

2017 AAO Annual Session Oral Research Presentations

The Oral Research presentation will be held on Sunday, April 23 in San Diego Convention Center Room 22 from 8:00am-3:30pm with a break from Noon to 12:30pm. Oral Research presentations are 10 minutes long with 5 minutes for questions from the audience.

*- Denotes financial interest or visual enhancement

Moderator: Dr. Flavio Uribe - 8:00am-10:00am

ORTHODONTIC TREATMENT EFFECTS I

8:00am-8:15am

Evaluation of root resorption with clear aligners and two different fixed appliances

Osama Eissa, et al.

Edmonton, Alberta, Canada

Lecture Description:

Apical root resorption is considered one of the unwanted consequences of orthodontic tooth movement. There is paucity in the literature about the incidence of orthodontically induced root resorption with clear aligners compared to fixed appliances. This presentation will address the degree of orthodontically induced apical root resorption following treatment with Smart Track® aligners as well as two different fixed orthodontic appliances; regular and Damon braces using Cone Beam Computerized Tomography (CBCT).

Learning Objectives:

1. To recognize the differences in apical root resorption as measured by difference in root lengths between three groups of patients that were treated by Damon system, conventional bracket system or Invisalign SmartTrack material
2. This presentation will demonstrate that the use of Smart Track® aligners showed less root resorption relative to regular fixed or Damon appliances

8:15am-8:30am

Evaluation of miniplates versus mini-implants anchorage with Forsus Fatigue Resistant Device: a randomized controlled trial*

Sherif Elkordy, et al.

Cairo, Egypt

Lecture Description:

The Forsus Fatigue Resistant Device (FFRD) is a popular fixed functional appliance used for treatment of Class II malocclusion. It is however well reported that its treatment effects are predominantly of dento-alveolar nature. This presentation comprises a randomized controlled trial that was conducted on 62 growing skeletal Class II females to demonstrate the effectiveness of using skeletal anchorage (miniplates and mini-implants) with the FFRD aiming at enhancement of its skeletal outcomes. Both anchorage types were compared with the conventional FFRD and with untreated Class II controls.

Learning Objectives:

1. Describe the direct miniplates anchorage and the indirect mini-implant anchorage with FFRD
2. Recognize the superiority of the miniplates over the mini-implants regarding the skeletal outcomes
3. Identify the indications of using each modality according to the patient characteristics

8:30am-8:45am

Rate of tooth movement with different acceleration modalities : a meta analysis

Viraj Doshi, et al.

Mumbai, India

Lecture Description:

This meta-analysis aims to analyze current literature for evidence on rate of tooth movement using conventional and non conventional methods for accelerated tooth movement. The methodological soundness of original studies affecting data acquisition of this meta analysis will be discussed.

Learning Objectives:

1. Identify and analyze the rate of tooth movement using conventional and non conventional methods
2. Identify and analyze the level of evidence and methodological soundness as far as the different methods of tooth movement is concerned

8:45am-9:00am

Stem cell enhanced bone regeneration of alveolar cleft and trauma defects in adults

Mona Bajestan, et al.

San Francisco, CA, USA

Lecture Description:

Autogenous alveolar bone grafting prior to oral implant therapy is considered standard-of-care for patients with severe alveolar defects such as the bony defects in patients with cleft palate. Though routine, these grafting procedures are often associated with significant morbidity of the donor site. More novel, less invasive techniques are needed to circumvent these limitations. The objective of this study was to determine whether an autologous stem cell-based therapy is safe and efficacious in the regeneration of large alveolar defects.

Learning Objectives:

1. Recognize that transplantation of autologous stem cells can be used safely for the reconstruction of large craniofacial defects
2. Demonstrate that although stem cell therapy is less invasive than traditional treatment, further development of this approach is needed to optimize treatment outcomes to meet those of the standard-of-care used to treat more complex defects such as those resulting from cleft palate

ORTHODONTIC TREATMENT EFFECTS II

9:00am-9:15am

Vertical and horizontal alveolar bone changes around mandibular incisors after orthodontic tooth movement

Shiva Senathirajah, et al.

