

College of Dentistry Research Day

Poster Presentation Abstracts

285 Abstract Title: **Physical and Psychological Impact of Periodontitis on Perpetuation of Negative Factors for the Underprivileged**

Author(s): N. A. Laungani, College of Dentistry, U of Kentucky
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Abstract: Gingivitis is a highly prevalent disease in the US affecting over 50 percent of the adult population and, if left untreated, progresses to periodontitis, a chronic inflammatory disease that destroys the gingival tissue and the underlying bone. Untreated periodontitis can ultimately leave the affected edentulous. The negative impacts of periodontitis have been shown to lead to diminished societal gains in the immediate and subsequent generations, however there is limited research explaining the progression to this outcome. This paper will address the literature related to our hypothesis that periodontitis contributes to a depression in physical and psychological health that ultimately hinders the affected individuals from attaining societal gains while also increasing the likelihood for the following generation to acquire periodontitis.

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Poster Presentation Abstracts

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

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Abstract: Endosseous oral implants have revolutionized the practice of modern dentistry. However, with the increasing number of patients receiving dental implants, the prevalence of implant failure has increased. Peri-implant diseases are one of the major biological complications of implant failure. Prevalence of peri-implantitis has been reported to be around 1-47% (mean value 22%). Surgical treatment of peri-implantitis are limited to open flap debridement, osseous resection, decontamination of dental implant and if necessary, bone regeneration. Recent studies involving the pathogenesis of peri-implant diseases have validated few putative biomarkers in oral fluids that could aid in the diagnostic process. To date, no interventional studies have evaluated the combination of inflammation, connective tissue and bone remodeling biomarkers in peri-implant disease. This case control study will evaluate specific peri-implant sulcular fluid biomarkers of inflammation (IL-1 β), connective tissue (MMP-8), and bone remodeling (CTSK, MIP-1 α) before and after surgical treatment of peri-implantitis.

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Poster Presentation Abstracts

287 Abstract Title: **A Survey of Kentucky Pediatricians Regarding The America Academy of Pediatrics Oral Health Policy**

Author(s): M. Bright, Pediatric Dentistry, U of Kentucky
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Abstract: Purpose: The purpose of this survey was to determine pediatricians' awareness of the guidelines on oral health adopted by the American Academy of Pediatrics who practice in Kentucky. Methods: An electronic survey was distributed to the 800+ members of the Kentucky Chapter of the American Academy of Pediatrics using RedCap. The survey consisted of 18 questions and included demographic data on location of training and current practice as well as their comfort level discussing oral health with parents and knowledge of oral health recommendations. Results: Of the 800 surveys emailed to members, 32 (4%) were completed. 31 of the respondents were currently practicing medicine, 56.7% practice in Central Kentucky, with 46% practicing in suburban areas. 66% received their medical training at one of three medical schools here in Kentucky, while the remaining 33% went to medical school out of state. 29 of participants stated they spent between 15 - 30 minutes with infants and their parents on their first visit. Participants stated that half of all of the child patients they see receive an Oral Health Risk Assessment (OHRA), while 6 of the participants (18.75%) do not provide OHRA. 19 participants stated that they discuss dietary choices as it pertains to oral health at each appointment. 18 participants agreed that a child should see a dentist after their first tooth erupts, while 12 participants stated that children shouldn't see a dentist until they have all of their teeth. 12 participants encouraged the use of fluoridated toothpaste while 17 encouraged non-fluoridated toothpaste or no toothpaste at all.

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288 Abstract Title: **A Study of dmfs/DMFS of Children in Central Kentucky**

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Abstract: Purpose: The purpose was to determine the dmfs/DMFS score of children in Central Kentucky who are on Medicaid or are uninsured. (Lower case dmfs represents primary teeth while upper case DMFS represents permanent teeth.) Methods: A retrospective cohort study of school children, preschool-5th grade, that attended elementary schools in Central Kentucky who were seen on a mobile dental unit between 2009-2014 and were either insured by Kentucky Medicaid or uninsured. Existing exam charts and radiographs of patients examined were looked at and information recorded about each patient. Results: Of the 1731 eligible cases, 51.5% (891) were males and 48.5% (840) females. Racially, the sample represented 88.7% Caucasian (1535), 5% African American (90), 0.3% Asian (5), 4.8% Hispanic (83), 0.5% Biracial (8), and 0.6% Native American (10). The average number of teeth per participant is 23.1, making the average number of surfaces per participant equal to 116.2. The average number of DMFS on all participants is 7.1 and of all the participants, 6.2% of their surfaces are DMFS. With an unequal representation among races, the correlation of race and total DMFS were not significant, $r(1731) = -0.03$, $P < .05$. With an average age of 7.7 years old, the correlation of age and total DMFS were not significant, $r(1731) = -.03$, $P < 0.05$. In the correlation analysis between gender and total DMFS, the results were not significant, $r(173) = 0.08$, $P < .05$. The results showed no significant relationship between an individual's total DMFS and their age, race, or gender.

