Basic Science

Poster #1

**New selective anti-Streptococci strategy for managing dental caries**
Abuna G, Pardi V, Cavanagh J, Murata R, Geraldeli S

**Objective:** The inclusion of the compound 2-amino-imidazole within a methacrylate polymer network will disperse selectively the biofilm formation without creating a dysbiosis.

**Materials and Methods:** One compound derivate from aminoimidazole was included in a sealant to test its abilities against the adhesion of S. mutans biofilm. Antibiofilm properties of the compound were tested in Overnight cultures of S. mutans UA159 in concentrations of 1000µM (in DMSO and PEG400), 500µM, 250µM, 125µM, and 62.5µM, used to test inhibition of the compound. The polymer network was assessed using FTIR-ATR and a flexural test. **Results:** The degree of conversion was not affected (H10: 94.6% and control: 93.5%). In addition, analysis of the IR spectra showed peaks at 1046, 1090, 1095 cm\(^{-1}\) for the imidazole ring that remain evident after polymerization of the compound. The flexural strength was improved dramatically in a 300%, and the graph showed a plastic material with higher toughness. The biofilm formed on the polymer were performed in 2 and 5 days. The reduction on the CFU and the biomass of the biofilm acquired demonstrates that the polymer has an antibiofouling properties. **Conclusion:** Our outcomes revealed that this new approach of dispersing the biofilm at early stages of formation is a viable prevention strategy to diminish the occurrence of caries lesions.

Poster #2

**Evaluating Neuroprotective Effects of Sulforaphane in a VPA-induced Autism Model**
Bessetti R, McCoy K, Litwa K

**Objectives:** In the last decade, there has been a substantial increase in U.S. autism spectrum disorder (ASD) diagnosis. Pregnant women are commonly exposed to environmental factors that can increase oxidative stress and thereby increase the likelihood of an offspring developing autism. A potential avenue for reducing oxidative stress and preventing the emergence of neurodevelopmental abnormalities is to enhance the body’s own detoxification and antioxidant pathways. NF-E2-related factor 2 (Nrf2) is a transcription factor that promotes the expression of cytoprotective and antioxidant genes. The phytochemical, sulforaphane (SFN), is a potent inducer of the Nrf2 pathway. SFN activates Nrf2 by preventing its proteasomal degradation, resulting in Nrf2 nuclear translocation and transcription of cellular detoxification and antioxidant genes. Thus, we hypothesize that SFN via Nrf2 will protect developing neural circuits from the detrimental effects of oxidative stress. To test this hypothesis, the objectives of our research are to 1) develop a human brain model of VPA-induced autism, 2) assess the efficacy of SFN to reduce the emergence of neurodevelopmental abnormalities and 3) determine whether SFN’s effects are through increased Nrf2 activity. **Methods:** To initially evaluate the efficacy of SFN to reduce oxidative stress and prevent altered neurodevelopment, we expose human cortical spheroids to VPA. Fetal exposure to the anti-epileptic drug VPA increases the risk of ASD diagnosis in humans.
and leads to autism-like behaviors in rodents. While VPA functions as an inhibitor of histone deacetylases, it is also known to increase oxidative stress. To test our hypothesis, we develop human cortical spheroids (HCSs) that resemble the fetal human brain, capturing the developmental window when neurons form synaptic connections and when the brain is particularly susceptible to environmentally induced alterations. Human cortical spheroids are exposed to VPA alone, VPA and SFN, SFN alone, or solvent control to investigate the neuroprotective effects of SFN in a VPA-induced autism model. In our current work, we used confocal imaging to assess synaptic alterations. We are also using CRISPR interference to establish whether SFN’s effects are mediated via the Nrf2 pathway. Results: While either VPA or SFN alone impairs synapse formation, in combination, they result in restored synapse formation. Likewise, VPA and SFN both increased Nrf2 nuclear translocation, which was further increased when VPA and SFN were together. To determine whether the effects of SFN are via Nrf2 antioxidant pathways, we have successfully used CRISPR interference to decrease Nrf2 expression.

Conclusions: Based on our findings, we are currently testing the hypothesis that synapse formation requires a delicate balance between oxidative stress and antioxidant buffering, and that SFN can restore oxidative homeostasis in the presence of environmental stressors.

Poster #3
Detecting SARS-CoV-2 From Dorm HVAC System Using PCR Method
Boatman B, Johansen L, Roper R, Sousan S
Objectives: As universities became more acclimated to the hardships of COVID-19, East Carolina University began to search for preventative detection methods as campus reopened for students. A method of sampling using the HVAC systems in dorms was implemented to determine if SARS-CoV-2 could be detected. This experiment was carried out based on the findings from the previous semester. Methods: Two experimental dorms were utilized during the four-month sampling period. Each experimental dorm contained one button air sampler that measured over a 24-hour period before collection. In one of the experimental dorms the AerosolSense sampler was deployed for 8 weeks before being transferred to the control dorm. One control dorm containing students with confirmed COVID-19 was sampled using four different methods: Button Sampler, Filter Cassette, BioSampler, and AerosolSense sampler, with sampling times ranging from 30 minutes to 24-hours. These collections were then sent for qRT-PCR analysis to detect for presence of the SARS-CoV-2 virus. Results: In the two experimental dorms, there was a total of 12 positives: 10 using the Button Samplers and 2 using the AerosolSense Sampler. In the control dorm, there were a total of 22 positive samples. Of the 22 samples, 11 were retrieved from Button Samplers, 4 from Filter Cassettes, 6 from the BioSampler, and 1 from the AerosolSense Sampler. Out of 203 samples collected over the semester, 34 were positive for SARS-CoV-2 after the qRT-PCR testing, with a success rate of 16.7%. Conclusions: Based on the data, it is possible to detect the SARS-CoV-2 virus using air samplers in HVAC systems of shared living spaces, such as dormitories. However, it does not have an exceptionally high success rate and cannot guarantee the detection of COVID-19. While this can be used as a detection method, it does have some caveats when being considered for widespread implementation.

Poster #4
Biochemical Analysis of Renin-Angiotensin System in (mRen2)27 transgenic form of Hypertension
Byrum R, Swami Vetha B, Aileru A
Introduction: Hypertension is a polygenic condition in which high blood pressure leads to cardiovascular complications, kidney failure and cerebral damage. The (mRen2)27 transgenic rat
A model of hypertension is characterized by overexpression of mouse Ren-2<sup>2</sup> gene in brain and adrenal gland, with a reduction in kidney renin. The (mRen2)27 rodent represents a model of hypertension in which the genetic basis for the disease is known but the mechanism responsible for elevated blood pressure remains elusive. However, alterations in the efficacy of sympathetic ganglionic transmission exist in these animals and are consistent with an important role in the neural control of arterial pressure. Both hypertension and sympathetic ganglionic alterations were reversed by an angiotensin converting enzyme (ACE) inhibitor, captopril, suggesting a role for endogenous angiotensin II (AngII) in the exaggerated nerve activities. The components of Renin-Angiotensin System (RAS) trigger complex signaling pathways and cellular processes that mediate and maintain ganglionic transmission and high blood pressure. The mainpressor component of the RAS, AngII, exists in many local organs and tissues. In many cases, local actions of the RAS complement the actions of systemic or peripheral RAS, but appear to be regulated, independent of the plasma RAS. **Objective:** to quantify the circulating levels of the RAS components; AngII, renin and ACE in this model of hypertension. **Methods:** Plasma AngII and ACE activities of rat’s serum was performed in duplicate by AngII Enzyme Immuno Assay Kit and ACE activity assay kit were measured in the blood serum, equilibrated to the room temperature. In 96-well fluorescence plate 40μL of assay buffer was mixed with 10μL of serum and that 50μl of substrate was added. **Results:** Plasma AngII in HnSD was greater (0.51±0.1 pg/mL) than that measured in (mRen2)27 hypertensive (0.12±0.05 pg/mL; *p<0.05; n=5). Plasma Renin concentration in HnSD (146±10 ng/mL; n=6) was greater versus measured in (mRen2)27 rat (76.3±14 ng/mL; n=7; *p<0.05). Plasma concentration of ACE is also greater in HnSD (0.9±0.008 nmol) than in (mRen2)27 rat (0.7±0.03 nmol; n=4; *p<0.05). **Conclusion:** The circulating level of AngII, ACE and renin are inversely proportional to the sustained blood pressure possibly a result of unregulated actions of systemic RAS, independent of the local RAS actions at the level of sympathetic synaptic transmission.

**Poster #5**

**Essential oils and their ability to combat fungal pathogens in contact with human gingival cells.** Cavaliere N, Abuna G, Murata RM

**Purpose:** To assess antifungal effects against Candida spp of Geraniol, Linalool, and Citronellal in contact with Human Gingival Fibroblasts. **Methods:** Three essential oils were assessed to find the antifungal properties without being cytotoxic. Human Gingival Fibroblast cells (1 x 10<sup>5</sup>) were seeded in 24 well plates with DMEM medium + 10% FBS and incubated at 37°C in 5% CO<sub>2</sub> for 24 hours. A Reductor of resazurin to resorufin was used to assess the cell viability. Candida spp (C. albicans MYA-2876, C. glabrata CBS-138, C. tropicalis MYA-750, C. dubliniensis MYA-646) were evaluated when treated with 5 mg/mL diluting 10 folds to find the MIC/MFC of Geraniol, Linalool, and Citronellal. **Results:** The cell viability has been established and confirms that Geraniol’s IC<sub>50</sub> = 223.5 μM (log [IC<sub>50</sub>] = 2.349 μM), Linalool’s IC<sub>50</sub> = 46.41 μM (log [IC<sub>50</sub>] = 1.667 μM), and Citronellal’s IC<sub>50</sub> = 93.31 μM (log [IC<sub>50</sub>] = 1.970 μM). MIC/MFC for Geraniol: C. albicans (792 μM/>500μM) C. tropicalis (4484μM/>50mM) C. glabrata (767μM/>50μM) C. dublinense (77.83μM/>50μM) for Linalool: C. albicans (5549μM/>500μM) C. tropicalis (1134μM/>50mM) C. glabrata (159μM/>50μM) C. dublinense (7516μM/>500μM) for Citronellal: C. albicans (/>50mM/>500mM) C. tropicalis (>50mM/>500mM) C. glabrata (>50mM/>500mM) C. dublinense (>50mM/>500mM). **Conclusion:** Geraniol and Linalool both showed antifungal properties at sub cytotoxic doses whereas Citronellal did not. Our outcomes proved the applicability of selected oils as alternative to synthetic agents in combating fungal pathogens.
Poster #6
Viral-Candida Interactions and Elucidation of Host Cell-Signaling Pathways
Lee K, Pasetto S, Murata R

