megha Mathur, Dr. Makena Sundine
This research aims to assess the effectiveness of an electronic module (e-module) in improving the understanding of dental students in the restoration of single implants via a digital workflow. As the field of dentistry continues to evolve, it is essential to incorporate effective educational tools to keep pace with the advancements in technology and treatment modalities. The e-module is designed to cover essential aspects of single-unit implant restorations, which includes implant components, digital impression techniques, and treatment algorithms and procedures required in the delivery process. The study will use a quantitative approach, using pre- and post-assessment surveys to evaluate the impact of the e-module on students' knowledge, skills, and confidence. These confidence measures include Likert scale self-assessment and multiple-choice questions. The results will be compared to the effectiveness of the e-module in enhancing students’ understanding and proficiency in single implant restorations. The results obtained may help identify the strengths and potential areas for improvement in integrating electronic learning resources into dental education curriculum. Ultimately, the goal of this research is to enhance dental education and improve the overall preparedness of dental students for clinical practices in implant dentistry via a digital workflow.

#26: The Effect of Time on Retention of General Pathology Course Material Amongst Second, Third, and Fourth-Year Dental Students at UNMC College of Dentistry
Ellie Petersen, Jonathan Mitzel, Dr. Peter Giannini
Objective: This study is intended to shed light on the amount of retained general pathology information as students progress through dental school.

Methods: A survey consisting of 7 demographic and 32 pathology questions were created by referencing a dental boards of study dental school anatomy. Quantitatively, performance on pre-professional anatomy exposure on academic success, stress level, confidence in application, and long-term retention of anatomy knowledge.

Results and Conclusions: There is significant association between what grade a student receives or expects to receive in Head and Neck Anatomy and whether they took an anatomy course during their undergraduate training (φ = 0.001). Qualitatively, of students who took pre-dental anatomy, 74% reported feeling increased confidence going into dental school anatomy; however, 46% of those students did not report feeling as though they could decrease the amount of time necessary to study dental school anatomy. Quantitatively, performance on the retention assessment was impacted by pre-dental anatomy completion only in the D1 cohort, who collectively scored significantly higher overall than both the D2 and D3 cohorts (p = 0.001) as well as in each tier of cognitive processing (low, intermediate, and higher level questions; p<0.001). Within the D1 class, students with pre-dental anatomy experience scored significantly higher than those without an pre-dental experience on each tier of questions, most notably in the ‘higher level’ questions (6.8 vs. 5.2). Collectively, these results suggest recommend students to undergo anatomy training for students applying to dental school.

#27: Impact of Pre-Dental Anatomy Experience on Dental School Anatomy Performance and Knowledge Retention
Riley Nitsch, Hannah Janecek, Dr. Shayla Yachieh
Background: As a challenging foundational course, Head and Neck Anatomy poses a major hurdle in the first-year tradition- al dental curriculum. It has been hypothesized that students electing to take undergraduate anatomy coursework may perform better in professional school anatomy by building onto a basic scaffold that undergraduate anatomy coursework provided. We aim to determine the impact on dental student pre-anatomy exposure on academic success, stress level, confidence in application, and long-term retention of anatomy knowledge.

Materials and Methods: Recruitment of students from the first-year dental student (D1), second-year dental student (D2), and third-year dental student (D3). D1 students were voluntary participation in a survey and retention assessment including both low-level anatomy recall and high-level clinical integration questions.

Results and Conclusions: There is significant association between what grade a student receives or expects to receive in Head and Neck Anatomy and whether they took an anatomy course during their undergraduate training (φ = 0.001). Qualitatively, of students who took pre-dental anatomy, 74% reported feeling increased confidence going into dental school anatomy; however, 46% of those students did not report feeling as though they could decrease the amount of time necessary to study dental school anatomy. Quantitatively, performance on the retention assessment was impacted by pre-dental anatomy completion only in the D1 cohort, who collectively scored significantly higher overall than both the D2 and D3 cohorts (p = 0.001) as well as in each tier of cognitive processing (low, intermediate, and higher level questions; p<0.001). Within the D1 class, students with pre-dental anatomy experience scored significantly higher than those without an pre-dental experience on each tier of questions, most notably in the ‘higher level’ questions (6.8 vs. 5.2). Collectively, these results suggest recommend students to undergo anatomy training for students applying to dental school.