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Poster Presentation Abstracts

289 Abstract Title: **Capnography for Patient Monitoring during Moderate Sedation in Pediatric Dentistry**

Author(s): R.W. Parr, Department of Pediatric Dentistry, U of Kentucky
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Abstract: Purpose: The purpose of this study was to investigate the current use of capnography as a monitor during moderate sedation by pediatric dentists. Methods: An electronic survey was sent to 7,073 members of the AAPD. The questionnaire consisted of 15 questions regarding current practice of capnography use, training received in monitoring, other monitors used during moderate sedation, and selection criteria for monitors. Results: Of 7,073 surveys, 583 (8%) were returned. 20% of survey responders report using capnography for moderate sedation. Other monitors used include blood pressure (67%), precordial stethoscope (55%), pulse oximeter (84%), and temperature probe (7%). 71% of survey responders personally support the use of capnography during moderate sedation. 62% of responders received greater than 20 hours of training in monitoring, while 9% received none. 10% received 1-5 hours, 9% received 6-10 hours, and 9% received 11-20 hours. 45% received training specific to capnography monitoring, while 55% did not. Conclusions: Predictive factors for capnography use include time of graduation from residency, training specific to capnography, greater training received in monitoring, and workplace location including private practice, academic institution or hospital. Many are aware of the proposed changes to AAPD guidelines regarding monitoring for sedation. Although the majority of survey responders personally support the use of capnography during moderate sedation, only approximately 20% are currently using it as a monitor.

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Poster Presentation Abstracts

290 Abstract Title: **University of Kentucky Pediatric Emergency Department Visits for Traumatic and Non-traumatic Dental Care**

Author(s): L.L. Cornelius, College of Dentistry, Pediatric Dentistry, U of Kentucky
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Abstract: Purpose: To compare and analyze the multifactorial characteristics of pediatric patients presenting to the University of Kentucky Pediatric Emergency Department (UKPED) with traumatic and non-traumatic dental complaints. Methods: Medical records from the UKPED were analyzed for patients between the ages of 0 to 18 presenting with dental complaints as their primary diagnosis, between 2010 and 2014. Demographic information including age, sex, ethnicity, insurance provider, and ICD 9 diagnosis codes were recorded from each of these records. Non-traumatic dental complaints were defined by ICD 9 diagnosis codes 520.6 – 520.7, 521.0 – 523.8, 525.4 - 525.9, and 528.3. Traumatic dental complaints were defined by ICD 9 diagnosis codes 524.34, 873.60, and 873.63. SAS was used for all statistical analyses (SAS 9.4, Cary, NC). Significance was defined as $p < .05$. Results: During 2010 -2014, 609 patients presented to the UKPED with primary dental complaints. Of these patients, 348 (57%) were for non-traumatic dental disease and 261 (43%) were for dental trauma. It was observed that African Americans and other races had a higher chance of utilizing the UKPED for non-traumatic dental disease compared to Caucasians. It was observed that patients with Kentucky Medicaid or no insurance were more likely to use the emergency department for non-traumatic dental disease, whereas, patients with Blue Cross, UKHMO, or commercial insurance were more likely to use the emergency department for dental trauma. Conclusion: More people are using the UKPED for non-traumatic dental disease than for traumatic dental injuries.

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Poster Presentation Abstracts

291 Abstract Title: **Effects of intraoral administration of onabotulinumtoxinA in intractable persistent dentoalveolar pain: A case series**

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Abstract: Aim: OnabotulinumtoxinA (BTX-A) is a neurotoxin that has been associated with pain reduction in certain neuropathic pain disorders. The mechanism of action seems to be independent of muscle tone. It has been hypothesized that BTX-A acts directly on sensory neurons inhibiting the release of nociceptive neurotransmitter associated with neurogenic inflammation. The aim of this case series was to evaluate the efficacy, safety and tolerability of intraoral administration of BTX-A in intractable persistent dentoalveolar pain. Methods: This is a case series of seven patients with intractable persistent dentoalveolar pain who received a one-time intraoral administration of BTX-A between 10-25 units in the area of the painful site. Baseline pain levels using VAS/VRS scale were recorded prior to the injection. Pain, as well as the efficacy, safety and tolerability of BTX-A were measured based on the patients' subjective report after 3 months. The onset and duration of pain relief were calculated. The safety and tolerability measures included any adverse effects reported by the patient at the injection site. Results: Four of seven patients reported positive pain reduction with a mean pain reduction from $4 \pm 1.22/10$ to $2.25 \pm 1.30/10$. Their onset of pain relief was observed between 12-14 days post-injection and it was effective for 5-8 weeks, with no adverse effects reported at the injection sites. Conclusions: In this case series of seven patients with intractable persistent dentoalveolar pain, BTX-A injections produced no adverse effects. Four patients reported pain reduction that lasted 5-8 weeks.