**Background:** HIV is responsible for the development of AIDS. People with advanced HIV infection are vulnerable to opportunistic infections such as candidiasis often caused by the organism *Candida albicans*. Candidiasis affects up to 50% of untreated HIV-1 subjects and 90% of AIDS patients. Interestingly, HIV-1 interacts with *Candida* spp, and this interaction overrides the production of HIV-1 by infected macrophages. **Objective:** The aim of the study was to investigate the pathways by which *Candida* spp interfere with HIV-1 pathogenesis and to elucidate cell-signaling pathways of *Candida* pathogen associated molecular pathways. The pathways by which *Candida* spp affect HIV-1 infection involve the upregulation and downregulation of genes. **Methods:** Human monocytes (THP-1) were cultured in RPMI-1640 medium with 10% fetal bovine serum and 0.05mM of 2-mercaptoethanol at 37ºC in 5% CO₂. The cells were exposed to a variety of *Candida* spp (tropicalis, glabrata, and dubliniensis) and HIV-1 BaL for a period of 4.5 hours. RNA was extracted and purified utilizing a Qiagen RNA extraction kit. The RNA was reverse-transcribed, and the cDNA was barcoded and pipetted into an Oxford Nanopore Mk1C device for sequencing. The data from the Mk1C was analyzed using EPI2ME software to determine modulation of genes. **Results:** There is modulation of genes associated with the toll-like receptor signaling pathway which may induce proinflammatory effects. Over 8000 genes were analyzed using EPI2ME-LABS software and genes that showed a log2 fold change above 2 and below -2 were inputted into the DAVID functional annotation bioinformatics microarray analysis to find pathways with upregulation or downregulation. **Conclusion:** There is modulation of genes in response to candida infection in the toll-like receptor pathway which primarily involve the PI3K and MAPK signaling pathways. Inflammatory cytokines are upregulated and result in proinflammatory effects.

Poster #7
Expression of Na⁺/K⁺ ATPase Isoforms and Na⁺/Ca²⁺ Exchanger in Cardiac Myocytes of (mRen2)27 Transgenic model of Hypertension
Peele K, Swami Vetha BS, Aileru A

**Introduction:** The Renin Angiotensin Aldosterone System (RAAS) is composed of various reactions in the regulation of blood pressure and plays crucial roles in cardiovascular physiology and pathophysiology. Classically, renin cleaves liver-derived angiotensinogen (AGT) into angiotensin I (Ang I), a decapeptide [Ang (1–10)] which is then further processed by angiotensin-converting enzyme (ACE) into the octapeptide AngII [Asp-Arg-Val-Tyr-Ile-His-Pro-Phe, Ang (1–8)]. AngII is known to physiologically regulate blood pressure and is a key player in hypertension. AngII causes vasoconstriction and production of aldosterone leading to retention of sodium (Na⁺) and water resulting in cardiovascular dysfunction. **Objective:** is to study AngII receptor mediation and the expression of intramembranous transporter of Na⁺ and Ca²⁺ in cardiomyocytes and correlate activities of different Na⁺/K⁺-ATPase isoforms with the (mRen2)27 transgenic phenotype. **Methods:** The left ventricle of 12-15-week-old (mRen2)27 transgenic and Hannover-Sprague Dawley (HnSD) rats was isolated where protein was used for SDS PAGE and Western blotting analysis. **Results:** showed a significant increase in the Mean Arterial BP in (mRen2)27 transgenic rats but no change in pulse rate compared to HnSD control. There was a significant protein expression for AngII receptor sub-type 1 (AT₁R) in (mRen2)27 when compared to control normotensive rodent. There were no differences in Na⁺/K⁺ ATPase α-1 isoform in both strains but a significant diminution of α-2 isoform in (mRen2)27 transgenic hypertensive rodents, suggesting an increase in intracellular Na⁺ and Ca²⁺ concentrations in cardiac myocytes through the Na-Ca
exchanger system. **Conclusion:** The finding suggests an increased AT₁ receptor protein, a diminished Na⁺/K⁺-ATPase α-2 isoform expression and augmented intracellular Na⁺ and Ca²⁺ concentrations in (mRen2)27 transgenic hypertensive rodents, all of which may contribute to an increase in cardiac contractility, cardiac output, and sustained blood pressure.

**Poster #8**

**Angiotensin Receptor Subtype-2 in the neuroplasticity of autonomic ganglia in (mRen2)27 transgenic model of Hypertension.**

Swami Vetha B, and Aileru A

**INTRODUCTION:** The expression of mouse submandibular Ren-2d gene in rat model has been noted to develop fulminant hypertension mediated by systemic renin-angiotensin-aldosterone axis and an exaggerated sympathetic nerve activities (SNA) which is aggravated by local tissue renin-angiotensin system (RAS). We study the SNA in the superior cervical ganglion (SCG) to delineate role of local RAS in ganglionic transmission. Bath super fusion of angiotensin II (AngII) peptide on SCG provoked postganglionic dose-dependent response in the amplitude of compound action potential (CAP) and ganglionic long-term potentiation (gLTP) and are remarkably higher in (mRen2)27 rats compared with Hannover Sprague-Dawley (HnSD) control animals. Previous studies showed that AngII effects are abolished by angiotensin receptor blocker (ARB), candesartan, in both (mRen2)27 and HnSD rats, suggesting a postganglionic AngII subtype-1 (AT₁) receptor localization and mediation. The **OBJECTIVE** of the study is to the influence of AngII in the synaptic transmission and the relative expression of angiotensin-related receptors in the SCG of hypertensive animals. **METHODS:** To achieve the objective, SCG of a 12 – 16-week-old (mRen2)27 transgenic rats were isolated for extracellular recording. Tissue was processed for semi-quantitative reverse transcriptase (RT-PCR), western blot analysis for protein expression and confocal microscopy. **RESULTS:** Immunocytochemistry (ICC) analysis also showed a similar AT₁ receptor distribution and localization in the SCG neurons. AngII subtype-2 (AT₂) receptor is one of the main components of the RAS and has a significant prospective for mediating the beneficial action of the RAS through its protective arm of autonomic homeostasis. In (mRen2)27 hypertension, AT₂ receptor protein expression decreased about four folds with a substantial decrease in mRNA gene profile in the SCG neurons. There is a significant decline in receptor localization of the immunofluorescence images in (mRen2)27 when compared to age-matched control SCG. While the MAS receptor protein expression was reduced approximately ten folds and NOX4 specific protein reduced approximate 2-fold, the quantitative Real Time-PCR (qRT-PCR) analysis showed no differences in the \(^{2}\Delta\Delta^{Ct}\) expressed in mRNA as well as no distinct differences in the ICC images for MAS receptors in (mRen2)27 vs control, probably a result of a delayed translational modification of the proteins. **CONCLUSIONS:** AngII–AT₁ receptor axis and local angiotensin converting enzyme-2 (ACE2) conversion of AngII into Ang-(1–7), possibly promotes a reduction in oxidative stress species (ROS) and a reduction in NOX4 and MAS protein expression in (mRen2)27 SCG. We speculate that the significant diminution in AT₂ mRNA-receptor profile, the reduction in Ang-(1-7)-MAS mediated-receptor density and the reduced NOX4 specific protein expression may play an indirect role in the alteration and efficacy of gLTP in hypertension.

**Poster #9**

**Identifying the roles of Rab10 signaling in the brain**


**OBJECTIVES:** Reduced level and activity of the small GTPase Rab10 lead to retaining of normal cognitive function even in the face of dementia (“cognitive resilience”). To understand the
mechanisms of Rab10-dependent neuroresilience, we created Rab10 conditional KO mice. As Rab10−/− is embryonic lethal, our studies were performed on Rab10+/− mice. **METHODS:**

**Behavioral testing:** Open Field, Object in Place, Morris Water Maze, Novel Object Recognition, trace Eye Blink Conditioning. **Immunofluorescence:** coronal brain sections stained with anti-NeuN antibody to evaluate the effect of Rab 10−/− on brain morphology. **Transcriptome profiling:** gene expression analysis using the nCounter neuropathology panel. **qPCR:** to validate transcriptome profiling. **Western blotting:** to evaluate Rab10 reduction in the brain of Rab10+/− mice and to validate transcriptome profiling. **RESULTS AND CONCLUSIONS:** Phenotypical characterization of Rab10+/− mice show increased body weight only in female Rab10+/− mice, that is consistent with the metabolic role of Rab10. A battery of behavioral testing revealed that Rab10+/− mice perform better in a hippocampus-dependent spatial task (Object in Place test), while their performance in trace Eye Blink Conditioning (EBC) was impaired. Brain expression of 880 genes involved in neurodegeneration was analyzed with the NanoString Neuropathology panel. Rab10+/− mice show higher activation scores of pathways associated with neuronal metabolism; structural integrity; neurotransmission and neuroplasticity compared to their Rab10+/+ littermates. Lower activation scores were observed for pathways involved in neuroinflammation and aging. Among the differentially expressed genes (DEG) were: Stx2, Stx1b, Vegfa, Lrrc25 (downregulated); and Prkaa2, Syt4 and Grind2d (upregulated).

Transcriptome profiling was validated by qPCR and Western Blot analysis. Our findings indicate that Rab10 signaling differentially controls the brain circuitry of self-motivated and conditioned behavior. Moreover, transcriptomic, and biochemical characterization of these mice identified Glutamate Ionotropic Receptor NMDA Type Subunit 2D as a potential mediator of Rab10+/− behavioral phenotypes.

