RESEARCH DAY

Featuring the
Fifty-fourth Annual
Frank M. Wentz
Student Scientific Program

and Keynote Speaker
Mark Herzberg, DDS, PhD

Oral Presentations by the Dental Class of 2022,
Dental Hygiene Class of 2021 & Postgraduate Students

College of Dentistry
February 26, 2021
Frank M. Wentz, DDS, MS, PhD, was a scholar, philosopher, dentist and humanitarian. He was a Diplomat of the American Board of Oral Medicine. His practice, in Chicago from 1955 to 1969, was limited to periodontics. He taught for many years at the University of Illinois and at the Loyola University College of Dentistry before coming to the University of Nebraska College of Dentistry in 1969. Dr. Wentz served the college with distinction as assistant dean for graduate studies and continuing education and professor of periodontics. His exuberant enthusiasm and gracious manner endeared him to all with whom he came in contact and served to stimulate many students to higher levels of achievement. We are pleased to honor the memory of Dr. Frank M. Wentz (1917-1984) with great appreciation for his many years of dedicated service to the College of Dentistry and to the dental profession.

2021 Student Scientific Program Sponsors
The UNMC College of Dentistry is pleased to recognize the following organizations who sponsored the awards for the winning student research presentations. Thank you for your generosity and support!

Alpha Lambda Chapter of Sigma Phi Alpha
The National Dental Hygiene Honor Society
Dentsply
International College of Dentists
Lincoln District Dental Association
Nebraska Dental Association
Nebraska Dental Hygienists’ Association

2021 Student Scientific Program Judges
Dr. Gregory Bennett
Ms. Jane Broekmeier
Dr. Larry Crouch
Ms. Nicole Baker
Dr. Marianne Day
Dr. Peter Giannini
Ms. Chelsea Hamilton
Dr. Robin Hattervig
Dr. James Jenkins
Mr. Todd Junge
Dr. Claire Koukol
Dr. Bradley Krivohlavek
Dr. Sarah Lowman
Dr. Nagamani Narayana
Dr. Ali Navshad
Dr. Greg Oakley
Dr. James Wahl
Dr. Jeffrey Payne
Dr. Aimin Peng
Dr. Thomas Petro
Dr. Myhanh Phan-Rinne
Dr. James Wahl
Dr. Shayla Yoachim

2021 Student Scientific Program Presentations
12:30 - 3:30 p.m.
D3 and Dental Hygiene
12:30 - 2:00 p.m.  First round. See schedule and breakout rooms.
2:00 - 3:30 p.m.  Final round; the top presenters in each group will present again. Breakout rooms: D3 Finals and DH4 Finals

Postgraduate
12:30 - 3:00 p.m.  One round. See schedule.

Breakout Rooms  D3 1-5  |  Dental Hygiene 6-7  |  Postgraduate 8

Keynote Speaker
3:30 - 4:30 p.m.
Mark Herzberg, DDS, PhD
“Developing calprotectin-specific mRNA as an antimicrobial therapy”

Dr. Herzberg is the current president of the American Association for Dental Research and a professor in the department of diagnostic and biological sciences in the School of Dentistry - University of Minnesota. He is director emeritus of the NIH-supported Minnesota Craniofacial Research Training Program and former associate director of the University of Minnesota Clinical and Translational Science Institute. Dr. Herzberg directs a research program focused on host-pathogen interactions with a serendipitous diversion into cancer biology.

Awards Ceremony
4:30 - 5:00 p.m.

2021 Research Day Committee
Colton Allen (Student)
Amanda Dolen (Chair)
Heather Hessheimer
Lisa Moravec
Dr. Greg Oakley
Dr. Aimin Peng
Kim Theesen
Dr. James Wahl

About the Frank M. Wentz Student Scientific Program
Frank M. Wentz, DDS, MS, PhD, was a scholar, philosopher, dentist and humanitarian. He was a Diplomat of the American Board of Oral Medicine. His practice, in Chicago from 1955 to 1969, was limited to periodontics. He taught for many years at the University of Illinois and at the Loyola University College of Dentistry before coming to the University of Nebraska College of Dentistry in 1969. Dr. Wentz served the college with distinction as assistant dean for graduate studies and continuing education and professor of periodontics. His exuberant enthusiasm and gracious manner endeared him to all with whom he came in contact and served to stimulate many students to higher levels of achievement. We are pleased to honor the memory of Dr. Frank M. Wentz (1917-1984) with great appreciation for his many years of dedicated service to the College of Dentistry and to the dental profession.
Student Presentations

### Breakout Room 1
**D3 Group 1**

**12:30 p.m.**  
Selam Carlson and James Canarsky  
Performance of 3D digital scanner versus visual examination for diagnosis of occlusal caries  
[Abstract #4]  
Mentors: Drs. Luana Oliveira-Haas and Gregory Bennett

**12:43 p.m.**  
Anthony Jacobson and Chad Sindelar  
Delivery of Oral Injections for Non-Traumatic Dental Conditions  
[Abstract #15]  
Mentor: Dr. James Jenkins

**12:56 p.m.**  
Dillon Woods and Nick Dierks  
Metastudy analysis of UNMC Dentistry e-module curriculum  
[Abstract #17]  
Mentor: Dr. Mary Lynn Froeschle

**1:09 p.m.**  
Jordan Verplank and Dr. Mark Beatty  
Engineered Selective Noise Cancelling Device to Reduce Long Term Hearing Damage in Dental Settings  
[Abstract #20]  
Mentor: Dr. Mark Beatty

**1:22 p.m.**  
Michael Correa, Nathan Free and Dr. Gregory Bennett  
Comparison of the trueness and tissue surface adaptation of CAD-CAM maxillary denture bases manufactured using digital light processing, stereolithography, and continuous liquid interface printing  
[Abstract #23]  
Mentor: Dr. Gregory Bennett

**1:35 p.m.**  
Huy Nguyen and John Denton  
The Need and Usefulness for a Coagulation Cascade eModule at UNMC  
[Abstract #29]  
Mentor: Dr. Larry Crouch

**1:48 p.m.**  
Hibah Chughtai and Logan Kludt Lawrence  
Analysis of Inclusion within the UNMC College of Dentistry Community  
[Abstract #32]  
Mentor: Dr. Yun Saksena

### Breakout Room 2
**D3 Group 2**

**12:30 p.m.**  
Caleb McKinley and Lotte Sjulin  
The Correlation Between Dental School Application and Success in Dental School  
[Abstract #1]  
Mentor: Dr. Merlyn Vogt

**12:43 p.m.**  
Sunil Patel and Aadil Toor  
Common variations of superficial head and neck venous drainage: Can visual inspection be used to identify superficial vessel patterns?  
[Abstract #10]  
Mentor: Dr. Shayla Yoachim

**12:56 p.m.**  
Mitchell Kaus  
Effect of incremental versus bulk placement of composite resin on depth of cure  
[Abstract #12]  
Mentors: Drs. Steven Haas and Luana Oliveira-Haas

**1:09 p.m.**  
Alexis Jessen  
Applying RealWear Headset to education in dentistry  
[Abstract #16]  
Mentor: Dr. Bryan Skar

**1:22 p.m.**  
Andrew Bruch, Zachary Janecek, Dr. Meenakshi Vishwanath, Dr. Luana Oliveira-Haas and Dr. Sundaralingam Premaraj  
Does orthodontic treatment in children and adolescents increase the risk of non-caries cervical lesions and gingival recession?  
[Abstract #25]  
Mentors: Drs. Luana Oliveira-Haas and Sundaralingam Premaraj

**1:35 p.m.**  
Evan McGowan and Lucas Van Wie  
Cost Benefit Analysis: PVS and Intraoral Scanning  
[Abstract #28]  
Mentor: Dr. Gregory Bennett

**1:48 p.m.**  
Kiran Shahid  
Level of Fear among Pediatric Dentists during COVID-19 Pandemic and Associated Practice Modifications  
[Abstract #30]  
Mentor: Dr. Jennifer Marshall

### Breakout Room 3
**D3 Group 3**

**12:30 p.m.**  
Rooh Afza, Dr. Gregory Bennett and Dr. Yoshiharu Ameku  
Comparing the perceived usefulness of a true proportioned stepwise 3D Crown preparation model in addition to lectures and handouts, in increasing the understanding and confidence when the novice second year dental students prepare a single Monolithic Zirconia Crown  
[Abstract #1]  
Mentors: Drs. Gregory Bennett and Yoshiharu Ameku

**12:43 p.m.**  
Holly Hild and Shelby Rose  
A survey of patient factors that influence the selection of where patients receive their orthodontic treatment in Midwestern states  
[Abstract #3]  
Mentor: Dr. Meenakshi Vishwanath

**12:56 p.m.**  
Andrew Egger and Benjamin Wachholtz  
Accuracy of new generation intraoral scanners for digitized full arch fixed implant restoration workflows  
[Abstract #6]  
Mentor: Dr. Gregory Bennett

**1:09 p.m.**  
Carly Johnson  
The Effect of Periodontal Recall Intervals on Crestal Bone Loss in Patients with Local and Systemic Risk Factors  
[Abstract #7]  
Mentor: Dr. Amy Killeen

**1:22 p.m.**  
Jordan Ingersoll and Dr. Gregory Bennett  
Comparison of accuracy between an intraoral scanner and CBCT  
[Abstract #11]  
Mentor: Dr. Gregory Bennett

