



**2021 LLUH VIRTUALHOMECOMING**  
***LLUSD POSTER SESSION PROGRAM***

WELCOME!

Join us virtually to celebrate the scientific research achievements  
of our students at School of Dentistry!

This is a great opportunity to stay up-to-date with comprehensive research,  
listen to the students' presentations, and actively engage in research discussions.

Mark your calendar and save the date to participate on March 4 and March 5, 2021.

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Thank you!

Homecoming

## Poster Presentation Schedule and Awards

|                                              | <b>Dental Hygiene Student Competition</b>                                                                                                                                              |          | <b>Dental Student Competition</b> |          |            |
|----------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|-----------------------------------|----------|------------|
|                                              | Community                                                                                                                                                                              | Clinical | Community                         | Clinical | Scientific |
| Date                                         | Thursday March 4, 2021                                                                                                                                                                 |          | Friday March 5, 2021              |          |            |
| Time                                         | 1:00 - 4:00 PM                                                                                                                                                                         |          | 8:00 AM - 12:00 PM                |          |            |
| Award Announcement                           | Awards will be announced via email on Friday March 5, 2021                                                                                                                             |          |                                   |          |            |
| 1 <sup>st</sup> Place                        | \$600.00                                                                                                                                                                               | \$600.00 | \$600.00                          | \$600.00 | \$600.00   |
| 2 <sup>nd</sup> Place                        | \$300.00                                                                                                                                                                               | \$300.00 | \$300.00                          | \$300.00 | \$300.00   |
| 3 <sup>rd</sup> Place                        | \$150.00                                                                                                                                                                               | \$150.00 | \$150.00                          | \$150.00 | \$150.00   |
| AADR/Dentsply Sirona Award                   | A crystal engraved award to honor the individual selected to represent LLUSD in the 2022 AADR/Dentsply Sirona Student Clinician Research Program in Atlanta Georgia March 23-26, 2022. |          |                                   |          |            |
| Student Research Mentor of the Year (DDS/DH) | This award recognizes faculty (DDS/DH) who have demonstrated a longstanding commitment to mentoring student researchers that align with LLUSD's vision and mission.                    |          |                                   |          |            |

**Thursday March 4, 2021 1:00 – 4:00 PM**

Poster 21001 CLN1

**The Effect of Hydrogen Peroxide Rinse on ATP Caries Risk Testing**

*Alexa Campbell\*, Madison Hillman\*, Ayumi Mayfield\*, Sydney McKenna\*, Brian Pheng\*, Madison Verska\*, Shelly Withers, Udochukwu Oyoyo*

Loma Linda University School of Dentistry, Loma Linda, CA

Poster 21002 CLN2

**The Quest for an Alternative to Hydrogen Peroxide Whitening**

*Elisabeth Crespo\*, Sarah Phelps\*, John Cua\*, Rachel Ramirez\*, Gina Roque-Torres, Udochukwu Oyoyo, So Ran Kwon*

Loma Linda University School of Dentistry, Loma Linda, CA

Poster 21003 CLN3

**Antibacterial Effect of Nanoparticle-Infused Toothbrush Bristles**

*Jasmine Hicks\*, Herriett Truong\*, Heidi Beisigel\*, Sandra Saucedo\*, Annalie Adlaon\*, Mary Campbell-Beachler, Udochukwu Oyoyo, Ryan Sinclair,<sup>1</sup> Christopher Perry,<sup>2</sup> So Ran Kwon*

Loma Linda University School of Dentistry, Loma Linda University School of Public Health,<sup>1</sup> Loma Linda University School of Medicine,<sup>2</sup> Loma Linda, CA

Poster 21004 COM1

**Knowledge of Hand Hygiene Between Dental Healthcare Professionals**

*Robert Hysa\*, Mikayla Lopez\*, Thang Ngo\*, Sara Pak\*, Arraiya Perez\*, Stanford Shin\*, Udochukwu Oyoyo, Shelley Hayton*

Loma Linda University School of Dentistry, Loma Linda, CA

Poster 21005 COM2

**Oral Anatomy: The Impact of Face-to-Face Education compared to Distance Learning Education**

*Daisy Gutierrez\*, Samantha Jauregui\*, Guadalupe Jordan\*, Nadine Tawfik\*, Mayra Venegas\*, Zuleika Villarreal\*, Udochukwu Oyoyo, Shirley Lee*

Loma Linda University School of Dentistry, Loma Linda, CA

Poster 21006 COM3

**Relationship of Perceived Risk Due to COVID-19 and Anxiety Levels in Students**

*Emily Aguilar\*, Kimberly Coy\*, Dana Gabriel\*, Carol Diaz\*, Courtney Lewis\*, Christine Rodriguez\*, Euni Cho, Udochukwu Oyoyo, Patricia Lennan*

Loma Linda University School of Dentistry, Loma Linda, CA

Poster 21007 COM4

**Effects of Online Interactive Oral Health Education on Migrant School Children in California**

*Michelle Abad\*, Priscila Larios\*, Sarah Rangel\*, Tracy Thai\*, Theo Tzeng\*, Nina Yu\*, Michelle Loomis, Udochukwu Oyoyo*

