

# 32nd Annual Scientific Day

April 16, 2013

Embassy Suites Norman, Oklahoma

#### OU College of Dentistry Scientific Day – 32<sup>nd</sup> Anniversary

The first Scientific Day was held in 1981 and consisted of table clinics in the hallways of OUCOD and a few dozen donuts in the Commons. The next year, the event became more sophisticated with the addition of orange juice and coffee. We then graduated to bagels, and quickly outgrew the confines of our building. As the summer research program grew and corporate support became stronger, Scientific Day evolved into what it is today ----- the 32<sup>nd</sup> annual Scientific Day!

The evolution of Scientific Day is due to the dedication and support of all of you here today. To the students and their faculty mentors who complete meaningful research projects, to all of the faculty and staff who help plan and coordinate this event, and to the many sponsors who provide funding and help show us how advances in research translate into better products and services for our patients --- **We Thank You!** 

Please enjoy the outstanding projects presented here today by our dental students, dental hygiene students, and residents. As you do, we hope that you will reflect on our humble beginnings, be proud of where we are today, and help us build an even better future.

Welcome to the University of Oklahoma College of Dentistry 32<sup>nd</sup> Scientific Day!

### **Corporate Exhibitors**

The following companies have provided additional funding to support this year's Scientific Day and have been granted exhibit space adjacent to the posters. Please spend some time visiting the corporate sponsors to learn about their products and to thank them for their generosity.

Biomet 3i

Brasseler USA

Colgate

**Dentsply International** 

GlaxoSmithKline

**Hu-Friedy** 

Johnson & Johnson

Procter & Gamble - Crest/Oral-B

### Special Thanks to the Following for Generous Support of The University of Oklahoma College of Dentistry's 32<sup>nd</sup> Annual Scientific Day

ADA/Dentsply Student Clinician Award by Dentsply International

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# Special Thanks to the Following for Generous Support of The University of Oklahoma College of Dentistry's 32<sup>nd</sup> Annual Scientific Day

Michael D. Rohrer Fund

Oklahoma Academy of General Dentistry

Oklahoma County Dental Hygienists' Society

Oklahoma County Dental Society

Oklahoma Dental Association

Oklahoma Dental Hygienists' Association

Oklahoma Orthodontic Society

Oklahoma Section of the American College of Prosthodontists

Oklahoma Society of Oral & Maxillofacial Surgeons

Oklahoma Society of Periodontists

Robert T. Probst Omicron Kappa Upsilon Award

Procter & Gamble - Crest/Oral-B

Student American Dental Hygienists' Association Award by Johnson & Johnson

# Thank You to the Following Area Businesses for Door Prize Donations



Domino's Pizza

National Cowboy & Western Heritage Museum

Oklahoma City Redhawks

Quizno's Subs

The Albert F. Staples Society

The Uniform Shoppe

Whip Mix

(To win a door prize you have to be present at the luncheon)

#### **Special Thanks to the Following Individuals**

#### POSTER PRESENTATION JUDGES

Fred W. Benenati, D.D.S., M.Ed.

Luis Blanco, D.M.D., M.S.

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Cheryl L. Church, D.D.S.

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Laurie Cunningham, R.D.H., C.D.A, M.Ed.

Christinna R. Fairchild, D.D.S.

Thomas Klag, D.D.S.

Sharon K. Lloyd, R.D.H.

Edward Lorentz, D.D.S.

Robert Miller, D.D.S., M.Ed.

Bernard C. Rhone, D.D.S.

Douglas Rockwood, D.D.S.

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David Sather, D.D.S.

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Nan Shadid, D.D.S.

Berry Greenley, D.D.S. Donna Sheppard, R.D.H., M.Ed.

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Janet West, R.D.H.

Jim Kessler, D.D.S., B.S.

Theresa White, D.D.S., M.S.

#### ISHMAEL ESSAY CONTEST JUDGES

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Joy Beckerley, D.D.S., M.Ed., M.S

Douglas Hall, D.D.S., M.S.

Farah Masood, B.D.S., M.S.

Jane Gray, R.D.H, C.D.A., M.Ed. Frank Miranda, D.D.S., M.Ed., M.B.A.

Tammie Vargo, R.D.H., M.Ed.

#### SCIENTIFIC DAY COMMITTEE

Mr. Jeremy Bueckers
Ms. Luellen Chenoweth
Mr. Scott Newhouse
Mr. Neil Clark
Ms. Carolyn Ray
Dr. John Dmytryk
Ms. Stacey Reynolds
Ms. Sharon Ingram
Mr. Jason Jones
Ms. Ellen Ware

#### REGISTRATION

Ms. Robin Barnes
Ms. Carla Lawson
Ms. Sara Driver
Ms. Julie Mowdy
Ms. Diana Stone

Very special thanks to Dr. Donald Mitchell for overseeing the judging of posters.

# University of Oklahoma College of Dentistry 32<sup>nd</sup> Annual Scientific Day

# **Schedule of Events**

9:00 - 9:30	Registration East Entrance				
9:00 - 10:00	Continental Breakfast  East Entrance				
9:00 - 10:30	Poster Presentations Pre-Function East				
10:30	Poster Votes Due In Ballot Box Pre-Function East				
10:30 - 12:00	Ishmael Essay Presentations Oklahoma E Ballroom				
12:00	CE Cards Available Registration Desk				
12:00 - 1:30	Awards Luncheon Oklahoma ABCD Ballroom				