Melbourne, Australia

Lecture Description:

Alveolar bone is an integral component of the periodontium and contributes to periodontal health and tooth stability. Orthodontic tooth movement results in alveolar bone changes, however these morphological changes cannot be evaluated clinically. High resolution, small field of view CBCT facilitates accurate assessment of alveolar bone. This presentation describes changes in labial and lingual alveolar bone around mandibular incisors following rapid orthodontic tooth movement in patients treated with surgery first. The effects of the quantity and type of tooth movement on alveolar bone will be discussed.

Learning Objectives:

1. Describe alveolar bone changes around the mandibular incisors that occur following orthodontic tooth movement
2. Recognize that greater tooth movement may result in greater alveolar bone changes
3. Compare the alveolar bone response of different types of tooth movement

9:15am-9:30am

The influence of cortical bone thickness on miniscrew microcrack formation

Melissa Nguyen

Adelaide, Australia

Lecture Description:

Initial orthodontic miniscrew success has been associated with the obtainment of mechanical retention. The ridged bone-miniscrew contact, however, elicits extensive microdamage within the adjacent bone, resulting in site-specific remodeling. Minimizing the formation of microdamage might be an important determinant related to the clinical success of the orthodontic miniscrew. This presentation will answer the following questions: does cortical bone thickness influence the amount of microdamage? How far does the microdamage extend to?

Learning Objectives:

1. To recognize the association between microdamage and orthodontic miniscrew success
2. To evaluate the importance of cortical bone thickness
3. To evaluate orthodontic miniscrew insertion sites with respect to the safety zone

9:30am-9:45am

Long term effects of vacuum formed retainers on periodontal status and their effectiveness on retention
Muhsin Cifter, et al.
Istanbul, Turkey

Lecture Description:

The stability of treatment results is a major concern in orthodontics and so numerous retention regimes have been introduced to maintain the stability of treatment results. The aim of this presentation is to answer the questions: Are vacuum-formed retainers effective in retaining treatment results? How do their long-term use effect periodontal health?

Learning Objectives:

1. To show that vacuum-formed retainers are effective in retaining treatment results
2. To recognize that their long-term use resulted in slight periodontal loss without gingival recession or gingival inflammation

9:45am-10:00am

McNamara's upper pharyngeal airways measurement associated with maxillomandibular length
Nathali López-Godoy, Luis Cruz
Bogota, Colombia

Lecture Description:

Despite the CBCT and new technologies McNamara's upper airways analysis remains an easy, reliable and valid method to evaluate upper airways dimensions. We identified a positive association between McNamara's upper pharyngeal measure and both, maxillary length and mandibular corpus length. Upper airways association is more understandable if linear measures are used rather than classical skeletal classification.

Learning Objectives:

1. To identify that McNamara's pharyngeal measurements are was associated to maxillary length
2. To recognize that upper pharyngeal airway width could be a better indicator than lower pharyngeal airway width to identify maxillary dimensions

Moderator: Dr. Sylvia Frazier-Bowers - 10:00am-Noon

FACIAL GROWTH and TOOTH MOVEMENT I

10:00am-10:15am

The varying effect of intensity levels of LIPUS on orthodontic tooth movement
Afsaneh Rangiani, et al.
Farmington, CT, USA

Lecture Description:

The effects of LIPUS on orthodontic tooth movement (OTM) has been studied before, but there is a big controversy over the role of LIPUS on the rate of OTM. The is to investigate the effect of different intensities of LIPUS on OTM, as well as biological properties of the bone. 24 mice randomly divided into four groups, and on each group different intensities of LIPUS were applied (control, 15 mW/cm², 30 mW/cm², and 50 mW/cm²). The rate of OTM changes depending on the intensity of ultrasound with a significant increase in OTM in 30 compared to 15 and 50 mW/cm². Series of biological reactions such as PGE₂ and VEGF expression and osteoclast numbers alter in response to the force. LIPUS can be utilized in clinical orthodontics for acceleration or retention purposes.