Loma Linda School of Dentistry, Loma Linda, CA

\* Students

**Friday March 5, 2021 8:00 AM - 12:00 PM**

Poster 21008 COM1

**Success of Primary Teeth Pulpotomy Treatment in Patients with Hereditary Bleeding Disorders**

*Katelyn Ordway\*, Samah Omar, Udochukwu Oyoyo*

Loma Linda University School of Dentistry, Loma Linda, CA

Poster 21009 COM2

**Radiographic Assessment of Alveolar Bone Levels in Elderly Individuals with Metabolic Syndrome**

*Jacqueline LeNoir\*, Richard Chong\*, Jordan Dobbin\*, Hyeon Kim\*, Leticia Lenoir, Ahmed Khocht*

Loma Linda University School of Dentistry, Loma Linda, CA

Poster 21010 COM3

**Dental Students' Perspectives on Clinic Assisting and Observation**

*Chelsea Paclibar\*, Alina Madgwick\*, Alice Lim\*, Isaac Arakaki\*, Udochukwu Oyoyo, Soh Yeun Kim*

Loma Linda University School of Dentistry, Loma Linda, CA

Poster 21011 CLIN1

**Ability of Intraoral Scanners to Capture Crown Finish Line at Various Depths**

*Christopher Chaffin\*, Eugenie Choi\*, Jorald Feliciano\*, Udochukwu Oyoyo, Brian Goodacre*

Loma Linda University School of Dentistry, Loma Linda, CA

Poster 21012 CLIN2

**What is the Most Accurate Technique for a Digital Interocclusal Record?**

*Rina Inaba\*, Joshua Penners\*, Brian Goodacre, Udochukwu Oyoyo*

Loma Linda University School of Dentistry, Loma Linda CA

Poster 21013 CLIN3

**Feasibility of At-Home Intraoral Photography by the General Public Using a Smartphone Application**

*Angela Chan\*, Kevin Jahng\*, Crystal Yeap\*, Udochukwu Oyoyo, So Ran Kwon*

Loma Linda University School of Dentistry, Loma Linda, CA

Poster 21014 SCIEN1

**Digital Imaging Filters and Their Effect on Detecting Vertical Root Fracture**

*Gurinder Singh\*, James Smith\*, Simrun Sandhu\*, Somyung Ji\*, Gabrielle Dennis\*, Gina Roque-Torres, Dwight Rice*

Loma Linda University School of Dentistry, Loma Linda, CA

Poster 21015 SCIEN2

**Micro Computed Tomography Analysis of Abrasivity of Toothpaste Tablets Compared to Conventional Toothpaste**

*Mohammed Shaikh\*, Guada Lund\*, Gina Roque-Torres, Udochukwu Oyoyo, So Ran Kwon*

Loma Linda University School of Dentistry, Loma Linda, CA

Poster 21016 SCIEN3

**Tooth Bleaching with Light Activation: Intensity Matters**

*Prarthit Mehta\*, Joshua Lee, Yooseok Shin, So Ran Kwon*

Loma Linda University School of Dentistry, Loma Linda, CA

Poster 21017 FACULTY1

**COVID-19 Educational Experience: At-Home Waxing and Webinars for Tooth Morphology**

*Charles J. Goodacre, DDS, MSD, Reema Younan, DDS, Vaughn Kearbey, DDS, Michael Fitzpatrick, DDS*

Loma Linda University School of Dentistry, Loma Linda, CA

Poster 21018 FACULTY2

**Effect of paroxetine on Bone Mineral Density and Volume, A real-time in-vivo micro-computed tomography**

*Khalid AlHezaimi, BDS, MSc, FRCD(C)*

Loma Linda University School of Dentistry, Loma Linda, CA

## Dental Hygiene Student Poster Abstracts

### Poster 21001 CLN1

#### **The Effect of Hydrogen Peroxide Rinse on ATP Caries Risk Testing**

*Alexa Campbell\*, Madison Hillman\*, Ayumi Mayfield\*, Sydney McKenna\*, Brian Pheng\*, Madison Verska\*, Shelly Withers, Udochukwu Oyoyo*

Dental caries is a multifactorial disease that involves many complex risk and protective factors. A risk factor for caries is bacteria that normally reside in the mouth. These bacteria can mutate and produce acid which has the ability to demineralize enamel and cause disease. A strategy to help prevent caries is to determine patients' caries risk. LLUSD utilizes the CariScreen Caries Susceptibility test to measure the level of bacterial ATP in plaque biofilm, which aids in determining risk. Previous research indicated that cariogenic bacteria use significantly more ATP than non-acid-producing strains. The purpose of this pilot study was to determine if the results of the CariScreen test would be altered by a prophylactic hydrogen peroxide rinse, and produce inaccurate information regarding patients' caries risk. We hypothesized that the results of the CariScreen test will be lower if a hydrogen peroxide rinse is administered prior to the CariScreen test, compared to the results without. A sample size of twelve participants was used to evaluate our hypothesis. The CariScreen test was administered to each participant with and without a hydrogen peroxide rinse. The data collected was analyzed using a paired samples t-test. We concluded that hydrogen peroxide, due to its antimicrobial properties, has the ability to alter the results of the CariScreen test. The data revealed a generally lower caries risk for patients who may actually have a higher caries risk due to the prophylactic rinse. Future studies should include a larger sample size to reaffirm our results.