#### **Ishmael Essay Contest Finalist Presentations**

Oklahoma E Ballroom, 10:30 - 12:00

10:30 a.m. Holly Abbott, DH2

The Dental Hygiene Appointment

10:45 a.m. Sneha Patel, DS2

Understanding and Utilizing Determinants of Oral

Health in Oklahoma

11:00 a.m. Chelsea Knox, DS2

Trends in Volunteerism Among Oklahoma Dentists

11:15 a.m. Chad Carter, DS2

The Soft Tissue Profile in Evaluation of Craniofacial Growth

11:30 a.m. Samantha Ali, DS2

Novel use of FISH to detect Fusobacterium nucleatum in

diabetic ulcerated tissue

# **POSTER PRESENTATIONS**

Poster #	Presenter Name(s) & Title						
# 1	MANOJ JAIN (DS3); SETH BROOKS (DS3) Human Papilloma Virus as an etiological agent in inducing squamous cell carcinoma of the oral cavity						
# 2	CLINT CHLARSON (DS3); JEREMY EDWARDS (DS3) Analysis of Interspecies Association of <i>Veillonellae</i> and <i>Porphyromonas Gingivalis</i> using Fluorescence in situ Hybridization						
# 3	CHAD CARTER (DS2) Longitudinal Evaluation of the Soft Tissue Facial Profile						
# 4	CHELSEA KNOX (DS2); DAVID GORE (DS2) Tracking trends in volunteerism among Oklahoma dentists						
# 5	SNEHA PATEL (DS2) Understanding and utilizing the determinants of oral health in Oklahoma						
# 6	CARLIE HALL (DS2) Correlation of 3-D biofilm structure with varying resin composite topographies						
#7	BRANDON LOESER (DS2) Surface Sialylation is Ubiquitous Among Oral Fusobacteria						
#8	SAMANTHA ALI (DS2) Novel use of FISH to detect <i>Fusobacterium nucleatum</i> in diabetic ulcerated tissue						
# 9	LINDSAY DEGUILIO (DS2) Longitudinal Changes in Arch Widths						
# 10	SHAUN MIRABAL (DS2) Gray value differences and Alveolar Ridge Width Changes After Tooth Extraction with NuOSS <sup>TM</sup> Particulate and NuOSS <sup>TM</sup> XC Bone Graft Materials						
# 11	JEREMY MORRIS (DS2) Dental Recognition of Child Abuse / Neglect by Oklahoma Dentists						
# 12	HOLLY ABBOTT (DH2); MORGAN MINGS (DH2) Ethnography of the Dental Hygiene Appointment						

# **POSTER PRESENTATIONS**

Poster #	Presenter Name(s) & Title
# 13	DARAH LANG (DH2) Oral Health Care in Oklahoma Continuing Care Retirement Communities
# 14	TODD WALKER (Postgraduate) Histologic Evaluation of Healing Following Tooth Extraction With Ridge Preservation Using NUOSS <sup>TM</sup> XC and NUOSS <sup>TM</sup> Particulate
# 15	TONI DURR (DH2) Ultrasonic Nation: Risks Associated with Widespread Use
# 16	MEGAN ANGSTADT (DH2); ESMERALDA RUIZ (DH2) Saliva: the body's mirror
# 17	AMANDA BOSTON (DH2) Combatting Dentinal Hypersensitivity
# 18	BRANDY BUTTS (DH2); CASSIDY CLARK (DH2); STEVEN DUNN (DH2) The oral effect of medications
# 19	KENNA COPELAND (DH2); MACKENZIE VINES (DH2) Improving children's oral health
# 20	KALYNN LIABRAATEN (DH2); DEVIN SEWELL (DH2); HANNAH STOUT (DH2) Oral and Systemic Benefits of Xylitol
# 21	KAYLA MARKHAM (DH2) White for life
# 22	KATHLEEN MORROW (DH2) Oral Cancer Genomics
# 23	CAROLINA PEREZ (DH2) The dental hygienist's role in obstructive sleep apnea
# 24	RYANNE PINK (DH2) The relationship between HPV and oropharyngeal cancer

# **POSTER PRESENTATIONS**

Poster #	Presenter Name(s) & Title
# 25	ALISHA UNDERWOOD (DH2) Probiotics and Oral Health
# 26	ALEJANDRO ROMERO-DELMASTRO (Postgraduate) A digital tooth-based superimposition method for assessment of alveolar bone level changes
#27	BLAIRE BOWERS (Postgraduate) Management of Peri-Implantitis in the Esthetic Zone
# 28	JOSEPH FENG (Postgraduate) Comparison of an Autogenous Free Gingival Graft with a Porcine Collagen Matrix Graft for Increasing the Width of Attached Gingiva
# 29	JASON NICHOLSON (Postgraduate) Complex Maxillary and Mandibular Reconstructions: Three Case Reports
#30	MILES BERG (Postgraduate) Osseoincorporation of Tantalum Coated Trabecular Metal Implants Allows for Earlier Predictable Implant Loading
#31	CHRIS HOPKINS (Postgraduate) Case Presentation – Fixed Detachable Hybrid Dentures
#32	COURTNEY JOHNSON (Postgraduate) Incorporating Esthetic Crown Lengthening in the Restoration of Upper Anterior Teeth: A Case Study
#33	DREW HENDRIX (Postgraduate) Increasing Vertical dimension of Occlusion to achieve esthetics and function
#34	PETER CARLSON (Postgraduate) Restoration of Disarticulation Resections of the Mandible for Pathology with Patient-Fitted Custom Total Joint Replacement
#35	GOKAY KARAPINAR (DS4, Istanbul University, Faculty of Dentistry) In vitro evaluation of dental enamel exposed to medicines used in pediatric cardiology

Title: Human Papilloma Virus as an etiological agent in inducing squamous cell carcinoma of the oral cavity

Presenter(s): Manoj Jain, DS3; Seth Brooks, DS3

Advisor(s): Glen Houston

#### Abstract:

In the USA, approximately 22,000 new cases of oral squamous cell carcinoma (OSCC) are diagnosed annually, and slightly more than 5300 individuals die of this disease each year. It typically involves patients in the fifth through seventh decades of life. Men are afflicted three to five times more often than women, and tobacco and alcohol abuse represent the most significant risk factors for its development. Meta-analysis performed by Miller et al. (Oral Surg Oral Med Oral Pathol Oral Radiol Endod 2001;91:622-35) concluded that oral infection with high risk genotypes of Human Papilloma Virus (HPV) to be a significant independent risk factor for OSCC. However, other authors have suggested that it is unlikely that HPV plays a significant role in the etiology, of oral SCC. In order to prove that HPV is an independent risk factor for the development of OSSC, ten biopsy samples of patients that had been diagnosed with OSCC were tested for HPV-16 using Polymerase Chain Reaction analysis. These subjects were all under forty years of age and had no history of alcohol and tobacco use. The results showed that 50% of the subjects were positive for HPV 16 infection and 50% of the subjects were negative for HPV 16 infection. Since an equal number of positive and negative results were obtained no statistical significant difference was found in the data. This study shows that the role HPV 16 plays as an independent etiological factor in the development of OSCC is inconclusive. The results reflect the current controversy surrounding HPV and OSCC. Future studies with a larger sample size and a control group may define the role of HPV and its significance in the etiology, pathogenesis and clinical outcomes of oral SCC.