#28: TBD
Nicholas Peterson
The oral cavity hosts approximately 772 bacterial species (Verna et al.). Many of these bacteria can induce inflammation and transmit disease. The potential of these bacteria to adhere
to needle tips and create bacteremia, septicaemia, or localized infections should not be invested into. The study's objective is to quantify the number of bacteria collected on the needle tip versus local anesthetic injection sites. The results of the study aim to assess if needle tips can become contaminated and ultimately should dental providers be changing needle tips to reduce potential bacteremia? The tool used to quantify bacteria was with three needles used for each patient. One needle was a control placed immediately into a test tube containing 3 ml of sterile PBS, the second needle was only injected once into patient tissue, while the third was injected into patient tissue three or more times. A 200-micro- liter aliquot was then taken from the sample containing and plated out on nutrient agar. Colony forming units (CFUs) were counted after incubating for 96 hours (about 4 days) at 37 degrees Celsius. *Results (still collecting some data from samples) - but what has been recorded so far – The control needle tip did not form any CFUs while on average the one needle stick had an estimated 30 CFUs and the three plus stick culturalized 19 CFUs on average. The results of this indicate needle tips can become contaminated on consecutive needle sticks which can potentially mitigate bacteria that has introduced into patients could be of potential value. Changing needle tips is a potential solution while considering the use of a pre-injection disinfectant. A notable rush such as chlorhexidine could also potentially mitigate bacterial load.

#29: Investigation of the Impact of the Snowplow Technique on Microleakage of Permanent Posterior Teeth
Elizabeth Dressler, Ryan Rawlings, Dr. Mark Beatty
Background: The snowplow technique is a novel method of composite restoration. It consists of using a flowable liner, condensing packable composite with the uncured liner, and then co-curing the mixture together.

Aim: The purpose of this experiment was to evaluate the in vitro performance of class II direct composite restorations using the snowplow technique compared to other methods.

Materials and Methods: In this experiment, 3D extruded posterior human teeth that were healthy (free from decay, restoration, fracture, or crack) were collected and randomly divided into three groups of ten. One group was restored with conventional composite technique. The second was restored with a flowable composite liner that was cured, which after packable composite was placed. The last group was cured with packable composite technique, which both the flowable liner and packable composite were cured at the same time. The teeth were thermocycled for 1,000 cycles between 5 degrees Celsius versus 55 degrees Celsius. *Results (still collecting some data from samples) – The teeth were thermocycled for 1,000 cycles between 5 degrees Celsius versus 55 degrees Celsius. *Results (still collecting some data from samples) – The teeth were thermocycled for 1,000 cycles between 5 degrees Celsius versus 55 degrees Celsius. *Results (still collecting some data from samples) – The teeth were thermocycled for 1,000 cycles between 5 degrees Celsius versus 55 degrees Celsius. *Results (still collecting some data from samples) – The teeth were thermocycled for 1,000 cycles between 5 degrees Celsius versus 55 degrees Celsius. *Results (still collecting some data from samples) – The teeth were thermocycled for 1,000 cycles between 5 degrees Celsius versus 55 degrees Celsius. *Results (still collecting some data from samples) – The teeth were thermocycled for 1,000 cycles between 5 degrees Celsius versus 55 degrees Celsius. *Results (still collecting some data from samples) – The teeth were thermocycled for 1,000 cycles between 5 degrees Celsius versus 55 degrees Celsius. *Results (still collecting some data from samples) – The teeth were thermocycled for 1,000 cycles between 5 degrees Celsius versus 55 degrees Celsius. *Results (still collecting some data from samples) – The teeth were thermocycled for 1,000 cycles between 5 degrees Celsius versus 55 degrees Celsius. *Results (still collecting some data from samples) – The teeth were thermocycled for 1,000 cycles between 5 degrees Celsius versus 55 degrees Celsius. *Results (still collecting some data from samples) – The teeth were thermocycled for 1,000 cycles between 5 degrees Celsius versus 55 degrees Celsius. *Results (still collecting some data from samples) – The teeth were thermocycled for 1,000 cycles between 5 degrees Celsius versus 55 degrees Celsius. *Results (still collecting some data from samples) – The teeth were thermocycled for 1,000 cycles between 5 degrees Celsius versus 55 degrees Celsius. *Results (still collecting some data from samples) – The teeth were thermocycled for 1,000 cycles between 5 degrees Celsius versus 55 degrees Celsius. *Results (still collecting some data from samples) – The teeth were thermocycled for 1,000 cycles between 5 degrees Celsius versus 55 degrees Celsius. *Results (still collecting some data from samples) – The teeth were thermocycled for 1,000 cycles between 5 degrees Celsius versus 55 degrees Celsius. *Results (still collecting some data from samples) – The teeth were thermocycled for 1,000 cycles between 5 degrees Celsius versus 55 degrees Celsius. *Results (still collecting some data from samples) – The teeth were thermocycled for 1,000 cycles between 5 degrees Celsius versus 55 degrees Celsius. *Results (still collecting some data from samples) – The teeth were thermocycled for 1,000 cycles between 5 degrees Celsius versus 55 degrees Celsius. *Results (still collecting some data from samples) – The teeth were thermocycled for 1,000 cycles between 5 degrees Celsius versus 55 degrees Celsius. *Results (still collecting some data from samples) – The teeth were thermocycled for 1,000 cycles between 5 degrees Celsius versus 55 degrees Celsius. *Results (still collecting some data from samples) – The teeth were thermocycled for 1,000 cycles between 5 degrees Celsius versus 55 degrees Celsius. *Results (still collecting some data from samples) – The teeth were thermocycled for 1,000 cycles between 5 degrees Celsius versus 55 degrees Celsius. *Results (still collecting some data from samples) – The teeth were thermocycled for 1,000 cycles between 5 degrees Celsius versus 55 degrees Celsius. *Results (still collecting some data from samples) – The teeth were ther
composites (BA2, BA3) were inserted in a single increment.