**Keywords:** Dental Caries Risk, Hydrogen Peroxide, Bacteria, CariScreen, ATP

### Poster 21002 CLN2

#### **The Quest for an Alternative to Hydrogen Peroxide Whitening**

*Elisabeth Crespo\*, Sarah Phelps\*, John Cua\*, Rachel Ramirez\*, Gina Roque-Torres, Udochukwu Oyoyo, So Ran Kwon*

**Objectives:** The study evaluated the efficacy and potential erosion of non-peroxide compared to hydrogen-peroxide whitening strips. **Methods:** Color samples (N=64) were distributed into four groups. NC: Negative control treated with water; BT: Non-Peroxide Brilliant Dissolving Strips; FM: Non-Peroxide Fancymay Teeth Whitening Strips; WS: Crest 3D Brilliance Hydrogen-Peroxide White Strips. A spectrophotometer was used to measure color at baseline (T1), 1-day post-treatment (T2), and 1-week post-treatment (T3). Teeth were cut to a rectangular block for microCT erosion assessment. Samples (N=30) were divided into five groups. In addition to four groups for color-assessment a positive control (PC) treated with 0.25% citric acid was added. Erosion-depth was measured using a microCT program. Kruskal-Wallis test determined differences in color change and erosion depth among groups. Tests of hypotheses were two-sided with alpha of 0.05. **Results:** Mean  $\Delta E^*ab$  at 1-day/1-week post-treatment were 2.4/2.5, 2.8/2.9, 2.8/3.2, and 8.6/11.0 for NC, BT, FM, and WS respectively. There was a statistically significant difference for  $\Delta E^*ab$  at 1-day and 1-week post-treatment ( $P < 0.001$ ). WS had highest color-change while the other groups did not differ from each other ( $p > 0.05$ ). Mean erosion in microns were 0.52, 0.58, 0.42, 0.49, and 29.55 for NC, BT, FM, WS, and PC respectively. There was a statistically significant difference among groups ( $P = 0.004$ ). Group PC had the greatest erosion while the other groups had negligible erosion that did not differ from each other ( $P > 0.05$ ). **Conclusion:** Peroxide whitening strips have superior efficacy than non-peroxide strips. None of the tested products compromise tooth structure integrity through enamel erosion.

**Keywords:** Hydrogen Peroxide, Sodium Chlorite, Whitening Strips, Tooth Color Change

### Poster 21003 CLN3

#### **Antibacterial Effect of Nanoparticle-Infused Toothbrush Bristles**

*Jasmine Hicks\*, Herriett Truong\*, Heidi Beisigel\*, Sandra Saucedo\*, Annalie Adlaon\*, Mary Campbell-Beachler, Udochukwu Oyoyo, Ryan Sinclair,<sup>1</sup> Christopher Perry,<sup>2</sup> So Ran Kwon*

**Objectives:** The study evaluated the antibacterial effect of conventional nylon toothbristles compared to silver and gold nanoparticle infused bristles. **Methods:** The laboratory study involved the use of *E. Faecalis* (EF), a gram(+) facultative anaerobe which is found in healthy humans but can cause serious infections. The following three toothbrushes were tested, NC: Oral-B® 35 tuft toothbrushes with soft bristles (Procter&Gamble); AG: Doctor Plotka's Antimicrobial Silver Toothbrush (Mouthwatchers); AU: Nano-BTM Gold & Charcoal Toothbrush (Nano- B); PC: Oral-B® immersed in Peroxyl mouthwash (Colgate-Palmolive). All toothbrush types were contaminated with *E. Faecalis* solution for 1 hour, and then dried for 1, 3, and 6hrs. At each time point, bristles were immersed in PBS solution and 50  $\mu$ L dropped onto agar plates and incubated overnight for colony counting the next day. Kruskal-Wallis test was used to

evaluate difference in colony counts among the groups. Friedman's test was used to evaluate change within the groups. Tests of hypotheses were two-sided with an alpha level of 0.05. **Results:** There was no statistically significant difference among the three groups at 1 hr and 3 hrs ( $P > 0.05$ ). At 6 hrs, AU had the lowest count while NC had the highest count.

**Conclusion:** Our pilot study sheds light on the antibacterial effect of nanomaterial infused toothbrushes. Based on the results we partly rejected/accepted our null hypothesis. Although there was no difference at 1 hr and 3 hrs, at 6 hrs the gold toothbrush bristles had an inhibitory effect compared to conventional toothbrushes.