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Poster Presentation Abstracts

293 Abstract Title: **Incidence and Treatment of Impacted Maxillary Canines**

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Abstract: The etiology of impacted maxillary canines is multifactorial, including developments such as delayed resorption of primary teeth, abnormal tooth bud eruption, agenesis of additional permanent teeth, and genetic factors. Maxillary canines can be labially or palatally impacted, with reports consistently showing that as much as 85% of maxillary impacted canines are palatally located. Because palatally impacted canines are often accompanied by malocclusion, they often elude detection until a later age when correction is more difficult. Therefore, early diagnosis is critical to good care. Two key predictors of potential impaction are the mesiodistal location of the crown and the tooth's angulation, with mesiodistal location being the most significant. Early extraction of the deciduous canine can lead to spontaneous resolution of the potential impaction. If such extractions are combined with palatal expansion, the chance of spontaneous eruption is higher still. Surgical exposure is required when these and other non-surgical remedies fail to facilitate eruption. Selection of the most appropriate surgical technique is critical to an optimal outcome, considering esthetics and health of surrounding gingiva and long-term stability. Risk of failure, along with increased treatment duration should be thoroughly discussed with the patient prior to the inception of treatment.

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Poster Presentation Abstracts

294 Abstract Title: **Oral Epithelial Keratinocytes Transdifferentiation to Ameloblast-like Cells**

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Abstract: Several ways to produce functional ameloblasts have been described in the literature. DenBesten et al. (1998) found that ameloblast-like cells could be chosen from enamel organ epithelial cells cultured in special media. Nakata et al. (2003) established a spontaneously immortalized mouse ameloblast cell line, capable of producing calcified nodules. Hu et al. (2006) showed that bone marrow derived cells can be reprogrammed to ameloblast-like cells co-cultured with EDE cells. Honda et al. (2009) developed a method for regenerating enamel tissue by using cultured EOE cells. Shinmura et al. (2008) generated enamel-like tissue using elements from ERM that were differentiated into ameloblast-like cells. Takahashi et al. (2010) found that clonal cell lines established from the oral epithelium of p53-deficient mice can differentiate into ameloblasts and regenerate enamel in vivo when combined with tooth germ mesenchyme. Liu et al. (2012) used dental papillae mesenchymal cells to induce rat skin epithelial cells, giving rise ameloblast-like cells. We developed a method to transdifferentiate oral epithelial keratinocytes to ameloblast-like cells without the need of mesenchymal induction employing cells from a readily available and easily maintained immortalized oral epithelial keratinocyte cell line (Parikh et al. 2008). This transdifferentiation is accomplished in 2 steps: (a) De-differentiation to an intermediary primordial (stem cell-like), by TGF- β treatment in vitro. (b) Differentiation to ameloblast-like cells by serotonin in 3D cultures. The extracellular matrix produced is amelogenin positive and can be mineralized by hydroxyapatite. This novel method will enable the production of enamel-like material suitable for use in dental restorations.

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Poster Presentation Abstracts

295 Abstract Title: **Development of small molecule inhibitors of the cystalysin of *Treponema denticola***

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Abstract: *Treponema denticola* is an important constituent of the oral microbiome, emerging in pathogenic biofilms and contributing to an altered periodontal microenvironment with elevated pH (eg. ammonia), volatile sulfur compounds (eg. H₂S) and nutritional substrates for other bacteria (eg. pyruvate). Cystalysin produced by *T. denticola* enzymatically provides these end-products from degradation of cysteine/cystine and glutathione. **OBJECTIVE:** This study identified small molecule cystalysin inhibitors based on their capacity to block H₂S production. Cytotoxicity of the most potent inhibitors was tested using human epithelial cell lines (OKF6; A549). **METHODS:** Cystalysin activity in a *T. denticola* extract was measured by release of H₂S from cysteine using a colorimetric change of lead acetate strips (white-brownish-black). Intensity/area of color change provided an indirect measure of the cystalysin activity including positive and negative controls. The size and intensity of the color was determined and normalized to a non-exposed control area within each strip. The % inhibition by individual inhibitors was determined by comparison to the positive control. **RESULTS:** Of the 63 predicted small molecule inhibitors, selected based upon analysis of the crystal structure of cystalysin, four potent inhibitors were identified in two general structural classes: 1,3-disubstituted 5-membered heterocycle (B04 and E05) and C8-substituted purine mimetics (NC110 and NC112). Only E05 displayed moderate general cytotoxicity. **CONCLUSIONS:** This study demonstrated the potential for a targeted therapeutic approach to treating periodontitis via disruption of the dysbiotic biofilms through a novel manipulation of the microenvironment at diseased sites.

