

College of Dentistry Research Day

ORAL PRESENTATION

Abstract Title: **Biosignatures of Recurrent Attachment Loss (RAL) Patients**

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Abstract: As clinical sciences move towards the concept of evidence-based treatment decisions and the use of precision medicine strategies, there is an opportunity to integrate clinical information and treatment outcomes with biologic profiles. Objective: To develop biosignatures that would enable earlier identification and improve current therapeutic strategies and help prepare the discipline for the adoption of next generation targeted therapies. Methods: This study recruited 48 patients with generalized periodontitis (21-61 yo; 67% male; mean PPD = 3.7 mm; 6.8-64.5% sites with PPD >5 mm) and used clinical and biologic samples (saliva, serum, plaque) to assess risk for recurrent attachment loss (RAL) following scaling and root planing (SRP) therapy. Samples were obtained at baseline and at 8, 16 and 28 weeks post-therapy and sites with CAL >3 mm compared to baseline determined as RAL. Results: Thirteen participants (27%) exhibited RAL at one or more subsequent time points ranging from 1 to 15 affected sites. RAL patients demonstrated significantly increased total bacteria and Gram-negative anaerobe levels in diseased sites at baseline compared to responders. Salivary levels of several host response biomarkers were significantly increased in RAL patients at baseline sampling, and decreased post-SRP, but remained elevated over the responders through 16 weeks. Serum levels of select matrix metalloproteinases, IgG antibody to Gram-negative anaerobes and bactericidal permeability inducing factor (BPI) were also significantly increased in RAL patients at baseline. Elevated levels of four or more biological variables from a targeted group of measures was significantly associated with RAL (OR = 56.67; 95% CI: 8.28-387.74; p<0.0001). Conclusions: Low response to therapy presents as an early biosignature.

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College of Dentistry Research Day

POSTER PRESENTATION #253

Abstract Title: **A Prospective Study of dmfs/DMFS of Attention deficit hyperactivity disorder (ADHD) children at the University of Kentucky**

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Abstract: Attention deficit hyperactivity disorder (ADHD) is a neurobehavioral disorder characterized by pervasive inattention and/or hyperactivity-impulsivity.¹ Previous studies indicate that children with ADHD have a higher prevalence of oral soft tissue lesions, caries and gingivitis.³ Our search of the literature failed to find studies that describe a relationship between the prevalence of dental caries and the use of medication for the treatment of ADHD in children and adolescents. Medications prescribed for the treatment of ADHD include stimulants such as amphetamines.³ Methamphetamine, a well-known street drug, may lead to rampant caries in the form of “meth mouth”, which is similar to early childhood caries.³ The hypothesis of the present study was that children and adolescents taking amphetamine-based medications for the treatment of ADHD may have a higher prevalence of caries than those with ADHD not taking amphetamines, or healthy counterparts under no medication. Therefore, the aim of this study was to examine the prevalence of caries in children with ADHD taking or not taking amphetamines, and in a non-medicated healthy control group. The children with a low SES had a statistically significant higher number of DMFT than the children with a middle SES (4.4±0.5 and 1.1±0.8 respectively, ANOVA, p= .001). Children taking amphetamines for the treatment of ADHD and attending a University pediatric dental clinic, did not have a higher prevalence of dental caries than those with ADHD not taking amphetamines, or a control group under no medication.

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College of Dentistry Research Day

POSTER PRESENTATION #254

Abstract Title: **Zirconia in Dentistry: A Literature Review**

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Abstract: Purpose: Literature review focusing on the clinical implications of zirconia and its use as an alternative to metal and lithium disilicate restorations. Methods: Summation of up to date literature reviews that have a 3 to 5 year follow up, and provide decisive research into the useful nature of zirconia in terms of abutments, cementing, FPD's and single unit crowns. PubMed was the search engine used to gather peer reviewed dental literature to find the most comprehensive clinical studies and systematic reviews pertaining to zirconia. Articles were excluded that did not focus in one of these areas, or did not have adequate long-term data or subjects. Results: Zirconia can be used as an abutment in the anterior and premolar regions safely and successfully, but in the posterior, more research needs to be done. Zirconia can be used as a suitable material for single crowns and FPDs and is not restricted by location in the arch. The majority of the technical problems that were seen in single crown and FPDs made from zirconia was that the veneering ceramic could fracture and chip off of the zirconia framework. The best bond between zirconia, cement, and tooth structure was seen with resin cements and the intaglio of the restoration roughened by sandblaster or a bur. Conclusion: There are numerous studies in all of the above applications of zirconia in dentistry, but long term monitoring and follow up are still necessary to adequately understand how zirconia should be used in practice. The research as of now indicates that zirconia can be used for anterior abutments, single crowns, and FPDs with excellent results.

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College of Dentistry Research Day

POSTER PRESENTATION #255

Abstract Title: **Kentucky Clinic Parents' Conference on Being Present in the Dental Operatory and Their Opinion to New Ideas**

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Abstract: The purpose of this study was to analyze different aspects related to parents' preferences on being present in the dental operatory with their children. One important aspect investigated was Co-sleeping between child and parent/parents. **Methods:** Data was collected through a survey distributed to parents of patients at the Kentucky Clinic in Lexington, KY. The specific procedures that were investigated were first exam, routine 6 month comprehensive exam, x-rays, restorative (white fillings, crowns), extraction, and sedation and their correlation to different demographic and educational statistics. Statistical analyses utilized Chi Square analysis and Fisher's Exact analysis. **Results:** The total number of surveys collected were N=80. The following results were found to be statistically significant. Parents who were more inclined to be with their child during a certain procedure, i.e. first exam ($P=.009$) were more inclined to be with their child during a routine 6 month comprehensive exam. The "mother" in a relationship to child was more likely to answer yes to being in the operatory, odds ratio 1.692. Parents that co-sleep with their children were not statistically significantly inclined to being present in the dental operatory during their child's visit. **Conclusions:** Parents who wanted to be with their child for one procedure were more inclined to be with their child for every different type of procedure $p<0.05$. Co sleeping is not related to the desire to be present in the operatory with their children.

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College of Dentistry Research Day

POSTER PRESENTATION #256

Abstract Title: **The effects of an animal-assisted therapy dog in reducing children's anxiety in a dental setting**

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Abstract: Purpose: The purpose of this study was to determine the impact a therapy dog has on children's anxiety levels during a complex dental procedure. Methods: 50 randomly selected patients chosen for oral sedation between the ages of 2 and 18 years undergoing dental treatment were utilized. 50 percent were randomly allocated to the study group and exposed to a trained therapy dog while the other 50 percent were assigned to the control group and received the standard of care with no exposure to the canine. Both group's anxiety was evaluated using the faces version of the modified child dental anxiety scale [MCDAS(f)] before the oral medication was administered. After five minutes of interaction with the canine, the canine was removed from the area to minimize distraction of the patient, and the MCDAS(f) was utilized to re-assess the patient's anxiety. The canine was allowed to accompany the patient and remain in the room during treatment. Following completion of treatment, re-assessment of the anxiety was recorded. The control group was treated in the same manner however with no exposure to the canine. Statistical analysis: Paired T-tests and One Way ANOVA were utilized. The significance level was set at $P=0.05$ Results: The exposure to the trained therapy dog, significantly reduced the anxiety level of children undergoing complex dental procedures (p -value=0.0001). Conclusion: The presence of a trained therapy dog significantly decreases pre-and post-operative anxiety in children receiving dental treatment.