**Keywords:** Antibacterial effect, Toothbrush, Nano-Gold, Nano-Silver

#### Poster 21004 COM1

##### **Knowledge of Hand Hygiene Between Dental Healthcare Professionals**

*Robert Hysa\*, Mikayla Lopez\*, Thang Ngo\*, Sara Pak\*, Arraiya Perez\*, Stanford Shin\*, Udochukwu Oyoyo, Shelley Hayton*

**Objectives:** Bringing attention to the importance of proper hand hygiene techniques in the dental clinic and gauging participants' understanding of the subject. **Methods:** Cross-sectional survey responses were obtained through LLUSD's online survey platform, "Qualtrics". This 14-question survey was sent through email to determine the knowledge of proper hand hygiene techniques and demographics in the following three groups: dental clinicians, dental school professors, and dental students attending LLUSD. This questionnaire is adapted from a study conducted by Thakker and Pradeep (2015). Descriptive statistics on the survey items were run in order to analyze the frequency and proportion of responses. The data was cross-tabulated using chi-squared analysis, determining any significant association between a variety of variables. **Results:** A pairwise comparison determined that the greatest difference in percentages was between the Professors and Students, and the smallest difference was between the Professors and Clinicians. However, these differences were statistically insignificant with  $p$ -values  $> 0.05$ . **Conclusion:** We reject our first null hypothesis, the overall percentage of questions scored correctly was 65.1% which was statistically significantly higher ( $p$ -value  $< .001$ ) than 50%. We failed to reject our second null hypothesis, there was no statistical significance ( $p$ -value = 0.056) in the difference of percentages answered correctly among the groups. Our research showed that dental professionals were more knowledgeable about the proper hand hygiene methods when given a standardized test regarding the subject. The statistical significance of the data proves that dental professionals learned correct asepsis procedure and also apply their knowledge when in a clinical setting.

**Keywords:** Dental clinicians, dental professionals, dental students, hand hygiene.

#### Poster 21005 COM2

##### **Oral Anatomy: The Impact of Face-to-Face Education compared to Distance Learning Education**

*Daisy Gutierrez\*, Samantha Jauregui\*, Guadalupe Jordan\*, Nadine Tawfik\*, Mayra Venegas\*, Zuleika Villarreal\*, Udochukwu Oyoyo, Shirley Lee*

**Objectives:** Determine the impact and information retention of students' face-to-face learning compared to distance learning of Oral Anatomy by using test scores from both the Junior Cohort of 2021 and the Junior Cohort of 2022. We hypothesize that there will be a significant difference between face-to-face in classroom setting learning versus distance learning. **Methods:** This study utilized DNHY 305 Oral Anatomy course from Loma Linda University School of Dentistry, Department of Dental Hygiene. The acquired data included scores comparisons: Individual Quiz Scores DH 2021 vs. Individual Quiz Scores DH 2022, Midterm and Final Exam Scores for DH 2021 vs. Midterm and Final Exam Scores for DH 2022. As a retrospective research, a total estimate of (77) scores. The Cohort of 2021 included (39) students and Cohort of 2022 included (38) students. **Results:** Our results revealed a minor difference in the midterm-exam and final-exam of Oral Anatomy between the two cohorts. The median value for Cohort 2021 was lower than that of Cohort 2022. In the final exam, the mean for Cohort 2021 was 42.3, while the mean for Cohort 2022 was 43.4. Within both the midterm and final,  $p > 0.05$  so is statistically insignificant. **Conclusion:** The data results showed that online learning versus face-to-face learning had no significant difference between Cohort 2021 and Cohort 2022. The only statistical significant difference was shown in some quizzes. The results did not prove a significant difference between Cohort 2021 and Cohort 2022 and showed that online learning is as beneficial as face-to-face learning.

**Keywords:** face-to-face learning, virtual, online education

Poster 21006 COM3

**Relationship of Perceived Risk Due to COVID-19 and Anxiety Levels in Students**

*Emily Aguilar\*, Kimberly Coy\*, Dana Gabriel\*, Carol Diaz\*, Courtney Lewis\*, Christine Rodriguez\*, Euni Cho, Udochukwu Oyoyo, Patricia Lennan*

**Objectives:** To investigate experiences and interventions which affect students' perception of risk, and the associated anxiety, in dental and dental hygiene students at Loma Linda University during the COVID-19 pandemic. **Methods:** An Institutional Review Board application was filed to confirm exempt status for this study (IRB #5200434). The study includes an anonymous survey sent out to 601 dental and dental hygiene students via Qualtrics. The statistics were compiled and compared with 6 demographic and 13 risk/anxiety related questions. The study included the previous graduating year (2020) in opposition to studies done on pre-COVID-19 students and their anxiety level results. We would have 80% power to detect a 20% difference in anxiety scores (effect size = 0.67 at an alpha level of 0.05). The difference in anxiety scores was used to evaluate the ANCOVA. All statistical analysis and tests of hypotheses were conducted using our version 3.6.2. **Results:** COVID-19 affected anxiety of our Dental, IDP and DH students ( $P > 0.001$ ) This new clinical environment did negatively affect students' level of anxiety, with the degree of anxiety linked to both perceived risk of infection with COVID-19, and training in clinical interventions and infection control procedures designed to limit transmission of the disease. ( $P > 0.5$ ). **Conclusion:** Our null hypothesis was that the new clinical environment would not affect students' level of anxiety. We did not get the sample size we aimed for, but we obtained enough responses from our data with evidence to accept our hypothesis and reject the null hypothesis.