Title: Analysis of Interspecies Association of *Veillonellae* and *Porphyromonas Gingivalis* using Fluorescence in situ Hybridization

Presenter(s): Clint Chlarson, DS3; Jeremy Edwards, DS3

Advisor(s): Fengxia Qi

#### Abstract:

The human oral cavity is home to hundreds of bacteria that have a complicated multispecies interaction. Some of them have a key role in developing disease. The progression to disease can have many different routes, but the process usually starts with the pioneer colonizers, followed by early colonizers, than the mid and late colonizers. Highly effective interspecies association and recognition occur between bacteria for a biofilm to grow. This research focused on the interaction between the early colonizer, Porphyromonas Gingivalis and the middle colonizer, Veillonellae. Porphyromonas gingivalis is of concern because of its important role in the development of periodontal disease. Fluorescence in Situ hybridization was used to visualize this interaction. Under fluorescence microscopy, a physical association occurred between Porphyromonas Gingivalis and Veillonellae. This coaggregation can further be studied to see what the effects are on growth if this association is blocked or stopped.

**Title: Longitudinal Evaluation of the Soft Tissue Facial Profile** 

**Presenter(s):** Chad Carter, DS2

Advisor(s): Fräns Currier, Onur Kadioglu

#### Abstract:

The Denver Growth Study has a series of records from 1927 to 1967 for nearly 300 untreated individuals of Northern European decent which are equally distributed between males and females. The purpose of this study was to electronically transfer the standardized lateral facial photographs and identify the changes over time from childhood to adulthood.

The lateral photographs of 246 individuals (126 female / 120 male) were digitized using a 2-dimensional photographic scanner. There were 1133 female images from 6 months to 37 years and 1,190 male images from 1 year to 41 years 9 months. A sample of 17 females and 17 males were studied at multiple timepoints. T1 = <6 years, T2 = 6-8 years, T3 = 8-10 years, T4 = 10-12 years, T5 = 12-14 years, T6 = 14-16 years, T7 = 16-18 years, T8 (males only) = >18 years.

The various soft tissue measures were both angular (facial angle, angle of convexity, and upper and lower Z angles), linear (upper and lowers E-lines, facial lengths, lower and total anterior vertical face heights) and ratios (percentage of lower anterior face height). The digitized images where analyzed using soft tissue point placement in the OsiriX imaging software. Statistical evaluations and clinical application from the preschool through the adolescent will be presented.

This study was supported by a grant from the J. Dean Robertson Society and involved partnership with the IADS with visiting researcher Gokay Karapinar, DS4, Istanbul.

Title: Tracking trends in volunteerism among Oklahoma dentists

Presenter(s): Chelsea Knox, DS2; David Gore, DS2

Advisor(s): Kenneth Coy

#### Abstract:

In an investigation of the trends in volunteerism among dentists, a total of 1495 dentists, who are members of the Oklahoma Dental Association, were surveyed throughout the state of Oklahoma. One goal of this study was to investigate how access to care and the practice location of dentists affected trends in volunteerism. Other areas analyzed include the type of non-profit work performed, the impact of a practitioner's geographic setting on his or her volunteer efforts, and observations relative to the differences in a dentist's participation in philanthropic efforts over the course of his or her career. There was no significant association between the number of hours volunteered and practice location or age for both urban and rural dentists. Fifty-eight percent of dentists reported an increase in the number of hours volunteered throughout their career due to "financial stability." Thirty-six percent claimed their volunteer efforts have increased due to an "increase in the needs of the community." Both of these reasons for increasing volunteer efforts, had a p-value of <0.001 when compared to other reasons for increasing or decreasing the number of hours spent volunteering. Age, gender and practice location were not correlated with the amount of time spent volunteering, Conversely, an increase or decrease in volunteer efforts was directly related to financial security and awareness of the needs of the community.

Title: Understanding and utilizing the determinants of oral health in Oklahoma

Presenter(s): Sneha Patel, DS2

Advisor(s): Sydney Sevier, Marsha Beatty, Kenneth Coy

#### Abstract:

**Objective:** Oklahoma ranks last in the nation and territories for the number of adults who visited a dentist in the past year (2010). The aim of this study was to better understand the determinants of oral health in Oklahoma. The relationship between selected demographics and indicators of oral health were analyzed for selected communities in Oklahoma. Method: An ecological study design was utilized to profile selected counties in Oklahoma. Data was collected from government agency databases. Fifteen counties were selected and ranked (top 5, middle 5, bottom5) based on adult dental visits as a measure of access to care. Data on age distribution, race, education, income, unemployment rate, poverty, health insurance status, water fluoridation, behavioral factors such as smoking and methamphetamine use, and proximity of FOHCs and IHS clinics were also collected for each of these counties. **Result:** The top three counties for adults visiting the dentist in the past year were rural counties. However, these three rural counties shared the same characteristics as those counties in the bottom five in respect to education, income, unemployment rate, poverty, and others, suggesting that there are other factors that are influencing adults to seek dental care in those counties. Conclusion: The data from this study will serve as a valuable resource for different outreach agencies in Oklahoma by allowing them to target resources towards specific underserved communities. This study also highlights the lack of available data on oral health indicators in Oklahoma and the need for more surveillance and data collection in the state.

This study was supported by a grant from the J. Dean Robertson Society and was presented at the American Association for Dental Research 2013 General Session.

Title: Correlation of 3-D biofilm structure with varying resin composite topographies

**Presenter(s):** Carlie Hall, DS2

Advisor(s): Sharukh Khajotia

#### Abstract:

**Objectives:** To determine correlations between the 3-D structures of *Streptococcus mutans* biofilms with various resin composite topographies. **Methods:** Specimens of Point 4 resin composite were sequentially prepared (180-1200 grit SiC disks followed by diamond suspensions) with final polishes equivalent to 5, 3, 1 or 0.5μm. Control group specimens were prepared against Mylar<sup>TM</sup> strips and left unpolished. Surfaces were imaged using a confocal laser scanning microscope (CLSM; Leica TCS NT, reflection mode, n=9 images/group). *S. mutans* (UA159) biofilms were grown microaerophilically on specimens (batch culture, 0.5X Tryptone-yeast extract medium with 10mM sucrose, 37°C). After 48h bacterial growth, specimens were stained with Con A-Alexa Fluor 647 (extracellular polymeric substances), Sypro Red (proteins), and Syto 9 (nucleic acids). Biofilms were imaged using CLSM (Leica TSC SP2 MP; transmission mode, n=9 images/group). Topographical parameters calculated using Leica software were: mean surface roughness (R<sub>a</sub>), average maximum height (R<sub>p</sub>) and average maximum depth (R<sub>v</sub>). Biofilm structural parameters calculated using ISA3-D software were: porosity (PR), mean biomass thickness (MT) and bioroughness coefficient (BR). Topographical and biofilm parameters were analyzed for correlations with polishing groups by Pearson's Correlation, and separate one-factor ANOVA and SNK tests for each parameter (α=0.05).