Conclusion: Results suggest sonic insertion might reduce void formation during composite delivery, while incremental lay-

ing might increase surface microhardness. Further studies are indicated to ensure differences observed in this study can influence the clinical relevance of resin composite delivery systems.

#32: Nebraska Dentists’ Views on Cannabinoids for Treatment of Orofacial Pain

Bayler DeVries, Sierah Samway, Dr. Joseph Bavitz

Research on the use of cannabinoids for the treatment of orofacial pain has found it to have comparable results as non-steroidal anti-inflammatory drugs (NSAIDs). Those allergic to NSAIDs have limited options for pain relief, however, canna-

binoids may be an option for those patients. The goal of this research is to determine the knowledge Nebraska dentists have on the use of cannabinoids for orofacial pain and if that knowledge or perception impacts their willingness to utilize cannabinoids in the future if found effective. This research utilized a survey that was sent to all dentists that currently hold a license in the state of Nebraska. Ten multiple choice questions were asked that was sent to all dentists that currently hold a license in the state of Nebraska. Ten multiple choice questions were asked to dentists (Table 1). Sonic insertion had significantly fewer voids than incremen-
tal layering (Table III).

Conclusion: Results suggest sonic insertion might reduce void formation during composite delivery, while incremental lay-
ing might increase surface microhardness. Further studies are indicated to ensure differences observed in this study can influence the clinical relevance of resin composite delivery systems.

#33: Assessing Risk Factors in High Risk Fall Patients in a Predoctoral Dental Clinic

Khoi Mai, Harrison Sanny, Dr. Sarah Lowman

Background: With a growing aging population, falls are becom-
ing an increasingly prevalent public health crisis. Falls can result in death, debilitating injury, and increased healthcare costs for those affected. The CDC has put forth an initiative (STEADI) for fall risk assessment and while many healthcare facilities have adopted the methods of screening set forth by the CDC, many dental facilities have not. The CDC’s STEADI initiative states that if a 60+ year old patient worries about falling, has fallen in the last year, or feels un-
steady while walking then they are at high risk for a fall.

Purpose: The UNMC College of Dentistry’s patient base is made up of a large number of 60+ year old individuals, and at the time of the start of this research project had not incorporat-
ed the facets of the STEADI initiative. The goal of this project was to: 1) Collect quantitative data on the number of new patients who were 60+ years old and are at high fall risk. 2) Assess additional risk factors that may contribute to a patient’s risk of falling (Missing teeth, neurological conditions, and dental anxiety).

Methods: The three questions recommended by the STEADI initiative are: Have you fallen in the last 12 months? Do you feel steady while walking?, and Do you worry about falling? were added to the UNMC College of Dentistry’s electronic dental record in the form of a drop-down menu. This data was collected for new patients 60 years or older along with their responses to four other ques-
tions regarding missing teeth, neurological conditions, and den-
tal anxiety to assess the relationships between their answers and their fall risk status.

Results/conclusion are pending at this time.

#34: Radiographic Bone Loss and Probing Depths in Relation to Tooth Loss: A Seven-Year Retrospective Study

Bobbie Fowler, Laura Shaw, Dr. Jeffrey Payne, Dr. Kayva Muttanahally, Kaeli Sampson

Objective: To determine associations between radiographic bone loss and deep probing depths with tooth loss in periodon-
tal maintenance patients over a seven-year period.

Methods: The number of sites per patient among 323 patients with probing depths ≥ 6 mm and the deepest probing depth at each site were recorded by BC. The percentage of sites with those probing depth thresholds were determined. BF also recorded, for each patient, whether or not any tooth in the den-
tition had mobility. Differences between dichotomous groups were assessed with independent samples t-tests with Wilcoxon Rank Sum tests for continuous variables, and Chi-Square or Fisher’s exact tests for categorical variables. Following radi-
ographs acquired and archived using MPIACs software (iMed-
DIC Imaging, Charlotte, NC) were taken from a randomized sub-sample made up of 146 patients’ dental records in this study. LS recorded linear alveolar bone height measurements between the same landmarks and analyzed the data using the method described by Hausmann and colleagues (1992).