**Keywords:** Anxiety levels and COVID-19, Dental Hygiene students, Dental students

Poster 21007 COM4

**Effects of Online Interactive Oral Health Education on Migrant School Children in California**

*Michelle Abad\*, Priscila Larios\*, Sarah Rangel\*, Tracy Thai\*, Theo Tzeng\*, Nina Yu\*, Michelle Loomis, Udochukwu Oyoyo*

**Objectives:** To determine the effectiveness of an online interactive approach to oral health education among migrant school children ages 8-11, in California. **Methods:** An Institutional Review Board (IRB) application was filed to confirm exempt status for this study (IRB #5200400). Two classes for a total of 52 students ages 8-11 were recruited and divided into two groups. Group 1 will receive the informative oral health education presentation while Group 2 will receive an interactive presentation which incorporates a powerpoint game. Both groups will be presented with an introductory overview on six dental-related topics: what to expect at the dental office, proper techniques for brushing, as well as flossing, the benefits of fluoride, the etiology and management of cavities, and lastly nutrition. All students will take a survey one week preceding and one week following the oral health education program. This will allow us to compare the differences in the student's knowledge regarding oral health and attitudes towards visiting the dental office. Through statistical analysis we will determine whether differences in the pre-survey and post-survey data represents a statistically significant finding. **Results:** To be determined. **Conclusion:** The findings of our study will provide insight on effective means to develop worthwhile, transient oral health education programs that are capable of improving the overall oral health knowledge of the participants, while also leading to positive oral health behavior changes. Ultimately, the results will provide insight regarding information processing and learning in migrant children.

**Keywords:** Oral Health Education, Migrant School Children, Survey, Interactive, Informative, Presentations

## Dental Student Poster Abstracts

### Poster 21008 COM1

#### **Success of Primary Teeth Pulpotomy Treatment in Patients with Hereditary Bleeding Disorders**

*Katelyn Ordway\*, Samah Omar, Udochukwu Oyoyo*

**Objectives:** To determine the clinical and radiographic success rates of pulpotomy treated primary teeth in patients diagnosed with hereditary bleeding disorders (HBD) compared to healthy patients. **Methods:** Thirty-four children with HBD treated at Loma Linda University (LLU) from 2008-2020 were identified after Institutional Review Board approval was obtained (#5200382). Eight teeth that had at least one pulpotomy treatment done and came back for follow up were included in the study as HBD sample. A control group of 24 healthy patients that met the same inclusion criteria were randomly selected to match the age and gender of the bleeding disorders group. The clinical and radiographic success rates for all patients were determined and compared for both groups at 6, 12, 24, and 36 months and longer. Descriptive and inferential statistics were done using Jamovi software. A mixed effects model ANOVA was used with an alpha level of 0.05. **Results:** Overall clinical and radiographic success rates in the HBD group were 100% for all follow-up periods. Overall clinical and radiographic success rates for the healthy group were 91.7% and 79.2%, respectively. There was a 20.8% difference in overall pulpotomy success rate between groups. No statistically significant association between overall pulpotomy success and HBD status was observed ( $p = 0.160$ , 95% CI: -0.371, -0.0459). **Conclusion:** There was no statistically significant difference among overall pulpotomy success rates of HBD patients compared to healthy patients. Pulpotomies were 100% successful in our HBD group and should be considered as a viable treatment option for this population.

**Keywords:** bleeding disorders, pulpotomy, primary teeth

### Poster 21009 COM2

#### **Radiographic Assessment of Alveolar Bone Levels in Elderly Individuals with Metabolic Syndrome**

*Jacqueline LeNoir\*, Richard Chong\*, Jordan Dobbins\*, Hyeon Kim\*, Leticia Lenoir, Ahmed Khocht*

**Objectives:** Metabolic syndrome (MetS) is a cluster of metabolic conditions that increase the risk of heart disease, stroke, and diabetes. This study aimed to test the hypothesis that MetS is associated with alveolar bone loss in elderly individuals. **Methods:** Institutional Review Board exempt status for this study (#5200441). Search queries scanned LLU School of Dentistry patient records (2016-2020) to identify dentulous individuals  $\geq 60$  yrs., with a minimum of 15 teeth and a full mouth series of digital periapical radiographs. The concurrent presence of central obesity, type 2 diabetes and hypertension was used to determine MetS. Alveolar bone level (BL) on interproximal sites of all teeth was measured from periapical radiographs. The distance from the cemento-enamel junction (CEJ) to the most coronal point where the periodontal ligament space remained at normal width was measured in millimeters. Examiners were blinded to MetS status. Power analysis indicated 29 records per group are needed at 80% power. **Results:** Out of 2369 records of individuals  $\geq 60$  yrs., random sampling selected 40 MetS cases and 40 healthy controls. Fifteen records were discarded due to inadequate radiographs. The significance of the difference in BL between MetS cases and controls was determined using the Wilcoxon rank-sum test. MetS cases showed higher average bone loss ( $p=0.03$ ) and greater percent of sites with  $\geq 4$ mm bone loss ( $p=0.02$ ) than controls. Multivariate analyses adjusting for age, race, sex, cigarette smoking, and plaque score confirmed the univariate findings. **Conclusion:** MetS was independently associated with alveolar bone loss in elderly individuals.