#### Results:

Results:						
Group	R <sub>a</sub> (nm)	<u>R<sub>v</sub> (μm)</u>	<u>R<sub>p</sub> (μm)</u>	<u>PR (μm³)</u>	<u>MT (μm)</u>	BR
5um	588.6±396.4	3.3±2.6 <sup>A</sup>	5.6±5.4	0.96±0.01 <sup>A</sup> ,	44.0±16.0	0.83±0.13 <sup>A</sup>
3um	638.9±323.4	3.1±0.8 <sup>A</sup>	4.2±1.5	0.97±0.01 <sup>A</sup>	32.3±13.0	0.73±0.14 <sup>B</sup>
1um	450.9±391.3	2.6±1.5 <sup>A</sup> ,	4.1±1.8 A	0.96±0.02 <sup>B</sup> ,	24.1±4.4 <sup>C</sup>	0.62±0.08 <sup>C</sup>
0.5um	228.0±119.7	1.8±0.6 <sup>B</sup>	3.3±2.0	0.95±0.01 <sup>C</sup>	34.6±7.3 <sup>B</sup>	0.61±0.10 <sup>C</sup>
Contro 1	605.1±331.6	2.9±1.5 <sup>A</sup>	6.3±7.2	0.93±0.02 <sup>D</sup>	26.4±5.9 <sup>C</sup>	0.68±0.10 <sup>B</sup> ,

Letters within columns denote statistically different mean values (p<0.05)

**Conclusions:** Polishing of resin composite produced distinct topographies that showed positive correlations ( $r \ge 0.45$ ) with biofilm structure.

This study was supported by a grant from the J. Dean Robertson Society and NIH/NIDCR grant R15DE019566-01A1 and was presented at the American Association for Dental Research 2013 General Session.

Title: Surface Sialylation is Ubiquitous Among Oral Fusobacteria

**Presenter(s):** Brandon Loeser, DS2

Advisor(s): John Dmytryk, Felicia Qi, Justin Merritt

#### Abstract:

**Objectives:** Recent evidence suggests that certain pathogens from various human mucosal sites utilize molecular mimicry via surface sialylation to modulate the host-pathogen interaction. Surprisingly, the oral cavity is one of the few mucosal sites where there have been no reports of bacteria synthesizing surface sialic acids. Thus, our aim was to determine whether oral fusobacteria have the ability to decorate their outer surfaces with *de novo* synthesized sialic acid.

**Methods:** The completed genomes for *F. nucleatum ssp. nucleatum*, *F. nucleatum ssp. polymorphum*, and *F. nucleatum ssp. vincentii* were searched for orthologs of genes required for sialic acid biosynthesis. A panel of each of the *F. nucleatum* subspecies and *F. periodonticum* was examined for surface sialylation using a mild periodate oxidation and labeling protocol. Clinical subgingival plaque samples and *in vitro* plaque samples were labeled using the same protocol in combination with FISH to localize fusobacteria. Sialidase activity was visualized using 4-MU and inhibited with DANA.

**Results:** Most or all of the expected genes required for sialic acid biosynthesis could be found in each of 3 completed *F. nucleatum* genomes and all were localized within LPS modification loci. Though, each strain had distinct sialic acid synthesis operons. In pure culture, every *F. nucleatum* and *F. periodonticum* strain tested each modified their outer surfaces with large quantities of *de novo* synthesized sialic acid. Interestingly, within clinical plaque samples, fusobacteria were rarely sialylated. Consistent with this result, potent sialidase activity was detected in cultured dental plaques.

**Conclusions:** Oral fusobacteria all likely produce and decorate their outer surfaces with sialic acid. Given the numerous sialidase producing species in dental plaque, bacterially derived sialic acid may serve as a food source for neighboring organisms, whereas sialylated planktonic fusobacteria may be able to modulate host responses.

This study was supported by a grant from the J. Dean Robertson Society and was presented at the American Association for Dental Research 2013 General Session.

Title: Novel use of FISH to detect Fusobacterium nucleatum in diabetic ulcerated tissue

**Presenter(s):** Samantha Ali, DS2

Advisor(s): Justin Merritt

#### Abstract:

Background: Diabetes is a significant worldwide problem. Diabetic foot complications can lead to ulcerations and amputations, which has become the most common cause of diabetic hospitalizations. Due to recent advances in research, the major player in periodontal disease, Fusobacterium, has been linked to diabetic ulcers. One such research advancement is fluorescence in situ-hybridization (FISH). FISH allows for a greater understanding of the intricacies of a complex bacteria environment as well as the growth and identification of bacteria of which would otherwise be impossible. Objective: Until now, there has been no published data exploring the connection between periodontal disease and diabetic ulcers. Therefore, this study is interested in establishing a proper FISH protocol for imaging Fusobacterium in human diabetic ulcer tissue to better understand if such a connection exists. Method: Human ulcerated foot tissue, Fusobacterium, Bacteroides, and eukaryotic cell specimens were collected, sectioned, and embedded in a paraffinized medium for storage. Deparaffinization of tissue specimen occurred with Hemo-de, EtOH, and H20. Different samples were then hybridized with Eub 338, Fuso 664, and DAPI probes. The slides were mounted with Prolong Gold w/ DAPI and each slide was visualized with an epifluorescence microscope. Results: Direct visualization of FUSO bacteria with FISH provided additional support of the growing evidence that FUSO bacteria are present in diabetic ulcerated tissue. Conclusion: This technique may have potential value in elucidating the correlation of periodontal disease and diabetes. However, more FISH studies need to be done to better understand the intricacies of biofilm formation, wound healing, and perhaps discover other pathogens that contribute to this micro-colony.

**Title: Longitudinal Changes in Arch Widths** 

Presenter(s): Lindsay DeGuilio, DS2

**Advisor(s):** Fräns Currier

#### Abstract:

**Introduction:** Longitudinal width changes of both arches in an untreated sample of children from preschoolers to young adulthood.

**Methods and Materials:** Forty sets of casts (20 males/20 females) from the Denver Growth Study were selected. A total of 185 models were transferred into an electronic format for evaluation of the changes in mandibular and maxillary arch widths from the primary/permanent canine, primary molars/permanent premolars, and permanent first and second molars at 5 time points; T1= <6yrs (primary dentition), T2= 7-9yrs (early transitional), T3= 10-12yrs (middle transitional), T4= 13-15yrs (late transitional), and T5= 16-22yrs (permanent).

**Results:** Maxillary arch widths were consistently larger than in the mandible while the male width values were consistently larger than the females. Permanent canine/premolar interarch widths were consistently larger than those for the primary canine/molar widths. There was a mild increase in arch width for the primary canines and primary first molars in both arches. However, there was basically no change in interpremolar arch width while the maxillary permanent canine arch width mildly increased and the mandibular permanent canine arch width mildly decreased.