**1:35 p.m.**  
Jason Jurca, Dr. Luana Oliveira-Haas, Dr. Steven Haas and Dr. John Reinhardt  
[Abstract #18]  
Mentor: Dr. Luana Oliveira-Haas

**1:48 p.m.**  
Bailey Peterson  
Determine the role of palmitoylation on Nectin-2 function  
[Abstract #24]  
Mentor: Dr. James Wahl
Breakout Room 4
D3 Group 4

12:30 p.m.
Blake Hansen, Dr. Jeffrey Payne, Dr. Peter Giannini and Kaeli Samson
Assessing the agreement of light microscopic evaluation of oral lichen planus lesions with associated direct immunofluorescence evaluation (Abstract #6)
Mentors: Drs. Jeffrey Payne and Peter Giannini

12:43 p.m.
Brant McNew
Periodontalaccelerated osteogenic orthodontics: a review (Abstract #15)
Mentor: Dr. Gerald Tussing

12:56 p.m.
Alec Maly and Benjamin Petry
Effect of Layer Height on Internal Fit of 3D-Printed Crowns (Abstract #18)
Mentor: Dr. Gregory Bennett

1:09 p.m.
Dani Most, Mikaela Shaw and Dr. Gregory Bennett
Flexural strength of denture base acrylic resins processed by 3D printing methods (Abstract #21)
Mentor: Dr. Gregory Bennett

1:22 p.m.
Mattie Eddleman and Joe McNish
Examining Variations in Crown Types Found in Dentistry (Abstract #31)
Mentor: Dr. Mary Lynn Froeschle

1:35 p.m.
Madeleine Witte and Mikayla Rekken
The effects of new PPE for aerosol-producing dental procedures on anxiety levels of UNMC COD patients (Abstract #33)
Mentor: Dr. Steven Haas

Breakout Room 5
D3 Group 5

12:30 p.m.
Lance Lucas and Preston Dramse
Survey of Digital dentistry utilization in practice by UNMC COD graduates since 2010 (Abstract #8)
Mentor: Dr. Gregory Bennett

12:43 p.m.
Bo Chao and Safia Rauf
Comparison of the effectiveness of the Echo360 and E-Module on developing skills of interpreting dental age from panoramic radiographs (Abstract #9)
Mentor: Dr. Sung Kim

12:56 p.m.
Karla Mejia and Ramanpreet Randhawa
Bruxism orthotic designs: effectiveness of an asynchronous learning-a pilot study (Abstract #13)
Mentors: Drs. Julie Marshall and Bri Chandwani

1:09 p.m.
Kathryn Moncrief, Jade Koch, Dr. John Reinhardt, Kaeli Samson and Dr. Fang Yu
Determining Characteristics of Rural Nebraska Dentists (Abstract #22)
Mentor: Dr. John Reinhardt

1:22 p.m.
Katie Moody, Kathleen Bartunek and Dr. Luana Olivera-Haas
Class IV Composite Restorations: Color Perception of Layered Dental Composite (Abstract #26)
Mentor: Dr. Luana Olivera-Haas

1:35 p.m.
Emily Kleier, Amanda German, Autumn Chapman, Tracy Peitz, Dr. Meenakshi Vishwanath, Dr. Sung Kim and Dr. Jeffrey Payne
Assessment of the incidence and Severity of Impacted Canines in the Nebraska Population: a retrospective study (Abstract #27)
Mentor: Dr. Meenakshi Vishwanath

Breakout Room 6
Dental Hygiene Group 1

12:30 p.m.
Samantha Beal and Harley Ray
Effect of the 360 Sonic Toothbrush Compared to Oral-8 Genius on Plaque Control: An In-Vitro Study (Abstract #34)
Mentor: Amanda Dolen

12:43 p.m.
Cassidy Borjmann and Abigail Jonas
The Efficacy of Charcoal in Whitening Therapy (Abstract #36)
Mentor: Todd Junge

12:56 p.m.
Toni Doescher and Aspen Wallace
Prevalence of dental hygienists performing extraoral and intraoral assessments in the state of Nebraska (Abstract #38)
Mentors: Lisa Moravec and Heather Hessheimer

1:09 p.m.
Abby Duffy and Emily Houtby
A study of differing high-volume evacuator tips and their efficacy in removing aerosols (Abstract #40)
Mentor: Jaimee Shropshire

1:22 p.m.
Noni Henderson and Kazandra Valadez
The Erosive Potential of Bang Energy Drinks vs Caffeinated Soda: An In Vitro Study (Abstract #42)
Mentor: Lindsay Mundil

1:35 p.m.
Sarah Scholl and Kaylene Roberts
In Vitro Study involving the growth of S. mutans in the presence of Whole Milk and Almond Milk (Abstract #45)
Mentors: Lindsay Mundil and Dr. Thomas Petro

Breakout Room 7
Dental Hygiene Group 2

12:30 p.m.
Ciarra Benes and Danielle Salvatori
A comparison of the effect of Listerine® and clove on streptococcus mutans: An in vitro study (Abstract #35)
Mentors: Dr. Thomas Petro, Amanda Dolen and Heather Hessheimer

12:43 p.m.
Caylynn Cruse and Callie Kenning
Swirlit tea in comparison to Camellia sinensis on microbial counts of Streptococcus mutans: An in-vitro pilot study (Abstract #37)
Mentor: Darlene Carritt

12:56 p.m.
Elizabeth Dowling and Abigail Johnston
Comparison of sodium fluoride dentifrice and nano-hydroxyapatite dentifrice in remineralization of carious lesions: An in vitro study (Abstract #39)
Mentor: Amanda Dolen

1:09 p.m.
Kellse Embretson and Haritareddy Gujjula
Darkening effect of amalgam using whitening strip with hydrogen peroxide versus without peroxide: An in vitro study (Abstract #41)
Mentors: Drs. Mark Beatty and William Johnson

1:22 p.m.
Vicky Nguyen and Olivia Rezac
The effectiveness of activated charcoal dentifrice: An in vitro study (Abstract #43)
Mentor: Brenda Utecht

1:35 p.m.
Sarah Scholl and Kaylene Roberts
In Vitro Study involving the growth of S. mutans in the presence of Whole Milk and Almond Milk (Abstract #45)
Mentors: Lindsay Mundil and Dr. Thomas Petro
Abstract #1
Comparing the perceived usefulness of a true proportioned stepwise 3D Crown preparation model in addition to lectures and handsouts, in increasing the understanding and confidence when the novice second year dental students prepare a single Monolithic Zirconia Crown. Authors: Rooh Afza, Dr. Gregory Bennett and Dr. Yoshiharu Ameku. Mentors: Drs. Gregory Bennett and Yoshiharu Ameku.

Objective: To compare the perceived usefulness of a true proportioned stepwise 3D Crown preparation model in addition to lectures, handsouts, in increasing the understanding and confidence when the novice second year dental students prepare a single Monolithic Zirconia Crown.

Material and Methods: Fifty-eight second year dental students were recruited into the study and allocated randomly into two groups, each group consisting of 29 students. One group received lecture and a picture of the 3D printed stepwise crown preparation model, and the other group received lecture and the 3D printed stepwise crown preparation models. Both these groups prepared a Monolithic Zirconia Crown preparation on tooth number 14 on the manikin in the simulation lab.

To obtain feedback on the 3D model and the picture of the 3D model, two different questionnaire surveys were distributed to both the groups. All the students completed the survey. The questionnaire survey explored students’ perceived benefits/drawbacks of the 3D model and the picture. The two teaching methods were compared using Fisher’s exact Chi-square test of independence.

Results: Different aspects of the 3D model and the picture were evaluated by a questionnaire using Likert scale. While there was no statistically significant evidence of an impact of group on the student’s performance, 72% of students in the 3D group felt positive and 0% felt negative about their performance while only 52% in the Picture group felt positive and 10% felt negative about their performance.

Conclusion: There appears to be a positive impact of using the 3D model method as a teaching tool as it improves student’s confidence and self-assessment.

Abstract #2
The Correlation Between Dental School Application and Success in Dental School. Authors: Caleb McKinley and Lottie Sjulin. Mentor: Dr. Merlyn Vogt.

Introduction: This study was designed as a blind, retrospective study from the UNMC College of Dentistry graduating classes of 2015, 2016, 2017, 2018, and 2019. This totaled 231 eligible dental students over the 5 dental classes. Pearson correlation coefficients were calculated for associations between continuous variables (e.g. test scores, grades) and final GPA. Independent samples t-tests were used to assess for differences in mean final GPA between dichotomous groups (i.e. gender [male/female] or parent in health care). A Wilcoxon Rank Sum test was used to assess for a difference in the distribution of final GPA between students with or without a military background. A t-test was not used due to small sample size. A general linear model was used to assess differences in mean GPA between the various class years and used Tukey’s adjustment for p-values of post-hoc pairwise comparisons. A mixed effect model was used to determine model adjusted effects of multiple variables’ associations with final GPA and included random intercepts for class year.

The correlation between undergraduate GPA, PAT, and TS with final dental school GPA were statistically significant. The correlation between gender, military status, parent in healthcare, and reading comprehension with final dental school GPA were not statistically significant.