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POSTER PRESENTATION #257

Abstract Title: **'Does Performing Treatment at an Elementary School Have Any Bearing on Absenteeism?'**

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Abstract: Childhood caries has been noted as one of the most common childhood chronic diseases (Agaku, Olutola, Adisa, Obadan, & Vardavas, 2015). There are a disproportionate number of children living in poverty with higher numbers of decayed teeth than those who are not (Seirawan, Faust, & Mulligan, 2012). One study showed that many of the children with caries missed school not from the pain but due to the multiple dental appointments required to restore compromised teeth (Krisdapong, Prasertsom, Rattanaangsim, & Sheiham, 2013). As children with caries postpone dental treatment, this leads to larger carious lesions and dental abscesses. To restore the child's dentition to good oral health, numerous dental appointments are required. This leads to an increased number of hours/days children are absent from school and hours/days of work missed by parents (Krisdapong et al., 2013). Lack of preventative care also contributes to poor oral health. Another study examined the number of children seeking dental care in pediatric dental training programs. In the study, many of the children were seen in after-hour clinics and had been previously seen for similar dental pain/swellings. When parents were asked why they delayed dental treatment for their children, they indicated three reasons including the inability to take off work (Edelstein, Vargas, Candelaria, & Vemuri, 2006). Respondents, including those on Medicaid (57%), reported obstacles like limited access to dental care or lack of transportation to the dentist (Edelstein et al., 2006). **OBJECTIVES:** To explore and document whether the presence of the mobile dental unit had an impact on student attendance. Did the resources provided by the dental mobile affect the school attendance? Did the absenteeism decrease after treatment was completed? **METHODS:** Data was collected from three elementary schools with similar demographics to correlate school attendance with the presence of the dental mobile, and dental urgency. **RESULTS:** There were no significant findings after looking at the data. No significant changes in absenteeism when the mobile dental unit was present at schools. **CONCLUSIONS:** Further studies can be conducted to compare patients absentee rates and their participation on the mobile dental unit to those who did not participate in the mobile dental program. This may possibly show an impact.

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College of Dentistry Research Day

POSTER PRESENTATION #258

Abstract Title: **Dietary Counseling to Prevent Childhood Caries: A Survey Among Pediatric Dentists in Kentucky**

Author(s): S. Boyles, Department of Pediatric Dentistry, U of Kentucky
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Abstract: Objectives: The goal of this study was to determine the degree of implementation, frequency of use, and barriers to the use of dietary counseling among pediatric dentists in the state of Kentucky via electronic survey. Methods: A survey consisting of 33 multiple-choice questions in relation to dietary counseling was distributed to active members of the American Academy of Pediatric Dentistry in the state of Kentucky. Statistical analysis: Descriptive statistics and Fisher's Exact Test were used. Mosaic plots were created to observe the cross count/frequency values. All analysis was performed using $P < 0.05$. Results: The respondents of this survey were 60% female, mostly trained at the University of Kentucky between the years of 2010 to 2015. Those who graduated between the years of 1980-1999 conducted a caries risk assessment, including dietary counseling, on more than 50% of patients as compared to pediatric dentists who graduated before or after those years. University of Kentucky graduates conducted counseling more frequently than University of Louisville graduates. Ninety-two percent of the respondents answered that they were aware of the AAPD's policy on dietary counseling however many (63%) feel it is only somewhat effective to perform the counseling. Thirty percent of the respondents feel it is the responsibility of their auxiliary staff to perform this counseling. Almost 70% of the respondents feel they are not adequately reimbursed for diet counseling. Conclusion: The respondents of this survey feel that dietary counseling is an important part of their practice and perform it regularly, nevertheless, they feel they are not adequately reimbursed for this activity. Lack of reimbursement and practice busyness appear to be the most reported barriers.

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College of Dentistry Research Day

POSTER PRESENTATION #259

Abstract Title: **Does Standing Increase Musculoskeletal Complaints in Oral and Maxillofacial Surgeons?**

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Abstract: Purpose: Oral and Maxillofacial surgeons traditionally have suffered from musculoskeletal pain. The aim of this study is to determine the postural preferences of oral and maxillofacial surgeons and its effect on musculoskeletal pain. Methods: The investigators designed a cross sectional study with the use of a questionnaire. The outcome variables measured were pain, postural preferences, and use of loupes. The predictor variable was postural preferences, use of loupes, and age while the outcome measure was musculoskeletal complaints. Contingency analysis was used to compare participant's responses to demographic variables, and nominal logistic regression for modeling. Results: The sample was composed of 153 oral and maxillofacial surgeons of which 32% indicated a history significant for musculoskeletal pain lasting more than two weeks. Practitioners reported neck and back pain as being most common. 84% of practitioners stood for both extractions and placement of implants. Those who stood did so for visibility. Practitioners who sat indicated they did so for orthopedic reason ($p < 0.001$). 26% of practitioners indicated loupes use. Those who used loupes were more likely to report pain ($p < 0.05$). Conclusion: The majority of respondents stood and did not use loupes. Those who did use loupes were more likely to report pain. Those who stood did so for visibility; those who sat did so for orthopedic reasons. Almost a third of respondents reported pain lasting at least two weeks during practice.

Supported by: This study was approved through VCU IRB and qualified for exemption according to 45 CFR 46.101(b), category 2. Study data were collected and managed using the REDCap electronic data capture system, a secure, web-based application designed to support data capture for research, hosted at Virginia Commonwealth University and supported through Center for Clinical and Translational Research and VCU Technology Services grant (CTSA Award Number UL1TR000058). Contingency analysis was used to compare participant's responses to demographic variables, and nominal logistic regression for modeling. Analysis was completed using JMP software (version 11.0.0, SAS Institute Inc., Cary, NC, USA 27513).

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College of Dentistry Research Day

POSTER PRESENTATION #260

Abstract Title: **Rate and Type of Tooth Movement in Rats Under Low Orthodontic Force**

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Abstract: Background and Objectives: Many studies testing new mechanisms of orthodontic tooth movement (OTM) use rats as an animal model. Forces applied to rodent molars in many experiments seem excessive (20-100cN). Although recent studies have indicated that a lower and presumably more physiologic force of 3cN is capable of producing tooth movement, the concurrent pattern of bone modeling/adaptation has not been studied. The purpose of this study is to establish and describe a more physiologically appropriate rodent model for studying OTM. Materials and Methods: Seventy-two male Sprague-Dawley rats (12-14 weeks old, n=72) were divided in to 4 groups (3 days, 7 days, 14 days, 28 days) for a total of 18 rats per group. A micro implant provided anchorage to protract the first permanent molar using a calibrated NiTi closed coil spring in a split mouth design with n=12 experimental ~3cN group and n=6 in a 0cN sham group. Dissected maxillae were scanned with MicroCT and analyzed with OnDemand3D Application (Tustin, CA). Results: Tooth movement increased with each time interval. Mean(SD) for the 4 time points were: 3day: 0.1mm(0.0) , 7day: 0.1 (.1) , 14 day: 0.2mm(0.1) , 28 day: 0.4mm(0.2). Angular measurements revealed steadily increasing tipping of the first molar compared to control side: 3day: 1.2°(3) , 7day: 3.5° (3.6), 14 day: 5.6° (1.9), 28 day: 6.8° (3.9). Conclusion: Predictable tooth movement was achieved in a rodent model using a skeletal anchor and low force levels of ~3 cN.