**Keywords:** Periodontitis, Metabolic Syndrome, Adult, Aged, 60 and over, Radiography

### Poster 21010 COM3

#### **Dental Students' Perspectives on Clinic Assisting and Observation**

*Chelsea Paclibar\*, Alina Madgwick\*, Alice Lim\*, Isaac Arakaki\*, Udochukwu Oyoyo, Soh Yeun Kim*

**Objectives:** To characterize the students' experience of clinic assisting and observation during the second year of dental school. **Methods:** An Institutional Review Board approval was obtained to distribute a survey which addressed the students' perception on the learning experience of assisting or observing upper classmates during their second year. The questions varied from ranking category to a 5-point Likert scale. Descriptive analysis was conducted, and the frequency of positive versus negative responses were calculated and compared.



**Results:** The response rate was 64.6%. When asked if assisting or observing upperclassmen was a valuable tool for learning and made transition into D3 year easier, 89% of respondents agreed, whereas 11% disagreed. When asked if they felt prepared to see patients after assisting/observing, 49% of the respondents agreed, whereas 51% of respondents disagreed. When asked if they felt that assisting/observing in clinic increased proficiency on axium, 78% of respondents agreed whereas 28% of respondents disagreed. Rotating on different specialty clinics was considered an enjoyable learning experience for 83.1% of students. 90.6% of students felt that time spent assisting in the clinic would feel more valuable if students were able to perform procedures under supervision.

**Conclusion:** The results are intuitive but this study is the first at LLUSD to confirm what has been described and supported by other studies in literature on the benefits of learning from experienced peers. The results suggest the degree to which students are supportive of the curriculum changes that have been made on clinic to address readiness.

**Keywords:** Assisting, Observing, Dental Students, Clinic Experience

Poster 21011 CLIN1

**Ability of Intraoral Scanners to Capture Crown Finish Line at Various Depths**

*Christopher Chaffin\*, Eugenie Choi\*, Jorald Feliciano\*, Udochukwu Oyoyo, Brian Goodacre*

**Objectives:** To investigate the ability of TRIOS intraoral scanner to obtain distinct subgingival finish lines. **Methods:** A dentofrom #14 all-ceramic crown preparation was inserted into five 3D printed AG-3 DA dental model that allow for the dentofrom tooth to be placed 1 mm supragingival, equigingival, and 1-3 mm subgingival. Using a TRIOS 3 IOS, all models were scanned with and without zoom. In Geomagic Control, all scans were superimposed upon a reference lab scan of the dentofrom tooth and color maps were generated using 3D Compare Analysis. Cross sections at twelve designated locations were generated. The distinctness of the finish line was measured by finding the radius using 2D Dimension. One way ANOVA and Pairwise Comparison tests were used to analyze and compare radii at each depth. **Results:** The 1 mm supragingival group produced the most clinically acceptable finish line with the least deviation from the reference scan and no missing data on the finish line. The equigingival finish line group did not produce any areas of missing data, but there was increased deviation. The 1 mm subgingival finish line group had a significant loss of data and greater deviation. The 2-3 mm subgingival group produced the most missing data and had the greatest deviation. **Conclusion:** As subgingival depths increased, the finish line distinctiveness decreased. The IOS was able to capture distinct finish line margins for both supragingival and equigingival margins. The zoom feature was able to capture a more accurate finish line across all groups, specifically as subgingival depth increases.

**Keywords:** TRIOS intraoral scanner, finish lines, dentofrom

Poster 21012 CLIN2

**What is the Most Accurate Technique for a Digital Interocclusal Record?**

*Rina Inaba\*, Joshua Penners\*, Brian Goodacre, Udochukwu Oyoyo*

**Objectives:** To determine if cast sizes, interocclusal record (IOR) locations, and scan paths affected the accuracy and reproducibility of the digital interocclusal record. **Methods:** 3D printed dental models with seven pairs of cones were designed, printed, and equilibrated so the tip of each cone contacted its partner in the opposing arch. The models were scanned into master casts using a TRIOS 3 intraoral scanner (3Shape) and then fixed rigidly together. The IOR was taken 5 times for each group. The scans were uploaded to analysis software (Geomagic Control) and the distance between the cones was quantified. Descriptive statistics and repeated measures ANOVA test were used to analyze the data. **Results:** Different regions of the casts as well as locations where the IOR was taken changed the level of IOR accuracy and reproducibility ( $p < 0.001$ ) whereas different scan paths tested did not significantly affect accuracy or reproducibility ( $p = 0.297$ ). **Conclusion:** When digitally articulating full arch casts a bilateral IOR is favorable. Stopping the capture of the IOR when the models are auto-aligned by the scanner leads to the most reproducible but not always most accurate results. When choosing the number of teeth to scan and size of the scanned IOR, capture the least amount of data required. When scanning the IOR, scan path is not as significant as IOR location.