Results: There was a higher proportion of patients who lost at least one tooth among patients who had at least one probing depth 6 mm or greater at baseline (57.0%) compared to pa-
tients who did not lose any tooth. Among patients who had at least one site with a probing depth 6 mm or greater at baseline (n = 207), patients who lost at least one tooth had a higher mean amount of bone loss (2.8 mm) with probing depths ≥ 1.1 mm at least 6 mm (2.8% (IOR: 0.8, 5.8)) compared to patients who did not lose any teeth during follow up (1.4% (1.0, 0.02), p = 0.002). Differences were found at all levels of mobility at baseline was not significantly associated with tooth loss (p = 0.19).

Patients who lost at least one tooth during the study period had a significantly higher mean radiographic distance averaged across all teeth and sites (2.9 mm (SD = 1.03)) relative to pa-
tients who did not lose any teeth (2.4 mm (SD = 0.69), P>0.05). Tooth loss due to periodontitis, non-restorability, and endodontic rea-
sions were all significantly associated with baseline radiograph-
ic alveolar bone loss (p-values < 0.05). Tooth loss due to caries was not significantly associated with baseline radiographic bone loss (p = 0.14).

Conclusion: Patients who had higher radiographic bone dis-
tance, at or least one probing depth greater than or equal to 6 mm at baseline, were more likely to lose teeth over seven years.

#35: Examining Surgery Wait Times and Treatment Effects in Adult Patients with Disabilities

Ella Majerus, Lydia Sigler, Dr. Jennifer Kallio, Dr. Corinne Van Osdel, Kaeli Sampson

Am: The purpose of this study is to analyze the impact of long waits for specialty care on specialty dental care needs patients who have received dental care under general anesthesia in the operating room. The wait times since the COVID-19 pandemic have increased, and these wait times are hypothesized to be connected to more extensive treatment rendered during the OR appoint-

ement. Currently the wait time at the UNMC GPR program is approximately 4-5 years, and before COVID-19 the wait time was approximately 2-3 years.

Methods: The researchers gathered data from patient records ages 19 and older that were seen in the operating room by the UNMC College of Dentistry from June 30th, 2016 to June 30th, 2019 and June 16th, 2020 to June 16th, 2023. LS recorded linear alveolar bone height measurements of Patients who lost at least one tooth during the study period had a significantly higher mean radiographic distance averaged across all teeth and sites (2.9 mm (SD = 1.03)) relative to pa-
tients who did not lose any teeth (2.4 mm (SD = 0.69), P>0.05). Tooth loss due to periodontitis, non-restorability, and endodontic rea-
sions were all significantly associated with baseline radiograph-
ic alveolar bone loss (p-values < 0.05). Tooth loss due to caries was not significantly associated with baseline radiographic bone loss (p = 0.14).

Conclusion: Patients who had higher radiographic bone dis-
tance, at or least one probing depth greater than or equal to 6 mm at baseline, were more likely to lose teeth over seven years.

#36: Evaluation of the Patient Perceptions of Quality of Care at UNMC College of Dentistry

Delaney Springer, Emma Wilkinson, Dr. Amanda Wobido

This study aimed to investigate the factors influencing patients’ perceptions of quality of dental care at the UNMC College of Dentistry (CoD) and to identify areas for enhancement in dental care delivery within the academic setting. A patient satisfaction survey, comprising 27 questions covering demo-
ographic information, quality of care, service speed, and specific aspects related to general/faculty, student, faculty, and general practice coordinator (GPC), was developed and distributed by the CoD administration to all patients treated at the College between 2022 and 2023. The anonymous survey was available via email or in paper format in the waiting room or at the end of appointments. Responses were analyzed using a 5-point Likert-type scale, with the average score calculated for each topic. Data analysis included the exclusion of incomplete sur-
veys and employed statistical tests such as the Kruskal-Wallis and Fisher’s exact tests for numerical and categorical data, respectively (a = 0.05). The correlation between quality of care and specific topics was assessed using Pearson’s correlation test. Results from 196 patient surveys (114 from 2022, 82 from 2023) revealed that the majority were female (62.2%) and white (93.3%). Overall, 78.1% rated care quality as very good, while 61.2% evaluated service speed as reasonable. Significant associations were found between quality of care and evalu-
ations of speed of care, CoD facilities, students, faculty, and GPCs (p<0.001), with a positive correlation. However, the correlation of evaluation patient, gender, and race/ethnicity did not sig-
nificantly influence care quality perception (p=0.252, p=0.617, p=0.940). This study shows the multifaceted nature of patients’ care quality perceptions, highlighting the significant influence of factors beyond dental care, such as patient interactions with students, faculty, GPCs, and facility ambiance play pivotal roles in shap-
ing overall patient experiences. Therefore, emphasizing not only treatment and appointment scheduling, but also general patient experienc-
e is important to ensure high-quality care dental care delivery.