**Clinical**

**Poster #10**  
**Retrospective Analysis of Separated Endodontic Instrument Incidence and Outcomes**  
Adei E, Ajaj, M, Williams, B Schnoor, Z, Lindauer P  

**Objective:** 1) Determine the incidence of separated instruments during nonsurgical endodontic procedures in a dental school setting; 2) determine the survival rate for teeth having a separated instrument. **Methods:** A retrospective data analysis from electronic dental records in a dental school practice was performed. The database was searched for nonsurgical endodontic procedures between January 2011 and October 2021. Inclusion criteria included: any patient undergoing a nonsurgical endodontic procedure, follow up exam or odontogram, subsequent endodontic therapy or extraction code for the treated tooth. Cases were defined as those patients with a separated instrument occurrence from the nonsurgical endodontic procedure. Tooth survival was defined as an asymptomatic, functioning tooth post-instrument separation. The final analysis included 57 cases; seven of the teeth were excluded from survival analysis because the separated instruments were removed. **Results:** 12,577 patients were identified meeting inclusion criteria. Of these patients, 57 cases exhibited separated instruments for an incidence of 0.57%. The study group (n=50) included 32 females and 18 male patients between the ages of 12 and 79 years. All separated instruments were endodontic files: 11 hand files, 41 rotary files and five not specified. 17 teeth were treated by dental students, 38 by residents and 2 by faculty. Six teeth (12%) were subsequently extracted; all were in female patients (p<0.05). Kaplan-Meier survival curves showed survival rates at 2500 days post-procedure of 94% for patients treated by students, 87% for patients treated by residents and 100% for faculty (p>0.05). **Conclusion:** Retrospective analysis of extant data from an academic dental setting
indicates a low overall incidence of instrument fracture but a 12% tooth loss when instrument separation occurs. No statistically significant difference in tooth survival was noted among different provider groups.

**Poster #11**

**Case Report: Management of Tetracycline-Stained Teeth with Full Coverage Translucent Zirconia Crowns**

Ajaj M, Elgendy H

**Background:** Tetracycline has long been used as an antibiotic to treat several common bacterial infections. But it's use has long been associated with the common dental problem of tetracycline staining which causes esthetic issues for patients. Gastroesophageal Reflux Disease (GERD) is a common disorder in the public that results when the lower esophageal sphincter is abnormally relaxed or has a low resting pressure. The acidic contents of the stomach can be regurgitated into the esophagus and occasionally into the oral cavity causing severe hard tissue damage. The following case is of a patient who presented with a combination of tetracycline staining and GERD and the management of this patient’s esthetic and functional chief complaints. **Case Description:** We present the case of a 64-year-old Caucasian male who presented to the ECU School of Dental Medicine Advanced Care Clinic. The patient’s chief complaint was that he was experiencing esthetic and functional problems due to tetracycline staining and acid erosion from GERD on his maxillary anterior dentition. Evaluation presented severe acid erosion on teeth 6 through 11 with generalized tetracycline staining; most prominently on teeth 6 through 11. The patient opted to pursue full coverage translucent zirconia crowns on teeth 6 through 11. Diagnostic wax up and try-in were completed and the patient was satisfied with the proposed treatment plan. Lab fabricated zirconia crowns were then delivered on teeth 6 through 11. The patient was satisfied with the esthetic and functional result. **Conclusion:** Tetracycline staining varies in severity, proper planning can enable execution of the most appropriate restorative treatment, and preservation of healthy tooth structure. A detailed and comprehensive treatment plan is significant for achieving successful esthetic restorative outcomes. However, these results are only possible with collaboration and appropriate communication among laboratory, patient, and dentist.

**Poster #12**

**Anterior Esthetic Rehabilitation – A Digital and Traditional Planning Approach**

Allen M, Elgendy H, Martinez Luna AA

**Objectives:** Restoring esthetics is a common patient request; however, there are patients with high esthetic demands and certain oral conditions that compromise having an ideal outcome. Data collection and treatment planning must be incorporated to achieve an attainable result that will please the patient. Traditionally, this planning process included a wax-up from study models; nevertheless, this approach does not account for soft and osseous tissue deficiency. Newer digital workflows take these aspects into consideration. This case report details the hybrid use of both traditional and contemporary digital techniques, including videography.

**Methods:** A 72-year-old female patient presented to the ECU SoDM AEGD clinic for an implant at site #8. She expressed a desire to improve her smile, wanting her teeth aligned and proportionate. A thorough clinical assessment was performed, including impressions and pre-operative photographs. The study models were mounted and using landmark and soft tissue evaluation of the clinical photographs, a wax-up of teeth #6-11 was completed. The patient returned to the clinic for a mock-up presentation of the design. Images and video of the temporary materials were obtained. **Results:** The use of a mockup allowed the patient to
provide input on esthetics, comfort, and function of her planned restorations. She was also able to see herself speaking in real time. Finally, this mockup allowed the clinicians to have a blueprint for the final restorations and implant position. **Conclusions:** Utilizing digital analysis programs with high resolution photography and videography enables accurate evaluation of a patient’s anatomy and provides an efficient method for planning and visualizing results. The process is enhanced when digital methods are used in combination with a traditional and tangible 3D wax-up. This case shows that the use of these techniques in treatment planning esthetic cases can reduce error, enhance predictability, and create a result the patient is satisfied with.

**Poster #13**  
**Orthodontic Appliances Related Soft Tissue Trauma and Lesions**  
Baldwin, F, Vossers S, Williams, C, Bloss J, Hasan I  
**Objective:** The purpose of this review is to explore soft tissue trauma and oral lesions caused by orthodontic appliances and its impact on quality of life (QOL). This review seeks to outline preventative and treatment modalities for these patients. **Methods:** Searches were conducted using keywords related to orthodontic appliances and oral soft tissue trauma or lesions in PubMed, Embase, and Scopus resulting in 390 abstracts which were subsequently screened. Full text articles of accepted abstracts were obtained and further screened to provide 22 articles which qualified for this literature review based on screening requirements. **Results:** Dental trauma commonly involves soft tissues (15%-90% prevalence) in permanent dentition. There are several types of orthodontic appliances, but studies show that the majority of oral discomfort is experienced by patients wearing braces and headgear. Poor fabrication of appliances is a major concern for soft tissue abrasions and injuries of the oral mucosa. Injuries of the soft tissue during orthodontic treatment could lead to the appliance becoming sequestered in the oral mucosa, and/or surgical removal. Quality of life (QOL) was also investigated in this review, social angst was seen more in the groups of patients that had functional appliances, braces, and head gear. Patients wearing removable and functional appliances rarely complained of nutritional impediments or a decrease in QOL. **Conclusion:** This review shows the relationship between orthodontic appliances and incidences of soft tissue trauma and oral lesions. Due to the impact on quality of life of patients with lesions more studies are needed to explore the causes and possible prevention of these lesions. The role of materials used in appliances, and possible treatment options also needs to be investigated. This is an area which is largely ignored in research and the aim of this review is to increase awareness.

**Poster #14**  
**Periodontal regeneration in a 13-year-old patient: A Case Report**  
Conner C, Martinez Luna A, Gillone A  
**Objective:** The use of biomimetic agents and osseous grafts could aid to obtain periodontal regeneration in patients that present with infrabony defects. This case report presents the use of periodontal regenerative therapy to treat Stage III Grade C Periodontitis (previously termed “aggressive periodontitis”). **Material and Methods:** A 13-year-old male was referred to ECU SoDM Faculty Practice for comprehensive periodontal evaluation. Full mouth series, clinical photographs, and a comprehensive periodontal exam were obtained at the initial examination. Severe bone loss was noted around teeth #24 and #25 and vertical bone loss was present on first molars (except #14). The etiology of periodontal disease and oral hygiene instructions were discussed since the initial appointment. After phase I therapy, periodontal regeneration was completed on the infrabony defects using enamel matrix derivative in combination with
Results: The periodontal regeneration treatment yielded effective results and radiographic bitewings confirmed bone fill in the infrabony defects. The follow-up maintenance visits showed a reduction in plaque, bleeding, and probing depths. Conclusion: The use of a periodontal classification system that utilizes staging and grading with bone loss patterns could help to identify advanced periodontitis in young patients that need immediate intervention and referral to a specialist. Early treatment of young patients with periodontitis using a regenerative approach could lead to successful outcomes and improve the prognosis of the teeth.

**Poster #15**

**Oral Manifestations of Hemophagocytic Lymphohistiocytosis/Pancytopenia - A Case Report**

Eleidy S, Hasan I, Flores-Hidalgo A

**Introduction:** Hemophagocytic lymphohistiocytosis (HLH) is a life-threatening disorder characterized by uncontrolled activation of lymphocytes and macrophages resulting in hypercytokinemia, subsequent immune dysregulation, and injury of multiple organ systems as a result. HLH can cause severe neutropenia if left untreated, and patients often die from bacterial or fungal infections. Prompt initiation of treatment for HLH is essential for the survival of affected patients.

**Case Presentation:** 45-year-old female presented to the ECU School of Dental Medicine with bilateral tender ulcerations on the buccal mucosa at the occlusal plane level and hard palate. Oral mucosa sloughing was also noticed at the gingival margins of multiple mandibular teeth, with a grey-yellow appearance. The patient was later admitted through an ER visit to our Medical Center due to severe pancytopenia, where her condition worsened, including the developing of jaundice, excessive lethargy, and blood in the stool. The oral ulcers increased in size and became painful. Hematopathology later confirmed the diagnosis of HLH/pancytopenia and transaminitis AKI (acute kidney injury).

**Discussion and Conclusion:** The findings of this case report are consistent with those in the literature concerning clinical presentation HLH. The patient appears to have primary HLH and not associated with other underlying immune disorders. Typically, HLH is presented in secondary cases and may not be visible until late in the disease progression. Overall, such cases require careful listening to the patient’s history, performing a thorough physical examination, and additional laboratory investigations for a definitive diagnosis.