Contrary to what we originally hypothesized, by far the largest indication of dental school final GPA was undergraduate GPA. Followed by this, PAT score was the second most significant predictor of final dental school GPA. Lastly, Total Science score of DAT was the only remaining statistically significant factor correlating with dental school grades. Surprisingly, Reading and Comprehension DAT had no correlation with dental school GPA.

Abstract #3
A survey of patient factors that influence the selection of where patients receive their orthodontic treatment in Midwestern states. Authors: Holly Hild and Shelby Rose. Mentor: Dr. Meenakshi Vishwanath.

Introduction: Advancements in technology and social media have given rise to a new form of dentistry – at home clear aligners. This product has been controversial in the dental community, but has shown a growing popularity in the general public. By understanding the driving force behind the general public’s decision in treatment methods, orthodontists and general dentists may be able to market to these patients and provide a safer mode of treatment.

Methods: A twenty-seven question survey was sent out through SurveyMonkey targeting the Midwestern general public. A screening question was used to target those who had an interest in straightening their teeth. A total of 397 respondents answered this survey – 259 adults and 120 parents for their children. A Monte Carlo estimate of Fisher’s Exact Test was performed to analyze the statistical relationship between questions.

Results: Respondents significantly chose an orthodontist as their preferred orthodontic provider (p < .001). Even so, 34.93% of respondents had heard of at-home aligners, and 36.94% of respondents felt confident using at-home aligner

point average (GPA) and be statistically significant. We do not hypothesize that undergraduate GPA, age, military status, or parent in healthcare (IP, IH) will correlate with Final GPA.

Our study was designed as a blind, retrospective study from the UNMC College of Dentistry graduating classes of 2015, 2016, 2017, 2018, and 2019. This totaled 231 eligible dental students over the 5 dental classes. Pearson correlation coefficients were calculated for associations between continuous variables (e.g. test scores, grades) and final GPA. Independent samples t-tests were used to assess for differences in mean final GPA between dichotomous groups (i.e. gender [male/female] or parent in health care). A Wilcoxon Rank Sum test was used to assess for a difference in the distribution of final GPA between students with or without a military background. A t-test was not used due to small sample size. A general linear model was used to assess differences in mean GPA between the various class years and used Tukey’s adjustment for p-values of post-hoc pairwise comparisons. A mixed effect model was used to determine model adjusted effects of multiple variables’ associations with final GPA and included random intercepts for class year.

The correlation between undergraduate GPA, PAT, and TS with final dental school GPA were statistically significant. The correlation between gender, military status, parent in healthcare, and reading comprehension with final dental school GPA were not statistically significant.

Contrary to what we originally hypothesized, by far the largest indication of dental school final GPA was undergraduate GPA. Followed by this, PAT score was the second most significant predictor of final dental school GPA. Lastly, Total Science score of DAT was the only remaining statistically significant factor correlating with dental school grades. Surprisingly, Reading and Comprehension DAT had no correlation with dental school GPA.

Abstract #1
Comparing the perceived usefulness of a true proportioned stepwise 3D Crown preparation model in addition to lectures and handsouts, in increasing the understanding and confidence when the novice second year dental students prepare a single Monolithic Zirconia Crown. Authors: Rooh Afza, Dr. Gregory Bennett and Dr. Yoshiharu Ameku. Mentors: Drs. Gregory Bennett and Yoshiharu Ameku.

Objective: To compare the perceived usefulness of a true proportioned stepwise 3D Crown preparation model in addition to lectures, handsouts, in increasing the understanding and confidence when the novice second year dental students prepare a single Monolithic Zirconia Crown.

Material and Methods: Fifty-eight second year dental students were recruited into the study and allocated randomly into two groups, each group consisting of 29 students. One group received lecture and a picture of the 3D printed stepwise crown preparation model, and the other group received lecture and the 3D printed stepwise crown preparation models. Both these groups prepared a Monolithic Zirconia Crown preparation on tooth number 14 on the manikin in the simulation lab.

To obtain feedback on the 3D model and the picture of the 3D model, two different questionnaire surveys were distributed to both the groups. All the students completed the survey. The questionnaire survey explored students’ perceived benefits/drawbacks of the 3D model and the picture. The two teaching methods were compared using Fisher’s exact Chi-square test of independence.

Results: Different aspects of the 3D model and the picture were evaluated by a questionnaire using Likert scale. While there was no statistically significant evidence of an impact of group on the student’s performance, 72% of students in the 3D group felt positive and 0% felt negative about their performance while only 52% in the Picture group felt positive and 10% felt negative about their performance.

Conclusion: There appears to be a positive impact of using the 3D model method as a teaching tool as it improves student’s confidence and self-assessment.

Abstract #2
The Correlation Between Dental School Application and Success in Dental School. Authors: Caleb McKinley and Lottie Sjulin. Mentor: Dr. Merlyn Vogt.

Introduction: This study was designed as a blind, retrospective study from the UNMC College of Dentistry graduating classes of 2015, 2016, 2017, 2018, and 2019. This totaled 231 eligible dental students over the 5 dental classes. Pearson correlation coefficients were calculated for associations between continuous variables (e.g. test scores, grades) and final GPA. Independent samples t-tests were used to assess for differences in mean final GPA between dichotomous groups (i.e. gender [male/female] or parent in health care). A Wilcoxon Rank Sum test was used to assess for a difference in the distribution of final GPA between students with or without a military background. A t-test was not used due to small sample size. A general linear model was used to assess differences in mean GPA between the various class years and used Tukey’s adjustment for p-values of post-hoc pairwise comparisons. A mixed effect model was used to determine model adjusted effects of multiple variables’ associations with final GPA and included random intercepts for class year.

The correlation between undergraduate GPA, PAT, and TS with final dental school GPA were statistically significant. The correlation between gender, military status, parent in healthcare, and reading comprehension with final dental school GPA were not statistically significant.

Contrary to what we originally hypothesized, by far the largest indication of dental school final GPA was undergraduate GPA. Followed by this, PAT score was the second most significant predictor of final dental school GPA. Lastly, Total Science score of DAT was the only remaining statistically significant factor correlating with dental school grades. Surprisingly, Reading and Comprehension DAT had no correlation with dental school GPA.

Abstract #3
A survey of patient factors that influence the selection of where patients receive their orthodontic treatment in Midwestern states. Authors: Holly Hild and Shelby Rose. Mentor: Dr. Meenakshi Vishwanath.

Introduction: Advancements in technology and social media have given rise to a new form of dentistry – at home clear aligners. This product has been controversial in the dental community, but has shown a growing popularity in the general public. By understanding the driving force behind the general public’s decision in treatment methods, orthodontists and general dentists may be able to market to these patients and provide a safer mode of treatment.

Methods: A twenty-seven question survey was sent out through SurveyMonkey targeting the Midwestern general public. A screening question was used to target those who have had an interest in straightening their teeth. A total of 397 respondents answered this survey – 259 adults and 120 parents for their children. A Monte Carlo estimate of Fisher’s Exact Test was performed to analyze the statistical relationship between questions.

Results: Respondents significantly chose an orthodontist as their preferred orthodontic provider (p < .001). Even so, 34.93% of respondents had heard of at-home aligners, and 36.94% of respondents felt confident using at-home aligner
were selected based on the presence of both light microscopic cases from the UNMC COD Oral Pathology database. Cases from the Oral Pathology database.

**Abstract #4**

**Performance of 3D digital scanner versus visual examination for diagnosis of occlusal caries.** Authors: Selam Carlson and James Canans. Mentors: Drs. Luana Oliveira-Haas and Gregory Bennett.

The aim of this study is to compare the performance of 3D digital scanner (DS) using integrated fluorescence versus visual examination (VE) on the diagnosis of occlusal caries of extracted posterior teeth. The International Caries Detection and Assessment System (ICDAS) was used as standard for caries classification. 106 teeth will be mounted and three experienced examiners will be selected to inspect teeth with a two week interval between measurements. Inter-rater and intra-rater agreement will be assessed using intraclass coefficients. The diagnostic accuracy of digital scanner and visual examination will be compared to the gold standard (histological analysis). The null hypothesis is that digital scanning is more accurate than visual examination in the diagnosis of occlusal caries. Data analysis is currently underway.

**Abstract #5**

**Assessing the agreement of light microscopic evaluation of oral lichen planus lesions associated with direct immunofluorescence.** Authors: Blake Hansen, Dr. Jeffrey Payne, Dr. Peter Giannini and Kaeli Samson. Mentors: Drs. Jeffrey Payne and Peter Giannini.

Background: Lichen planus (LP) is a chronic inflamma- tory disease that affects the oral mucosa as well as extra- oral locations. Differential diagnosis can be challenging. Direct immunofluorescence evaluation of suspected LP lesions has been the standard to diagnose lesions since about 2013. Anti- bodies against IgA, IgG, IgM, C3, and fibrin/fibrinogen are commonly used in diagnosing LP-like lesions. The cost of analyzing a lichen planus specimen with DIF is significantly higher than light microscopy.

Objective: To evaluate the agreement between light microscopy and direct immunofluorescence in the histopatho- logical evaluation of oral lichen planus.

Materials: Records for evaluation included 59 LP cases, 17 lichenoid mucosis cases, and 69 non-LP or LM cases from the UNMC COD Oral Pathology database. Cases were selected based on the presence of both light microscopic and DIF evaluations. Data analysis was ongoing at the moment and we will look to discuss results and analyses of results once completed.