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Taylor Steiner, McKenzie Nutter, Dr. Merlyn Vogt

Background: Several objective measures can be used to predict how successful a person will be in professional school. The Dental Admission Test (DAT) and cumulative grade point average are all expected to correlate with grades in a dental program. The matriculation process into dental school is extremely competitive, and a student's medical school grades differ. This research will test whether there is any significant correlation between the two. Additionally, educators at the University of Nebraska Medical Center's College of Dentistry should consider the extent of these traits among students to cultivate the best environment for effective learning in the next generation of dentists.

Objectives: This study was performed at a CODA-accredited dental school to determine how noncognitive traits of grit and resilience are as a possible predictor of academic performance among dental and hygiene students. We predict that there will be a direct correlation between the two.

Materials/Methods: Students completed an anonymous electronic questionnaire that included the Short Grit Scale (Grit-S) and the Brief Resilience Scale (BRS) during the Fall 2023 semester. Students also provided their University ID numbers to maintain anonymity while corresponding grade point average and class rank to their responses of our survey. Statistical analyses using linear models were performed to determine association.

Results: Analysis revealed a significant correlation between student’s averaged resilience scores and their cumulative GPA (p<0.01) and their cumulative class rank (p<0.02). There was no significant correlation between student’s averaged grit scores and their cumulative GPA (p=0.07) and their cumulative class rank (p=0.08). There was no significant difference between cohorts regarding both grit and resilience.

Conclusion: This data indicates that resilience does impact student's ability to be successful in an increasingly rigorous dental program, while grit is not a significant indicator. Additionally, we could not conclude that grit and resilience differed significantly between subjects in different program years.

#38: Can Inflammatory Markers Identify Periodontal Health Changes Following Extraction? A Pilot Study

Jacob Stewart, Ben Wetsvick, Dr. Richard Reinhardt, Dr. Amy Killeen

The purpose of this pilot study was to explore the impact extraction has on periodontal health and inflammatory markers in gingival crevicular fluid (GCF) of adjacent teeth. The hypothesis for this research is that post-inflammation a trend of decreases would create and anti-inflammatory cytokines/growth factors would increase from baseline to 3 months post-extraction. The rationale behind this hypothesis is the removal of tooth with significant periodontal bone loss of non-restorable cases, or fracture would decrease inflammation and promote periodontal health in adjacent sites. METHODS: This study investigated previous analytic data (Mohammad, 2023). This study included nine teeth that were extracted automatically. Clinical measures were recorded preoperatively (PPO) insertion (REC), clinical attachment level (CAL), and bleeding on probing (BOP) of the tooth to be extracted and adjacent teeth. Gingival crevicular fluid (GCF) was collected using collection strips. Measurements were recorded at baseline (before extraction) and 3 months post-extraction. Mixed models/analysis was utilized to measure nineteen different analytes in GCF Measurements were compared between baseline and 3 months. RESULTS: Significant pro-inflammatory cytokines, interleukin (IL)-6 and tumour necrosis factor alpha (TNFα), were significantly decreased from baseline to 3 months. IL-6 had a median decrease of 43.7 pg/ml (IQR=78.6, 8.6, p=0.01), and IL-1B median decrease on 9.9 pg/ml (IQR=20.2, 2.3, 8.8, p=0.041). IL-18 trended down as well with a median decrease of 34.2 5 pg/ml (IQR=138.8, 165.8, p=0.081). However, there was also a noted decrease in inflammatory IL-10 with a median decrease of 13.8 (IQR=36.3, 9.3, p=0.021). Inflammatory ratio of TNFα/IL-10 also displayed a significant increase of 0.4 pg/ml (IQR=2.3, 1.5, p=0.021). PPD and CAL also decreased on adjacent teeth but not significantly. CONCLUSION: Clinical measurements from this pilot study showed no significant changes from baseline to 3 months. The predominant inflammatory mediators, therefore, could be a more sensitive tool in determining periodontal health changes following extraction.

#39: Dental Students’ Attitudes on Educational Debt and Initial Post-Graduation Career Plans

Jaspreeet Grewal, Harinderjit Kaur, Dr. Julie Marshall, Dr. Jim O’Meara

Objectives: Study aims to examine relationships between educational debt and potential impact on immediate career choices for UNMC senior dental students.

Materials and Methods: A 12 questions secure REDCAP survey was distributed to UNMC Dental Class of 2024 following completion of a practice management course. Participation was voluntary and anonymous. Respondents (N=38, 48% male, 52% female) answered questions regarding their financial situation, the distribution of anticipated debt levels as a D1 student to total debt as a D4 student, lifestyle changes and attitudes toward educational investment. Results were compared with findings from the annual ADEA Senior Survey-2022 of US dental graduates.