**Poster #16**

**Medical History of Patients see at ECU School of Dental Medicine: A 5-year Retrospective Review**

Flores-Hidalgo A, Hasan A, Camargo G, Troy S

Patients requesting dental treatment may have severe systemic disease and may be taking drugs that can influence dental treatment. Healthcare professionals responsible for the oral and dental health of these patients must ensure that the risks of systemic complications during or as a result of dental treatment are minimized. Patients who come to ECU SoDM dental clinics do not always report their past medical history, usually because they do not consider it essential or do not relate it to their dental problem. Adequate medical training and the taking of a detailed medical history, which must include the patient’s past medical and drug history, and interrogation about the general state of health, are essential to detect patients with relevant medical conditions and to avoid the risks derived from dental treatment.

To the best of our knowledge, few studies have correlated the systemic status of patients and dental needs encountered in Easter North Carolina. We present to report our institution’s experience, and the profile of the patient that seeks dental care at ECU SoDM, in the account of systemic conditions, medications, age, sex, ethnicity, socioeconomic status, among other
variables explained in this application. We believe the results of our investigation will lay the foundations of personalized dental treatment for our patients.

Poster #17
10-Yr Study of Posterior Restorations Placed in a University Setting.

Objectives: The purpose of this 10-yr retrospective study was to evaluate the annual failure rate and reasons for failure of amalgam (A) and composite resin (CR) posterior restorations placed by dental students at the University of North Carolina Adams School of Dentistry. Methods: This research study was approved by the UNC IRB # 16-0472. The electronic dental health records of patients receiving dental care under faculty supervision by 3rd and 4th year dental students at the University of North Carolina Adams School of Dentistry from Jan 1, 2003, to Dec 31, 2012, were evaluated for Class I and Class II A and CR restorations. A total of 5,155 restorations (n = 2932 A and n = 2,223 CR) met inclusion criteria. Patients (n = 3070) who had formal Caries Risk Assessments (High, Medium, Low) were evaluated as a sub-population. Results: Reasons for failure were noted and highest frequency occurrences included, in descending order of incidence, Secondary Caries (36.9 %), Restoration Fracture (13.1 %), Tooth Fracture (12.7%) and Marginal Deterioration (6.6%). Annual failure rates statistically significantly increased from 3.4%, 3.4% (1 surface) to 8.2%, 8.8% (4 surface) for A and CR (respectively), p<0.0001. First molar A and CRs were more likely to fail than first premolar restorations, HR=1.28 (CI 1.10-1.50). Composite Resin restorations were statistically significantly more likely to fail (35.6%) when rubber dam was not used versus when rubber dam isolation was used (29.0%), p = 0.008. High Caries Risk patients were more likely to have an A or CR failure than Low Caries Risk Patients, HR=1.57 (CI 1.25-1.98). High caries risk was attenuated after adjusting for the restorative material used (HR=1.46 (CI 1.25-1.70) with hazard ratio for composite being 1.09 (CI 0.95-1.24).

Conclusions: Amalgam and Composite Resin restorations demonstrated equivalent clinical performance over a 10-year period of evaluation. Key Words: Amalgam, Composite Resin, Annual Failure Rate, Caries Risk

Poster #18
Dental Visits for Children Awaiting OR Treatment
Kalaskey M, Webb M, Moss M

Objectives: To determine the relationship between the amount of time a child is on the dental operating room waitlist and the number and type of dental visits. Methods: Using data from the electronic health record (axiUM), dental visits between scheduling and completion of treatment in the OR will be analyzed. Results: Currently no data: pending. We expect to see more visits the longer the time the child is on the waitlist. Conclusions: Project in progress.

Poster #19
Incidence of Periodontitis Progression for Patients with the Lapse in Maintenance Therapy Secondary to the COVID-19 Pandemic

Periodontitis is a common, oral inflammatory condition affecting approximately half of U.S. adults. Observational studies indicate that periodontitis can be effectively managed with compliance to professional maintenance therapy. A recent systematic review and meta-analysis found that only 25% of periodontitis patients in maintenance exhibit periodontitis progression
over 5-10 years. Objectives: 1) to examine the effect of the COVID-19 pandemic on periodontitis patients and their scheduled maintenance within an academic practice-based network (PBN); and 2) to measure the incidence of periodontitis progression that occurred over the pandemic and closure of the PBN. Methods: This retrospective, cohort study utilized de-identified electronic health record (EHR) data from a PBN involving nine clinical sites. For inclusion, patients needed to have completed two periodontal maintenance visits (D4910), one prior to the pandemic closure (September 2019 – March 2020), and one after clinic reopening (May – December 2020). Patients also needed to have full mouth periodontal charting at the two maintenance visits. For the statistical analysis, mean changes in CAL were calculated along with the incidence of CAL loss according to defined thresholds. Results: 1,573 periodontitis maintenance patients met inclusion criteria for the analysis. Of these, 924 patients (58.7%) exhibited a mean loss of CAL (0.3 mm, SD 0.3), and 649 patients (41.3%) exhibited a mean gain of CAL (0.3 mm, SD 0.3) over the two maintenance visits. These mean CAL changes were not statistically significant (p>0.05). Meanwhile, 442 (28.1%), 334 (21.2%) and 262 (16.7%) patients exhibited CAL loss of ≥3 mm at ≥1 site, ≥2 sites, and ≥3 sites, respectively. 257 (16.3%), 140 (8.9%), and 82 (5.2%) patients exhibited CAL loss of ≥4 mm, at ≥1 site, ≥2 sites, and ≥3 sites, respectively. Conclusions: The data from this analysis support the use of site-based case definitions for periodontitis progression. The data also suggest that a sizeable proportion of periodontitis patients experienced disease progression over the COVID-19 pandemic and lapse in maintenance care.

Poster #20
Full-Arch Implant Placement Using a Magnetically Connected Surgical Guide
Martinez Luna, AA, Gillone A, Abdelaal M, Paquette, DW
Objective: Digital workflows for implant placement and rehabilitation have gained popularity over the years due to improved accuracy, reduced surgical time, better communication, and improved prosthetic outcomes. Currently, there are multiple stackable guide designs for alveoloplasty and guided implant placement. This case report will describe a novel technique that utilizes a stackable 3-piece 3D printed guide that is magnetically connected. Material and Methods: A 62-year-old healthy female patient presented to the University of East Carolina School of Dental Medicine clinic for comprehensive treatment. She had a history of periodontal disease and demonstrated excellent compliance. Following full-mouth extractions due to extensive attachment loss and esthetics, she received complete dentures. To improve function, a mandibular hybrid denture was planned. A CBCT was exposed using a dual-scan protocol. After image superimposition, 4 implants and respective abutments were planned to use CoDiagnostix® software. A 3-piece magnetic guide was designed using several software and 3D printed. Following local anesthesia and flap reflection, the base of the guide was magnetically connected to the verification guide to ensure the correct position and fixed using pins. The verification guide was removed and alveoloplasty was completed up to the level of the base using a piezotome. The implant placement guide was magnetically connected to the base and 4 Straumann® bone level tapered implants were placed using a guided protocol. Results: The 3-piece magnetically connected surgical guide for alveoloplasty, and implant placement was successfully used to obtain the required restorative space and allowed an exact restoratively driven implant placement and position for a full-arch mandibular hybrid complete denture. Conclusion: The described fully digital technique allows for a precise alveoloplasty and guided implant placement using a stable guide that could be easily fixed and assembled during the surgical procedure without losing the planned implant position.
Poster #21
Lip repositioning, an Innovative Approach for the Treatment of “Gummy” Smile: A Case Report
Martinez Luna AA, Gillone A, Elgendy H

Objective: The demand for esthetics has significantly increased, driven by patient awareness and search for an ideal smile. Creating the perfect smile is an intricate process that requires a multidisciplinary approach, with careful consideration of the lips, maxilla, and the gingival outline. Excess gingival display due to maxillary excess results in an unaesthetic smile. This case report describes the use of the lip repositioning technique to treat this problem. Materials and Methods: A 38-year-old female presented to ECU SoDM Faculty Practice Clinic with the chief complaint of excessive gingival display. Clinical examination and pre-operative measurements lead to the diagnosis of excess gingival display due to maxillary excess and lip hypermobility. At maximum smile, the patient showed the teeth and gingiva from first molar to first molar, with 5-6 mm of gingival display with normal dental anatomic proportions. Under local anesthesia, the mucogingival junction and upper limit of the muscular insertions was marked with a diode laser. Using a scalpel, the points were connected, and a band of soft tissue was removed using partial thickness dissection. The diode laser was used to remove the muscular insertions and achieve hemostasis. Using 4-0 PTFE suture, tissues were adapted and sutured to the new mucogingival junction. Results: Post-operative examination and measurements were obtained. The lip hypermobility was significantly reduced, and the lip was successfully positioned coronally. Upon maximum smile, the gingival display was significantly reduced. There was no gingival display on the anterior teeth and minimal on the posterior teeth. The patient was pleased with the esthetic result. Conclusion: Lip repositioning has emerged as an innovative and effective way to improve the “gummy” smile. This intervention is predictable, less time consuming and cost-effective, as compared to other invasive methods such as orthognathic surgery. However, adequate case selection and thorough diagnosis are necessary to obtain successful outcomes.

Poster #22
Comparison of CBCT prescription among Ross Hall and CSLCs
Phen C, Camargo G, Zhang W

Objectives: East Carolina University School of Dental Medicine (ECU SoDM) distinguishes itself from other US dental schools by its unique education model, which incorporates a dental curriculum with community service-learning centers (CSLCs) to the rural areas across North Carolina. It is important to assess the oral health needs of local residents and educational experience of dental students to ensure adequate and fair allocation of patient care and educational resources among different sites. The objective of this study is to analyze patient composition and CBCT prescription patterns at Ross Hall and eight CSLCs, to compare CBCT experience for the students among various sites. Methods: CBCTs taken at ECU SoDM in 2017-2021 were evaluated. The demographics, Medicaid coverage, and scan indications were recorded and analyzed. One-way analysis of variance and Wilcoxon Rank sum test were used to determine significant difference in Medicaid coverage and scan indications among different sites. Results: A total of 1444 patients were included, with an age range of 4-90 years old; male 685, female 758; 1130 not Hispanic/Latino, 71 Hispanic/Latino. For races, white 1106, African American 156, American Indian/Alaskan Native 32, Asian 18, mixed 13, others 46. For Medicaid, 75 with and 1369 without coverage. Ross Hall has the largest number of patients 537, followed by Davidson 218, Brunswick 189, Lillington 169, with Elizabeth City being the least with 45 patients. The top four reasons for taking CBCTs were implant, endo, oral pathology and 3rd molar assessment. There was no significant difference in the indications for CBCTs or Medicaid
coverage among various sites. **Conclusions:** The demographic profile, Medicaid coverage and CBCT prescription patterns were comparable among various sites. There was site-related difference in the number of scans taken, warranting the necessity to monitor CSLC rotation selections to ensure a consistent patient care and learning experience for the students.