**Keywords:** Digital Interocclusal Record, Intraoral Scanner

Poster 21013 CLIN3

**Feasibility of At-Home Intraoral Photography by the General Public Using a Smartphone Application**

*Angela Chan\*, Kevin Jahng\*, Crystal Yeap\*, Udochukwu Oyoyo, So Ran Kwon*

**Objectives:** To evaluate the feasibility of generating diagnostic images of dentition by having members of the general public use a smartphone application to take intraoral photographs at home. **Methods:** The Loma Linda University Institutional Review Board (IRB) approved this clinical study (IRB #5200481). Forty candidates were recruited from three age categories: teen (n=9), adult (n=22), and older adult (n=9). Subjects were given a research package which consisted of instruments and instructions for taking intraoral photos. Subjects completed a set of seven intraoral photos which were assessed for quality on a four-point scale by three calibrated examiners. The Friedman and Kruskal-Wallis procedures compared the mean score of the seven different photo types by age category and the mean scores of photos between the three different age categories. All tests of significance were two-sided and conducted at an alpha level of 0.05 with SPSS v25. **Results:** There was a significant difference in mean scores for taking the seven different types of photos within each age category ( $p < 0.001$ ). There was no significant difference in mean scores when comparing photo types between the three age categories ( $p > 0.05$ ). The average score for a full set was 3.4, 3.5, and 3.4 for teens, adults, and older adults respectively ( $P > 0.05$ ). **Conclusion:** Intraoral photos taken by the general public at home with a smartphone app were clinically acceptable and of diagnostic value, and there was no difference in quality among the three age categories. These techniques may see increased prominence as utilization of teledentistry increases in the future.

**Keywords:** Intraoral photography, Teledentistry, Older adults

Poster 21014 SCIEN1

**Digital Imaging Filters and Their Effect on Detecting Vertical Root Fracture**

*Gurinder Singh\*, James Smith\*, Simrun Sandhu\*, Somyung Ji\*, Gabrielle Dennis\*, Gina Roque-Torres, Dwight Rice*

**Objectives:** This study evaluated the efficacy radiographic filters in the detection of vertical root fracture. **Methods:** Thirty teeth were evaluated for this study using CMOS digital x-ray images. The images consisted of teeth with/without VRF in a phantom. Images include teeth without filling and three images with different filling materials, such as a post, gutta-percha, or carbon fiber. A total of 60 control and 60 experimental were acquired. A common dental imaging software was used to create four different images using the following built-in filters: contrast filter, inversion filter, sharpener filter, endo filter and the original unfiltered image. Three independent dental students individually scored the 600 images using a 5 point grading scale of: absence, probably absent, uncertain, probably present and present. Intra/inter-observer agreement was calculated to corroborated agreement. ROC (Receive Operating Characteristic) curve along with its 95% confidence interval (CI) to represent a point estimate of diagnostic accuracy and sensibility and specificity values was obtained. **Results:** ICC analysis showed excellent correlation. The most accurate ROC was observed with the contrast filter (AUC=0.769). The least accurate ROC was observed with the endo filter (AUC=0.702).

**Conclusion:** We concluded that original image with the contrast filter is the best image to diagnosis VRF.

**Keywords:** diagnostic filters, digital radiography, root fracture, endodontics.

Poster 21015 SCIEN2

**Micro Computed Tomography Analysis of Abrasivity of Toothpaste Tablets Compared to Conventional Toothpaste**

*Mohammed Shaikh\*, Guada Lund\*, Gina Roque-Torres, Udochukwu Oyoyo, So Ran Kwon*

**Objectives:** Use microCT to evaluate dentin and enamel abrasion depth caused by toothpaste tablets when compared to conventional toothpastes. **Methods:** Dentin (N=64) and enamel blocks (N=64) were randomized into four experimental groups of 16 specimens each for dentin and enamel. CP: Colgate Cavity Protection (Colgate- Palmolive, New York, NY) served as the low abrasive toothpaste; AW: Total Advanced Whitening (Colgate-Palmolive, New York, NY) was used to represent a highly abrasive toothpaste. Two different types of toothpaste tablets were used. DT: Denttabs (Denttabs GmbH, Berlin, DE) and BT: Bite tabs (The Kind Lab, Marina del Rey, CA). Blocks were brushed for a total of 10,000 and 40,000 strokes for dentin and enamel, respectively. On completion of brushing, specimens were scanned with a microCT system. Tomographic 3D reconstruction followed by abrasion depths measurements were performed. Kruskal-Wallis procedure tested abrasion depths among the different groups. Tests of hypotheses were two-sided with an alpha level at 0.05. **Results:** There was a statistically significant difference in dentin abrasion depth among the four groups ( $P < 0.001$ ). The dentin abrasion depth of AW was the highest with a mean of 230.3  $\mu\text{m}$  and was different from all other groups after multiple comparisons ( $P < 0.05$ ). The enamel abrasion depth of AW was the highest with a mean of 15.5  $\mu\text{m}$  and was different from all other groups after multiple comparisons ( $P < 0.05$ ) while CP, DT, and BT did not differ from each other ( $P > 0.05$ , in all instances). **Conclusion:** Dentin abrasivity of toothpaste tabs is negligible as substantiated with microCT.