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College of Dentistry Research Day

POSTER PRESENTATION #261

Abstract Title: **Preliminary experience with patients in clear aligners and orthognathic surgery**

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Abstract: Objectives: An increasing number of patients are requesting clear aligners as a way of addressing their dentofacial deformities. The study aims to evaluate the treatment of dentoskeletal dysgnathia when using preoperative and postoperative orthodontics with clear aligners and orthognathic surgery. Patients & Methods: A retrospective study involving 4 females and 1 male. 2 cases were diagnosed with Class II skeletal malocclusion and 3 cases class III skeletal malocclusion , one of which had mandibular asymmetry . Inclusion criteria were patients who underwent orthodontical treatment with clear aligners and underwent orthognathic surgery and are one year post operatively. Patients were orthodontically treated with clear aligners (Invisalign ®). The Invisalign system consists from individually generated aligners according to the computer-designed arch form. Inclusion criteria were patients who undergone orthognathic surgery bilateral sagittal split osteotomy and/or Le Fort I-osteotomy and had pre and postoperative orthodontic treatment by clear aligners. Results: All patients successfully underwent surgery. Islets or brackets with an attachment bonded to the centrals, cuspids and first molars were necessary to facilitate postoperative physiotherapy in all cases. Surgical splints were left in place for 4 of the 5 patients for two weeks or more after the surgery. A postoperative posterior open bite necessitated bonded brackets in one case to close the open bite. A removable Hawley retainer was used for three months to retain the transverse expansion in one patient. Conclusions: In this small group orthognathic surgery was successfully completed in a group of patients with clear aligners

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College of Dentistry Research Day

POSTER PRESENTATION #262

Abstract Title: **'Teeth in a Day': A Case Report**

Author(s): M. Rechtin, Department of Oral and Maxillofacial Surgery, U of Kentucky
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Abstract: A healthy 67-year-old male referred from an outside dentist with fractured #11 and #13. The patient's chief complaint is he desired a return to a fully functioning dentition, and esthetics is an issue. The patient desires a fixed prosthesis, but is not interested in any sinus augmentation. He desires a long-term definitive restorative option that would not interfere with his social life, improve his self-image, and provide overall comfort and practical function. The patient elects for 6 implants in the maxilla and an immediate fixed maxillary denture. The first appointment following the final treatment plan includes all records and scans necessary for the technician's to digitally plan the case. Virtual planning is then performed by technicians and Nsequence facility to determine implant placement and needed bone reduction. The maxilla is to be restored with implants at sites 8 and 9 with angled implants at 4,6,11, and 13 eliminating the need for sinus augmentation. Using the records and scans, all splints are 3D printed and a temporary denture is milled with a titanium superstructure. The second appointment includes extractions, bone reduction, implant placement, and seating the temporary denture. All surgery is performed and the patient leaves that same day with a complete full span fixed maxillary prosthesis. The temporary denture is a trial run where the patient is able to "test drive" the new dentition. The patient will wear this denture for 6-8 months to which he will follow up for seating of his final complete prosthesis.

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College of Dentistry Research Day

POSTER PRESENTATION #263

Abstract Title: **Early Childhood Teachers' Knowledge on Oral Health in Fayette County, Kentucky**

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Abstract: Objectives: The purpose of the present study was to determine the oral health knowledge of Early Childhood Teachers in Fayette County, Kentucky. Methods: A sample of Early Childhood Teachers were given questionnaires regarding oral health at an Early Childhood Teacher Symposium in Fayette County, Kentucky. The information regarding oral health knowledge, attitude, and practices was collected through a self-administered questionnaire. Results: All of the teachers (100%) agreed that having good dental health is important to having good general health. The majority of teachers agreed that routine checkups help in maintaining good dental health, when a child should see a dentist for the first time, how often a child should see a dentist, when parents should start brushing their child's teeth, how often the parents should brush their child's teeth, and the importance of the use of toothpaste with fluoride. The majority of teachers (66.06%) did not talk to parents about oral health, pacifier use, and brushing habits. There was a disagreement between teachers regarding when a child should stop using a pacifier, with 45.22% believing it should be at one year old, 40.13% at six months old, and 13.38% at two years old. The majority of the teachers (65.56%) said that children do not brush their teeth at the daycare. There was also a difference in belief as to the cause of a cavity (too much sugar, sugary snacks, not brushing, bacteria, juice, and soda pop). Conclusions: The oral health knowledge of Early Childhood Teachers in Fayette County, Kentucky is fair. The impact and implementation of monitoring their students and talking with the student's parents can be vastly improved.

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College of Dentistry Research Day

POSTER PRESENTATION #264

Abstract Title: **Securing Split Thickness Skin Grafts to Microvascular Free Flaps in the Head and Neck Region using the Vacuum-assisted Closure (VAC) Device: A case report**

Author(s): M.S. Yeoh, Department of Oral and Maxillofacial Surgery, U of Kentucky
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Abstract: Background: This abstract is aimed at evaluating the clinical significance of using the vacuum assisted closure (VAC) device (KCI, San Antonio, TX) to secure a split thickness skin graft to the external surface of a free muscle flap. This method of skin graft to free muscle flap fixation was selected due to the complex anatomical defect being reconstructed and an unavailable composite (musculo-cutaneous or fascio-cutaneous) flap that would provide the matching volume of the defect. The VAC device was chosen as there were concerns that there may be inadequate fixation provided by the tie-over bolster technique in these areas. Materials and Methods: This case involves a patient with a soft tissue defect of the head and neck region treated by rectus abdominus free flap transplantation combined with split thickness skin grafting and VAC device dressing. The wound was approximately 15 x 9 cm and the reconstructed area spanned from the right temporal region superiorly to the right mandibular angle inferiorly. The defect was reconstructed with a thigh split thickness skin graft overlaid on a free muscle flap and then covered with a VAC device at 125mm Hg pressure. Results: The free flap transplanted remained viable throughout the treatment course and was successful. The patient also experienced excellent skin-graft take. Facial appearance and functional recovery were satisfactory. Decreased flap edema was also notable. Conclusions: The VAC device may be a useful tool in fixation of skin grafts to micro-vascular free flaps in the head and neck region. The VAC, in this case, did not compromise free flap survival and may represent a reliable treatment option for large soft tissue defects of the head and neck region.

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College of Dentistry Research Day

POSTER PRESENTATION #265

Abstract Title: **Notch-1/PLA2-IIA activation in Oral Epithelial Cells and Periodontal Disease**

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Abstract: Objective: *P. gingivalis* (Pg) is a strong inducer of Phospholipase 2-group IIA (PLA2-IIA) in oral epithelial cells (OECs). PLA2-IIA has antimicrobial and pro-inflammatory properties that could contribute to Pg-induced oral dysbiosis. Herein, we sought to identify the mechanisms involved in Pg-induced PLA2-IIA and determine variations in PLA2-IIA expression during initiation and progression of periodontal disease. Methods: OECs were challenged with Pg or other bacterial species, and PLA2-IIA expression levels evaluated by qPCR and ELISA. The role of Notch-1, TLR2, and TLR4 in Pg-induced PLA2-IIA was evaluated through siRNA approach and neutralizing antibodies. The role of gingipains was evaluated using a triple mutant Pg strain (rgpA-rgpB-kgp-). The ligature-induced periodontitis non-human primate model *M. mulatta* was used to determine variations in the gingival expression of PLA2-IIA and Notch-1 activation. Results: Other oral Gram-positive and Gram-negative species failed to induce similar Pg-induced PLA2-IIA OEC responses. OECs constitutively expressed Notch-1 and TLR2 but not TLR4. Notch-1 was activated by Pg and inhibition or silencing of Notch-1 decreased Pg-induced PLA2-IIA. TLR-2 neutralization did not affect PLA2-IIA expression or Notch-1 activation. The Pg triple mutant failed to activate Notch-1 and PLA2-IIA production. Increases in Notch-1 activation correlated with higher PLA2-IIA gingival expression during initiation of periodontal disease. Conclusion: PLA2-IIA production in OECs is strongly and specifically induced by Pg in a mechanism that involves Notch-1 activation by gingipains. Increased Notch-1 activation and PLA2-IIA expression are associated with the initiation of periodontal disease. We hypothesize that up-regulation of Notch-1/PLA2-IIA is involved in Pg-induced oral dysbiosis and inflammation.