Learning Objectives:

1. To identify some of the mechanisms involved in the process of tooth movement
2. To distinguish the varying effect of LIPUS on orthodontic tooth movement
3. To discuss the possibility of using LIPUS in orthodontic treatment as an inhibitor or accelerator of the tooth movement

10:15am-10:30am

Comparison of micro-osteoperforation and corticision on the rate of orthodontic tooth movement

Chi-Yang Tsai, Teng-Kai Yang

Taipei, Taiwan

Lecture Description:

Most patients prefer a short orthodontic treatment time. Over the past decade, the regional acceleratory phenomenon induced by surgical trauma has received considerable emphasis for reducing the treatment time. The purpose of this study was to compare acceleration in tooth movement between micro-osteoperforation and corticision without flap elevation by measuring the movement distance, alveolar bone density changes, and number of osteoclasts.

Learning Objectives:

1. To show that two minor flapless surgical operations increased bone remodeling and osteoclast activity and induced faster orthodontic tooth movement for at least 2 weeks in rats
2. To demonstrate that no obvious differences were observed between flapless micro-osteoperforation and corticision in rats

10:30am-10:45am

The impact of bone regenerative materials on orthodontic tooth movement

Omer Fleissig, et al.

Jerusalem, Israel

Lecture Description:

Clinical practice shows that orthodontic tooth movement into previously grafted site with BioOss® is slowed down and even stopped. In this lecture we will describe a classic "Chair-to-Bench" research, in which we observed a clinical problem and mimicked it in a novel PRT-OTM mouse model in order to find answers to biological questions that were raised. Based on this unique mouse model, we were able to follow biologic processes of osteoclasts but more importantly, this model will serve as a central infrastructure for future research in the field of PRT and OTM.

Learning Objectives:

1. Explain what is the PRT-OTM mice model
2. Describe what happens to the tooth movement in an area grafted with BioOss® in mice
3. Compare the tooth movement in area of PRT compared to area without PRT

10:45am-11:00am

Malocclusions in young children – does breastfeeding really reduce the risk?

Esma J. Dođramaci, et al.

Adelaide, Australia

Lecture Description:

The innumerable benefits of breastfeeding for infants and nursing women are well known. Another purported benefit is a decrease in the risk of malocclusions. Can this really be true? Can malocclusions be eradicated by this uniquely mammalian feeding method? Should orthodontists be worried? This lecture will summarize the results of studies into this topic, as well as present the quality and level of evidence of the information that the lay public can encounter when they research this phenomenon on the Internet.

Learning Objectives:

1. Explain that a lower prevalence of malocclusions amongst children with a history of breastfeeding is not the same as breastfeeding decreasing the risk of malocclusion
2. Recognize that breastfeeding will not prevent the development of malocclusions of skeletal, soft tissue or dental origin
3. Demonstrate that the evidence-base cited to support information targeting the lay public is largely low to very low level

FACIAL GROWTH and TOOTH MOVEMENT II

11:00am-11:15am

3D changes in maxillary expansion with hyrax or Damon system using CBCT

Manuel Oscar Lagravere Vich, et al.

Edmonton, Alberta, Canada

Lecture Description:

Although there are several studies published covering the skeletal and dental changes when doing maxillary expansion with Damon system or using a Hyrax appliance, still there is no clear cut answer on what these changes are in three-dimensions. This lecture will answer this question by showing CBCTs taken at different time points of patients treated with either of these appliances. With this, the audience will be able to compare the two treatment protocols and be able to make a scientific decision on which modality would bring the desired results.

Learning Objectives:

1. Distinguish between dental and skeletal changes present with two different types of expansion treatments
2. Assess CBCT images to identify pre and post changes in structures

11:15am-11:30am

3D dentoalveolar changes following bone anchored maxillary protraction

Mohammed Elnagar, et al.

Chicago, IL, USA

Lecture Description:

Recently miniplates have been used in orthopedic treatment of Class III patients with maxillary deficiency to provide absolute skeletal anchorage and direct application of orthopedic force to the maxillofacial skeletal complex. The aim of this study was to evaluate dentoalveolar and arch dimension changes in two miniplates-anchored maxillary protraction protocols in relation to untreated Class III control group using 3D digital models.