**Poster #23**

**A non-traditional endodontic access opening**
Dickinson I, Henry, K, Schnoor Z, Lindauer P

**Objectives:** To describe an alternative approach to a traditional endodontic access opening made possible by the patient’s presentation with severe facial caries. Goals of an endodontic access preparation include unroofing the pulp chamber, locating the canal orifice, and conserving tooth structure while facilitating canal instrumentation and obturation. Access openings on anterior teeth are traditionally placed on the lingual surface for esthetics and restorative purposes. However, studies show that a more labially oriented opening provides better straight-line access to the canal space. An endodontic treatment option for an anterior tooth with significant facial caries, avoiding a traditional lingual access, is presented. A facial access opening is utilized, leveraging only the loss of tooth structure from the caries removal to enter the canal and enable treatment. **Methods:** A patient with extensive facial caries on tooth #6 diagnosed as symptomatic irreversible pulpitis with symptomatic apical periodontitis presented to the clinic. During caries removal, a facial pulp exposure occurred. Via this exposure direct access to the canal system was attained, facilitating treatment, and left the lingual surface untouched. Endodontic therapy was completed; both the access preparation and facial surface were restored with composite. **Results:** A completed endodontic and restorative procedure which avoided extensive tooth loss and more complex restorative treatment. **Conclusions:** A caries leveraged access opening is an efficient and tooth structure sparing approach which can be used in teeth presenting with gross caries.

**Poster #24**

**Cone-Beam Computed Tomography to identify an ectopic sinus tract**
Henry K, Schnoor Z, Lindauer P

**Objectives:** To describe the use of Cone-Beam Computed Tomography (CBCT) to identify the origin of an ectopic sinus tract. A sinus tract is a pathway from an enclosed area of infection to an epithelial surface. Its path can be irregular, and the opening may be located away from its source. The presence of a sinus tract has been associated with a lower incidence of pain and can be present with or without an accompanying radiolucency, making diagnosis difficult. Tracing a sinus tract with a gutta-percha point can serve as a useful diagnostic aid. A case is presented showing an ectopic sinus tract which could not be effectively traced with a gutta-percha cone. It is correctly identified to its tooth of origin using Cone-Beam Computed Tomography (CBCT). **Methods:** A patient presented with a sinus tract which traced to the mid-root level of endodontically treated tooth #5, where a radiolucent lesion was present. All teeth in the quadrant were non-responsive to pulp testing and normal to percussion and biting. Because the patient was asymptomatic, pulp testing inconclusive, and teeth with root fractures, perforations, or resorption can also present with a sinus tract, a definitive diagnosis was not established. A CBCT was ordered. It identified a radiolucent tract, which originated from the palatal root apex of tooth #4, traversed between the roots of tooth #5, and emerged through the buccal cortical plate mesial to tooth #5 at the mid-root level. **Results:** Tooth #4 was diagnosed as necrotic pulp with a chronic apical abscess. Endodontic therapy was performed on tooth #4 and the sinus tract resolved. **Conclusion:** Occasionally sinus tracts present away from
the source tooth. CBCT can be a useful diagnostic tool to identify the origin of an ectopic sinus tract when other diagnostic findings are inconclusive.

Educational

Poster #25
The Efficacy of Live-Patient integration in Complete Denture Education
Williams, C. Sheba M, Abdelaal M, Serag M

Introduction: Complete denture education poses a great challenge to pre-doctoral dental students. In most U.S. dental schools, Complete denture education usually is limited to didactic presentations and preclinical laboratory exercises. The conceptual theories associated with complete denture construction impose some challenges to the educational process. Early students’ involvement in patients’ care may help the students understand conceptual theories related to the nature of complete denture construction. Method: A comprehensive survey was developed and consisted of 16 questions grouped in two main domains: knowledge, perception. Following IRB approval, D2 students completed the pre-live-patient survey in Spring 2021, after students had completed their complete denture didactic course. Following the live-patient module delivery, the same group of students completed the post live-patient survey. The survey data was tabulated for each survey separately to compare trends and changes. Each response was analyzed individually before creating scores for the Knowledge domain. Results: The response rate was 95% (n=52). Mean age of participants was 26.4 years and even distribution between males and females. There were significant differences between the pre and post live-patient module survey in some of the knowledge domain questions (p < 0.01), however, the overall mean knowledge score did not change significantly between before and after the live-patient module. There were significant differences between the pre and post live-patient module survey in most of the perception domain questions using Fisher’s exact test (p< 0.01). Conclusions: Students may have a better understanding, gain more knowledge, and feel more confident with the complete denture fabrication process after they receive the live-patient complete denture module clinical experience. Keywords: Dental Education, Perceptions, Pre-doctoral students, Complete Denture

Poster #26
Is there a correlation between the drawing aptitude and manual skills of dental students?
Elgendy H, Cui X, Watkins T, McQuistan M

Objective: Enhancing student learning of Dental Anatomy with teeth drawing by improving students’ understanding of tooth morphology, develop their dexterity, and translate this into improved clinical skills. Students learn how their brains handle visual information through drawing. Methods: Freshman dental students were experienced “Teeth Drawing Module” at East Carolina University School of Dental Medicine. In this course, they learn to draw accurate outlines of teeth. The students are required to complete two drawing projects. The first project is, “Drawing teeth with measurements”, in which photographs of the five aspects of each tooth were super-imposed on squared millimeter cross-section paper so that it is possible to compare and record the contours. The second project is, “Free Drawing” in which any silver-coated pictures will be drawn on either sketch paper or digitally. Illustrations and instructions of teeth drawings outlined in a manual drawing book, PowerPoint presentations, illustration videos, and assessments are provided. A comprehensive survey was developed to evaluate and assess if the students developed their learning of the visual details associated with teeth and/or also their perceptual skills and artistic development through Survey. Results: When compared with traditional modules, the drawing technique used as self-improvement was just as effective.
Students’ feedback was assessed through a survey. “Teeth drawing module” is the first in a series after dental waxing that develops skills in analyzing the morphology, function and develop students’ manual dexterity skills. **Conclusions:** Teaching with drawing has shown promising results by stimulating interactivity and independence in the learning experience. Drawing exercises are useful instruments for effectively representing and integrating the spatial and symbolic domains of anatomical information. Teeth drawings as an adjunctive tool offers excellent visualization and allows students to have access to the information any time.

**Poster #27**

**Artificial Carious Dentin for Education Purposes**

Feggeler S, Oyen M, Abuna G, Geraldeli S

**Objective:** This project aims to design a process that forms an artificial material that mimics the characteristics of carious dentin to be used in new educational models. Forming hydroxyapatite crystals within a collagen gelatin through an alternate soaking process. **Methods:** Molds were printed on a 3D printer (Formlabs Form 2) using clear methacrylate resin (Formlabs). Then cleaned in isopropyl alcohol and cured, in the Formlabs Form Wash and Form Cure, respectively. Forming the dentin-like material began with a 1 M solution of CaCl$_2$ (VWR Life Science) and a .25 M solution of Na$_2$HPO$_4$ (Sigma-Aldrich) both in 200 mL of diH$_2$O. TRIS HCl (VWR Life Science) was dissolved into each solution. The Ca$^{2+}$ solution was buffered to a pH of 7.4 with 5 M NaOH (VWR Life Science). 25 g of porcine gelatin (Sigma) was added to each solution after reaching a temperature of 37 $^\circ$C. A mold was subjected to an alternate soaking process, soaking in the Ca$^{2+}$ solution, deionized water, the PO$_4^{3-}$ solution and deionized water (Figure 1A). This was repeated and then the hydroxyapatite-gelatin was dehydrated. The sample was assessed using infrared spectroscopy FTIR (Bruker Lumos II). **Results:** The FTIR spectrum (Figure 1B) was normalized and the concentration of hydroxyapatite in the dentin-like material was ~16.17 mg/mL. A Scanning Electron Microscope was used to collect images and the crystals of the sample were clear, allowing us to compare them to hydroxyapatite.