**Conclusion:** There are dynamic changes in arch widths from the primary dentition through the permanent dentition over time. Changes that occur are more pronounced in the maxilla as compared to the mandible and are larger in the males as compared to the females. The interarch changes in the posterior segment of the arches are greater than the anterior segment of the arches.

This study was supported by a grant from the J. Dean Robertson Society and was presented at the 2013 Delta Sigma Delta Southern Annual Regional Meeting.

# Title: Gray value differences and Alveolar Ridge Width Changes After Tooth Extraction with NuOSS™ Particulate and NuOSS™ XC Bone Graft Materials

**Presenter(s):** Shaun Mirabal, DH2

Advisor(s): Farah Masood

#### Abstract:

Preservation of alveolar bone after extraction of teeth is a very important factor in future implant placement. Inadequate amount of bone or excessive bone loss is a common reason for bone grafting. The purpose of this study was (1) to compare the mean gray values of the two selected bone grafting materials on radiographic images: 1. NuOss<sup>TM</sup> particulate and 2. NuOss<sup>TM</sup> XC, and (2) to study the clinical ridge width changes. Several newer bone graft materials are available. NuOss<sup>TM</sup> XC is relatively new in the market. Fifteen patients from the Graduate Periodontics Program at the University of Oklahoma College of Dentistry were included in the study. Study was approved by IRB. Written consent was obtained from each patient. After random selection, twenty extraction sites were grafted with one of these materials. Radiographic images were made six months after the placement of bone grafts. Gray values of the sockets were analyzed by two examiners using IMAGEJ image analysis software version 1.46, at the following locations: crest, midroot and apex.

Multivariate mixed regression model showed that the estimated mean gray values were not significantly different between the majority of the locations in maxillary and mandibular sites between the two materials. Bland-Altman plot showed that examiner's repeat measurements were consistent and reliable. Ridge width changes did not differ significantly between the two materials.

NuOss<sup>TM</sup> XC is simpler to place, is self-expandable upon hydration and the composite nature of the material enhances graft stability and minimizes particulate migration. Because of the several advantages associated with NuOss<sup>TM</sup> XC , one might be able to conclude that NuOss<sup>TM</sup> XC could be an equal and possibly better alternative due to its simpler placement technique and potential superior properties.

Title: Dental Recognition of Child Abuse / Neglect by Oklahoma Dentist

Presenter(s): Jeremy Morris, DS2

**Advisor(s):** Kevin Haney

#### Abstract:

One of the most disturbing developments in recent decades is the plethora of child abuse and neglect cases here in Oklahoma, America, and around the world. Such an epidemic requires the efforts of all of society to combat, including dental professionals. The purpose of this study is to assess the knowledge and reporting behaviors of Oklahoma dentists regarding suspected child maltreatment. This will be accomplished through an online study sent to dental professionals in Oklahoma through the Oklahoma Dental Association's database, and it is the third in a series of surveys conducted over a twenty-year period. Because of the increased education received in dental school and other continuing education opportunities, to see that the recognition and reporting skills have increased. The next project that is planned is a retrospective analysis of confirmed child abuse and neglect cases in Oklahoma through the University of Oklahoma's Children's Hospital to see what the most common physical signs of abuse are in children. These studies together will help us to understand the dental implications of child abuse and, therefore, help to guide the future education of dentists.

Title: Ethnography of the Dental Hygiene Appointment

**Presenter(s):** Holly Abbott, DH2; Morgan Mings, DH2

Advisor(s): Carolyn Ray

#### Abstract:

**Background:** The "prophy hour" is an illusive term used to describe the time allotted for the dental hygiene appointment. There is a lack of published information that describes the therapy provided during this time frame or the decision making process used by dental hygienists in determining what therapy to include in that time.

**Methods:** The purpose of this ethnography is to study the dental hygiene appointment and the influences of the workplace culture on the process of care provided. Data collection included over 84 hours of observation and interview sessions with 7 dental hygienists.

**Results:** The findings demonstrate that dental hygienists have a routine process that they follow while providing care, yet the process does not necessarily include all aspects described in the ADHA Standards for Clinical Dental Hygiene Practice.

**Conclusion:** Dental hygienists are challenged to provide all aspects of the process of care illustrated in the ADHA Standards for Clinical Dental Hygiene Practice in the time scheduled for the dental hygiene appointment. Their office environments influence their decision making on what therapy to include or exclude during their scheduled appointments.

Clinical implications: Dental hygienists should be provided the opportunity to schedule appointment times that allow for inclusion of all therapy necessary for provision of care uniquely needed by each patient.

Title: Oral Health Care in Oklahoma Continuing Care Retirement Communities

**Presenter(s):** Darah Lang, DH2

Advisor(s): Tammie Vargo

#### Abstract:

**Background:** Traditionally, long-term care institutions for older people have been identified as "nursing homes." During the past 20 years, however, additional options for long-term care have evolved, including various levels of life-care. A Continuing Care Retirement Community (CCRC) provides residents with the option of independent living, assisted living, nursing care, and special care facilities. These facilities offer a place for the elderly to retire in one location and remain until the end of life. As residents age and medical needs change, the level of nursing care and service increases proportionately.

**Methods**: The purpose of this study is to explore the status of oral health services in Continuing Care Retirement Communities (CCRC), responsibilities for providing care, and practices for obtaining dental care. A descriptive study utilizing a one-page (15 question) survey was mailed to 65 licensed Continuing Care Retirement Communities in the state of Oklahoma. Participating facilities were selected from an online directory utilizing simple random sampling.

**Results**: Nine Continuing Care Retirement Community administrators returned the survey for an overall response rate of 13%. Of these, 78% of nurse aides are responsible for oral care. Routine oral hygiene care for residents was reported to be 67% at least once per day. Most administrators (67%) reported a dentist or dental hygienist does not examine CCRC residents, and 44% reported not having policies regarding oral health care.

**Conclusion:** The findings highlighted a majority of CCRC residents receive routine oral health care by nurse aides. On the other hand, a dentist or dental hygienist has not examined most residents while the residents have lived at the retirement centers, and most facilities had no policies regarding oral care.