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Poster Presentation Abstracts

296 Abstract Title: **Beta-Angle and W-Angle Cephalometric Values in a Caucasian Ohio Valley USA Sample**

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Abstract: Objectives: To determine Caucasian cephalometric norms for Beta- and W-angles, and test the hypothesis that these angles have similar sensitivity and specificity to assess ANB-angle and Wits defined sagittal jaw relationships. Methods: This retrospective study was conducted under UK-IRB approval #14-1025-P6J. Pretreatment cephalometric radiographs of Caucasian orthodontic patients were screened in Dolphin Imaging software for ANB-angle and Wits parameters used to define skeletal Class I, II or III according to the Iowa Growth Study. Ninety-six subject radiographs qualified, were coded to remove patient identifiers, and divided into three skeletal classification groups (32 subjects/group). All lateral cephalograms were re-traced by one orthodontist using Dolphin to measure ANB-angle, Wits, Beta-angle, and W-angle. Receiver operating characteristic (ROC) curves and tables were used to assess sensitivity and specificity of the Beta- and W-angles to delineate skeletal classification based on ANB-angle and Wits. Results: The Beta- and W-angle data was normally distributed, with the exception of Class-I Beta-angle. The Beta-angle median for Class-I was 31.1° (25th&75thpercentiles: 25.6°,33.5°); means for Class-II and Class-III were 23.8°±4.1°, and 40.3°±4.8°, respectively. The mean W-angles for skeletal Class-I, II and III were 52.9°±3.2°, 48.7°±2.8°, and 60.4±3.2°, respectively. Beta-angles<26° discriminated Class-II from Class-I (sensitivity 69%, specificity 69%), while Beta-angles>35° discriminated Class-III from Class-I (sensitivity 88%, specificity 94%). Similarly, W-angles<50° discriminated Class-II from Class-I (sensitivity 69%, specificity 88%), while W-angles>58° discriminated Class-III from Class-I (sensitivity 84%, specificity 97%). Conclusions: The W-angle had greater sensitivity and specificity than the Beta-angle to delineate subjects according to classification based on both ANB-angle and Wits criteria.

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Poster Presentation Abstracts

297 Abstract Title: **Epithelial Cell Death is Differentially Induced by Commensals and Pathogens**

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Abstract: Objective: Oral epithelial cell (OEC) death is a critical mucosal innate mechanism that can enable the elimination of bacteria and modulate immunoinflammatory responses. We hypothesized that cell death of OECs is differentially modulated by oral bacteria, whereby oral commensals will induce more apoptosis, but minimal necrosis and pyroptosis compared to periodontopathogens. Methods: The effect of oral commensals [*S. gordonii* (Sg), *S. sanguinis* (Ss), and *V. parvula* (Vp)] and pathogens [*P. gingivalis* (Pg), *T. forsythia* (Tf), and *F. nucleatum* (Fn)] in oral epithelial cell death was evaluated in OKF6 cells. Apoptosis and necrosis were determined by flow cytometry using Annexin V and Propidium Iodide staining. Apoptotic and pyroptotic responses were confirmed by activated Caspase-3/7 and Caspase-1 levels respectively. IL-1 β protein levels were determined in supernatants by ELISA. Results: Apoptosis and necrosis were significantly induced by the oral commensals Sg and Ss in a dose and time-response manner. Among pathogens, only Pg enhanced apoptosis although at a lower level. Vp, Tf, and Fn showed insignificant effects on cell viability. These results were consistent with the ability of Sg, Ss, and Pg to activate Caspase 3/7. Only Ss significantly increased the levels of activated Caspase-1, which correlated with its ability to increase IL-1 β expression. Conclusion: OEC death processes are differentially induced by commensals and pathogens, with commensals being more pro-apoptotic (Ss and Sg) and pro-pyroptotic (Ss) than pathogens. A better understanding of bacterial modulation of OEC death will help develop disease management strategies aimed at controlling infection and inflammation, central events of periodontitis.