**Figure 1A.** Representation of the project’s goal. **1B.** FTIR spectrum comparing concentrations of hydroxyapatite crystals and the experimental samples.
**Conclusions:** Hydroxyapatite-gelatin formed through the alternate soaking process is similar to carious dentin and with further investigation should be able to be used in educational dental models. **References:** 1. Strange DG, Oyen ML. Biomimetic bone-like composites fabricated through an automated alternate soaking process. Acta Biomater. 2011 Oct;7(10):3586-94. Doi

Biomaterials

**Poster #28**
**Clinical Performance of Universal Adhesives Used With/Without Phosphoric Acid Pre-conditioning**
Ruschel VC, Stolf SC, Baratieri CdL, Chung Y, Boushell LW, Baratieri LN, Walter R

**Objectives:** To compare the 5-year performance of restorations placed using mildly acidic universal adhesives Scotchbond Universal (SU, 3M Oral Care, St Paul, MN, USA) and Prime & Bond Elect (PBE, Dentsply Sirona, Charlotte, NC, USA) in the restoration of noncarious cervical lesions (NCCLs) in a randomized controlled clinical trial using etch & rinse (ER) and self-etch (SE) application modes. **Methods:** The study (IRB #745.430/14) included two-hundred-three NCCLs in 63 patients that were restored with Kalore (GC Corporation, Tokyo, Japan) after application of either SU or PBE following the ER or SE techniques. Restorations were examined at 60 months. Statistical analyses evaluated the change of outcome overtime as assessed by Modified USPHS criteria (i.e., Alfa vs Bravo and Charlie outcomes). Logistic regression was performed for each outcome separately with compound symmetric variance-covariance structure assumed to consider a correlation of restorations within subjects (SAS, Cary, NC). **Results:** One hundred and thirty restorations in 35 subjects were assessed at the 60-month follow-up. Restorations placed using various methods demonstrated 5-year retention as follows: SU_ER – 32/34(93.8%), SU_SE – 31/31(100%), PBE_ER – 31/31(100%), PBE_SE – 33/36(90.9%). No secondary caries was detected. Statistically significant differences were a) Restorations placed with SU_SE were 64% less likely to maintain an Alfa score for marginal discoloration than those with PBE_ER (OR 0.36, 95% CI: 0.17-0.75, p=0.01); and b) PBE_SE restorations were 58% less likely to maintain a score of Alfa for marginal discoloration than PBE_ER restorations (OR 0.42, 95% CI: 0.19-0.96, p=0.04). **Conclusions:** SU and PBE demonstrated acceptable clinical performance at 60 months in both SE and ER modes. Phosphoric acid etching of the NCCLs prior to PBE adhesive application statistically significantly improved restoration performance with regard to marginal discoloration. The ER application method of adhesive application generally resulted in less marginal discoloration and better marginal adaptation though these trends were not statistically significant. **Key Words:** Randomized Clinical Trial, Mildly Acidic, Universal Adhesive, NCCLs, Scotchbond Universal, Prime & Bond Elect

**Poster #29**
**In Vitro evaluation of the mechanical properties of CAD/CAM Denture Base Resins**
Dehghani P, Sheba M, Abuna G, Geraldeli S

**Objectives:** The emergence of new technology is permeating all aspects of dentistry. The incorporation of CAD/CAM processes in removable prosthetics led clinicians to explore the use technology in fabrication of complete dentures. Hence, there are a wide variety of CAD/CAM systems currently available. However, there is a limited amount of research that evaluated the mechanical properties of dentures fabricated by additive manufacturing. The aim of the current study is to test the null hypothesis that there is no difference in flexural strength between conventional and CAD/CAM denture base dental materials. **Methods:** A total of 45 rectangular specimens 64 x 10 x 3.3 ± 0.2 mm, ISO 20795- 1:2013 were fabricated by 3 different
manufacturing processes: injection molding, subtractive manufacturing, and additive manufacturing. Specimens were tested for flexural strength in a 3-point bending device attached to a Universal testing machine following the ISO 20795-1 guidelines for denture base polymers materials. The moment of fracture was designated as the moment the applied load dropped to zero. The maximum load exerted at failure was recorded in Newtons (N). Flexural strength (Fs) and flexural modulus (Fm) were then calculated. Results: Preliminary results of flexural strength indicated that there was no statistically significant difference between the three fabrication techniques (p<0.01). Flexural strength of 3D printed samples was 77.27 ± 1.70 MPa, milled samples 76.51 ± 1.35 MPa, injection molded samples 77.96 ± 3.57 MPa.

Conclusions: There is no difference in flexural strength between conventional and CAM/CAM denture base dental material tested. All tested materials exceeded the 65 MPa minimal requirement recommended by the ISO 20795-1 guidelines.

Poster #30
Reconciling the Mechanical Properties of Lung Tissue using Computational Modeling
Dimbath E, George, Vahdati A
Objectives: The emergent mesoscale mechanical properties of the lung are dependent on the microscale properties of the alveolar wall components and the surface tension. Currently, there are discrepancies in reported stiffness values of lung tissue. Therefore, our aim is to use computational modeling to reconcile the lung mechanical properties measured using different techniques at different length scales. Methods: A mesoscale finite element (FE) model composed of a network of hexagonal geometries representing individual alveoli was constructed in COMSOL Multiphysics 5.6 (COMSOL Inc, MA, USA). Uniaxial tensile tests were simulated using FE analysis to compare the results of two microscale studies based on AFM to two studies of lung tissue strips at mesoscale. Mechanical properties from microscale studies were applied to the mesoscale models. Then, emergent properties from the computational models were compared to experimental data on lung tissue strips. Results: In comparison to data from mesoscale studies, emergent behavior based on microscale studies showed some similarity to mesoscale behavior in specific strain ranges. At lower strains, the mechanical properties from AFM studies resulted in underestimation of stiffness compared to the mesoscale data with strain-stiffening occurring at larger strains. Conclusion: Many studies on determining lung mechanical properties at the micro and mesoscales have reported a wide range of moduli for lung tissue. Our study shows that micro- and mesoscale mechanical testing data on lung tissue can be reasonably reconciled using computational modeling. In using stiffness values for FE modeling of lung tissue, it is essential to consider the experimental setup, pre-loading, and length and time scales of the mechanical tests performed to obtain relevant and accurate stiffness values. Acknowledgements: This material is based upon work supported by the National Science Foundation under CMMI-216934. The funding source had no role in writing the abstract.

Poster #31
Optimization of Nanoparticle-GelMA Hydrogels for Endodontic Restorative Application
Hampton J, Abuna G, Wheeler M, Geraldeli S
Purpose: To evaluate the elastic modulus and flexural strength of hot and cold hydrogel setting mechanisms when doped with bioglass nanoparticles in the short-term. Methods – A bioglass nanoparticle, 40S5 (0.1% w/v), was mixed with gelMA, PBS (10% w/v), and lithiumphenyl-2,4,6-trimethylbenzoylphosphinate (LAP) (0.5% w/v) as photocuring polymerization agent. GelMA solution was used to prepare cylindrical samples (6 mm diameter x 3 mm thickness) for two
groups: heat set (N=6) and cold set (N=6). Heat set (HS) was immediately light cured (20 J/cm², Valo) at 50 °C for 20 seconds. Cold set (CS) was left at 4 °C for 30 minutes before being light cured (Valo). Samples were immersed in water or simulated body fluid (SBF) for 21 days and 1 day prior to testing. Control sets were immersed in SBF. Samples were submitted to a compressive test to obtain elastic modulus and flexural strength. **Results** – After 1 day, **CS-control** samples averaged an elastic modulus (E) of 2.51 MPa and a flexural strength (FS) of 0.20 MPa. **CS-SBF** displayed E - 2.97 MPa and FS - 0.23 MPa. **CS-H2O**: E - 3.33 MPa and FS - 0.27 MPa. **HS-control**: E - 1.54 MPa and FS - 0.10 MPa. **HS-SBF**: E - 1.16 MPa and FS - 0.08 MPa. **HS-H2O**: E - 2.19 MPa and FS - 0.14 MPa. Following 21 days, **CS-control**: E - 3.96 MPa and FS - 0.31 MPa. **CS-SBF**: E - 5.23 MPa and FS - 0.43 MPa. **CS-H2O**: E - 5.78 MPa and FS - 0.48 MPa. **HS-control**: E - 1.29 MPa and FS - 0.11 MPa. **HS-SBF**: E - 1.62 MPa and FS - 0.12 MPa. **HS-H2O**: E - 1.73 MPa and FS - 0.13 MPa. **Conclusions** – Cold set hydrogels exhibit a higher elastic modulus and flexural strength than heat set and thus, are stiffer.

**Poster #32**
**ToothBrush Abrasion and Light Curing Effects on the Gloss Retention and Repolishability of Composite Resins**
Russell J, Sensi L DDS, Geraldeli A

**Purpose:** Effective esthetic restorative composite treatments strongly rely on the material’s optical ability to mimic accurate tooth gloss, which can be influenced by light curing and mechanical wear (brushing). Little is known about the impact these variables have on subsequent repolishing of the material. Therefore, the aim is to compare the effect of different light curing settings and toothbrush abrasion on the repolishability, and initial and long-term gloss retention of resin composites. **Method:** 48 specimens (10mm diameter and 2mm thick; N=6) were fabricated from 4 resin composites (Surefil, Sonicfill 3, Admira Fusion, and Quixx; N=6) and 2 light curing settings (Standard and Xtra, Valo Grand) using a stainless-steel adjustable mold. Initial polishings were given to each specimen before baseline gloss measurements were taken. The Odeme MEV3 8LC provided brushing cycles in 5000, 10000, and 20000 (N=6) cumulative cycles. Three repolishings were performed between each cycle and gloss measurements were taken before and after each repolishing. Multi-variable ANOVAs were performed for significance. **Results:** Preliminary results found significant differences in gloss retention means when varying of brushing cycles (.027) and composite (<.01). Differences in gloss between composite groups is likely due to inorganic composition and matrix differences; increased cumulative wear explains differences observed in gloss between abrasion cycles. Significant differences were also found between Baseline and 3rd Polish of Surefil (0.04), Sonicfill (>0.01), Fusion (0.02), and Quixx (0.24) when light curing by Xtra setting. Light curing procedures had little effect on gloss retention of the specimens; differences between baseline and 3rd polishings were more significant when using the Xtra setting. Quixx produced the lowest gloss while Fusion produced the highest. **Conclusion:** Results suggest that yearly repolishings of composite restorations can increase long-term gloss retention. Further research is needed to understand the effects of Xtra light curing on gloss retention.

**Poster #33**
**Increased JUUL emissions from initial puffs after device activation**

**Introduction:** Standard puffing protocols are used to examine tobacco product emissions. Electronic cigarette (ECIG) emissions that do not use standard puffing protocols may differ. This study compared JUUL particulate matter (PM) emissions using four unique 10-puff bout
procedures. **Methods**: We generated e-cigarette aerosol in a 0.5 m³ chamber using a JUUL ECIG device. For each experiment, 10 three-second puffs (30 second inter-puff interval) were generated. In Experiment 1, the JUUL pod was connected to the device for the duration of the bout. For Experiment 2, the JUUL pod was removed and reinserted after the first five puffs. For Experiment 3, the JUUL pod was removed and reinserted after every two puffs. For Experiment 4, the JUUL pod was removed and reinserted after each puff. PM 2.5 μm in diameter and smaller (PM2.5) was measured using an aerosol sensor. **Results**: Mean real-time PM2.5 concentration was 65.06 µg/m³ (SD=99.53, Median=16.01) for Experiment 1, 375.50 µg/m³ (SD=346.45, Median=265.47) for Experiment 2, 501.94 µg/m³ (SD=450.00, Median=374.71) for Experiment 3, 834.69 µg/m³ (SD=578.34, Median=725.34), and for Experiment 4. For experiment 1, peak PM2.5 concentrations occurred after the first puff, dropped, and leveled out after puff five. **Conclusions**: This study demonstrates that initial puffs after a JUUL is turned on or a pod is removed and inserted generate more emissions than later puffs. Laboratory protocols should be developed to examine a range of JUUL puffing behaviors to examine exposures that are associated with different user behaviors.