**Abstract #6**

**Accuracy of new generation intraoral scanners for digitized full arch fixed implant restoration workflows.** Authors: Andrew Egger and Benjamin Wachholtz. Mentor: Dr. Gregory Bennett.

Background: Accuracy is imperative for the fit of full implant prostheses. Without accuracy, stress is placed on surrounding bone and the mechanical implant compo- nents, which can lead to loosening or fracture. Early intraoral scanners have been used and limited to short span prosth- odontic restorations. Research has shown that intraoral scanners experience increased dimensional distortion as scan- ning increases. The aim of this study was to investigate the accuracy of new intraoral scanners for digitized full arch implant supported restoration workflows.

Methods: A 3D printed reference model of an eden- tulous mandible with 4 implant scan bodies was used for the scanning exercises. The reference model was scanned 10 times using each of the following digital scanners: 3Shape TRIOS 4, and CEREC Primescan devices all with the latest software. The parameters assessed were: average, root mean squared error (RMSE), standard deviation and variance. Primary focus was placed on trueness for scanner comparison.

Results: Preliminary results showed significant changes in the scans. There was increasing variance with the TRIOS 4, while the Primescan struggled to accurately capture the posterior portion of the implant scan bodies. Complete analysis of the data is ongoing.

Conclusion: New advanced intraoral scanning technology produces improved accuracy over previous generations; warranting possible use in full arch implant supported restorations. More investigation is required before digital workflow can be accepted as the standard practice for full arch implant prostheses. New software ver- sions and operator skill play major roles in improving accuracy.

**Abstract #7**

**The Effect of Periodontal Recall Intervals on Crestal Bone Loss in Patients with Local and Systemic Risk Factors.** Author: Early Johnson. Mentor: Dr. Amy Kileen.

The aim of this retrospective study was to more comprehensively assess the effect of the recall interval in patients who have bone loss in patients with certain systemic and/ or local periodontal risk factors. Systemic risk factors studied include: past and present tobacco use, xerostomia, osteoporosis, and diabetes mellitus. Patients utilized to topographically simplify acquisition of our scan. The same scanning pattern was followed for each scan, beginning with the maxillary anterior teeth. After scanning the right maxillary anterior teeth, the left maxillary anterior teeth were scanned. The null hypothesis for this study was that there was no statistically significant difference in bone levels between the groups.

**Abstract #8**

**Comparison of the effectiveness of the Echo360 and E-Module on developing skills of interpreting dental age from panoramic radiographs. Authors: Bo Chao and Saha Rafi. Mentor: Dr. Sunit Patel.**

Background: Studies of the literature show that entirely digital education or a mix of traditional and digital learning is the same or better in terms of medical education. The National Center for Education demonstrated that entirely digital education or a mix of traditional and digital learning is the same or better in terms of medical education.

Objectives: The objective of the research was to determine whether the students who used an e-module had the same or better learning outcomes compared to students who used Echo360.

Methods: The study included 264 students from the 2017-2018 academic year. The students were divided into two groups: one group was aged and gender matched to a corresponding patient in the stable group for this study. Data was then collected for each group of patients and then divided into 2 subgroups based on whether each patient had any systemic or local risk factors listed above. Statistical analysis is ongoing.

**Abstract #9**

**Survey of Digital dentistry utilization in practice by UNMC COD graduates since 2010.** Authors: Lucas Lunce and Preston Draasme. Mentor: Dr. Gregory Bennett.

Digitalization of dental technology has the potential to change nearly every aspect of day-to-day dental practice. Previous studies in Switzerland and Netherlands demonstrated that the younger the dentist, and the more recent the open- ing of their practice the more digital technology they used in practice. To our knowledge, there are no studies of American dentists, or Nebraska dentists. With more technologies being used by dentists, the aim of the study was to assess the utilization of digital dental technology.

The aim of this study was to assess the digital technology utilization in practice by UNMC COD graduates since 2010.

Methods: A survey was administered to 261 graduates of UNMC COD from the past ten years (2010-2020). There were 32 responses from the questionnaire.

Results: Of the 32 respondents, 100% of all respondents answered “yes” to using one or more digital technologies in their practice. Our findings indicate that digital equipment is being utilized by a majority of UNMC COD graduates.

**Abstract #10**

**Comparison of accuracy between an intraoral scanner and panoramic radiographs.** Authors: Sunit Patel and Aadil Toor. Mentor: Dr. Shayla Yoachim.

No studies to date have used visual inspection using surface anatomy landmarks to determine venous drainage patterns without using digital tools. Venous drainage is critical to clinical applications including central line catheterization, vascular and reconstructive neck surgeries, etc. Patient education provided by the health care provider can greatly patient anatomic information to minimize risks during clinical procedures. We wish to determine whether the addition of digital technology improves patient safety, whether it drills into internal jugular vein or external jugular vein.

Methods: The presented study aims to evaluate student and faculty awareness of the retromandibular vein drainage and whether it drills into internal jugular vein or external jugular vein. The primary objective was to determine the drainage of the retromandibular vein and whether it drills into internal jugular vein or external jugular vein. The secondary objectives were to determine the drainage of the retromandibular vein and whether it drills into internal jugular vein or external jugular vein. The results of the study were compared to the time it took for the students to complete the venous drainage task.

Conclusion: E-Module teaches as effectively as Echo360 does on the topic of interpreting dental age from panoramic radiographs. Both the teaching methods improved the students’ baseline knowledge and allowed for the retention of the information 8 weeks after the initial learning experience.

**Abstract #11**

**Comparison of accuracy between an intraoral scanner and CBCT.** Authors: Jordan Ingerolf and Dr. Gregory Bennett. Mentor: Dr. Gregory Bennett.

Objective: The objective of the research was to esti- mate the accuracy of CBCT scans using an intraoral scanner (ISOs) and cone beam computed tomography (CBCT) to scan a complete maxillary denture. The null hypothesis for our research is that there is no difference in the accuracy of scanning a complete maxillary denture between a Trios 4 IOS and a CBCT.

Materials and Methods: A complete maxillary den- ture was scanned by a 3Shape E3 lab scanner as a control for comparison. Then, the same denture was scanned 10 times with the Trios 4 IOS. The Trios 4 IOS Optimized was utilized to topographically simplify acquisition of our scan. The same scanning pattern was followed for each scan, beginning with the posterior teeth and finishing with the maxillary anterior teeth to capture the intaglio surface. The same denture was scanned 10 times with the CBCT using Romexis software. The authors evaluated the accuracy of the casts using the residual gap analysis technique.
scans were performed utilizing the software's model scanning technique. These participants were transferred to the scan of the maxillary denture than the IOS. The scan was significantly less accurate than the CBCT scans. They were analyzed and compared with the help of the UNL Mathematics and Statistics department.

Results: Data analysis is ongoing. Conclusions: To be determined.

Abstract #14

Periodically accelerated orthodontic osteotomies: a review.

Author: Brant McNew. Mentor: Dr. Gerald Tussing.

Abstract #13

Bruxism orthodontic design: effectiveness of an asynchronous learning pilot study.

Kari Hamano, Yang Ru, Ra

Abstract #12

Effect of incremental versus bulk placement of composite resin on depth of cure. Author: Mitchel Kaush. Mentors: Dr. Steven Haas and Luana Oliveira-Haas.

This study aimed to evaluate the effects of incremental versus bulk placement of composite resin on the depth of cure. This was accomplished by simulating a deep cavity preparation of 6mm. Three brands of resin-based co-reactive (RBC) resins were used to create the test samples: Tetric EvoCeram, Filtek Supreme Ultra Restorative, and Filtek Bulk Fill Flowable. Each brand of material was placed using both the incremental technique and the bulk-fill technique. These samples were light cured for 20 seconds per 2mm increment for the incremental technique and 20 seconds total for the bulk fill technique. Any uncured composite in the bulk-fill technique was immediately removed and depth of cure was determined using a light-curing radiometer. The null hypothesis was rejected as the CBCT scans were more accurate when scanning a maxillary denture than the IOS.

Results: Root mean square values (RMS) for each test were calculated for the CBCT and the mean RMS for the CBCT was 0.0784. The precision of the test was assessed with a T-value of 4.04 and a p-value of 0.00292.

Conclusions: Based on the results, the Ties 4 scans were significantly less accurate than the CBCT scans. A Paired T-test had a higher variance of the content and to provide feedback to enhance the information that will later be used in an e-module. Post test results will be analyzed and compared with the help of the UNL Mathematics and Statistical Analysis department.

Results: The data was analyzed and compared with the help of the UNL Mathematics and Statistics department.

Conclusions: To be determined.