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Poster Presentation Abstracts

298 Abstract Title: **Stability and Crestal Bone Changes Around Implants Immediately Loaded for Mandibular Overdentures: A Randomized Controlled Study**

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Abstract: Objective: Early and delayed loading protocols for implant retained mandibular complete overdenture (IOD) showed equivalent survival rates; 98% and 97% for delayed and early loading, respectively. However, there is lack of comparative studies on immediately loaded of unsplinted IOD. This study aimed to compare the quality of life, patient satisfaction, implant success rate, and peri-implant tissue response between immediate loading protocol and delay loading protocol for unsplinted IOD. 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. Implants were placed at the mandibular canine positions. Locator™ abutments were torqued to 20 Ncm. Attachments were picked up intra-orally and light retention inserts were placed. Results: Implant success rate after one year follow up was %100 in both groups. Overall marginal bone level change was $-0.5\text{mm}\pm 0.27\text{mm}$ for test group and $-0.6\text{mm}\pm 0.44\text{mm}$ for control group. Attached gingiva change was $-0.5\text{mm}\pm 1.3\text{mm}$ for test group and $-0.5\text{mm}\pm 0.7\text{mm}$ for control group. Osstell® value for test group was increased by $+1.38\text{ISQ}\pm 5.57\text{ISQ}$ and for control group was increased by $+15.25\text{ISQ}\pm 0.35\text{ISQ}$. Gingival index was higher in control group than test group with 0.5 ± 0.58 . Plaque index was higher in test group than control group with 0.88 ± 0.35 . No statistically significant difference between groups ($p > .05$). Conclusion: The preliminary results of this study indicated that immediate loading protocol for unsplinted IOD is as successful as delayed loading protocol with similar periimplant tissue responses after one year of implant loading.

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Poster Presentation Abstracts

299 Abstract Title: **Treatment Factors and VDR Polymorphism Effect on Orthodontic Root Resorption**

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Abstract: Objective: The vitamin D receptor (VDR) is involved in a wide spectrum of functions involving mineral metabolism. The association of VDR DNA polymorphisms with external apical root resorption (EARR) concurrent with orthodontic tooth movement has recently been reported. This sex and age matched Case-Control study will investigate the association of a VDR genetic variation and selected treatment factors with EARR concurrent with orthodontia. Methods: 134 unrelated Caucasians were selected for this study from a larger data bank sample (~1450 participants). All subjects mean age (16.2 years) elected to be orthodontically treated and consented to participate in research. Pre and post treatment diagnostic panoramic, cephalometric, and occlusal radiographs were obtained. 67 subjects were diagnosed with moderate to severe EARR (only maxillary incisors were evaluated by three independent evaluators). Each of the affected individuals (38 females and 29 males) was sex and age matched with a control. The following parameters were evaluated for all subjects: 1) treatment duration, 2) extraction of maxillary premolars, 3) numerous cephalometric measurements, and 4) a DNA polymorphism (rs2248098) within the VDR gene (more SNPs within the VDR will be tested in the future). Stepwise logistic regression was utilized to detect associated factors with EARR occurrence with significance at $p < 0.05$. Results: Treatment duration and extraction of maxillary premolars were significant factors affecting EARR ($p = .0001$, and $p = .0079$ respectively), while the VDR SNP was not. Conclusion: EARR occurrence is associated with extraction treatment and treatment duration, resulting in a greater likelihood of EARR. Further investigation of the contribution of VDR variation is required.

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Poster Presentation Abstracts

300 Abstract Title: **HIV Testing in Dental Practices, Is it Practical?**

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Abstract: It is estimated that 1.2 million people in the US are currently living with HIV. Of these individuals, nearly 168,000 are unaware that they are infected. This leads to poorer outcomes for the infected patients and contributes to the spread of new HIV infections. Clearly, better screening procedures are required to identify infected individuals. With the advent of rapid HIV oral testing, dentists are uniquely posed to provide this screening. Between 60 percent and 70 percent of adults reported visiting their dentist in the past year, but 10 to 24 percent hadn't visited their physician during the same period. Furthermore many of the earliest manifestations of HIV infection are oral lesions, opportunistic infections and malignancies. Dentists are likely the first providers to identify signs of HIV infection, and may be the only providers infected patients are seeing regularly. Although healthcare providers have expressed concerns about the use of oral fluid HIV tests, they can be more suitable than traditional whole blood or serum based testing methods. Oral fluid testing methods have higher patient acceptance, reduce the risk of transmission between patient and provider, and are efficient and more cost effective than traditional testing procedures. Furthermore, when used by trained professionals in the proper patient population oral fluid HIV tests are highly accurate. We advocate the use of rapid HIV testing in dental clinics as a primary diagnostic test to identify undiagnosed HIV infections, particularly in rural settings with limited access to care.