Statistical Analysis: Fisher’s exact test compared survey responses with gender and income, and analysis of variance was used to analyze the statistical comparison between D1 expectations and D4 expectations.

Results and Statistics: 55% of respondents indicated that debt influenced their future career expectations in a trend of female (62%)<male(38%)<careers influenced by finances. Amount of debt (low($<100,000, medium $100,000-$250,000, high $250,000>) did not significantly influence changes in ICC. Respondents who did not pay off debt during their education were more likely to pursue graduate studies (28.9%), group practice (50.0%) and general practice (21.2%). D4 responses shifted to increased group practices (69.1%), compared to solo practice (2.6%) or other (31.3%) as immediate career choice.

There was good agreement (Kappa = 0.69) between D1 anticipated and D4 actual educational debt. 55% of respondents indicated significant/moderate financial sacrifice or lifestyle changes related to dental school debt compared to their original plan. There was significant differences in lifestyle changes in relation to gender. However different levels of debt (low, medium, high) impact different lifestyle changes (p<0.05). Respondents felt very confident (44.7%) or somewhat confident (55%) compared to slight/very discouraged their dental education investment was a favorable financial decision.

Conclusion: The survey concluded that there is no statistically significant evidence to suggest that educational loans have an impact on the career choices of D4 students at UNMC COD, when considering gender and debt.

#40: Examining Associations Between Classes of Medications and Tooth Loss in Periodontal Maintenance Patients

Nicholas Stolze, Dr. Jeffrey Payne

Objective: To examine associations between commonly prescribed medication classes (i.e., statins, anti-hypertensives, diuretics, calcium, diabetes, and antidepressants, etc) and tooth loss in periodontal maintenance patients at the College of Dentistry (COD) over a seven-year period in a retrospective study.

Methods: Medication data was collected from baseline visits of 319 periodontal maintenance patients at the College of Dentistry in both 2013 and 2019 via the Salud Electronic Dental Record (Dublin, Ireland). Following data collection, associations between medication classes and any tooth loss over seven years, as well as reasons for tooth loss, were assessed using Chi-Square or Fisher’s exact tests. SAS software version 9.4 (SAS Institute Inc., Cary, NC) was used for analysis.

Results: There was a statistically significantly higher proportion of patients who lost at least one tooth among patients who were on an anti-depressant at baseline (68.9%) compared to patients who were not on an anti-depressant at baseline (48.9%), p = 0.01. After investigating specific types of anti-depressants, it was found that patients who were on a Selective Serotonin Reuptake inhibitor (SSRI) at baseline had a higher proportion of patients who lost at least one tooth (70.4%) compared to patients who were not (50.3%), p = 0.04. No statistically significant differences between the other medication categories and tooth loss were found. Anti-depressant usage was not associated with a particular reason for tooth loss.

Conclusion: Anti-depressant usage at baseline was associated with tooth loss at seven years in this retrospective study of periodontal maintenance patients.

#41: In Vitro Tensile Strength Comparison of Denture Liners to 3-D Printed Denture Resin

Merina Joseph, Mahima Kinra, Dr. Julie Marshall, Dr. Gregory Bennett, Dr. Mark Beatty

Objective: In vitro study to compare tensile bond strength of 2 soft tissue liners, A-Step(R)Denture Caulk and B-CoeSoft(R) BCGC) denture material modified with 3 types of surface pre-treatment.

Methods: 60 pairs of TrueDent(R) (10x10x20mm) resin blocks with 10x10 mm interfacing surfaces were fabricated using J55 DentalJet PolyJet(R) print cycle 9h. Blocks processed to manufacturer’s specification, pressure washed, soaked in 2% NaOH solution(120min), pressure washed second cycle, post-cured in glycin 80°C, 60min 2cycles with agitation of liquid between cycles. Blocks soaked in 7% isopropyl alcohol(300min), air dried(2hrs), divided into 3 surface pretreatments per material(=10). Group 1-acrylic base+HPSiGe, Brasstek(R), Group 2-air abrasion 60s 4A.15, 15s, 5Bar, Group 3-medium grit slurry/tygavek (30s) as control. Surface treatment confirmed using 3.5X magnification. Opposing blocks positioned 3mm apart using VPS matrix. Resin blocks were placed on opposing resin surfaces, cured(24h), placed in distilled water(24h). Instron 112344AR universal testing instrument with 5mm/min crosshead speed using 500N(50kg) load cell measured max load and tensile strength. Results analyzed with 2-way ANOVA/Tukey(p<0.05).

Results: Adhesion of liner to A printed resin was significantly stronger than liner to B printed resin. Adhesion was found to be significantly attenuated by air abrasion pre-treatment of printed resin produced strongest adhesion with liner A, compared to any other liner/surface treatment combination (p<0.05). No significant differences were observed among remaining liner/treatment combinations(p>0.05) except for pumice(R), which was significantly lower than all liner A treatments (p<0.05).