Abstract #15


In a state-wide study done in Nebraska between 2011 and 2013, the number of patients seen for dental conditions in the emergency department (ED) increased each year, totaling approximately 3,500 patients in the year 2013. A majority of these patients were low-income and uninsured (1). It is not uncommon for these patients to be prescribed opioids in these situations. In a study of EDs in the US, on average, 50.3% of patients who present with non-traumatic dental pain to an ED receive a prescription for opioid drugs (2). In the state of Nebraska, medication prescribing practices are not standardized as these practitioners are legally allowed to administer oral injections of local anesthesia the same as dentists. However, these prescriptions tend to not receive adequate training or instruction on how to properly give injections. The aim of this study is to test if students of the three professions can properly be taught how to give oral injections for dental pain and E-Module, a pre-test, post-test, MD, PA, and NP students will have their test scores compared against the scores of third-year and fourth-year dental students from 2019 who used the first version of this test. This comparison will allow researchers to know if those who score above a threshold or clinical dental experience against those who had a didactic course oral injections, and who give them on a routine basis. The analysis of data is currently on going. The aim of this study is to test the efficacy of this E-Module acting as a continuing education course in the future.

Abstract #16

Applying RealWear Headset to education in dentistry. Author: Brian Skar. Mentor: Dr. Mary Lyons Fossiech.

In a state-wide study done in Nebraska between 2011 and 2013, the number of patients seen for dental conditions in the emergency department (ED) increased each year, totaling approximately 3,500 patients in the year 2013. A majority of these patients were low-income and uninsured (1). It is not uncommon for these patients to be prescribed opioids in these situations. In a study of EDs in the US, on average, 50.3% of patients who present with non-traumatic dental pain to an ED receive a prescription for opioid drugs (2). In the state of Nebraska, medication prescribing practices are not standardized as these practitioners are legally allowed to administer oral injections of local anesthesia the same as dentists. However, these prescriptions tend to not receive adequate training or instruction on how to properly give injections. The aim of this study is to test if students of the three professions can properly be taught how to give oral injections for dental pain and E-Module, a pre-test, post-test, MD, PA, and NP students will have their test scores compared against the scores of third-year and fourth-year dental students from 2019 who used the first version of this test. This comparison will allow researchers to know if those who score above a threshold or clinical dental experience against those who had a didactic course oral injections, and who give them on a routine basis. The analysis of data is currently on going. The aim of this study is to test the efficacy of this E-Module acting as a continuing education course in the future.

Abstract #16

Applying RealWear Headset to education in dentistry. Author: Brian Skar. Mentor: Dr. Mary Lyons Fossiech.

In a state-wide study done in Nebraska between 2011 and 2013, the number of patients seen for dental conditions in the emergency department (ED) increased each year, totaling approximately 3,500 patients in the year 2013. A majority of these patients were low-income and uninsured (1). It is not uncommon for these patients to be prescribed opioids in these situations. In a study of EDs in the US, on average, 50.3% of patients who present with non-traumatic dental pain to an ED receive a prescription for opioid drugs (2). In the state of Nebraska, medication prescribing practices are not standardized as these practitioners are legally allowed to administer oral injections of local anesthesia the same as dentists. However, these prescriptions tend to not receive adequate training or instruction on how to properly give injections. The aim of this study is to test if students of the three professions can properly be taught how to give oral injections for dental pain and E-Module, a pre-test, post-test, MD, PA, and NP students will have their test scores compared against the scores of third-year and fourth-year dental students from 2019 who used the first version of this test. This comparison will allow researchers to know if those who score above a threshold or clinical dental experience against those who had a didactic course oral injections, and who give them on a routine basis. The analysis of data is currently on going. The aim of this study is to test the efficacy of this E-Module acting as a continuing education course in the future.
Abstract #19
Effect of Layer Height on Internal Fit of 3D-Printed Crowns. Authors: Alej Maly and Benjamin Petry. Mentor: Dr. Gregory Bennett.
Statement of Problem: Very little data is available evaluating the trueness of the intaglio surface of computer-aided design and computer-aided manufacturing (CAD-CAM) crowns fabricated using 3D printing techniques.
Purpose: The purpose of this in vitro study was to evaluate the effect of layer height on internal fit of crowns by comparing the trueness of the intaglio surface of the printed crowns to the original.
Materials and Methods: A single tooth crown for #18 was digitally designed and printed with 2D denture tooth resin. 10 crowns were printed using 50 micron layer height, and 10 more were printed with 100 micron layer height. After printing, the intaglio surface of each of the crowns was scanned, and superimposed upon the original STL file to analyze the trueness. Then an ANOVA single factor analysis was performed.
Results: After ANOVA single factor analysis of the truenesses, a p value of 0.004757 was obtained, which means that there is a significant difference in trueness of the 50 micron layer and the 100 micron layer. Also, we obtained an F value of 10.363 and an F crit value of 4.414.
Conclusions: After the statistical analysis we can conclude that there is a significant difference in trueness of the intaglio surfaces of 50 and 100 micron layer heights. The 100 micron layer heights were more trueness than the 50 micron layer height. Also, because the F value was greater than the F crit value, we can reject our null hypothesis that said there would be no difference between the truenessers of the layers.

Abstract #20
Engineered Selective Noise Cancelling Device to Reduce Long Term Hearing Damage in Dental Settings. Authors: Jordan Verplank and Dr. Mark Berry. Mentor: Dr. Mark Berry.
Problem Statement: Noise induced hearing loss (NIHL) is a controversial problem in the dental setting. The goal of this study is to determine the sound exposure among students at UNMC College of Dentistry, determine if the exposure levels are within the set by OSHA, and use the results from the study to engineer a selective noise canceling device to reduce sound exposure.
Materials and Methods: The frequency of the high speed cutting (HSC) and non-cutting (HSNC), slow speed cutting (SSC) and non-cutting (SSNC), and manual cutting (MSNC) were measured using Decibel X software for iOS. Cutting was performed on natural teeth ex vivo. The test was using 13x3cm block of silcon rubber, modeling stone, and mounting stone. The time weighted average (TWA) of sound exposure was calculated using a software Geomagic Control X and compared to OSHA standards. LabView were used to select a model noise cancelling device based on collected data.
Results: Data analysis ongoing. Conclusion: Data analysis ongoing.

Abstract #21
Flexural strength of denture base acrylic resins formed by 3D printing methods. Authors: Dani Most, Mikelah Shaw and Dr. Gregory Bennett. Mentor: Dr. Gregory Bennett.
Statement of Problem: The flexural strength of denture base acrylic resins is more desirable with higher strength. Several methods of additive manufacturing technology have been introduced to fabricate dentures. These methods use similar resins with slight changes in which each layer is cured. This study aims to determine which 3D printing technology (SLA, low-force stereolithography (LFS-LA), or digital light processing (DLP)) will yield the highest flexural strength. Denture base resin (Original Peeks Denture Base Resin) was printed in Form3 (SLA), Form3B (LFS-LA), and Sprintray Pro (DLP).
Purpose: The purpose of this study is to compare the flexural strength of 3D printed denture bases with traditional gingival printers that use different curing technologies: sla, low force sla and dlp.
Materials and Methods: Three groups (n=10) of denture base resin were printed and flexural strength tested. The specimens printed were rectangular in shape (length 64 mm, width 9 mm, thickness 3.4 mm). The flexural strength was tested using a 3-point bend test. Along with flexural strength, the modulus of elasticity was evaluated using the student t test.
Results: Data analysis is ongoing. Conclusion: Data analysis is ongoing.

Abstract #22
Determining Characteristics of Rural Nebraska Dentists. Authors: Kathryn Moncrief, Jade Koch, Dr. John Reinhardt, Maai Sami Lam. Mentor: Dr. John Reinhardt.
One in five Americans lives in a rural area, and rural communities are often underserved by medical professionals – including dentists. So many because Americans live in rural areas, it is important that dental schools analyze whether they have high-quality demographic information on students who choose to practice in rural communities.
Objective: The investigation was designed to determine the demographic characteristics of rural and urban dental students.
Methods: Using data from the annual Health Professions Tracking Service 2019 Dentistry Profile survey, we analyzed the demographic information of 169 graduates from 2009-2018 who are practicing in Nebraska. We analyzed factors such as the population of the counties where these dentists graduated from, and the demographic background information to see if it was associated with their practice location.
Results: This study found that demographic information is associated with future practice location. Specifically, graduates of rural high schools comprised 82% of the rural dentists, but only 38% of urban dentists (p < 0.001). For this 10-year period, males represented 53% of graduates that remained in Nebraska and made up 63% of those choosing to join the rural workforce, significantly higher than the 46% of males in the urban workforce (p = 0.02). Urban settings had a larger proportion of non-resident dental students who remained in Nebraska (14%) compared to rural settings (4%; p = 0.03).
Conclusion: We found significant positive associations between the demographic factors such as being male, rural high school graduates, and in-state pre dental residents. Further studies are needed to determine if similar demographic information are found nationwide. This study was supported by a UNMC College of Dentistry Student Research Award.