Title: Histologic Evaluation of Healing Following Tooth Extraction With Ridge Preservation Using NUOSS™ XC and NUOSS™ Particulate

Presenter(s): Todd Walker, Postgraduate

**Advisor(s):** Robert Carson

#### Abstract:

**Introduction:** Alveolar bone loss following tooth extraction is an ongoing process that is due to a lack of functional stimulation of the bone that previously supported the tooth. The rate and degree of bone loss varies among individuals. Due to the loss of bone, there are typically alterations in socket volume and anatomy that may necessitate bone augmentation procedures to maintain adequate bone volume for dental implant procedures. The goal of this study is to evaluate healing following tooth extraction with ridge preservation using two xenograft Methods: Patients that volunteered for the study received either NuOss<sup>TM</sup> materials. particulate or NuOss™ XC in the extraction socket. After six months of healing, a histologic core was retrieved from each extraction site. Additionally, clinical measurements and a radiograph were taken from each healed extraction site. All clinical, radiographic and histological parameters were evaluated to determine whether the extraction sites healed similarly using either NuOss™ XC or NuOss™ particulate. Results: There was no statistical difference in new bone growth in sites grafted with either product. Ridge dimensions were better preserved using NuOss<sup>TM</sup> XC vs. NuOss<sup>TM</sup> particulate. Radiographs that were taken six months post-extraction demonstrated similar grey values. Conclusion: This is the first human clinical study to compare ridge preservation using NuOss™ XC and NuOss™ particulate. Each augmentation material encouraged new bone formation and dental implants were placed successfully in 18 of 19 augmentation sites.

This study was supported by funding from Ace Surgical Supplies, INC and was presented at GREAT 2013.

Title: Ultrasonic Nation: Risks Associated with Widespread Use

Presenter(s): Toni Durr, DH2

Advisor(s): Lindsey Hays

#### Abstract:

**Purpose:** Ultrasonic instrumentation may pose a threat to high-risk patients. The purpose of this literature review is to determine the extent of risk associated with ultrasonic instruments and patients with lung disorders, in particular the development of aspiration pneumonia.

**Background:** Aspiration pneumonia is a common form of pneumonia in elderly and lung-compromised patients. Bacteria in the oral cavity can potentially cause life-threatening lung infections if inhaled. Ultrasonic instrumentation disrupts the deadly organisms and produces a bacteria laden aerosol spray in the oral cavity and within 3 feet of the patient.

**Significance:** Ultrasonic instrumentation is a daily practice among dental hygienists in the dental office. Contraindications for use are vague and rarely considered. Furthermore, patients may not associate the development of pneumonia with treatment using ultrasonic devices.

Clinical Implications: Education on the risks associated with ultrasonic instrumentation must be enforced and guidelines must be followed to ensure the safety of high-risk patients. Legal issues may arise from negligent use that results in harm to the patient.

Conclusions: Guidelines need to be made clear for the use of ultrasonic devices in dentistry. With oral health becoming a focus in overall health, physicians should be consulted before treatment is preformed on high-risk patients. Clinicians are left to use their judgment for ultrasonic use; however, lung disorders are rarely considered high risk during the course of treatment planning. Ultrasonic instrumentation can possibly be a dangerous treatment option if contraindications are not considered and patients are not informed of the potential risk.

Title: Saliva: the body's mirror

Presenter(s): Megan Angstadt, DH2; Esmeralda Ruiz, DH2

Advisor(s): Carolyn Ray

#### Abstract:

**Purpose:** The purpose of this literature review is to inform dental professionals about the emerging science of salivary diagnostics.

**Background:** Periodontal disease affects over half of the US population with prevalence increasing with age. Approximately 45% of adults over the age of 50 have periodontal disease. Oral cancer affects more than 300,000 people a year worldwide, 90% of which are squamous cell carcinoma. The key to prevention and successful clinical treatment is early detection. Much research has been conducted on salivary diagnostics as a preventive and prognostic tool. Saliva sampling is noninvasive, painless, and offers a reduced risk of infection compared to the collection of serum (blood). There are over 400 salivary proteins that could potentially be indicators of disease biomarkers.

**Significance:** Early detection would reduce the high morbidity rate of oral cancers and has the potential to increase the retention rate of natural teeth among adults.

**Clinical Implications**: Monitoring salivary biomarkers for oral disease could become an important supplement to clinical examinations and radiography.

**Conclusions:** Salivary diagnostics is new technology that still needs to be studied further in hopes that someday soon they can play a role in early detection and routine health monitoring.

**Title: Combatting Dentinal Hypersensitivity** 

**Presenter(s):** Amanda Boston, DH2

Advisor(s): Carolyn Ray

Abstract:

#### Purpose

The purpose of this literature review is to inform dental professionals about the etiology and management of dentinal hypersensitivity.

#### **Background**

For dentinal hypersensitivity to take place, open dentinal tubules must be exposed to the oral cavity and be subjected to some form of stimuli. It is not fully understood what causes dentinal hypersensitivity, but the most widely accepted theory is the hydrodynamic theory. This theory states that dentinal tubules contain fluid and certain stimuli will cause pressure changes within the tubules thus creating fluid movement within the tubules. This movement stimulates the nerves within the pulp chamber of the tooth and causes the sensation of pain. Upon removal of the stimulus, the pressure within the tubules will return to normal, and the pain will cease to exist.

#### **Clinical Significance**

Dentinal hypersensitivity is a painful, chronic condition that millions of people face each day. Individuals suffering from hypersensitivity often turn to their dental professionals for advice on the most effective treatments for sensitivity. It is important for dental professionals to stay informed on the most up-to-date research regarding this ubiquitous pathology and gain knowledge on the best products in today's market.

#### Conclusion

Iontophoresis combined with fluoride appears to be the most effective and longest lasting inoffice treatment for combatting dentinal hypersensitivity. In regards to at-home use of dentifrice, 8% arginine and 1450 ppm fluoride as sodium monofluorophosphate products had better results than other dentifrices evaluated. **Title: The oral effects of medications** 

Presenter(s): Brandy Butts, DH2; Cassidy Clark, DH2; Steven Dunn, DH2

**Advisor(s):** Carolyn Ray

#### Abstract:

**Purpose:** The purpose of this poster is to present information from literature reviews on the oral manifestations of medications and associated halitosis.

**Background:** The CDC reports that nearly 50% of Americans use at least one prescription drug; 21% use three or more; and 10.5% use five or more. Many of the prescribed medications have oral side effects. Xerostomia and halitosis have been reported as a common side effect in over 400 medications.

**Significance:** Dental professionals should be informed of the oral side effects of medications being routinely used by their patients. Awareness and knowledge of the dental interventions that alleviate or lessen oral side effects will provide optimal patient management and create a more personalized treatment plan.

**Conclusion:** Medications can impact the oral cavity in multiple ways. Dental professionals need to be knowledgeable of medications and how they impact the oral cavity. Dental hygienists have a unique opportunity to provide patients information and solutions to medication induced xerostomia and halitosis.