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College of Dentistry Research Day

POSTER PRESENTATION #266

Abstract Title: **Biomarkers Associated with Peri-implantitis and Response to Surgical Therapy**

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Abstract: Background and Objective: Peri-implantitis (PI) continues to increase in prevalence paralleling the substantial increase in dental implant placement globally. However, the etiology and pathogenesis to identify risk and expression of this disease are not well established. This study evaluated biomarker levels in gingival crevicular fluid (GCF) of subjects with PI, before and after therapy. Methods: Thirty-five patients (24 healthy implants and 11 PI) enrolled with baseline results reported. Clinical parameters including pocket depths (PD), attachment loss (AL) and bleeding on probing (BOP) were recorded. Treatment for PI included open flap debridement and decontamination of the implant surface. Periodontal maintenance was provided for healthy implants. GCF samples were collected prior to treatment and at a 3-month follow-up for the PI group. Host response biomarkers were measured by immunoassay. Results: The median age was 67 (range 39-87) and 73 (range 56-79) years and the mean (SE) years of implant function was 7 (1.1) and 11 (2.6) years, for the healthy and PI groups, respectively. Mean PD \pm SEM and mean AL \pm SEM were Healthy: 3 \pm 0.1 and 5 \pm 0.5 mm and PI: 3 \pm 0.2 and 6 \pm 0.5 mm. BOP was noted at 25% in health and 82% for PI. Mean IL-1 β levels were 6X higher in the PI group compared with the healthy group (50 \pm 34.0 vs. 8 \pm 3.4 pg/ml; P=0.0754). There was no significant difference in the MIP-1 α or MMP-8 levels between the groups. Conclusions: Our initial findings show that patients with PI show a trend towards higher GCF levels of IL-1 β than patients with healthy implants.

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College of Dentistry Research Day

POSTER PRESENTATION #267

Abstract Title: **Dentoalveolar Rehabilitation of Severe Maxillary Atrophy: The Use of Tricalcium Phosphate with BMP**

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Abstract: The dental rehabilitation of the patient with severe maxillary atrophy is a challenging and often multi-disciplinary undertaking. Severe maxillary atrophy is associated with increasing length of time since loss of teeth, and is exacerbated by pre-existing conditions such as periodontitis and trauma . Poor oral health, including loose dentures, is known to affect quality of life and is associated with anorexia and unintentional weight loss². Options for restoring atrophic maxillary dentoalveolar support range from autologous bone grafting to alloplastic grafting material with subsequent placement of dental or zygomatic implants³. Autografts are considered the gold standard in bone augmentation of the alveolar ridge, but have known complications, limitations, and associated donor morbidities⁴. We present a case of dental rehabilitation in a patient with maxillary atrophy secondary to trauma at a young age in whom autologous bone grafting failed to restore adequate dentoalveolar support. Options for various bone grafting technique indications are reviewed.

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College of Dentistry Research Day

POSTER PRESENTATION #268

Abstract Title: **Factors Influencing the Referral of Dental Implant Patients: The General Practitioner's Perspective**

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Abstract: Most of the contact that people have with dental professionals comes from their interactions with General Practitioners (GP). These dentists are also the main source of referrals to specialists, particularly when considering dental implant surgery. Specialists represent the majority of those who place dental implants and as they are becoming common in treatment plans, these specialists are continually looking for ways in which to make themselves more competitive in receiving referrals from GPs. This study provided 16 considerations of why GPs may or may not refer their patients to specialists when needing dental implant surgery. A survey of Southeast US general dentists identified 11 factors that they considered important when choosing a specialist to refer to. We then discuss three factors that can be addressed as a specialist continues to practice: formal implant placement training, board certification, and reputation in the community. With an increased awareness of what GPs consider when referring their patients, we suggest that the findings of this paper will allow specialists to better understand how they can shape their practices to potentially receive more referrals for dental implant surgery.

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POSTER PRESENTATION #269

Abstract Title: **P. gingivalis activates Notch-1 in Human Oral Epithelial Cells**

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Abstract: Objective: Notch-1 signaling pathway plays a central role in the development of multicellular organisms regulating cell differentiation, proliferation, and survival. Nevertheless, emerging evidence indicates that Notch-1 is also a key regulator of epithelial barrier function and mucosal immune responses in adult tissues. It has been shown that *P. gingivalis* (Pg) stimulates Notch-1 expression in aortic smooth muscle cells and osteoblast progenitor cells; however, the ability of Pg to activate Notch-1 in oral epithelial cells (OECs) remain unknown. Here, we sought to determine the ability of Pg to activate Notch-1 in OECs and identify potential mechanisms involved in these responses. Methods: Notch-1 expression was first evaluated by flow cytometry in human OECs. The ability of Pg and other oral bacterial strains to activate Notch-1 was tested through determination of mRNA levels of Hes-1 by qRT-PCR. Silencing of Notch-1 with a specific siRNA was used to validate Pg-induced Notch-1 activation. The role of Pg gingipains in Notch-1 activation was evaluated using a Pg mutant for these enzymes. Results: Notch-1 was constitutively expressed by OECs intracellularly and at the cell surface. Notch-1 activation was specifically induced by Pg and Notch-1 silencing significantly reduced Pg-induced Hes-1 expression. Pg mutant for gingipains failed to activate Notch-1. Conclusion: Pg activates Notch-1 in OECs through a mechanism that seems to involve gingipains. Activation of Notch-1 by Pg in OECs could be involved in early mechanisms associated with the pathogenesis of periodontal disease and other Notch-1-related oral diseases such as oropharyngeal cancer.

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POSTER PRESENTATION #270

Abstract Title: **HDAC Inhibitors Attenuate the Development of Hypersensitivity in a Mouse Model of Orofacial Neuropathic Pain**

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Abstract: Chronic orofacial pain (OFP) is a significant health problem afflicting millions of persons in the US. Chronic OFP occurs when a biological process becomes 'locked' in an improper pattern. Identification of this process and understanding why it cannot return to a resting pattern is important for developing new drugs that target this process. Recent evidence suggests that epigenetic mechanisms are involved in maintaining chronic pain states. Identification of genes critical to development of a persisting pain state and the molecular basis for such dysregulation would lead to targeted pharmacological treatment directed at the cause rather than the symptoms. Gene expression patterns in trigeminal ganglia (TG) were determined using microarray technology to identify differentially expressed genes in a mouse neuropathic OFP model at two time points. To identify evidence of epigenetic changes associated with establishment of orofacial pain, we examined H3K9 acetylation patterns in TG by immunohistochemistry and the ability of histone deacetylase inhibitor (HDAC) inhibitors (MS275, SAHA) to attenuate mechanical hypersensitivity using our novel trigeminal inflammatory compression (TIC) mouse model of neuropathic OFP. We determined that many genes in the TG are differentially expressed following TIC injury. Moreover, inhibition of H3K9 deacetylation before and shortly after nerve injury with SAHA or MS275 prevented development of OFP. Identifying genes critical in OFP and the basis of their dysregulation will lead to novel avenues for therapeutic intervention.