Abstract #23
Comparison of the trueness and tissue surface adaptation of CAD-CAM maxillary denture bases manufactured using digital light processing, stereolithography, and continuous liquid interface printing. Authors: Justin Frey and Dr. Gregory Bennett. Mentor: Dr. Gregory Bennett.
Statement of Problem: There is a lack of sufficient studies evaluating the trueness of CAD-CAM maxillary denture bases manufactured using digital light processing, stereolithography, and Continuous Liquid Interface Printing (CLIP). Purpose: The purpose was to evaluate the trueness and tissue surface adaptation of different CAD-CAM (CLIP vs SLA vs CLIP) materials manufactured using different printers. Materials and Methods: A traditional maxillary master cast was scanned and used as the reference cast to virtually fabricate ten denture bases for each of the CAD-CAM manufactured different types (DLP SLA, CLIP); totaling 30 denture bases. The intaglio surface of each denture base was scanned and overlaid with the reference digital file. The software Geomagic Control X was used to obtain and measure the absolute distance from the intaglio surface of each denture base and compare it to the surface of the master model. The Mann-Whitney test and Kruskal-Wallis analysis of variance (ANOVA) was used for statistical analyses. Results: The Form 3B printer (SLA) had the best trueness results and the least amount of standard deviation when compared to the Carbon printer (CLIP) and the Sprintray Pro (DLP). The Form 3B printer (SLA) had the best adaptation. The Sprintray Pro had the next highest trueness values; however, it also had the highest standard deviation. Conclusions: Our results show that the Form 3B printer has the best trueness and surface fit compared to the Carbon printer (CLIP) and the Sprintray Pro (DLP). This study supports the use of SLA vs CLIP for the fabrication of CAD-CAM maxillary denture bases.

Abstract #24
Determine the role of palmitoylation on Nectin-2 function. Author: Bailey Peterson. Mentor: Dr. James Wahl.
Nectins are a family of calcium independent adhesive proteins that act in homophilic and heterophilic trans-interactions to mediate cell adhesion between adjacent cells. Nectin-based adhesion is also involved in the assembly of calcium dependent adhesions junction. Nectin-2 is the only member of the nectin family that is also present in cancers. The mechanisms controlling nectin-2 localization and function at the cell surface is poorly understood. We proposed that in non-transformed cell nectin-2 is localised at the cell surface and regulates calcium independent adhesion between adjacent cells. We identified a single cysteine in the cytoplasmic domain of nectin-2 that is palmitoylated. Mutation of this cysteine abolished palmitoylation and affected protein localization in UM-SCC-38 cells. Over expression of wild-type nectin-2 in these cells resulted in increased cell migration and expression of nectin-2 palmitoylation deficient mutant was unable to increase cell migration. Together these data suggest that palmitoylation of nectin-2 at a single cysteine side chain in the cytoplasmic domain of nectin-2 regulates protein localization and cell migration. Identification of the palmitoyl acyltransferase responsible for palmitoylation of nectin-2 will reveal a potential target for regulating nectin-2 activity in migrating tumor cells.

Abstract #25
Does orthodox treatment in children and adolescents increase the risk of non-carious cervical lesions and gingival recession? Authors: Andrew Brugh, Zachary Janeczok, Dr. Matthew Turnan, Dr. Luana Oliveira-Haas and SS Sundaralingam Premaraj. Mentors: Drs. Luana Oliveira-Haas and Sundaralingam Premaraj.
The role of orthodontic tooth movement in the development of non-carious cervical lesions (NCCCL) and gingival recession is still a debated topic. The objective of this study is to assess the effect of orthodox treatment in children and adolescents on the possible development of NCCCLs and gingival recession. This retrospective study will include a randomized sample of 150 patients who have received orthodontic treatment at the Orthodontic Clinic, UNMC, CMD, and UNO. Patients who have completed orthodontic treatment with fixed orthodontic appliances and complete set of pre- and post-treatment intraoral photographs and dental casts will be analyzed. Data collected at baseline initial treatment (TI) and at treatment completion (TC) will be compared. Data collected from patient records will comprise of: patient age, gender, orthodontic-diagnosis, orthodontic treatment, type of appliance, treatment duration, oral hygiene, gingival biotype, and presence of NCCLs and gingival recession. The chi-square test and logistic regression methods will be utilized to determine the data. Free and gingival recession distribution will be performed to evaluate NCCLs prevalence and gingival and regressive logistic regression models will be used to determine the relationship between Orthodontic treatment and the occurrence of NCCLs and gingival recession. A p value of <.05 will be considered to indicate statistical significance. The null hypothesis that there is no association between the orthodontic treatment and the occurrence of NCCLs and gingival recession.

Abstract #26
Class IV Composite Restorations: Color Perception of Composite Materials. Authors: Katie Moody, Kathleen Bartonek and Dr. Luana Oliveira-Haas. Mentor: Dr. Luana Oliveira-Haas.
Objective: With the increasing demand for esthetics in dentistry, the color preferences of conventional dentists have evolved for direct restorations of anterior teeth. The objective of this study is to compare the difference in color perception of dental students and orthodontists when evaluating different layered dental composite techniques. In addition, the correlation between technique level of difficulty and color perception was assessed.
Materials and Methods: Four right maxillary central incisors with standardized Class IV preparations (Flex Dentof orm®) were fabricated using four techniques. Each restoration was restored in order to gain perspective on private practice acceptance and level of difficulty (1 to 4 scores) with the use of two shades, the first shade being dentin, and the second being enamel on top of the dentin. The second technique used only one shade, a shade 2 layer that involved two shades, with the shade 1 layer being like the first technique, however they were placed in a “sandwich” fashion so that there was a lingual enamel shell placed first, followed by a dentin shade, and topped with the same...
Although the initial costs associated with intraoral scanning are greater than PVS, the revenue generated over time is more beneficial, indicating that some of the total benefits associated with intraoral scanning—both quantitative and qualitative—indicate a more profitable outcome over time. In order to maximize financial potential, practitioners must reassess their fee-for-service model and engage in lateral cephalometric imaging as their primary method of taking impressions.

**Abstract #29**

The Need and Usefulness for a Coagulation Cascade eModule at UNMC. Authors: Huy Nguyen and John Denton. Mentor: Dr. Larry Cronin.

**Abstract #30**

Level of Fear among Pediatric Dentists during COVID-19 Pandemic and Its Association to Their Community Member in-Formations in regards to inclusion which included responses on a Likert scale from 1 = not anxious, 2 = slightly anxious, 3 = fairly anxious, 4 = very anxious, and 5 = extremely anxious. This survey will be made available to any patient coming for procedures with a Modified Dental Anxiety Scale (MDAS). The following question sections will assess the anxiety associated with standard pre-COVID-19 PPE (clionic coat, level 2 surgical mask, and nitrous oxide gas). The MDAS will be scored 1-5 with 1 = not anxious, 2 = slightly anxious, 3 = fairly anxious, 4 = very anxious, and 5 = extremely anxious. This survey will be made available to any patient coming for procedures (aerosol or non-aerosol) in the Fall Semas-ter of 2020. There are no age, sex, race, or procedure require-ments for participants, however it is required that they are a COD patient, as opposed to family or friends of a patient. Pa-tients can only participate in the survey once. The first section of questions will be used to establish an overall dental anxiety measure based on the aforementioned MDAS. The following question sections will assess the anxiety associated with standard pre-COVID-19 PPE (clionic coat, level 2 surgical mask, toothpaste or Crest’s 3D White Toothpaste. The teeth were brushed with either Crest’s 3D Whitening Therapy with Char-coal Toothpaste or Crest’s 3D White Toothpaste. The teeth were brushed once for 30 seconds during each session. The placebo of Listerine® as an antibacterial agent. Conclusion: The results showed no significant differ-ence between the two treatment groups. Toothpaste groups with Listerine® COOL MINT, and clove extract were found to have a significant effect on S. mutans, indicating that EO clove can be used in the manage-ment of caries due to its potential inhibitory effects on S. mutans.

**Abstract #33**

The effects of new PPE for aerosol-producing dental procedures on anxiety levels of UNMC COD patients. Authors: Madeline Witte and Mikaya Reyken. Mentor: Dr. Steven J. Hancock.

With the emergence of Covid-19 there has been an increasing number of safety measures being taken in many clinics. These measures aim to prevent the spread of this virus, however it is unknown whether visual or verbal cues alluding to these safety measures assure patients of the safety (reduce anxiety), reinforce a reason to worry (increase anxiety), or have no effect. A survey was developed to evaluate patient anxiety levels at the UNMC COD undergraduate clinic. The survey was developed to assess the anxiety associated with aerosol-producing dental procedures. The survey will be used in addition to a Modified Dental Anxiety Scale (MDAS). The survey will be distributed to all patients coming to the clinic for procedures requiring ane-esthesia or sedation. The survey consists of a total of 10 questions, each rated on a scale of 1 to 5, with 1 indicating none, 2 = slightly anxious, 3 = fairly anxious, 4 = very anxious, and 5 = extremely anxious.

**Abstract #34**

Effect of the 360 Sonic Toothbrush Compared to Oral-B Genius on Plaque Control: An In-Vitro Study. Authors: Samantha Beal and Hayley Ray. Mentor: Amanda Dolen.

**Abstract #35**

A comparison of the effect of Listerine® and clove on streptococcus mutans: An in vitro study. Authors: Ciara Benes and Danielle Salvatori. Mentors: Dr. Thomas Petro, Amanda Dolen, and Dr. Larry Cronin.

**Study Purpose/Objective:** The purpose of this study was to compare Listerine® and the essential oil (EO) clove on their antibacterial activity against Streptococcus mutans. Materials and Methods: Blood Heart Infused (BHI) broth, positive control – sodium fluoride, negative control – phosphate buffered saline sterile, Listerine® COOL MINT, and clove extract. Participants: 50 participants were enrolled in the study. The participants were divided into two groups. The first group was given Listerine® COOL MINT and the second group was given clove extract. Results: The Colony Forming Units (CFUs) were count-ed yielding no growth for any samples, except the negative control, where there were too many counts. Conclusion: The results showed no significant difference in the number of colony forming units for the Listerine® and EO clove on S. mutans, indicating that EO clove can be used in the place of Listerine® as an antibacterial agent.