Title: Improving children's oral health

Presenter(s): Kenna Copeland, DH2; MacKenzie Vines, DH2

Advisor(s): Carolyn Ray

#### Abstract:

**Purpose**: This poster will present information from two literature reviews that emphasize the importance for dental professionals to educate the public about the need for oral health for parents and children.

Background: Carious lesions are the most common chronic childhood disease. Children are 5-8 times more likely to suffer from carious lesions than they are to suffer from asthma. Of children between the ages 2-5, 23.7% have experienced a carious lesion. With caries experience comes dental pain, fever, swelling, difficulty chewing and speaking, disrupted sleep and missed learning opportunities when children are not able to attend school. According to the U.S. Department of Health and Human Services, fifty-one million hours are lost every year because of dental problems. Children with toothaches are four times more likely to have a low grade point average than their healthy classmates. A dental home should be established by the age of 1 year, but only half of children have a dental home by the age of five. Mothers who have experienced tooth loss and dental caries are more than three times more likely to have a child who will also experience tooth loss and dental caries. There is a strong correlation between parent's oral hygiene habits and their children's oral hygiene habits. If taught oral hygiene instructions early on in life, children are more likely to keep these good habits throughout their life. Many interventions can be implemented to control and stop dental decay. Fluoride can change the structure of enamel to make it more resistant to bacterial acid. Fluoride also remineralizes areas of demineralization and decreases the number of incipient lesions. High caries risk children benefit from having fluoride treatments every six months.

Conclusion: Many factors can be implemented to decrease carious lesions in children. Better oral hygiene, fluoride, and sealants have all shown to reduce the number of children who will experience dental decay. Parents must be educated on oral health in order to properly care for their children's oral health. Caries are preventable if the right prevention methods are implemented.

Title: Oral and Systemic Benefits of Xylitol

Presenter(s): Kalynn LiaBraaten, DH2; Devin Sewell, DH2; Hannah Stout, DH2

**Advisor(s):** Carolyn Ray

#### Abstract:

**Purpose:** This poster will present information on the beneficial effects of xylitol on oral and systemic health.

**Background:** Xylitol was manufactured for the first time by a German chemist in 1891. He discovered this unique sugar source derived from birch bark and corn cobs. After World War II, many more countries began using this substitute because of the sugar shortage. It was later noted that countries that used xylitol had, on average, benefitted from overall good health.

Clinical Significance: Different than other sugars like sorbitol and mannitol, xylitol is a 5-carbon sugar. Its unique chemical makeup aids in its anti cariogenic effects by reducing acid production and inhibiting the growth, metabolism and polysaccharide production of many bacteria strains including S. Mutans. Because xylitol has a very low glycemic index and fewer calories than normal sugar, it is a great substitute for diabetic patients.

**Conclusion**: Dental professionals are obligated to research and continue the implementation of xylitol in order to optimally treat our patients.

Title: White for life

Presenter(s): Kayla Markham, DH2

**Advisor(s):** Carolyn Ray

#### Abstract:

#### **Background**

Bleaching first came about in the 1800's when dentists would bleach non-vital teeth with stains or trauma-related injuries. By the mid 1990s teeth whitening's popularity increased and expanded into homes and dental offices across the United States. Hydrogen peroxide and Carbamide peroxide are the two main ingredients in whitening; they can be found anywhere from 3.5%-35% hydrogen peroxide or carbamide peroxide.

#### **Clinical implications**

Clinicians should be aware of the detrimental effects of whitening. Tooth and gingival sensitivity along with gingival irritation are commonly found effects. Dental professionals have an obligation to inform patients on the effects of tooth whitening along with educating the patient on how to alleviate or lessen these effects.

#### **Conclusions**

The higher concentration of the whitening ingredient causes a greater chance of sensitivity, but also increases the rate of the tooth whitening. Dental professionals should pre-screen and provide education for every patient who receives tooth-whitening procedures.

**Title: Oral Cancer Genomics** 

**Presenter(s):** Kathleen Morrow, DH2

Advisor(s): Carolyn Ray

#### Abstract:

**Purpose:** This literature review will provide dental professionals information about genomics and current cancer research technologies.

**Background:** Oral cancer is also known as squamous cell carcinoma. This particular disease contains the bulk of head and neck cancers. Gene therapy has become an increasing popular research method for the etiology, prevention and treatment of oral cancers. Genomics is cutting-edge, modern biotechnology that has been very beneficial in the areas of science, medicine and cancer research. There has been much hope in this area of research and as a method for a cure of oral cancer and many other types of cancers.

**Significance:** In dentistry, it is the responsibility of the clinician for the prevention, education and early detection of oral squamous cell carcinoma. Therefore, research and experimentation in this specific disease process had become quite ardent. Over the past few decades, there has been much research in the area of squamous cell carcinoma, which has uncovered many traits of the disease.

Conclusions: Treating oral cancer is best treated synergistically by traditional radiotherapy, chemotherapy and a surgical step as well. Oral cancer research has included methods of silencing flawed genes or by replacing them with normal, functioning genes. Although, there have been huge strides in research and development for a cure of oral cancer, the best medicine for such a disease is prevention. Dental hygienists are not limited to prophylaxis in their scope of practice, but it also includes prevention and education regarding tobacco cessation and early detection by way of intraoral and extraoral examinations. Registered dental hygienists take on the role of prevention specialists by educating and informing patients of preventative health practice.

Title: The dental hygienist's role in obstructive sleep apnea

Presenter(s): Carolina Perez, DH2

**Advisor(s):** Carolyn Ray

#### Abstract:

**Introduction**: As preventative health specialists, dental hygienists are taught to screen for many prevalent diseases; however, they lack the information necessary to screen for obstructive sleep apnea (OSA). The purpose of this literature review is to provide an overview of OSA and screening protocols that may assist hygienists in making referrals for patients with OSA.

**Background**: OSA affects 15-24% of the U.S. population, while 70-80% of cases are undiagnosed. OSA contributes to diabetes, strokes, hypertension, cardiovascular diseases, a poorer quality of life and automobile accidents due to drowsy driving.

Clinical Implications: Excessive somnolence, loud chronic snoring, observed apneas, depression, morning headaches, memory impairment, decreased concentration, sexual dysfunction or impotence, irritability, gastric reflux are OSA symptoms that can be discovered by simple questionnaires. Xerostomia, bruxism, dental erosion, and certain craniofacial characteristics can be detected by extra and intraoral exams. In addition, obesity, pregnancy, alcohol use, tobacco use, use of narcotics, and genetics are risk factors for OSA. Dental hygienists can make referrals to physicians once they implement questionnaires about risk factors and symptoms associated with OSA and look for signs associated with OSA.