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College of Dentistry Research Day

POSTER PRESENTATION #271

Abstract Title: **SHP-2-dependent Signaling Pathways Programing the Oral Cancer-cell-secretome**

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Abstract: Head and neck squamous cell carcinoma (HNSCC) is the sixth most common cancer worldwide and accounts for approximately 65,000 new diagnoses and 35,000 cancer-related deaths every year in US alone. Aberrant levels of protein tyrosine phosphatase PTPN11/SHP-2 have been shown to contribute to HNSCC tumorigenesis and progression. Cancer-induced bone loss further complicates the clinical management of HNSCC and the role of SHP-2 hyperactivation in driving osteolysis is unclear. While studies indicate PI3K/Akt/mTOR activation, together with frequent alterations in tumor suppressor PTEN in HNSCC are responsible for tumorigenesis via multiple mechanisms, we speculated whether SHP-2/PI3K/Akt axis may be responsible for tumorigenesis and dictate cancer-cell-secretome. Preliminary results show decreased PTEN expression in HNSCC cells (UM-SCC12) displaying activated p-AKT and PI3K 110alpha catalytic subunit (PIK3CA), whereas SHP-2 inhibitor NSC 87877 (NSC) treatment restored PTEN expression while inhibiting PI3K-Akt signaling suggests a potential link between these alterations. Furthermore, cell culture-conditioned media (CM) collected from UM-SCC cells drive osteoclast (OC) differentiation, whereas NSC-treated UM-SCC-CM failed to drive osteoclast, suggesting altered secretome composition. Interestingly, metalloproteases secreted by cancer cells known to aid in invasion and migration to distant tissues and MMP-9 secretion which is a measure of the ability of cancer cells to metastasize is decreased in CM following NSC treatment suggesting altered secretome following SHP-2 inhibition. These findings led us to hypothesize that SHP-2-dependent downstream pathways influence the resorption agonist secretion, and SHP-2 silencing alters the tumor-cell-secretome and help diminish tumor-accompanied bone loss, which is the focus of our current investigations.

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POSTER PRESENTATION #272

Abstract Title: **Management of mandibular subcondylar fractures with a single 1.5mm miniplate via a direct transparotid approach.**

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Abstract: The aim of this abstract was to evaluate the utility and morbidity associated with open surgical treatment of mandibular subcondylar fractures using a modified transparotid approach without facial nerve dissection and the stability of a single 1.5mm miniplate fixation for such fractures. Thirty four cases with thirty four non-comminuted mandibular subcondylar fractures repaired via a modified transparotid approach without facial nerve dissection and fixated with a single 1.5mm miniplate placed along the posterior border of the mandible performed by the same surgeon over the course 2 years were analyzed and evaluated for functional results, postoperative complications and stability of fixation. In all cases, a skin incision approximately 2 cm in length was placed 1 cm inferior to the ear lobe over the posterior border of the mandible. The parotid fascia was then opened directly over the fractured site and the parotid gland and masseter muscle dissected bluntly to expose the mandibular subcondylar fracture. Once adequate exposure of the fracture was obtained and the fracture reduced, a 1.5mm thickness titanium mini plate was placed along the posterior border of the mandible for fixation of the fracture. Meticulous water-tight closure of the parotid fascia was then performed and the remainder of the incision closed in multiple layers. The patients were followed at 1 week, 3 weeks, 6 weeks and 3 months post-operation. The direct transparotid approach without facial nerve dissection provided good visualization of the fracture for open reduction, minimal operating time (mean time 14 minutes), minimal post-operative facial nerve palsy, and a cosmetically acceptable post-operative scar. There were two cases of salivary sialoceles that resolved with aspiration and a pressure dressing, four cases of transient facial nerve weakness that resolved within one to six weeks, and one case of suboptimal occlusion requiring plate removal and plate reapplication. Two patients had deviation on opening with stable occlusion. Maximal postoperative interincisal opening ranged from 30-55mm. There were no cases of hematoma. All cases showed stable fracture reduction radiographically at 6 weeks post op.

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POSTER PRESENTATION #273

Abstract Title: **Decreased Vertical Dimension of Occlusion and the Effects on Temporomandibular Disorder Signs and Symptoms**

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Abstract: Objectives: To identify if decreased vertical dimension of occlusion (VDO) influences signs and symptoms of Temporomandibular joint disorders (TMD). According to the Guidelines of the American Academy of Orofacial Pain, temporomandibular disorders (TMD) are defined as “a collective term embracing a number of clinical problems involving the temporomandibular joint (TMJ), masticatory muscles and associated structures or a combination of all the above.” (1). Approximately 5% to 12% of the population suffers from symptoms of TMD (2). There are many that believe changes in VDO can result in an imbalance of the stomatognathic system, creating signs and symptoms of TMD. Other studies argue that the musculatory system can adapt rapidly to mild/moderate changes in VDO without producing any symptoms. Although a number of studies have analyzed the VDO and its relation to TM disorders, none have concluded a definitive relationship between the two. The present study will look at 25 dentate patients with loss of posterior support and thus, reduced VDO. Data will be obtained at baseline, 1 week following treatment to restore VDO, and 6 months post-treatment. We will use a modified Diagnostic Criteria for Temporal Mandibular Disorders (DC/TMD) Axis I to assess signs and symptom of TMD. A facial scanning software will be used to measure VDO and vertical dimension of rest (VDR). The aim of this study is to evaluate possible correlations between reduced vertical dimension of occlusion and alteration in subsequent signs and symptoms of TMD. Furthermore we aim to analyze if restoring occlusion to permit a normal VDO will produce a variation in signs and symptoms of TM disorders.

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POSTER PRESENTATION #277

Abstract Title: **Immediate Loading of Unsplinted Implant Retained Mandibular Overdenture: A Randomized Controlled Clinical Study**

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Abstract: The aim of this study was to clinically and radiographically compare the implant success rate and peri-implant tissue response between immediate loading protocol and delay loading protocol for unsplinted implant retained mandibular overdenture. Materials and Methods: Twenty completely edentulous patients were enrolled. 10 patients received 20 implants and immediately loaded in test group and 10 patients received 20 implants and conventionally loaded in the control group. All participants received new complete dentures prior to implant placement. Two implants placed at the mandibular canine positions. Locator abutments were torqued to 20 Ncm. Attachments were picked up intra-orally and medium retention inserts were placed. Marginal bone levels, Plaque Index, Gingival Index, and Implant Stability Quotient recorded at baseline, 3 months and 1 year. Results: After one year , implant success rate was 100% in both groups. The overall marginal bone level changes were -0.65 mm for test group and -1.32 mm for control group measured on CBCT. At 12 months, the mean Keratinized mucosa was 5.06 for test group and 3.70 mm for control group. After 12 months there was a significant difference in the mean Osstell measurements for the test group 79.56 ISQ and for control group was 76.33 ISQ. Gingival index was higher in control group than test group. Plaque index was higher in test group than control group. Conclusion: With the limitations of this study and the small sample size, immediate loading protocol for unsplinted implant retained mandibular complete overdenture is predictable treatment, safe, and as successful as delayed loading protocol.

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POSTER PRESENTATION #278

Abstract Title: **Clinical Guidelines for Bone-Grafting Future Implant Sites, A Systematic Review**

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Abstract: When a tooth is lost, the surrounding alveolar ridge begins to resorb if left untreated. This becomes a clinical problem when there is no longer adequate support for dentures or other prostheses. As the dental implant is quickly becoming the standard of care for replacing missing teeth, adequate bone is required for implant success, both functionally and esthetically. As alternatives to invasive autogenous grafting procedures, practitioners are moving toward using xenografts, allografts, and alloplast bone grafts. This literature review research project is aimed to provide clinicians with an accessible and evidence-based clinical protocol for using bone graft materials and membranes for implant site preparations. A review of the literature was performed to present histologically-assessed quality of bone generation following grafting with different available bone grafts and membranes, i.e., allograft, xenograft, and alloplast materials as presented in randomized, controlled clinical trials. Articles that met the criteria were chosen to construct a tabular outline for clinicians to consult when making treatment-planning decisions for bone grafting. The results of this review will direct clinician for better treatment planning socket preservation, ridge augmentation, and maxillary sinus augmentation. Primarily, the percentages of vital bone remaining after a specified healing time will be used to forecast the osseointegration period and, therefore, success of each grafting material for future implant placement and restoration. As the use of implants and their applications expand, so does the need for evidence-based, effective site preparation. This review constructs a comprehensible bone-grafting guide for use by the clinician for more intentional and effective treatment planning.