**Poster #34**
**Mechanical Failure of Human Fetal Membrane Tissues in Premature Birth**
Wheeler M, Buckner T, Vahdati A, Ryan T, Oyen M

**Objectives**: More than 1 in 10 babies in the U.S. are born prematurely, resulting in approximately 4,000 premature deaths annually. The objective of this project is to determine the force required for the amniotic sac to rupture, leading to the onset of labor, and provide a biomimetic mat to patch the membrane rupture. This work focuses on the process of optimizing the manufacture of electrospun nanofiber mats. **Methods**: Gelatin, acetic acid, and water were combined to create uncrosslinked fibers. Citric acid and sodium hypophosphate were added to create crosslinked fibers. These solutions were electrospun for 7 hours. Four categories of nanofiber mats were fabricated. These categories include heat treated crosslinked and uncrosslinked (150 °C for 4 hours) and untreated crosslinked and uncrosslinked. Through mechanical testing, the maximum load and displacement at failure were obtained, which allowed the elastic modulus and strength to be calculated for each category of mats. **Results**: The untreated uncrosslinked nanofibers had the greatest elastic modulus and strength at approximately 390 MPa and 14 MPa, respectively. The untreated crosslinked resulted in the lowest elastic modulus of roughly 170 MPa and strength of nearly 3 MPa. Both heat treated samples had relatively similar moduli and strength values at approximately 200 MPa and 10 MPa, respectively. **Conclusions**: These preliminary results indicate that the untreated uncrosslinked nanofibers are most suitable. Moving forward, nanofiber mats will continue to be electrospun and mechanically tested. In addition to nanofiber mats, human fetal membrane tissues are being tested in the same manner. The elastic modulus and strength values of the nanofiber mats and the fetal membranes will be compared to evaluate which category of nanofiber mats would be most sufficient for patching a woman’s rupture site to prevent premature birth.

**Poster #35**
**Characterization of Reproductive Materials**
McDougal M, Buckner T, Vahdati A, Ryan T, Oyen M

**Objectives**: The aim of this project is to better understand the factors that can cause preterm birth, which affects 1 in 10 births. We will determine the chemical and molecular changes that occur in reproductive tissues, specifically the cervix. We are trying to understand how the cervix
develops during a pregnancy to be able to identify potential problems. **Methods:** Fourier-transform infrared spectroscopy (FTIR) is a technique that is used to procure the electromagnetic radiation frequency of a material by detecting the sample’s measured wavelengths. A spectrum of the wavelengths is obtained and can be analyzed to determine the molecular makeup of the material. Thus, FTIR can determine molecular changes in biological tissues, offering a simple, non-invasive way to diagnose and predict abnormal tissues. Determining the wavenumbers and determining correlation with published wavenumber bands helps to not only show the differences between healthy and unhealthy tissue, but also exemplify where different bonds and biological structures occur. **Results:** Testing cross sections of 50 micrometer thick rat cervix samples that varied in gestational age show trends in the peaks for Amide I and II, collagen, hyaluronic acid, and elastin. The data from gestational ages of 6 and 18 days were compared as they showed the greatest differences. Collagen and hyaluronic acid both showed increases from day 6 to day 18, while the peak elastin content occurred at day 6. **Conclusions:** The next step in this project is to compare the peak trends in cervical tissues that are from a healthy pregnancy to the peak trends in tissues that have resulted in preterm birth, specifically due to cervical insufficiency. Pinpointing when in gestation and which substance levels could be affecting preterm birth can aid in increasing a baby’s time in the womb.

**Poster #36**

**Semi-Automatic Workflows for Segmenting COVID-19 Lungs from CT Images**

**Objectives:** The objective of this study was to develop and compare two semi-automatic workflows for segmenting COVID-19 lungs from low-resolution computed tomography (CT) images at full inspiration and expiration. Computed tomography (CT) scan segmentations are useful for diagnosis, analysis, and research of COVID-19 infected lungs. COVID-19 makes segmentation challenging due to ground-glass opacities (GGOs) and nodules. Thus, investigating different semi-automatic segmentation methods using open source-software is a promising option for analysis of COVID-19 lungs. **Methods:** A lung CT dataset was obtained from a COVID-19-positive patient at Vidant Medical Center. Data were imported to 3D Slicer software and used in two workflows to create lung lobe and lesion segmentations at end-inhalation and exhalation. Workflows both used the Interactive Lobe Segmentation module to outline the lung lobes based on interlobar fissures. The additive workflow consisted of region growing and manual addition of GGOs. The subtractive workflow created a segmentation of both lungs using the Lung CT Segmenter, added GGOs on the edges of the lungs, and isolated each lobe from the lungs. Volumetric analysis was performed in the Lung CT Analyzer. **Results:** Total, functional, and COVID-affected volume (infiltrated and collapsed regions) were compared. Differences in these values ranged from 0% to 6% when comparing end-inhalation to end-exhalation segmentations, indicating similar capability for segmenting COVID lungs. A 30% reduction in functional volume and a 3-6% increase in COVID-affected volume was observed when comparing end-inhalation and exhalation. 48% of the lung volume is COVID-affected at end-inhalation compared to 59% at end-exhalation. **Conclusions:** Additive and subtractive semi-automatic workflows are effective for COVID lung lobe segmentation. Inflated lung volume decreases from end-inhalation to end-exhalation while COVID-affected volume persists, resulting in the appearance of higher severity at end-exhalation than end-inhalation. This indicates that the current stage of the respiratory cycle should be considered when analyzing COVID lungs.
**Poster #37**

**Size and crystal structure of bioglasses influence mineralization of Collagen**

Nashed D, Abuna G, Geraldeli S

**Objective:** The demineralization process affects many structures of our human bodies. Both pathologic and physiologic demineralization may occur in bone and teeth. Here we aim to mineralize Collagen Type I after immersion in TRIS solution at different concentrations of synthetic hydroxyapatite nanoparticles, microparticles and nanoparticles bioglasses, and for different times. **Methods:** Synthetic collagen Type I tape was placed in TRIS buffer solution to simulate body fluids. Three different concentrations of nanoparticles hydroxyapatite, microparticles and nanoparticles bioglasses were used: 0.5mg/mL, 1mg/mL, and 2mg/mL to promote mineralization of the synthetic collagen. Control was TRIS buffer solution without hydroxyapatite or bioglass. Samples were immersed for a duration of 1, 2, and 3 hours. Collagen mineralization was evaluated by FTIR, and calcium release by spectrophotometer. **Results:** The Calcium release after 3 hours after immersion for mineralization was high for hydroxyapatite nanoparticle containing solution (1349.5 mM Ca). When the bioglasses were assessed for calcium release, the nanoparticles released 873.2 mM Ca and the microparticles released 561.7 mM Ca. The data was analyzed with Repeated Measures ANOVA test. The microparticles and nanoparticles bioglasses were not statistically different (p>0.05) as well as the HAp compared to the nanoparticle bioglass, however, the microparticle bioglass was statistically different when compared to the HAp nanoparticles (p=0.00149). **Conclusion:** Collagen type I could be mineralized at different ratios based on the size of the precursors; a smaller particle will enhance the ability of mineralization. In addition, the crystallinity of the precursor will increase the Calcium intake of the collagen scaffold.

**Poster #38**

**Implementation of a modeling pipeline for bone remodeling in microgravity**

Paul E, Vahdati A

**Objectives:** As space exploration become more prevalent, bone health in microgravity remains a major concern. Microgravity puts astronauts at risk of losing 1% - 1.5% of bone mass per month in space [1]. Researchers must better understand the pathways behind mechanically induced bone remodeling so that measures can be taken to protect astronauts’ bones. This study aims to implement a mechanistic in silico approach to simulate mechanically induced bone remodeling in microgravity. **Methods:** A finite element model was developed in the open-source software FEBio [2], which was run using a MATLAB script and the open-source toolbox GIBBON. The output of this finite element analysis became the input to an existing NASA toolchain for bone remodeling in microgravity [3], which couples differential equations for temporal evolution of biological and chemical factors. **Results:** Preliminary results show that factors, such as TGF-β1, osteoblasts, and osteoclasts population dynamics play an important role in the computational remodeling simulations. For example, when the mechanical loading was increased, the population of active osteoblasts and bone density slightly increased, while the number of active osteoclasts slightly decreased. **Conclusions:** This in silico model is currently being further developed, verified, and validated against NASA’s existing modeling toolchain [3]. The fully verified and validated model can eventually aid in designing exercise protocols that minimize astronaut bone loss and maximize the potential for safe space exploration.
Poster #39
Fractographic Analysis of Different Commercially Available Zirconia Blocks for CAD/CAM Technology
Okons IJ, Abdelaal M, Geraldeli S, Serag M, Sheba M
Objectives: The purpose of this study was to perform fractographic analysis to evaluate crack behavior of commercially available zirconia for CAD/CAM technology. Methods: Four different commercially available zirconia blocks (IPS e.max ZirCAD, 3M™ Chairside Zirconia, CEREC® Zirconia & KATANA™ Zirconia) were sliced into discs 1.25 mm thick using a low-speed diamond saw. Specimens (n=5 per group) were sintered following manufacturers’ recommendation. Specimens were then polished to a mirror polish using a series of abrasives ending with a diamond polishing suspension. Polished specimens were indented under a 98N load. Specimens were thermally etched, ultrasonically cleaned and gold coated prior to SEM examination. Crack patterns were analyzed on digital images. The length ratio of transgranular to intergranular fracture were determined. Results: Crack patterns analyses showed that the ratio of transgranular to intergranular fracture was affected by the sintering temperature and the different phase composition of the different blocks. Conclusion: Crack patterns are strongly influenced by the crystalline phase composition of the material. Following the recommended manufacturer’s sintering temperature is crucial for predictable outcomes and therefore better clinical performance.