**Keywords:** Micro Computed Tomography, Abrasivity, Toothpaste Tablets

**Tooth Bleaching with Light Activation: Intensity Matters**

*Prarthit Mehta\*, Joshua Lee, Yooseok Shin, So Ran Kwon*

**Objectives:** The mechanism by which light therapy activates the bleaching process is still not fully understood and remains a controversy. Theories of heat, chromogen excitation, and photocatalytic activation have been proposed, yet there is no scientific study to support conclusive evidence. The objective was to determine how effective different light sources perform when the bleaching agent used is the same. **Methods:** Extracted sound human molars were collected, prepared and randomized into treatment groups of 20 specimens each - Group NC: distilled water, Group OW-NL: 9% hydrogen peroxide gel without light, Group OW-OWL: 9% hydrogen peroxide gel with Optic White light, Group OW-AG: 9% hydrogen peroxide gel with Aura glow light, and Group OW-ZOOM: 9% hydrogen peroxide gel with ZOOM light. Tooth color was measured instrumentally with the VITA Easy shade spectrophotometer at baseline (T1), 1-day (T2), and 1-week post-treatment (T3). Additionally, the intensity and peak wavelength of each light-activating unit was measured using a radio spectrophotometer. One-way ANOVA was used to evaluate the differences among groups and Bonferroni tests were used for post-hoc comparisons. All tests used a significance level of 0.05. **Results:** There was no significant difference in all color parameters at baseline ( $P>0.05$ ). There was a statistically significant difference in overall color change at T2 and T3. After multiple comparisons Group OW-ZOOM showed the highest color change at T2 and T3. ( $P<0.05$ ). **Conclusion:** Bleaching with 9% hydrogen peroxide gel produces a perceivable tooth color change. Bleaching efficacy can be increased by using a high intensity light.

**Keywords:** Bleaching, light activation, overall color change

## Faculty Poster Abstracts

### Poster 21017 FACULTY1

#### **COVID-19 Educational Experience: At-Home Waxing and Webinars for Tooth Morphology**

*Charles J. Goodacre, DDS, MSD, Reema Younan, DDS, Vaughn Kearbey, DDS, Michael Fitzpatrick, DDS*

**Objectives:** To report the outcomes of presenting a 3-week intensive course in tooth morphology to first year dental students using “at-home” waxing projects and webinars. **Materials and Methods:** Students were provided with the instrumentation and materials required to complete 5 waxing projects at home during the 3-week course. In the same time period, the didactic content was presented via 11 webinar sessions. A post course survey provided student perspectives regarding this new experience. **Results:** Students were able to effectively complete high-quality waxing projects at home by using step- by-step images and videos but the survey indicated an over-whelming preference for in-person faculty feedback. Webinars based on the students having studied the 3D Tooth Atlas and an instructor reviewing content in the Atlas was effective in teaching the didactic aspect of tooth morphology as evidenced by the student grades and survey results. However, most of the students indicated a preference for physically going to class and being able to interact with faculty and classmates. **Conclusions:** The at-home waxing exercises produced very good results by having the students use step- by-step images and videos in the 3D Tooth Atlas. Students effectively learned the didactic aspects of tooth morphology through the webinars with accompanying use of the 3D Tooth Atlas.

**Keywords:** Tooth Morphology, At-Home Waxing, 3D Tooth Atlas

### Poster 21018 FACULTY2

#### **Effect of paroxetine on Bone Mineral Density and Volume, A real-time in-vivo micro-computed tomography**

*Khalid AlHezaimi, BDS, MSc, FRCD(C)*

**Objectives:** Selective serotonin reuptake inhibitors (SSRIs) reportedly inhibit bone metabolism. The aim of this real-time, in-vivo micro-computed tomographic ( $\mu$ CT) randomized controlled trial was to evaluate effect of SSRI (paroxetine) on bone regeneration. Measurements of bone volume (BV) and bone mineral density (BMD) of the newly formed bone (NFB) in standardized calvarial defects (SCD) in a rat model were made. **Materials and methods:** Fourteen female Wistar-albino rats (aged 6-9months; weighing 250-300grams) were randomly divided into test (n=7; oral paroxetine administered for 8-weeks) and control groups (n = 7; placebo administered for 8-weeks). All animals underwent surgery under GA for preparation of bilateral SCD (4.6mm diameter). SCD were filled with deproteinized particulate xenograft and covered by resorbable collagen membrane (RCM). Real-time in-vivo  $\mu$ CT to evaluate BV-NFB and BMD-NFB was done immediately after surgery (baseline) and at 2, 4, 6 and 8-weeks post-operatively.

**Results:** Gradual increase in BMD-NFB and BV-NFB in both test and control groups. In control group, the BMD/BV mean at 6-weeks and 8-weeks were significantly higher ( $p<0.01$ ) than mean BMD/BV at 2-weeks. Test groups showed significant increase from baseline in BMD & BV only at the eight weeks ( $p<0.01$ ). **Conclusion:** Based on the present real-time in-vivo  $\mu$ CT results, administration of paroxetine (5mg/kg/day) over a period of 8 weeks resulted in delayed increase and significantly lower BMD-NFB/BV-NFB.

**Keywords:** Selective serotonin reuptake inhibitors; Paroxetine; Bone regeneration; Bone volume; Bone mineral density; Micro-computed tomography