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College of Dentistry Research Day

POSTER PRESENTATION #279

Abstract Title: **Study of Chromosome 11q22.2q22.3 for Linkage to Class III Malocclusion in South Americans**

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Abstract: 4 single nucleotide polymorphisms (SNPs;rs666723, rs578169, rs1386719 and rs12416856) have been selected and genotyped within the 11q22.2-22.3 region on two multigenerational family-based cohorts from Brazil and Colombia for multipoint linkage analysis. The families in each cohort had a high prevalence of class III malocclusion; and varied greatly in the size, structure, and number of affected individuals. Class III affected and unaffected individuals were diagnosed based on cephalometric measurements, models, photographs and/or oral examination. Maximum maximized LOD score (MMLS) and multipoint heterogeneity LOD scores (HLODs) maximized over different levels of heterogeneity, and two genetic models (reduced penetrance dominant and recessive), were generated using SimWalk2. To estimate the empirical significance of these multipoint HLODs, 1000 replicates of unlinked genotype data based on real data pedigree structures, affection status and pattern of missing genotypes were simulated for the Brazilian and Colombian cohort using SLINK and SIMULATE respectively. These replicates were then analyzed using SimWalk2 with the original maximizing mode of inheritance. Power was estimated similarly for each cohort by generating 1000 replicates of pedigree data linked to the SNP with the highest HLOD. The corresponding cohort-specific mode of inheritance was used for the power simulation genetic parameters. For the Brazilian cohort, the MMLS was observed for rs12416856 at 191.6 cM (HLOD=1.84), under a recessive mode of inheritance. The empirical significance for this HLOD was a p-value <0.001 and the empirical type 1 error threshold for $\alpha=0.05$, was an HLOD equal to 1.6. The power for suggestive linkage (HLOD \geq 2) was 80%. For the Colombian cohort, the maximum MMLS was observed for rs578169 at 188.4 cM (HLOD=0.51), under a recessive mode of inheritance. The empirical significance for this HLOD was a p-value of 0.023 and the empirical type 1 error threshold for $\alpha=0.05$, was an HLOD equal to 1.5. These results support potential linkage on chromosome 11.

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POSTER PRESENTATION #280

Abstract Title: **'Oral Health Status in Children Assisted by the Central Kentucky Dental Mobile Unit School Program'**

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Abstract: Untreated decay is much higher in children of lower SES families. This has been seen throughout the United States, as well as other countries (Agrawal, et. al, March 2011). Kentucky has been shown to have higher than the national average for decay in children and adults in this population (Dawkins, et. al, May 2013). There are numerous contributing factors to why children from the lower SES families have increased carious lesions; lack of access to care, poor diets, early exposure to S. Mutans, low oral health literacy, and limited/no insurance (Simmer-Beck, et.al, Summer 2011 and NIH, 2014). The University of Kentucky College of Dentistry utilizes a mobile unit to provide preventative and restorative dental treatments at the elementary schools in Lexington, Kentucky. This paper will be focusing on the influence a dental mobile unit providing treatment at one elementary school in Lexington, Kentucky has had on the DMFS/dmfs rates in children over the past 10 years by eliminating barriers such as access to care and limited/no insurance. **OBJECTIVE:** This is a review of records to determine if there has been a decrease in DMSF/dmsf among children seen on the UK dental mobile unit at an elementary school in Fayette County. **METHODS:** The UK dental mobile unit has provided treatment at one elementary school in Fayette County from 2008 through 2016. A chart review of existing data has been entered into excel to determine if the DMSF/dmsf rates have decrease from the first time the UK mobile unit provided treatment in 2008 to the last time treatment was completed in 2016 at one school. Children from grades kindergarten to 5th grade with health status ASA 1 and ASA 2 received treatment if a parental consent was returned to the elementary school. **RESULTS:** The data has shown a positive trend among the 7 year olds and 10 year olds, however, nothing significant has been seen from this data set. **CONCLUSIONS:** Due to the positive trend between the data sets, school years 2008-2009 and 2015-2016, continued research to include all years mobile unit provided dental services will be done. A larger data set will enhance the positive trends to possibly show significance. In addition, children who have received dental care on the mobile unit multiple years can be compared to each other from year to year.

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POSTER PRESENTATION #281

Abstract Title: **Full Mouth Implant-retained Prosthesis for a Patient with Marfan Syndrome: Clinical Case Report and Literature Review**

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Abstract: Objective: The purpose of this case report is to present the course of treatment for a 56 year old female with Marfan syndrome who was treated with implant-retained maxillary and mandibular complete dentures. Case report: Patient had prior periodontal involvement with scaling and root planning done in 1995 and maintenance thereafter. Periodontal disease progressively worsened and led to the extraction of some involved teeth. Decision was made that implant-retained maxillary and mandibular complete dentures were the best course of treatment. Sinus augmentation was performed bilaterally in maxilla six months prior to full mouth extraction, alveoloplasty, and immediate placement of nine implants (5 in maxilla and 4 in mandible) in 2015. Immediate complete dentures for both upper and lower were delivered. Complete maxillary and mandibular over-denture fabrication began after 4 months of healing. The patient was seen regularly throughout the healing process for peri-implant maintenance. Soft tissue grafts were done in order to gain attached gingiva around each implant after delivery of final complete over-dentures. Treatment is ongoing. Conclusion: After the sinus augmentation, implant integration, and fabrication and placement of the prostheses, the patient is functioning well with no major complications aside from retention. For patients with Marfan syndrome, implant-retained prostheses prove to be a highly functional treatment option.

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POSTER PRESENTATION #282

Abstract Title: **Skeletal Anchorage in a Rat Model of Orthodontic Tooth Movement (OTM)**

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Abstract: Objectives: The purpose of this study was to determine the viability of a skeletal anchorage, and the effect of low force (~3cN) on bone adaptation in response to tooth movement. Methods: 72 Sprague-dawley rats were divided in to 4 groups (3, 7, 14 and 28 days). A micro implant was used to protract the first molar with a NiTi coil spring exerting a 3cN load (experimental)/ 0cN (Sham) in a split mouth design. The stability of the micro implants, linear and angular displacement of first molar via μ CT and BV/TV (Bone volume/Total volume) values of interradicular bone were evaluated. Results: The success rate of mini implants and NiTi springs was 100%. BV/TV values of experimental side is lower than control side for all time points. The Mean (SD) BV/TV values in interradicular bone for 4 time points are 3days-0.6(0.10), 0.7(0.10); 7days-0.5(0.12), 0.7(0.11); 14days-0.6(0.14), 0.7(0.1); 28days-0.5(0.10), 0.7(0.11) at experimental and control side respectively. Conclusions: Although the results from the study reports lower BV/TV values on experimental side than control side, the reduction is lower than the reported values in the literature which can be attributed to the use of very low physiologic force (3cN) in this study. The findings from the study suggest a novel modification to a commonly model for OTM using a secure anchorage and appropriate force.