Learning Objectives:

1. To understand different protocols of maxillary protraction using miniplates as skeletal anchorage devices
2. To demonstrate dentoalveolar and arch dimension changes associated with bone anchored maxillary protraction
3. To discuss if Rapid maxillary expansion is required or not during bone anchored maxillary protraction

11:30am-11:45am

Quantitative analysis of facial expression: moving towards creation of virtual patient

Cathy (Sungah) Lee, Won Moon

Los Angeles, CA, USA

Lecture Description:

Facial expression is continuous dynamic movement of facial soft tissue. However, 2D static photos with subjective visual evaluation have been used in orthodontic facial analysis. There have been no previous studies investigating how to quantify the dynamic movements of soft tissues in 3D during various facial expressions. This presentation will explore the following concepts: dealing with the dynamic data of the facial soft tissue movements in 3D and quantitatively tracking and analyzing the dynamic 3D movements of facial expressions during smile by generating trajectories of the average movement.

Learning Objectives:

1. To manage the dynamic data of the facial soft tissue in three dimension
2. To recognize that dynamic 3D movements of facial expressions can be quantitatively tracked and analyzed, offering additional dimension to the diagnosis and treatment planning of patients (from 2D to 3D facial expression analysis)
3. To recognize that the trajectories of the average smiling movement can be quantitatively illustrated

11:45am-Noon

Quality of life of 6- to 18-year-old orthodontic patients

Susie Paes da Silva, et al.

Munich, Germany

Lecture Description:

Malocclusion is one of the most common oral diseases affecting patients' oral health, social life and self-confidence. Therefore, it has great impact on patients' the quality of life. A validated questionnaire to measure "Oral Health-Related Quality of Life" (OHRQoL) of patients during orthodontic treatment was used. Findings in the areas of: (1) functional limitations of the masticatory system; (2) orofacial pain; (3) dentofacial esthetics and (4) psychosocial influence of oral health will be presented.

Learning Objectives:

1. To assess the importance of "Oral Health Related Quality of Life" (OHRQoL) for patients during orthodontic treatment
2. To apply a validated questionnaire which measure the OHRQoL: the Oral Health impact Profile (OHIP)
3. To evaluate the Quality of Life of patients under orthodontic treatment through the OHIP-G14 (German short version)

Moderator: Dr. Jeff Erickson - 12:30pm-2:00pm

FRONTIERS in ORTHODONTICS: PATHOLOGY, EDUCATION and BEYOND

12:30pm-12:45pm

Dynamic smile and its relationship with facial hard and soft tissues

Pradeep Tandon

Lucknow, India

Lecture Description:

So many study has been conducted on smile analysis, some has taken static smile and some has taken dynamic records. But there are very few studies that has been done on dynamic smile, lateral cephalogram and study models. It is believed that this investigation is essential for orthodontist particularly because it has an important impact on the overall treatment outcome. This paper will present the dynamic smile characteristics and their correlation with hard and soft tissue parameters.

Learning Objectives:

1. To evaluate dynamic smile and facial hard and soft tissue parameters
2. To correlate specific hard and soft tissue parameters to the smile characteristics

12:45pm-1:00pm

Bacterial adhesion on metallic brackets after plasma surface treatment: in vitro study*

Celestino Nobrega, et al.

Cleveland, OH, USA

Lecture Description:

The amount of sites available to bacterial growth in the oral cavity increases in the presence of orthodontic appliances and fixed accessories, making surfaces traditionally unlikely to the development of caries into high incidence areas. This lecture will present a lab research that aims to compare the performance of the plasma (HMDSO) film as an inhibit barrier for biofilm formation in different types of orthodontic brackets. The presentation will answer if the presence of HMSDO film would interfere on biofilm formation over conventional and self-ligating brackets.

Learning Objectives:

1. Realize that modifying orthodontic appliances surface properties may difficult oral bacterial adhesion
2. Discuss a modern resource commonly used in other technologies that can be applied to orthodontic materials
3. Understand that plasma polymer film deposition can be a reliable method to prevent bacterial adhesion, colonization and growth over metallic brackets surfaces

1:00pm-1:15pm

The influence of the quality of radiographs and training on the reproducibility of the cervical vertebrae maturation method

Anfal Khajah

Farmington, CT, USA

Lecture Description:

Cervical vertebrae morphology is one of the methods used to assess skeletal maturity. The literature is inconsistent about the reproducibility of the cervical vertebrae maturation (CVM) method. Some studies reported the reproducibility to be as high as 98% while more recent studies have reported a poor reproducibility. This presentation will answer the following question: Is the reproducibility of the CVM method influenced by training and the quality of radiographs?