**Abstract #36**


**Study Purpose/Objective:** The purpose of this study was to determine the efficacies of charcoal as an additive in denti-trifluoride to yield whitening effects.

Materials and Methods: 32 extracted teeth were stained with walnut extract, then split into two groups of 16 teeth. Two groups were given two different researchers and were split into two groups again to be brushed with either charcoal or TheraBrite® (3M Oral Care). The charcoal was applied to the tooth surface using a clean toothbrush, then dried with a stream of water and then brushed with an electric toothbrush. The toothpaste was brushed once for 30 seconds during each session. The placebo of Listerine® as an antibacterial agent. Conclusion: The results showed no significant differ-ence between the two treatment groups. Toothpaste groups with Listerine® COOL MINT, and clove extract were found to have a significant effect on S. mutans, indicating that EO clove can be used in the manage-ment of caries due to its potential inhibitory effects on S. mutans.
and each brushing treatment the tooth shade was taken and recorded with a spectrophotometer and the values L*, a*, and b* were collected.

Results: Both groups showed a visible shade change from the initial shade reading to the final post-treatment shade. The Activated Charcoal group showed a significant shade change difference between each other (p=0.0010). Two sample T-test was conducted to analyze the data recorded to see if it was statistically significant. 

Conclusion(s): There was no significant shade difference between the Hello® and Colgate® groups and the regular whitening toothpaste group. This evidence provides reason to believe that using charcoal as an additive in whitening toothpaste is unnecessary and only adds abrasivity that may not be needed and could have potential to be harmful.

Abstract #37

Study Purpose/Objective: The purpose of this study was to evaluate the antimicrobial properties and growth inhibition in the presence of Swirlit tea - an anti-plaque beverage - in an in vitro setting.

Methods and Materials: Researchers obtained Brain Heart Infusion (BHI) Broth, BHI agar plates, Sodium Fluoride, and Phosphate Buffered Saline solution. The Phosphate Buff- ered Saline solution served as the control for the experiment. Three trials of the following seven solutions were completed for a total of 21 observations: 1) S. mutans diluted with BHI broth, 2) S. mutans diluted with Swirlit tea and Phosphate Buffered Saline solution, 3) S. mutans diluted with Camellia sinensis, 4) S. mutans diluted with sodium fluoride, 5) S. mutans diluted with Phosphate Buffered Saline solution, 6) Swirlit tea with no S. mutans, and 7) Camellia sin- ensis without S. mutans.

Results: The null hypothesis, that there would be no difference in S. mutans CFUs from exposure to Swirlit tea to exposure to Camellia sinensis, was rejected. Swirlit tea exhib- ited a 10.93 % reduction more than Camellia sinensis.

Conclusion(s): The test results influence the overall health of the oral cavity, specifically in regard to biofilm, plaque accum- ulation, and caries. Any reduction of S. mutans in the mouth is beneficial, and nearly 11% is a dramatic decrease. Clinically, if hygienists were able to advertise Swirlit Tea as an oral health beverage that has been shown to aid in the reduction of S. mutans influences the overall health of the oral cavity, specifically in regard to biofilm, plaque accumu- lation, and caries. Any reduction of S. mutans in the mouth is beneficial, and nearly 11% is a dramatic decrease. Clinically, if hygienists were able to advertise Swirlit Tea as an oral health beverage that has been shown to aid in the reduction of S. mutans.

Abstract #38

Study Purpose/Objective: In this study, researchers compared the remineralizing effects of an all-natural dentifrice containing nano-hydroxyapatite and a sodium fluoride natural dentifrice on artificial caries lesions. The remineralizing dentifrice contains sodium fluoride.

Methods and Materials: The study was an in vitro study conducted in a controlled environment. The Canary Sys- tem was utilized to obtain remineralization and remineralization values.

Results: As hypothesized, no significant difference between the dentifrices were found. 

Conclusion(s): The results suggest that nano-hydroxy-apatite is as effective at remineralization of enamel as sodium fluoride.

Abstract #40
A study of differing high-volume evacuator tips and their efficacy in removing aerosols. Authors: Abby Duffy and Emily Houtby. Mentor: Jaimee Shropshire.

Study Purpose/Objective: The purpose of the study was to compare three vacuums (PureVac, Saliva Ejector and Nu-Bind) in the elimination of aerosols produced during scaling.

Methods and Materials: Paper filter discs were used to collect the aerosols dispersions and four filter discs were placed at various orientations of 12.2, 4.6, 8, and 10 clock and at different dis- tances of one, two, and three feet. Scaling via the ultrasonic was performed on each mandible. The Canavan System was utilized to control the experiment. The Canary System was utilized to obtain remineralization and remineralization values.

Results: As hypothesized, no significant difference between the dentifrices were found.

Conclusion(s): The results suggest that nano-hydroxy-apatite is as effective at remineralization of enamel as sodium fluoride.

Abstract #41

Study Purpose/Objective: The purpose of this study was to observe a darkening effect in dental amalgam by com- paring whitening strips with hydrogen peroxide versus without.

Methods and Materials: Fifteen amalgam discs were made and placed into a humidifier at 85% to stimulate the oral environment. Five discs were used for a control group, five discs were attached to Crest Whitening Strips that had a 14% hydroperoxide concentration, and five discs were attached to Bostone Whitening Strips that had sodium hypochlorite as their whitening ingredient. The amalgam discs were analyzed using a color spectrophotometer at an initial color difference which was then compared at 24, 48, 72, and 96 hour intervals.

Results: An ANOVA test showed that the Crest Whit- ening Strips resulted in a darker color effect on the amalgam discs when compared to Bostone Whitening Strips. However, the results showed no significant color change when compared to the control group, as both groups had a smaller color change.

Conclusion(s): The hypothesis was rejected as the re- search showed that Crest Whitening Strips with strips with hydroperoxide did cause a darkening effect on the amalgam discs, but it was comparable to the control group.

Abstract #42

Study Purpose/Objective: The purpose of this study was to determine the erosive potential of Bang energy drink compared to regular caffeinated beverages like Coca-Cola. 

Methods: Twenty permanent molars and premolars were treated with hydrogen peroxide versus without peroxide: An in vitro study. Authors: Shelby Jones and Kaylene Roberts. Mentors: Lindsay Mundil and Hattareddy Gujula.

Methods and Materials: The study used extracted, virgin, third molars that had been exposed to whole bovine milk and almond milk. 

Results: The results showed that more S. mutans was able to grow in the presence of both whole bovine milk and almond milk, 92 responded “yes” and 13 responded “no”. Regarding school fluoride programs, 20 answered no to hav- ing on in place and 86 said that they do have a school fluoride program. When asked if the school nurses knew what decay looked like in the oral cavity, 102 responded “yes” and three answered “no”! All 100 nurses stated that their school does not have an intraoral camera.

Conclusion(s): To conclude the researchers found that education level does not have a significant effect on knowledge of the oral cavity. However, for every one year of experience the odds of knowing what to do with an avulsed was 1.24 times higher.

Abstract #45
In Vitro Study involving the growth of S. mutans in the presence of Whole Milk and Almond Milk. Authors: Sarah Scholl and Kaylene Roberts. Mentors: Lindsay Mundil and Dr. Thomas Petro.

Study Purpose/Objective: The purpose of this study was to test alternative milk sources, such as almond milk and compare them to whole milk’s ability to grow and reproduce Strep- tococcus mutans (S. mutans) in the oral cavity.

Methods: The amalgam discs were analyzed in the presence of both whole bovine milk and almond milk in incub- ators with carbon dioxide to create a pH similar to that of the oral cavity.

Results: The results showed that more S. mutans grew in the presence of whole bovine milk than almond milk.
Abstract #46


Introduction: Talon cusp is a protrubance on the lingual or facial surfaces of anterior teeth that often contains pulpal tissue. Early recognition of this anomaly in an increasingly diverse patient demographic would presumably help to prevent pulpal vitality and even endodontic failure. Unfortunately, the two recent systematic reviews of talon cusp only examined case reports regarding mandibular talons in 2014 and management options in 2016. Although this abstruseness seems to be a global entity, there is no database available to appraise and compile the current prevalence studies.

Objective: The aim of this systematic review was to examine the distribution of the prevalence, gender, laterality, and tooth type affected by talon cusp.

Methods: Seven electronic databases were exhaustively searched in English language and were screened with pre-defined inclusion and exclusion criteria. Hand searching was conducted, as well as peer consultation for searching the Chinese literature. The Joanna Briggs Institute Critical Appraisal checklist for the systematic review of prevalence studies was utilized for merit assessment.

Results: A total of 20 different countries including 6,129 individuals were included in the qualitative analysis. The prevalence among these countries ranged from 0.06% to 0.54%. The talon cusp revealed prominence in maxillary lateral incisors, with a slight predilection in males, unilaterality, and right-sided presenta- tion. Metana and aplastic anomalies were also evidenced.

Conclusion: The prevalence of talon cusp varies among countries where maxillary lateral incisors appear to be the most afflicted in developing countries, which seems to be minimal difference in gender or laterality.