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POSTER PRESENTATION #283

Abstract Title: **Relationships between Moderate to Severe External Apical Root Resorption (EARR) concurrent with Orthodontic Treatment and Patient Reported Allergy and/or Asthma**

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Abstract: Objective: Limited data is available on the relationship between EARR and allergy/asthma. We hypothesized that patients with self-reported allergies and/or asthma would be at higher risk of developing EARR concurrent with orthodontia than allergy/asthma-free individuals. In addition, we hypothesized those patients who lack tonsils/adenoids prior to orthodontic treatment would be at lower risk of EARR. Finally, we investigated the interaction between EARR, EARR-associated genetic variations and allergy/asthma. Population: This case-control study received IRB approval from Indiana University and the University of Kentucky. Of the 1458 orthodontically-treated patients recruited from an Indiana Private Practice, pre and post-treatment radiographs from 530 randomly chosen Caucasian-patients were evaluated for EARR of the four permanent maxillary incisors. Thirty-nine EARR-cases (18-males/21-females) were identified who provided self-reported-health-history (SRHH) data. Cases were age and sex-matched with two "unaffected"-controls (36-males/42-females). Methods: Patients were orthodontically-treated by one practitioner using conventional-fixed-appliances. Patients (or their parent) provided SRHH data regarding allergy/asthma and the removal of tonsils/adenoids. Buccal swabs were collected, genomic DNA isolated, and genetic markers tested within the IL1 α and P2RX7 genes. Chi-square or logistic regression was used to test for associations/interactions between EARR and SRHH or genetic data, with significance at $p < 0.05$. Results: The number of "unaffected"-controls with allergies (15-males/8-females) was significantly elevated compared to EARR-cases with allergies (1-male/3-females) ($p = 0.01$; odds ratio (OR) = 0.27 95%CI = 0.09-0.86). There were no significant associations between EARR-status and asthma, tonsil-removal or adenoid-removal. There were no interactions between EARR-status, allergy-status and the genetic markers examined. Conclusions: We rejected our hypothesis that allergies associated with EARR-patients more frequently than "unaffected"-control patients. We lacked power to evaluate relationships between EARR and asthma, or tonsil/adenoid-removal.

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College of Dentistry Research Day

POSTER PRESENTATION #284

Abstract Title: **Digital Implant Dentistry Workflow. An Educational Tool for Predoctoral Program: 2 Case Report**

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Abstract: Prosthetically driven implant placement is a key factor for successful implant therapy. Computer-Assisted Implant Surgery (CAIS) offers an additional tool for treatment planning, surgical placement and prosthetic rehabilitation in an interdisciplinary team approach. The continuous technological progress in both the computer-based development and the dental manufacturing process ensures new opportunities in the clinical workflow. CoDiagnostiX or 3-Shape software ensures the planning of the implant position using CBCT with DICOM data and the subsequent transfer of the virtual situation into reality with an interdisciplinary team approach including the restorative dentist, the implant surgeon, and the dental technologist. This digital approach allows for accurate surgical planning and execution that can improve the predictability of the placement and restorability of implants. This two case presentation displays insights into the current processes of the digital implant workflow at UKCD Predoctoral program as an educational tool for both patients and students.

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POSTER PRESENTATION #285

Abstract Title: **Variation in Grey-Scale Intensity for Hard Tissue Landmarks by CBCT**

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Abstract: Objectives: The specific aim is to investigate and understand magnitude of the variation in grey-scale intensity in hard tissues between patients in order to develop a relative calibration method between patients and Cone Beam Computed Tomography (CBCT). Methods: OnDemand (Cybermed, Tustin, CA) software was used to identify landmarks in cortical bone, enamel, and dentin of patients with IRB approval. The images were gathered from CBCT images of 55 male and 51 female patients (ages 8.0-80.9) from three different CBCTs. The cortical bone grey-scale measurements were taken from 0.6 mm into the cortical bone from the most inferior mandibular border below the root tips of each of the mandibular incisors. The enamel and dentin points were obtained from sagittal plane views along the long axis of maxillary and mandibular central incisors. The measurements were obtained from a point directly in the middle of enamel and in the middle of dentin. Four repeat measurements were made for each landmark in each patient. Results: The mean (SD) cortical bone, enamel, and dentin for grey-scale intensities obtained by the methods above were as follows: 1821 (305), 2816 (355), 2098 (397), respectively. Conclusion: The grey-scale variation in the study can be attributed to CBCT and patient variation. Assuming each individual machine was calibrated, the combined patient and machine variation for the entire study was 6.11%. Analyzing patient variation for each CBCT data set ranges from -0.99% to 2.20%. This data presents opportunities to understand relative calibration between CBCT machines and understanding patient variation.

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POSTER PRESENTATION #286

Abstract Title: **Modulation of Epithelial Chemokine responses by Oral Commensal bacteria**

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Abstract: Objectives: Cellular and molecular mechanisms involved in commensal-specific tolerogenic oral epithelial cell (OEC) responses remain unclear. We sought to determine the transcriptional/translational OEC chemokine responses induced by oral commensal bacteria, and their association with the expression of miRNAs as a potential regulatory mechanism for these responses. Methods: OECs were challenged with oral commensal or pathogenic bacteria and chemokine mRNA and protein levels determined by qPCR and Luminex respectively (CXCL8, CCL4, CCL5, CCL20 and CXCL10). Time and dose-responses of *S. gordonii*-induced representative chemokines were evaluated. Expression of miR663a, miR4516, and miR492, previously validated as regulators of chemokine-associated pathways, was determined. Results: A disconnection between transcription and translation was observed for all chemokines in OECs exposed to *S. gordonii* (Sg) and *S. sanguinis* (Ss), for CXCL10 in OECs exposed to *C. sputigena* (Cs), and for CCL5 in cells challenged with *N. mucosa* (Nm). A consistent increase in mRNA and protein levels was generally seen in cells exposed to *V. parvula* (Vp) and *A. naeslundii* (An). mRNA-protein disconnection for CCL4 was observed with all commensals. Up-regulation of miR663a, miR4516 and miR492 was induced by Sg, Ss, Nm, and Cs. In contrast, a decreased expression of miR4516 and miR663a was seen with An and Vp. Conclusions: Disconnection between chemokine transcriptional and translational responses in OECs is associated with oral commensal species that up-regulated specific miRNAs with validated targets associated with chemokine responses. Confirmation of the effect of these miRNAs in OEC tolerance could represent a novel regulatory mechanism of inflammation by oral commensal bacteria.

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POSTER PRESENTATION #287

Abstract Title: **Management of White Spot Lesions in Orthodontics**

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Abstract: Although they can occur in individuals who do not have orthodontic brackets or bands on their teeth, white spot lesions (WSL) are a major adverse outcome of conventional orthodontic therapy. The prevalence and incidence of WSL during orthodontic therapy is a significant concern. Limited progress has been made in decreasing the risk of developing WSL. We will summarize and present the literature to gain an understanding of the etiology of WSL. Also, we will review current preventative techniques along with standard treatments for WSL. There has been increased interest in the “medical model” of dental carries management. The medical model of dental caries views caries as a continuum of disease with specific pathogens and bacterial load involved on the infectious process that ultimately leads to caries. Viewing WSL through the lens of the medical model may help the orthodontic profession successfully manage the problem of WSL. We will look at how the current literature describes the medical model of caries and how that may be implemented into comprehensive orthodontic treatment. We will also explore the research hypothesis that use of the parameters of a medical model would allow investigators to compare the variation of WSL incidence among patients with similar risk factors, and if and why such an individual variation exists.