Conclusion: Best adhesion to TrueDent(R) printed resin was obtained with acrylic base pretreatment and use of HPSiGe.

#42: Evaluation of the Efficacy of an E-learning Module in Dental Photography Education

Yuliya Vaniurska, Ryta Wodzińska, Dr. Amanda Wobido, Dr. Shaila Yoachim

This study aimed to assess the effectiveness of a Dental Photography e-module compared to a traditional lecture among second- and third-year dental students (n=22 and n=33). A traditional lecture and e-module were created on the principles and technical aspects of dental photography. Forty-six second-year and 27 third-year students were assigned to two groups: traditional lecture (TL, n=38), and independent e-module (IE, n=37). Before the intervention, all students completed a pre-test to assess their prior exposure to the content. Following the intervention, both groups underwent a post-test and engaged in a critical thinking exercise, which involved analyzing dental images with various issues and suggesting corrective measures. Participants' ages ranged from 22 to 33, with rel...
Results: 953 reports fit the criteria and were analyzed. Of the 953 reports, 517 reported incidental findings (54%). 968 incidental findings were reported among the 517 reports with a mean of 1.8 findings per CBCT. There were 282 reports with 1 finding, 121 with 2 findings, 58 with 3 findings, 30 with 4 findings, and 26 with 5 or more findings. There was a statistically significant increase in the number of incidental findings in radiographs with a larger patient file (p<0.001). For the location, 49.6% of findings were located on the dentition, 25% were found in the sinus, 18.5% were found in the bone. No significant association was found between the number of incidental findings and the reason that the CBCT was obtained, sex, or age.

Conclusion: As CBCT usage increases, it is essential that CBCT volumes be read in full.

#46: Recall Attendance Following Oral Moderate Sedation in Pediatric Dentistry
Dr. Emily Starman, Dr. Zachary Houser, Kaeli Sampson
Purpose: Determine significant factors associated with patients seeking recommended preventive dental care after treatment was completed under oral moderate sedation.

Methods: A retrospective chart review of patients treated under oral moderate sedation in a group practice of 4 pediatric dental offices from February 1st, 2021, to October 1st, 2022. Patient ID, age, sex, date of birth, insurance type, treatment completed, dates of sedation procedure and subsequent dental visits were collected. Recall attendance rate calculated and differences between subgroups assessed using Chi-Square and Fishers exact tests for categorical variables, and Wilcoxon Rank Sum or Kruskal Wallis tests for continuous variables.

Results: One-hundred sixty-nine patients treated under oral moderate sedation were analyzed (N=169). Recall rate for 6 months (±2 months) was 89.1% and for 12 months (±5 months) was 81.3%. 23.7% of patients had at least 1 recall appointment within 18 months of their sedation. Patients who were patients of record prior to their sedation appointment were the most likely to attend a recall in 12 months. There was no significant association between recall attendance rate and patient age; distance traveled; insurance, or treatment completed.

Conclusions: Recall attendance following oral moderate sedation could be an important factor for preventing future dental disease; however, it is difficult to measure or track patient follow-up for patients that do not receive restorative care at their dental home. Knowing the patient demographics of oral sedation patients may help better treat and provide follow-up, preventive dental care.

#47: The Effect of an Educational Intervention Regarding Athletic Mouth Guards
Dr. Bailey Neville, Claire Koukol, Julie Marshall
The aim of this study was to assess the effectiveness of an educational intervention regarding the use of athletic mouth guards in youth baseball. An e-module was created to provide information on the protective benefits of athletic mouthguards. An anonymous four question pre-survey and post-survey was administered through Microsoft Teams before and after viewing the e-module, and it included response questions (strongly disagree, disagree, neutral, agree or strongly agree). Respondents (N=40) were second year dental students. Descriptive statistics summarized survey responses, and paired t-tests and sign rank tests were utilized to compare pre and post responses. Significant differences (p<0.05) occurred in the mean response between pre and post-survey responses to “Mouth guards should be required at all GAMES” (p=0.0117) and “Mouth guards should be required at all times, including practice” (p=0.008), suggesting that athletic mouth guards serve to provide a significant protective benefit in youth baseball. Conclusion: An educational e-module regarding the protective benefits of athletic mouth guards in youth baseball suggests effectiveness in changing opinions of dental students regarding mouth guard use in youth baseball.

#48: The Age-Old Question: Why Do Younger, Systemically Healthy Patients have Better Wound Healing than Aged, Systemically Healthy Patients? a scRNAseq Fibroblast Study
Dr. Paula Cohen Schlemmer
Background: It is well established that wound healing is slower and less robust in aged patients. However, outside of systemic comorbidities, little is known about the role aging plays at the cellular level. Immediately after an extraction, fibroblasts are activated to rebuild the extracellular matrix (ECM), which is later regulated through expression of matrix metalloproteinases (MMPs). Gene expression may be altered in gingival fibroblasts of aged patients leading to deficiencies in ECM deposition and the recruitment and proliferation of immune cells, resulting in a slow healing fibrotic wound.