Community and Population
Poster #40
Teledentistry in Management of Oral Lesion Consultations in a Rural Setting
Purpose and Objectives: 1. Describe management of patients with oral lesions and consultation with specialists through presentation of case reports of atypical mucosal lesions 2. Showcase the use of telehealth dentistry at ECU SoDM CSLC-Ahoskie for diagnosis and support in medical management of surgical biopsy and complications. 3. Discuss multi-disciplinary management of medically complex patients for oral care in a rural setting and value of documentation review. Background: Nearly 90% of U. S. general dentists (87%) report discovering at least one suspicious oral lesion in a six-month period. It is estimated that 51,540 new oral cavity and pharynx cancer cases are detected, and 10,030 deaths occur each year. A multidisciplinary approach is needed in management of oral lesions. In rural dental practice, timely access to specialists and care coordination represents potential barriers to care. Through case presentation, the poster will describe how teledentistry can enhance the structure, process, and outcomes of care modalities used to overcome these barriers. The ECU CSLC in Ahoskie, North Carolina is a rural training site for AEGD Residents and fourth year dental students. Methods: Evaluation of the management of oral lesions was conducted using Donabedian’s framework (https://www.ahrq.gov/talkingquality/measures/types.html), a process improvement system. The paper clinic biopsy log was cross-referenced with all biopsy billing codes and pathology documentation. Final diagnoses were categorized, and cases followed for outcomes. Two cases from all biopsies completed at ECU SoDM CSLC- Ahoskie over an eight-year period are highlighted. Synchronous telehealth dentistry was used in several cases to consult on differential diagnoses, location of specimen site and urgency for treatment. Results: Preliminary data shows teledentistry modalities used in all pathology consults with synchronous teledentistry used in only most urgent situations. The consultants included Oral
Pathology, Oral Medicine, Periodontics and OMFS. Case one describes a biopsy consultation at first patient encounter utilizing synchronous teledentistry and greatly reducing the time for resolution with surgery in the OR. Case two demonstrates asynchronous consultation and support with oral pathology, oral medicine, OMFS and patient’s PCP. This case details support for biopsy site, management of bleeding complication and oral medicine support in developing a differential diagnosis. The evaluation of the consultation system and review of documentation identified gaps to fill in the system. Cases that were not treated on site, but referred to another location were not part of the logging system. Retrieval of data from the log was more practical than retrieval from the computer system. Creating a new log for all telehealth consults or adding oral medicine consultations and referrals for biopsy under GA to the existing log would enhance the ability to analyze cases and provide follow up to patient care. Conclusions: Oral lesions can be managed to a great extent in a general practice with telehealth dentistry in rural areas, if arrangements are made to build the proper team that includes needed consultants. This can reduce trips for consultation, keep travel to a minimum for patients with special needs and improve access to care in rural areas. Continual evaluation of structure, process, and outcome in tracking oral lesions, consults and referrals can improve healthcare outcomes.

Poster #41
Caregiver oral health literacy, pediatric oral health: A systematic review
McCarlie V, Smith B, Fogarty L, Vossers S, Stewart K, Bloss J
Objectives: The primary aim is to determine whether there is an association between caregiver oral health literacy and the oral health status of children. Methods: All bibliographic databases with salient information on the proposed research question were evaluated and included biomedical research literature (MEDLINE via PubMed and Embase), allied health, nursing and dental literature (CINAHL Complete), and social sciences/scientific literature (SCOPUS). We have also undertaken a grey literature search to be screened for additional articles or abstracts. The subject terms and keywords assessed for the main concept domains included: oral health literacy, oral health, parents or caregivers, and children. A comprehensive list of search terms was iteratively developed by the team, and peer reviewed by a second librarian. After removing duplicate works, 4,705 studies were screened at the title and abstract level by at least two independent reviewers. Five hundred twenty-six studies were identified for the full text screening. Preliminarily, at least two independent team members completed 40 full text reviews, with 15 articles meeting the specified inclusion criteria. Preliminary Results: For articles that were excluded within the full text review, the most common reason articles were excluded is that they did not specifically address both caregiver oral health literacy and children oral health status together. Of the full text articles meeting the established inclusion criteria (37.5%), the majority indicate a connection between caregiver oral health literacy and the oral health status of children. Preliminary Conclusions: Based on the articles reviewed thus far, there appears to be a positive association between caregiver oral health literacy and children oral health status across diverse countries and cultures.

Poster #42
A Survey in North Carolina Regarding Special Needs Pediatric Patients,
Patel D, Webb M, Moss M
Purpose: The purpose of this study was to evaluate the attitudes of general dentists and pediatric dentists in North Carolina with regards to providing dental care to pediatric patients with special health care needs (PSHCN). Methods: An 18-item questionnaire was sent to 1807 general dentists and 193 pediatric dentists in North Carolina who were members of the North
Carolina Dental Society. Questions asked included if they treated PSHCN, their confidence level, type of treatment provided, behavior management techniques used and how transition of pediatric dental care to adult dental care was managed. For those dentists that did not treat PSHCN, they were asked why not and what measures (if any) would allow them to be able and willing to treat these patients. Demographic information was also asked such as practice location, number of years in practice and types of insurance accepted. P value of < 0.05 was considered statistically significant. Results: Of the 224 qualified responses, 186 were from general dentists (9%) and 38 were from pediatric dentists (~20%). 100% of pediatric dentists reported treating PSHCN (p<0.001) compared to only 56% of general dentists. 100% Pediatric dentists also stated that they were confident in treating PSHCN compared to 43% of general dentists who were not confident (p<0.001). Reasons cited for not treating PSHCN included not having the right practice set up (~71%), inadequate training (~ 63%) and patient behavior was a barrier (60%). Only ~ 6 % stated it was not profitable. Conclusion: The data indicates that more general dentists in North Carolina would be willing to treat PSHCN with additional hands-on training, adequate facilities, sedation options and hospital privileges.

Poster #43
School-Based Oral Health Prevention Program During COVID-19
Stewart R, Buck J, Pardi V, Grant F, Betts B, Smallwood O, Wright WG
Objective: To explore the ability of a school-based oral health prevention program to provide dental services during COVID-19. Methods: The study involved 280 children enrolled in a school-based oral health prevention program in Bertie County, NC. Clinical services were provided by dentists, fourth-year dental students, and public health hygienists using portable equipment in a health department and a middle school in eastern NC. Results: A total of 1,717 procedures were completed on 280 children. Of these procedures, 178 were exams, 280 were prophylaxis, 319 were fluoride treatments, and 442 were sealants. Two patients received sodium diamine fluoride treatment and 11 received exams via teledentistry. Approximately 35% (99) were referred for treatment that was beyond preventive care and of these referred patients, 29.3% (29) have completed treatment plans. There was an average of 2.1 visits per patient, with a cancellation/fail rate of 21.3%, to complete the treatment plans of these 29 patients. Of the nearly 71% (70) with incomplete treatment plans, 28.6% (20) have active appointments, 4.3% (3) are awaiting an operating room appointment, and 2.8% (2) are awaiting an appointment with a pediatric specialist. The remaining 64.3% (45) do not currently have an appointment for operative treatment. Conclusions: Despite complications associated with the COVID-19 pandemic, the school-based oral health prevention program was able to provide a substantial number of dental procedures and services in alternative and limited settings. Keywords: dental, COVID-19, oral health, school children, rural health. Funded by The Duke Endowment. Grant # 216503.

Poster #44
Athletic trainers’ knowledge related to athletic-related dental trauma
Tucker K, Webb M, Moore S
Objectives: To evaluate the knowledge that athletic trainers have to appropriately manage dental injuries. Methods: A survey with multiple athletic dental injuries will be distributed to athletic trainers via the Official ECU Athletic Training Alumni Facebook page, the North Carolina Athletic Trainers Association Alumni Facebook page, and the Secondary School Athletic Trainers Facebook page to assess their level of knowledge to appropriately manage athletic dental injuries. Results: The knowledge of the athletic trainers will be assessed
and may be determined by factors such as level of education, their involvement in a contact vs. non-contact sports, etc. **Conclusion:** In progress.

**Poster #45**  
**Caregiver Perception of Their Child’s Oral Health and Their Own**  
Vossers, S, Camargo G. Black, K, Moss ME, Pardi V

**Objective:** Evaluation of the relationship between the caregiver perception on their own and their child’s oral health and associated variables (Operating Room (OR) visits, sex, and family history of cavities).  
**Methods:** De-identified electronic health data from ECU School of Dental Medicine Pediatric Axium were gathered including sociodemographic information, caregiver’s perception on their own oral health and their child’s oral health, family history of cavities, and OR visit status for children aged 0-5 years. SPSS was used to analyze data and provide descriptive statistics and correlations.  
**Results:** This observational study consists of 2,315 pediatric patients (50.3% were male and 49.7% were female). 41.5% of the patients were black, 29.5% were white, 14% were “other”, and the remaining were Asian, Hawaiian, Indian, Mixed, or refused to answer. 16.2% were Hispanic, while 71.2% were non-Hispanic. 16.4% of these patients has had an OR visit to have dental needs treated. The correlation between child’s oral health, the caregiver’s oral health, family history of cavities, and sex of the patient were evaluated. A moderate statistically significant correlation was found between caregiver’s perception of their own oral and their child’s oral health ($r=0.461$, $p<0.001$). Family’s history of cavities was weakly correlated to caregiver’s oral health and the child’s oral health ($r=0.185$ and $r=0.112$, respectively, $p<0.001$). There was a weak correlation between OR visits and caregiver perception of their child’s oral health ($r=0.162$, $p<0.001$).  
**Conclusion:** An important relationship exists between the caregiver’s perception of their own oral health and their child’s oral health suggesting that family-centered interventions should be further evaluated for promoting oral health.