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POSTER PRESENTATION #288

Abstract Title: **The Exposome and Periodontal Disease: Epidemiologic Evaluation of NHANES**

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Abstract: Periodontal disease is an immunoinflammatory disease with individual variation in disease processes regulated by the exposome, which extends beyond the individual's microbiome and may fundamentally impact the epigenome, with modulated responses to the microbiome. Objective: This report documented an Environment Wide Association Study (EWAS) of the exposome to the expression of periodontitis in smoking and non-smoking patients using data from the NHANES from 1999-2004. Methods: Environmental variables (n=156) were assessed in blood/urine and periodontitis patients categorized in a final cohort of 8884 individuals. Multiple statistical approaches were used to explore this dataset (Logistic Regression, Classification and Regression Tree, Random Forests) and identify patterns of the environmental variables that significantly enhanced the risk for expression of periodontitis. Results: Overall there were 42 environmental factors (cotinine, 4 heavy metals, 8 nutrients, 8 hydrocarbons, 1 dioxin, 17 PCBs and 3 volatile compounds) that resulted in a statistically significant odds ratio for disease versus health in this NHANES cohort. When data was stratified by the smoking status 20 environmental factors (2 heavy metals, 2 nutrients, 1 phthalates, 2dioxins, 12 PCBs, and 1 pesticide) in current smokers, 13 factors (acrylamide, 1 heavy metal, 1 pesticide, 1 nutrient and 9 PCBs) in former smokers, and 13 factors (2 heavy metal, 2 nutrients, 1 dioxin, 1 diakyl and 6 PCBs, rubella international units) in non-smokers were identified. These factors were found to be coupled with more classical risk factors (ie. age, gender, race/ethnicity) to create a model that predicted an increased disease likelihood of 3-4 fold across the population. Conclusions: The results support an association of targeted environmental factors with the risk of periodontitis, and may contribute altered gene expression and subsequent biologic processes enhancing the inflammatory tissue destruction

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POSTER PRESENTATION #289

Abstract Title: **NexGen Sequencing to Characterize the Oral Microbiome of *Macaca mulatta***

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Abstract: Young and adolescent humans demonstrate many of the microorganisms associated with periodontal disease in adults, and substantial gingival inflammatory responses to oral microbes. However, generally, younger individuals do not demonstrate the soft and hard tissue destruction that is the hallmark of periodontitis. Objective: This study evaluated the oral microbiome in gingival samples from Young and adolescent (Y/AL <3-7 years) compared to older animals (AD/AG: 12-23 years) that occurred during experimental ligature-induced periodontitis and disease resolution. Methods: Samples of the subgingival biofilms from Y/AL and AD/AG animals were obtained at baseline (BL), 2 weeks., 1 and 3-month post-ligation. The ligatures were removed after the 3 months and samples were collected at 5 months. Clinical parameters of bleeding on probing (BOP) and probing pocket depth (PPD) were obtained at all-time points. The DNA from these microbial samples were subjected to NexGen sequencing. Results: Clinical evaluation demonstrated that while the Y/AL group showed substantial BOP, they exhibited significantly less destructive disease (PPD). Comparison of the microbiome at BL showed that the AD/AG group displayed over 50% more phylotypes of bacteria than Y/AL group. Additionally, 21/30 of the most prevalent phylotypes were unique in the Y/AL versus the AD/AG samples. Though during ligature-induced periodontitis, the overall phylotype numbers remained consistent in both groups, there were significant changes in phylotype distribution. Finally, at the time point of disease resolution, top 30 phylotypes showed that 2/3 of the representatives were ranked differently in the AD/AG group. Conclusions: These results are the first to describe the microbiome changes in subgingival biofilms with disease across the lifespan, using a nonhuman primate periodontitis model. Clear differences in microbiome with age were noted, significant differences in changes during the disease process were observed between the groups, and once the clinical disease resolved the microbiomes remained substantially different from BL.

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POSTER PRESENTATION #290

Abstract Title: **Bone Adaptations in Untreated Unilateral Cleft Lip and Palate: A CBCT Analysis**

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Abstract: Objective: The purpose of this study was to quantitatively assess the dentoalveolar and skeletal compensations in patients with untreated unilateral cleft lip and palate (UCLP). This knowledge allows the provider to better diagnose and treatment plan for patients with UCLP where 3D imaging may not be prudent. Methods: A convenience retrospective sample of 30 patients with UCLP and a control group of 30 patients with unilateral crossbite without CLP received CBCTs. OnDemand-3D software was used to assess 38 parameters after IRB approval. Alveolar thickness was measured at 2 mm increments in cross sectional views along the long axis of the incisors. Alveolar height was also measured and the percentage of root length covered was calculated. Two-sample t-tests were used to analyze continuous variables. All tests were two-sided with a 5% significance level. Results: Adaptations to a unilateral cleft lip and palate were restricted to the cleft side and adjacent structures. Dental compensations include alteration in the position of cleft adjacent maxillary incisors and maxillary canines. No gross skeletal compensations were found. Alveolar support of cleft adjacent incisors was similar to that of control except for measurements most coronal and most apical. The cleft group contralateral incisor exhibited a buttressed effect and had significantly higher alveolar thickness in the coronal half of the tooth. There was no difference in alveolar bone height across all comparisons. Conclusion: The bone adaptations to the presence of a cleft were localized to the region in the close vicinity of the cleft and adaptations in the mandible were not apparent.

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POSTER PRESENTATION #291

Abstract Title: **Soft-Tissue Profile Comparisons Between African Americans and Caucasians in Kentucky**

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Abstract: Objective: Although previous studies have highlighted a number of significant differences in the soft-tissue profiles of different ethnic groups, comprehensive soft-tissue norms for non-Caucasians are rare in peer-reviewed literature. This retrospective study was designed to measure and compare the soft-tissue profiles of African-American and Caucasian orthodontic patients treated at the University of Kentucky (UK) between 2000-2014. Our study findings will establish a comprehensive set of African-American soft-tissue norms for clinical diagnosis and treatment planning. Methods: Approval for this study was obtained from the UK IRB. A total of 233 patients between the ages of 6-18 were identified for the study in archived records (70 African-American females, 44 African-American males, 68 Caucasian females, and 51 Caucasian males). Only patients diagnosed with dental class I first permanent molars and canines were included in the study. Patients with dental class II or III malocclusions, six or more missing teeth, skeletal asymmetries, craniofacial syndromes or deformities were excluded. Soft-tissue features have been traced on pre-treatment lateral cephalograms using Dolphin Imaging software version 11.8. The 21 soft-tissue measurements selected for comparison are derived from the Legan/Burstone, Holdaway and the UK Cephalometric Analysis. Intra-rater reliability, Dahlberg error, will be determined for the principal investigator via the retracing of 20 randomly-selected cephalograms one month after the initial tracings are complete. Means, standard deviation and range values will be determined for each measurement within each group. Appropriate statistical tests will be done. Results and Conclusions: Data are currently being analyzed. Complete study findings will be presented, including suggested soft-tissue norms for African-Americans located in Central Kentucky.

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POSTER PRESENTATION #292

Abstract Title: **Clinical Guidelines for Cement Selection for Implant-Supported Prosthesis: A Literature Review**

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Abstract: Cement-retained implant-supported prostheses are considered one of the most commonly used treatments for restoring missing teeth. However, complications such as difficulty in retrieving the restoration and concerns regarding biocompatibility may arise with the use of cements. As such, clinicians should consider several important factors when using this type of restoration. Appropriate cement selection is a major concern, with considerations including cement biologic compatibility, methods for limiting the excess cement, ease of removing the excess cement, and the choice of abutment and crown material. One of the most important criteria for long-term success of implant-supported restorations is the connection integrity of the prosthetic superstructure to the implant. This integrity can be maintained by cement or screw. However, neither method of retention is superior to the other, and choosing between them is mainly dependent on clinician selection regarding the clinical scenario. Cement-retained prostheses exhibit some advantages and disadvantages as compared to screw-retained prostheses. According to a systematic review comparing these two types of restorations, the total rate of technical and biological complications was greater in cemented prostheses, and screw-retained prostheses showed a higher rate of ceramic fracture and chipping. Neither the abutment material choice nor cement choice affected the failure of cemented restorations statistically. Nevertheless, some issues regarding the use of cement for these restorations require consideration. There is overwhelming data in literature on using different types of dental cements for cement-retained implant-supported prostheses. The aim of this literature review is to develop clinical guidelines for cement selection for implant-supported prostheses.

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