Methods: Using single-cell RNA sequencing (scRNA-seq), hundreds of thousands of individual cells were sequenced to identify subpopulations of cells that could be used to identify key cellular differences in young and aged. scRNA-seq expression analysis was performed at 24 and 66 days using single-cell RNA sequencing. Results were grouped based on from young and aged groups.

Results: Three subclusters of fibroblasts were identified: pro-inflammatory fibroblasts (PIFs), anti-inflammatory fibroblasts (AIFs), and gingival/mesenchymal stem cells (GMSCs).

Pathway enrichment for two fibroblast clusters indicated a more robust ECM assembly and innate immune response in the younger group. Gene expression of pathways involved in creating and maintaining the ECM were more enriched in the young patient. The pathway expression profile in young PIFs and AIFs were similar, while the aged PIFs were enriched for similar ECM pathways to AIFs. The GMSCs of both patients had a significant overlap in DEGs that indicated cellular housekeeping processes, while the young patient expressed genes associated with growth factors and proliferation that typically occurs at this healing time point. This may indicate that the aged patient was in a prolonged state of inflammation and fibrosis.

Conclusion: To our knowledge, this is the first study to utilize scRNAseq to understand if aging alters the fibroblast population in wound healing after an extraction. Differences in fibroblast phenotypes, gene expression, and pathway enrichment suggest that fibroblasts in aged patients may contribute towards wound healing fibrotic wound. An increased understanding of these differences can help guide future biologic research.

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#49: Associations between Periodontitis and Serum Anti-Malondialdehyde-Acetaldehyde Antibody Concentrations in Rheumatoid Arthritis: A Case-Control Study
Dr. Joyce Lee, Dr. Ted R. Mikuls, Dr. Geoffrey M. Thiele, Dr. Jeffrey B. Payne, Michael J. Duryee, Hanan R. Sayles
Background: Malondialdehyde-acetaldehyde (MAA) adducts lead to generation of anti-MAA autoantibodies and have been independently identified in inflamed periodontal and rheumatoid arthritis (RA) tissues. This study evaluates serum samples from RA cases and osteoarthritis (OA) controls to quantify associations between periodontal clinical measures, alveolar bone loss (ABL) and anti-Porphyrinum gingivalis, anti-Transferrin-referenced anti-subfusobacterium nucleatum (T-As) antibody concentrations with anti-MAA antibody concentrations.

Methods: Participants (n=284 RA cases, n=330 OA controls) underwent periodontal clinical assessments and ABL measurements. Serum IgA, IgG and IgM anti-MAA and serum IgG anti-bacterial antibody concentrations were quantified by ELI- SA. Analyses utilized simple linear regression and multivariable adjusted models.
The purpose of this study was to discover via survey which full coverage anterior tooth restorations residents are taught during residency and secondarily to determine which full coverage anterior restorations residents prefer. The goal was to identify with the survey how the treatment planning of anterior primary teeth is currently changing. An email survey was sent to AAPD member pediatric dental residents and asked about the district, type of program, and year of residency they are in. Research questions included restorations and preferences regarding primary anterior full-coverage restorations.

##51: How Age Affects Oral Wound Healing, A Gene Pathway Analysis

Dr. Alexander Lopez

We see the changes in aging at a macro level, but little is known about the role aging plays at the cellular level. Immediately after a traumatic event, such as an extraction or root end resection and retrofit, fibroblasts are quickly activated to initiate healing. Gene expression may be altered in gingival fibroblasts of elderly patients. These differentially expressed genes (DEGs) may have effects on inflammation, immune recruitment, and differences in matrix formation and composition.

Soft tissue was analyzed from a 35yo and 68yo healthy patient at the time of a single atrumatic posterior extraction. Two weeks post-extraction, a second sample of tissue was taken from the healing site. Cells were profiled and gene expressions measured using single-cell RNA sequencing (scRNA-seq), a novel method for analyzing gene expression of individual cells. DEGs were used to identify distinct biological pathways for each patient via pathway enrichment analysis using multiple tools, including DIAGEN's Ingenuity Pathway Analysis tool. Several pools of genes including inflammatory markers, and matrix metallo-proteinases were found to have significant differences in expression.

Preliminary data is currently being analyzed, with more subjects planned to be added to the analysis pool. It is hypothesized that elder patients (65+) will demonstrate a longer period of inflammation, with a more prolonged healing period in comparison to a younger patient (18-64). This is a pilot analysis to help glean information on wound healing pathways that can then be applied to modern endodontic microsurgical and pharmaceutical concepts.