Learning Objectives:

1. Discuss if supplemental training on CVM staging for clinicians has an influence on their ability to successfully utilize the cervical vertebrae maturation method
2. Discuss if the quality of the radiographs has an influence on the reproducibility of the cervical vertebrae maturation method
3. Assess if using 3-dimensional imaging (CBCT) maximizes the reproducibility of the cervical vertebrae maturation method

1:15pm-1:30pm

Self-Directed Learning in Orthodontics: When Do Students Study?

Tate H. Jackson, et al.

Chapel Hill, NC, USA

Lecture Description:

As orthodontic educators continue to be asked to teach more but have less time to do it, self-directed educational strategies become increasingly attractive. In particular, educating pre-doctoral dental students often demands a significant share of an orthodontic department's time and resources. The data presented will help guide instructors who seek to maximize educational value for their pre-doctoral students by efficiently structuring teaching and learning time within a DDS/DMD curriculum.

Learning Objectives:

1. To understand how Millennial-era pre-doctoral students use Orthodontic education resources in a self-directed learning curriculum
2. To obtain a data-driven understanding of one strategy for making pre-doctoral Orthodontic education more efficient

ORAL HYGIENE

1:30pm-1:45pm

Use of good bacteria in preventing white spots in orthodontic patients

Chandra Sekhar Gandikota, Manoj Sagar Gundu

Hyderabad, India

Lecture Description:

Use of probiotics in dentifrice can reduce the *S. mutans* levels significantly in orthodontic patients. Probiotic toothpaste and combination of probiotic toothpaste and mouthwash was more effective than probiotic mouthwash but the results were not statistically significant.

Learning Objectives:

1. To know the efficacy of probiotics in reducing the streptococcus mutans levels which prevents the formation of white spot lesions
2. To know the differences between the use of probiotics mouthwash, probiotics tooth paste and combination

1:45pm-2:00pm

Plaque removal and compliance using an interactive toothbrush in orthodontic adolescents

Christina Erbe, et al.

Mainz, Germany

Lecture Description:

Dental plaque is a causative factor for oral disease and thus its removal and control are an important aspect of oral health maintenance. For patients undergoing orthodontic treatment with use of fixed appliances the maintenance of proper hygiene critical for oral health could be a real challenge. Moreover, it is well known that compliance in oral hygiene can be a challenge for adolescents. Therefore, the question arises: Has a smartphone application designed to individually guide them through their daily toothbrushing the potential to increase motivation and plaque removal?

Learning Objectives:

1. To evaluate the efficacy of an interactive toothbrush versus a manual toothbrush
2. To analyze motivational aspects of using a power toothbrush in combination with a smartphone app in comparison to a manual toothbrush

Moderator: Dr. David Covell - 2:00pm-3:45pm

2:00pm-2:15pm

Enamel demineralization around two different bracket adhesive systems: an in vivo study

Naif Almosa, et al.

Riyadh, Saudi Arabia

Lecture Description:

The demineralization of the buccal surface of teeth around bonded brackets and the formation of white spot lesions has been an issue for several years. To minimize the risk of demineralization around the brackets, several adhesive bracket systems including precoated systems, APC PLUS and APC flash-free, have been developed. Up to our knowledge, there is no in-vivo study comparing the amount of enamel demineralization around different precoated adhesive systems. This presentation will answer the following

question: Is there any difference between APC Flash-Free and APC PLUS in the aspect of enamel demineralization around the bracket.

Learning Objectives:

1. To describe the degree of demineralization under electron microscope for teeth bonded with APC PLUS brackets
2. To describe the degree of demineralization under electron microscope for teeth bonded with APC Flash-Free brackets
3. To compare between the APC PLUS and APC Flash-Free bracket systems in the aspect of enamel demineralization

2:15pm-2:30pm

Bonded brackets and its correlation with dental demineralization, assessed by laser fluorescence

Marcia Ritzmann, et al.