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Poster Presentation Abstracts

301 Abstract Title: **Stability of Maxillary Advancements using a combination of prebent and conventional plates for fixation**

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Abstract: Introduction: The purpose of this study was to determine the stability of maxillary one piece advancements fixed with a combination of prebent plates and two “L” shaped plates. To date there are no clinical studies looking at this combination to fix maxillary advancements. Materials and methods: This was a retrospective cohort analysis Inclusion criteria were maxillary advancements (one piece Le Fort I osteotomy) fixed with two 1.5 mm prebent plates at the piriform rim and 2.0 “L” shaped plates at the maxillary buttresses with or without mandibular set back. Exclusion criteria were syndromic patients, segmental maxillary osteotomies, incomplete set of lateral cephalometric x-rays or prebent plates were not used. 26 patients met the inclusion criteria, 14 underwent isolated maxillary advancement (group 1) and 12 had concurrent mandibular procedures (group 2). Lateral cephalometric radiographs were taken preoperatively (T1), immediate post-operative (T2), after 4-8 weeks (T3) and after 6-9 months (T4). All were digitally traced and analyzed. Vertical, horizontal and rotational measurements were obtained at several skeletal and dental landmarks. t tests were used for comparisons between groups and linear regression analysis was done to assess stability of A point T2-T4 versus A point movement from T1-T2 and change in palatal plane T1-T2. Results: Group (1) had an average advancement of 7.61±1.73 mm and group (2) had an average advancement of 5.22±1.67 mm. There was a significant difference between the advancements between the two groups (p=0.002). Group (1) showed 0.79±0.96, and group (2) showed 0.40±0.49 horizontal relapse at 6 months. There was no significant difference in relapse between the two groups (p=0.393). There were significant results looking at the relationship between SN-PP difference after surgery, group, and 6 months A point relapse, in group 1 there was a statistically negative relationship between SN-PP at T1-T2 and A point T2-T4. This was not seen in group (2). Interestingly, when the values were combined as A point T1-T2 increased and SN-PP change increases, there was a greater amount of relapse (A point T2-T4) (p=0.07) (R² =0.4102). Conclusion: The results of our study concludes that prebent plates in combination with L plates is a stable method of fixation that offers a good alternative to the conventional two plate system. Both groups showed a small amount of horizontal relapse at 6 months (9.2 %). Large advancements when combined with changing in palatal plane (posterior impaction) showed a great amount of relapse than other movements.

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Poster Presentation Abstracts

302 Abstract Title: **Dentistry and Fatal Outcomes: A Systematic Review**

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Abstract: OBJECTIVES: This investigation sought to identify risk factors associated with death as an outcome of dental procedures by performing a systematic review according to Preferred Reporting Items for Systematic Reviews and Meta-Analyses guidelines. METHODS: Electronic searches in PubMed, Dental and Oral Sciences Source, Web of Science and the Cochrane database were performed. Studies published from 1960 until October 2015 were included if death occurred within 90 days of the dental appointment, and the patient's age, procedure and information regarding cause or time of death were provided. Risk factors for death were assessed with multivariate analyses and logistic regression (LR). RESULTS: Fifty-six publications reporting 148 fatalities met the inclusion criteria. Reports were level III (retrospective studies) and level IV (case reports/series) evidence. Eighteen deaths were attributed to airway/respiratory issues, 5 due to bleeding, 31 due to cardiovascular events, 70 associated with drug effects/adverse effects/drug interactions, 19 due to infection, 3 due to other causes, and 2 of unspecified causes. Age ($p < 0.0001$), disease severity ($P < 0.02$), disease stability ($P < 0.006$), dental provider ($p < 0.05$), level of consciousness/sedation ($P < 0.02$), and drug actions/interactions ($p < 0.03$) were significantly associated with fatal outcomes. Younger age (mean age < 26 years) was significantly associated with airway/respiratory and drug effects/adverse effects/drug interactions. In contrast, infection and cardiovascular events were associated with deaths more often in persons older than 40 years. Factors significantly associated with time to death were: cause of death, age, gender, American Society of Anesthesiologists (ASA) classification, operative setting, performance of the dental procedure, drug effects/adverse effects/drug interactions, postoperative setting, and the setting where the adverse progression began ($p < 0.05$). CONCLUSION: Several risk factors were shown to associate with dental care and fatal outcomes. These risk factors should be considered as we move forward in the development of guidelines that could help prevent fatal outcomes in dentistry.