Abstract #47

Barriers to Dental Provider Participation in Nebraska Medicaid for Children. Authors: Derek Mettenbrink, Z. Houser and H. Roberts.

Purpose: The purpose of this study was to identify potential barriers of Medicaid enrollment among pediatric dentists and general dentists within the state of Nebraska.

Methods: A questionnaire was sent to 43 pediatric and 848 general dentists within the state of Nebraska. The questionnaire consisted of 21 questions regarding demographic information and perceived barriers to Medicaid enrollment and dental provider participation. The data was analyzed using descriptive statistics and was presented in percentages.

Results: Pending. Conclusion: Pending.

Abstract #48

Usage of Sports Mouthgaurds by Pediatric Dentists and Pediatric Dental Residents. Authors: S. Burton, B. Reimer, Z. Houser, B. Skar and H. Roberts.

Purpose: The purpose of this study was to evaluate how pediatric dentists and dental residents recommend and prescribe sports mouthgaurds to their patients. Methods: A 15 question survey was sent to the AAPD membership via Survey Monkey. Responses were de-identified and responses entered into SPSS for statistical analysis.

Results: There were 561 responses received from the survey. There was a positive correlation between the number of dental trauma cases seen during residency and the number of sports mouthguardsth dentists currently fabricate in one year (P = .005). The prevalence in the number of sports mouthgaurds currently fabricated and the practitioner’s primary practice setting. Pediatric den- tists in private practice (26%) were more likely to fabricate sports mouthgaurds than dentists working an academic, corporate or public health setting (P = .006). There was no correlation between practice setting and the type of mouthguard recommended. Most pediatric dentists were recommending mouthguards for their patients (P = .213, P = .446, respectively).

Conclusions: Pediatric dentists who saw a large num- ber of sports-related dental injuries in residency were more likely to fabricate mouthguards for their patients. Pediatric den- tists who were in private practice were more likely to fabricate mouthgaurds than their counterparts in academia, corporate or public health practice; though academic dentists were equally likely to recommend mouthguards to their patients.

Abstract #49


Introduction: The aim of this study was to examine the characteristics of aerosols produced during orthodontic procedures. Processors may contain aerosols that can spread active microorganisms and cause infections. The risk of infection may be increased due to the widespread use of orthodontic procedures.

Objectives: The objectives of this study were to determine the aerosol characteristics produced during orthodontic procedures.

Methods: A pilot study was conducted in a closed-room dental operator setting on the production of aerosols produced during orthodontic procedures. The following orthodontic procedures were assessed: (1) cleaning of brackets by a scaler (SC), (2) bracket bonding by a bonding agent (BA), (3) debonding of brackets by a debonding agent (DA), (4) bracket placement by a bracket placement device (BPD), and (5) bracket removal by a bracket removal device (BRD).

Results: The results showed that the aerosol characteristics produced during orthodontic procedures varied. The highest aerosol production was observed during bracket bonding, while the lowest aerosol production was observed during bracket placement. The aerosol characteristics included particle size, concentration, and composition. Further studies are needed to determine the risk of infection associated with aerosol exposure during orthodontic procedures.

Conclusion(s): The research was limited to two trials and the results of the current study should be compared with future studies to establish the aerosol characteristics produced during orthodontic procedures.

Abstract #50


Purpose: The purpose of this study is to determine if local ap- plication of simvastatin is effective in increasing clinical attach- ment levels and alveolar bone in periodontal maintenance patients who undergo fixed appliances orthodontic therapy. Subjects undergoing PMT at the UNMC College of Dentistry and local private practice clinics will be recruited to participate in the ran- domized one year clinical trial based on the following eligibility criteria: (1) PMT (no further surgery), (2) fixed appliances only, (3) periodontally (regular- or generalized), 2), 2012. Randomization in participating PMT (within 3-6 month intervals, 3) no tumor (e.g. steroids, bisphosphonates, x-ray exposure in and general health general. 4) 1) One (2012-2015) experimental quadrant of the mouth with an inflated 6-mm interproximal periodontal pocket with history of bleeding on probing (OBP), 3) willingness to sign consent form. Subjects will be divided into 2 groups for additional therapy in a 6-month interproximal periodontal pocket at baseline: 1) local anesthesia and subgingival mechanical debridement plus simvastatin or 2) local anesthesia and subgingival mechanical debridement plus simulation and subgingival mechanical debridement plus simvastatin. The primary endpoint is the change in clinical attachment levels (CAL) and radiographic bone measurements between baseline and 1 year. Secondary endpoints include the change in CAL and radiographic bone measurements between baseline and 1 year, as well as the change in CAL and radiographic bone measurements between baseline and 6 months.

Conclusion(s): The research was limited to two trials and the results of the current study should be compared with future studies to establish the effectiveness of simvastatin in increasing clinical attachment levels and alveolar bone in periodontal maintenance patients who undergo fixed appliances orthodontic therapy.
present in the treatment room. A video camera will be placed so that the patient, operator and the dental assistant are in view, but so that the scorer is blinded as to whether or not the parent is present in the treatment room. Disruptive behavior of the child will be documented on a 15-second interval recording system using the North Carolina Behavior Rating Scale. After the dental appointment is finished, we aim to measure the guardians’ acceptability of their respective locations during their child’s dental treatment.

Results: Results pending.

Abstract #54
Applying RealWear Headset to Education in Dentistry. Authors: B. Skar, A. Jessen and T. Coffin.

Purpose: The UNMC College of Dentistry has obtained RealWear headsets to aid in dental education. The purpose of this study is to find the best possible way to use the headset to help advance student’s learning. RealWear headsets can be used to obtain live video recording of tasks, as well as provides recording for later review. For example, an anatomy professor can wear the headset while completing a cadaver dissection for students to watch live or view at another time. Students can wear the headset while treating a patient while the clinic professor can view the procedure live from his or her computer. RealWear headset can be worn by educators in pre-clinic lab to demonstrate for example the steps of implant placement. There are multiple uses for the RealWear headset technology and the intent of this study is to compile evidence as to how best use the headsets as an educational tool and how to make students most comfortable.

Methods: UNMC dental students were shown a short video which demonstrated four different ways RealWear headset can be used in dental education. After watching the video students are asked to complete a survey. Students will rank their impression on RealWear headset’s ability to enhance their learning in different areas including pre-clinic lab, anatomy lab, clinic, and practicing clinical skills while being recorded for a professor to watch live or review later. Students are asked what their comfort level would be using RealWear headset in different ways. Dental students are also asked if they are a visual, auditory, physical or reading/writing learner.

Results and conclusion are pending. Surveys have been sent out to the D1, D2, D3, and D4 UNMC College of Dentistry students. Once surveys are submitted data analysis will be completed.

Abstract #55

While guided endodontics has provided an answer to the task of canal localization as well as apex navigation, the technique can be applied in a wider range of clinical situations. This case report series describes the wide range of applications in which guided endodontics can prove relevant. Case 1 and 2 implement guided access preparation addressing a large internal/external resorptive lesion on #9, as well as significant canal calcification with apical periodontitis on #10. A CBCT and intraoral scan were taken, integrated and exported to a virtual planning software for individual 3D-printing of the fabricated guides. The technique performed illustrated an effective and reliable method for canal location and subsequent endodontic therapy through a long-span PFM FPD. In conjunction with the flap-and-restore of resorptive lesion, the external repair blocked out the apical 4 mm of canal. Another guide was designed and printed specifically to bypass the blockage and was performed with clinical success. Case 3 and 4 implement guided access preparation to implant indications. In both cases, the custom abutment crowns were made loose by faulty implant screws. Access guides were designed and printed in a similar fashion, and the occlusal access preparation led the operator directly to the screw for replacement and preservation of the implant crown. The patients were clinically and radiographically evaluated at 14 days, 6 months, and 12 months after treatment. The use of guided endodontics can be applied in many clinical situations in endodontics, as well as implant therapy, with high clinical dependability.

Abstract #56
The Efficacy of an Apex Locator in Detecting Working Length Measurements in Extracted Teeth With the Aid of the Protrain Device. Authors: Drs. Paul Pumilia and Hany Makkawy.

Introduction: Most undergraduate preclinical endodontic courses utilize radiographs to identify working length distances on extracted teeth. The Protrain device fixates extracted teeth and allows students to use an apex locator to obtain working lengths. The purpose of this study is to evaluate the accuracy of an apex locator on extracted teeth while fixated in the Protrain device.

Methods: Thirty single rooted teeth were accessed and positioned in the Protrain device. Working length was then determined using the Root ZX II apex locator. After shaving the apical segment longitudinally with a diamond bur, the point of minor constriction was identified with a k file cemented in place. The distance from the constriction to the file tip was then found. Distances were summarized using medians and interquartile ranges. A Kruskal Wallace test was used to examine differences in distance between tooth groups (incisors, canines and premolars). Spearman correlations were used to assess relationships between distance and working length.

Results: All of the files were overextended past the point of minor constriction when viewed under a stereomicroscope. The mean length of overextension was 0.67mm. The median distance of overextension for the premolar group was 0.66 mm. The summary statistics for the incisor and canine groups were similar. There was no significant difference in distance between the tooth groups.

Conclusion: If used in a preclinical course, 0.67mm should be subtracted from the working length obtained when using the Protrain device with the Root ZX II but is a welcome addition to an endodontic armamentarium.