Niteroi, Brazil

Lecture Description:

The bonding of the orthodontic accessories should be analyzed in several aspects in order to maximize benefits and minimize damages caused by the technique. With this intention, this study proposes an evaluation of the adhesive resistance at the bracket/resin interface, using four different commercial brands according to the models of enamel demineralization. The margins of the bracket/enamel interface were evaluated by 440nm laser readings and these values were correlated with the results of the shear bond strength performed with the different bonding systems.

Learning Objectives:

1. Compare the shear bond strength results of 4 commercial brands, evaluating their comportment within 3 models of demineralization and 1 control group
2. Perform the reading of the enamel surface adjacent to the bracket / enamel junction to evaluate the degree of demineralization through fluorescence laser
3. Determine the influence of each one on the success of accessory bonding through the correlation of these two analysis

MULTI-DIMENSIONAL ANALYSES of CRANIOFACIAL MORPHOLOGY

2:30pm-2:45pm

Rapid 3D mandibular superimposition for growing patients

Leonardo Koerich, et al.

Glen Allen, VA, USA

Lecture Description:

CBCT superimposition has been used for over 10 years. However, regional superimposition in growing patients is more challenging and, until very recently, it was not possible. Regional superimposition is important for understanding the 3D growth and treatment effects from orthodontics without the 2D limitations of cephalometric radiographs. This presentation will clarify the current state of 3D CBCT superimposition, advantages and limitations of the method as shown by the current study, as well as future trends in CBCT superimposition and application for clinical cases.

Learning Objectives:

1. Perform 3D superimposition for growing patients
2. Explain the benefits of 3D superimposition
3. Compare differences between 2D and 3D superimposition

2:45pm-3:00pm

Do functional appliances improve upper-airway dimensions? Lessons and considerations from CBCT studies

Thikriat Al-Jewair
Buffalo, NY, USA

Lecture Description:

Functional orthodontic appliances for Class II correction move the mandible forward, along with the associated hyoid bone and muscles. Whether this anterior movement increases the dimensions of the upper-airway or not is debated in the literature. This presentation will assess evidence from CBCT studies on the effects of functional appliances on upper-airway dimensions and hyoid bone position in growing patients with skeletal Class II malocclusion. It will also discuss limitations and considerations for future CBCT studies.

Learning Objectives:

1. To demonstrate that functional appliances result in short-term improvement in upper-airway volume, transverse and A-P dimensions in Class II growing patients
2. To show that evidence on the change in hyoid bone position is inconclusive
3. To discuss clinical and research implications of CBCT for assessing upper-airway

3:00pm-3:15pm

Stability of Class III reverse-pull treatment: systematic review and meta-analysis

Jessica Przybysz, et al.
Curitiba, Brazil

Lecture Description:

Maxillary protraction with orthopedic forces is the treatment of choice for young patients with maxillary deficiency. However, considering the late growth of all craniofacial structures, the stability of this therapeutic approach remains uncertain. This presentation will answer the following questions: What are the post-treatment dentoskeletal changes after facemask therapy for class III malocclusion growing patients? Do they determinate long-term stability? Does dentoalveolar compensation after completion of craniofacial growth contributes to the stability?

Learning Objectives:

1. To show which are the skeletal changes achieved during active growth
2. To show dentoalveolar compensation occurred after the completion of craniofacial growth
3. To demonstrate the components involved in the stability of class III malocclusion reverse-pull treatment in growing patients

3:15pm-3:30pm

Herbst-MB treatment – How stable are the results 15-25 years later?

Niko Bock, et al.
Giessen, Germany

Lecture Description:

The presentation will focus on an investigation of the long-term post-treatment changes (mean observation period: 18.3±3.1 years) after Herbst appliance and subsequent multibracket appliance treatment in former Class II patients. Data of 52 study participants from a clinical assessment and a study model analysis will be presented.

Learning Objectives:

1. Attendees of this lecture will be able to recognize the long-term post-treatment changes of the occlusion and the dental arches after Class II treatment
2. Attendees of this lecture will be able to discuss the long-term stability of fixed functional Class II treatment