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Poster Presentation Abstracts

303 Abstract Title:	Volumetric Root Resorption With Continuous Versus Dissipating intrusive Orthodontic Forces
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Abstract: Objective: To test the null hypothesis that intrusion mechanics, sex, Angle class, age, and intrusion duration have no effect on volumetric root resorption. Methods: Following IRB approval. Twenty-three subjects (12 male and 11 female, 13-25 years old) were selected based on deep overbite seeking orthodontic treatment after informed consent. The patients were randomly divided into two groups; Group I: continuous intrusive force (10 cases, 5 males and 5 females), and Group II: dissipating intrusive force (13 cases, 7 males and 6 females). CT radiography (Scanora 3D, Soredex, Charlotte, NC) was obtained before inserting mini-screws between the maxillary and mandibular laterals and canines and immediately at the same day of mini screws removal. In group I, NiTi closed-coil (3M Unitek, Monrovia, CA) spring was used for incisor intrusion with 80 gm in maxillary incisors and 60 gm in mandibular incisors. In group II, elastic power chain was used with the same force and changed every four weeks. Intrusion ended when the central incisors were level with the premolars. Volumetric root measurements were determined using Invivo 5 (Anatomage) software. Multivariate stepwise regression was performed with intrusion mechanics, sex, Angle class, age, and duration of intrusion predicting summed volumetric change in maxillary and mandibular roots using JMP 11 (SAS, Carey, NC) with $p \leq 0.05$. Results: None of the variables were significant for root resorption of the maxillary incisors with a post-hoc power of 0.5, while duration of intrusion was significant ($p=0.005$, post-hoc power 0.9) for the mandibular incisors. Conclusion: There was no difference based on intrusion mechanics. This study is sufficiently powered to show a significant association of the number of days of intrusion and root resorption of the mandibular incisors, suggesting the duration of intrusion of the mandibular incisors with 60 gm of force should be minimized.

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Poster Presentation Abstracts

304 Abstract Title: **Inhibition of Osteoclastogenesis In Vitro by Antibodies to Porphyromonas gingivalis**

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Abstract: A crucial step in the pathogenesis of periodontal disease (PD) is activation of osteoclasts (OC), the principal bone resorbing cells. Numerous virulence factors produced by Porphyromonas gingivalis (Pg) contribute towards the induction of bone resorption. To understand pathogenesis of PD and the role of specific adaptive immune responses of the host in this disease, antibody effects on Pg-induced OC differentiation and function were investigated. Human peripheral blood-derived monocytes were differentiated in vitro towards osteoclasts in the absence or presence of: a) antibodies to Pg; b) opsonized bacteria generated in vitro using antibodies to Pg; and, c) formalin fixed Pg. In addition, pre-osteoclasts prepared in the presence of M-CSF and RANKL for 72h were stimulated further for 24h with antibodies to Pg and opsonized Pg. End points analyzed were osteoclast differentiation, ie. quantification of tartrate resistant acid phosphatase positive multinucleated cells and gene expression of Toll-like receptors (TLRs) and osteoclast markers using qPCR. Osteoclastogenesis was induced significantly by formalin fixed Pg when compared with control cultures, whereas opsonized bacteria impaired it by 45% when compared to Pg alone (data analyzed from 4 independent donors). The TLR/pattern recognition receptor (PRR) gene expression profile of the pre-osteoclasts in the presence of antibodies and opsonized bacteria analyzed by qPCR showed marked up-regulation of TLR1 (3-fold), TLR2 (2-fold) along with FcγRIIB (2-fold) and FcγRIII receptors (5-fold), but not TLR4 and FcγR receptors (data from 2 independent donors). Antibodies alone failed to inhibit OC formation in the presence of M-CSF+RANKL. These findings suggest a bone protective role of the antibody in opsonizing the bacteria, thus modifying osteoclast formation. This could be affected by competing with Pg as an agonist for PRRs, and selective activation of FcγRs with simultaneous suppression of ITAM receptor FcγR that regulate bone resorptive processes.

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College of Dentistry Research Day

Poster Presentation Abstracts

305 Abstract Title: **Genetic Association of GHR and IGF-1 with Facial Growth**

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Abstract: Objectives: Progress in understanding how genetic variation is associated with differences in facial growth during puberty would help in studies of growth prediction and orthodontic treatment planning. The specific aim was to determine whether genetic variations in the GHR gene (rs2972408, rs4130114, rs6180) and/or the IGF-1 gene (rs10735380, rs1520220 and rs2946834) were associated with differences in facial growth rates. Methods: Cervical vertebral staging was performed on a total of 418 subjects by three independent orthodontists; agreement of two orthodontists designated the patients' stage. All subjects originated from an IRB approved database of approximately 1,500 patients. 182 Subjects (98 Female, 84 Male) with an initial cervical vertebral stage of 3 were included in the study. Initial and final cephalometric radiographs were traced by one individual. The differences in initial and final linear and angular measurements were annualized over the treatment period. DNA from each subject was also analyzed for each of the 6 SNPs being investigated. A stepwise multiple regression (JMP®, SAS Institute Inc, Cary, NC) was performed to determine association between any of the genetic variations and any facial measurements. Normal data distribution was assessed by Shapiro Wilk W test and transformed with the Johnson Su, as needed. Results: Genetic variation in IGF1 rs1520220 was associated with changes in SNA (CC>CG&GG, p= 0.0035, power=.8). Changes in S-Go were associated with IGF1 rs1073530 (GG>AG&AA, p=.0036, power = .8) and GHR rs4130114 (GG>GT&TT p= 0.0069, power=.8). Variation in GHR rs6180 was related to changes in mandibular length (AA>AC&CC, p=0.0097, power=.7) Conclusions: Genetic variation in these genes may explain some of the variability in facial growth, which could help to study the amount of growth that is related to orthodontic growth modification treatment.

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Poster Presentation Abstracts

306 Abstract Title: **Association of Human Dental Agenesis and Polymorphisms on Chromosome 8q24**

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Abstract: Objectives: Our laboratory has been interested in identifying novel dental development gene mutations that may play a role in other phenotypes within the body later in life. Based on published findings from multiple Ovarian Cancer (OvCA) genome-wide studies, we have examined 12 OvCA-susceptibility markers for associations to non-third-molar dental agenesis in healthy orthodontic patients. Our goal was to extend the lab's previous findings of single nucleotide polymorphisms (SNPs) on chromosome 8q24 and hypodontia with an enlarged cohort. In addition, we have begun to sequence the exons of long-non-coding-RNA, LINC00824, which are in linkage-disequilibrium (LD) with both SNPs, to identify potential causal mutations for dental-agenesis. Methods: Following informed consent, saliva was collected as a DNA source from 41-subjects diagnosed with hypodontia (agenesis of <5 teeth), 7-subjects diagnosed with oligodontia (agenesis of >6 teeth) and 69-control individuals with a complete dentition (excluding 3rd molars). Taqman® genotyping of rs10088218 and rs10098821 was done on all subjects, and statistical analysis completed with JMP-software. Sanger Sequencing of the LINC00824 exons in linkage disequilibrium with the markers, and comparison of the case/control sequences using GENEIOUS software is underway. Results: The most common agenic teeth were mandibular-2nd- premolars (n=27), followed by maxillary-lateral-incisors (n=22) and maxillary-2nd-premolars (n=15). The occurrence of the rs10098821 CC-genotype was associated with dental agenesis in a 2-phenotype (2PHE) and 3-phenotype (3PHE) Fit Model (p=0.0009, control/hypodontia; p=0.003, control / hypodontia / oligodontia, respectively). SNP rs10098821-CC was associated with an increased number of agenic teeth in both models (2PHE, p=0.004; 3PHE, p=0.003) as-well-as rs10088218-GA in the 3PHE model (p=0.008), with 0.8 power or greater. Conclusions: Significant associations of dental-agenesis have been localized to 8q24 at SNP markers rs10088218 and rs10098821. Because these markers are in LD with LINC00824, Sanger sequencing is being employed to identify casual mutations of hypodontia. Identified variations will be further studied for a dual association to dental agenesis and cancer.

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Poster Presentation Abstracts

307 Abstract Title: **OSA is Associated with Increased Waist and Neck Circumference Depending on Location/Altitude**

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Abstract: Objective: Analyze the association between neck and/or waist circumference with Obstructive Sleep Apnea (OSA) in Colombian at different locations/altitudes. Methods: Following Univeristy and Hospital approved informed consent polysomnography was performed on 368 men and 353 women (ages 56-67 years old). OSA was defined as having > 5 AHI events per hour caused by partial/complete collapse of the upper airway during sleep. Individuals were divided into four groups: two non-apneic control groups (154 women and 92 men) and two OSA groups (199 women and 276 men). Waist circumference was measured at the midpoint between the lower costal border and the iliac crest, at the end of exhalation. Neck circumference was measured above laryngeal prominence, perpendicular to neck axis. Chi-square, odds ratio (OR) tests, and nominal logistic regression were used for statistical analysis. Results: Increased neck circumference showed statistically significant association with OSA in women (OR=5 CI 95% 2.6-9.7; p<0.0001) and men (OR=1.9 CI 95% 1.8-9.8; p<0.001). Increased waist circumference showed statistically significant association with OSA in women (OR=4.1 CI 95% 2.6-9.7; p<0.0001) and men (OR=2.3 CI 95% 1.3-4.1; p<0.0001). Nominal Logistic Fit for OSA Effect Likelihood Ratio Tests found gender (p=0.002), waist circumference (p=0.001), and city (p<0.0001) to be significant. There was a significant interaction between waist circumference and city (p<0.0001). Neck circumference was not significant (p=0.4) for OSA, with no interaction between neck circumference and city (p=0.3). Conclusions: A positive association between increased neck and waist circumference and OSA is affected more by location/altitude for waist circumference than neck circumference.

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