Conclusions: OSA has many effective treatment options. However, patients may never receive those treatments if they are not aware of their condition. Dental hygienists have the unique opportunity to detect OSA by becoming aware of the risk factors, signs and symptoms associated with this potentially fatal sleeping disorder. Once dental hygienists start recognizing OSA in their evaluations, more referrals can be made and more lives can be saved.

Title: The relationship between HPV and oropharyngeal cancer

**Presenter(s):** Ryanne Pink, DH2

Advisor(s): Carolyn Ray

#### Abstract:

**Background**: The purpose of this literature review is to inform oral health professionals of the growing prevalence of HPV related oropharyngeal cancer, the multiple risk factors associated with this condition, and means of prevention. The most commonly affected intraoral sites, oral manifestations of the disease, and vaccinations for HPV-related oropharyngeal cancer will be discussed.

Conclusions: HPV has been identified as a risk factor for oropharyngeal cancer even in the absence of tobacco or alcohol use. HPV infection was consistently detected in the tonsillar region. HPV is spread through skin-to-skin contact, primarily oral sex. Individuals most susceptible to HPV infection are young, white males. The Human Papilloma Virus can present as thickened white patches, papillary growths, and/or warty growths. HPV-16 has been indicated as the main causative agent in oropharyngeal cancers.

**Practice Implications**: It is critical that oral health professionals be knowledgeable about the clinical manifestations of HPV. A thorough intraoral and extraoral examination must be done at every appointment. Practitioners should be familiar with the risk factors and demographics most commonly affected by HPV. By educating themselves and their patients with this information, prevention of HPV-related oral cancer can be achieved effectively.

Title: Probiotics and Oral Health

**Presenter(s):** Alisha Underwood, DH2

Advisor(s): Carolyn Ray

#### Abstract:

**Purpose:** The purpose of this literature review is to inform dental professionals about the prospective benefits that probiotics have on oral health.

**Background:** Probiotics are live microorganisms that provide a health benefit to the host when consumed in adequate amounts. The conception of the theory of probiotic bacteria dates back to the early 20<sup>th</sup> century, yet it was not until recent years that potential nutritional and medical benefits of their use was recognized. In 1994, the World Health Organization considered probiotics to be the most important immune defense system. The overuse of antibiotics in the U.S. has lead to the formation of resistant strains of bacteria and superbugs that have serious adverse effects and can even be lethal. The term "probiotic" was originally coined as an antonym for antibiotic.

**Significance:** An area of interest for dentistry involves probiotics and their effects on periodontal disease, periodontal health, dental caries, oral candidiasis, and halitosis.

Clinical Implications: Dental professionals should be aware of the emerging use of probiotics for enhancement of oral health, as well as an adjunctive therapy for treating periodontally involved patients.

**Conclusions:** Probiotics have a long-standing history of being a successful treatment for intestinal ailments due to their ability to change the bacterial flora of the intestines and intestinal tract. There is preliminary evidence that probiotics provide similar benefits in oral cavity.

Title: A digital tooth-based superimposition method for assessment of alveolar bone level changes

Presenter(s): Alejandro Romero-Delmastro, Postgraduate

Advisor(s): Fräns Currier

#### Abstract:

The use of Three-dimensional imaging has expanded the possibilities of clinical research in dentistry. Cone Beam Computed Tomography (CBCT) allows the orientation of images in any plane and precise measurements can be done on these images. In the past CBCT has been used for evaluation of alveolar bone levels before and after orthodontic treatment. However, due to the complex nature of the protocols described in the literature, the ability to generate reliable and repeatable data is often questionable. We have developed a digital tooth-based superimposition method for longitudinal quantitative assessment of alveolar bone heights and widths using CBCT images and OsiriX, an open-source multidimensional image navigation and display software. With this method tooth contours can be superimposed, user-defined reference points generated and alveolar bone measurements performed longitudinally on CBCTs with either a free (32-Bit) or a purchased (64-bit) version of the software; all this while taking advantage of CBCT's image quality as no print-outs, hand-tracing, hand-superimposition or format conversion are needed. This method could be used for clinical studies where direct measurements are not possible or practical; further research is needed to look at its reliability.

Title: Management of Peri-Implantitis in the Esthetic Zone

**Presenter(s):** Blaire Bowers, Postgraduate

Advisor(s): Robert Carson

#### Abstract:

Introduction: A 26 year-old patient with localized inflammation, bleeding and exudate on the distofacial of #9 implant presented to the Graduate Periodontics Clinic with a CC of "there is something wrong with my implant". The patient reported no discomfort associated with the affected area. The implant was placed in 2004 after a traumatic incident. Patient reported a history of crown re-cementation multiple times after original placement. After the patient began Invisalign<sup>R</sup> therapy in the Fall 2012, exudate was noticed coming from the #9 peri-implant area. Periapical radiograph revealed minor circumferential bone loss. Clinical exam revealed an 8mm probing depth with bleeding, exudate, and thin, inflamed tissue. The patient was diagnosed with peri-implantitis secondary to facial plate resorption and thin gingival tissue. Phase I therapy included subgingival Peridex<sup>TM</sup> irrigation and Arestin<sup>R</sup> placement. Planned surgical therapy included debridement, bony ridge augmentation followed by second stage soft tissue augmentation.

At the time of surgery, a full thickness flap was reflected. Facial plate was intact with no evidence of labial bone dehiscence. No implant threads were exposed apical to the machined collar (no platform switching). Therefore, bony ridge augmentation was not indicated. The abutment and collar were detoxified with a tetracycline slurry, and PerioDerm<sup>TM</sup> (thick) was placed and secured with a 5-0 Vicryl<sup>TM</sup> sling suture. The flap was coronally advanced to completely cover the PerioDerm<sup>TM</sup> and 7-0 polypropylene sling and vertical mattress sutures secured the flap. The patient received routine post-surgical care at 1,3, and 6 weeks. After soft tissue thickness was improved and orthodontic trays were adjusted to ensure no peri-implant soft tissue impingement, exudate was eliminated, deep probing depths were reduced, and bleeding on probing was resolved.

**Conclusion:** Foreign body impaction into the peri-implant tissues during restorative treatment and peri-implant impingement during orthodontic treatment must be avoided. Soft tissue health and thickness are essential to long-term implant therapy success.

Title: Comparison of an Autogenous Free Gingival Graft with a Porcine Collagen Matrix Graft for Increasing the Width of Attached Gingiva

**Presenter(s):** Joseph Feng, Postgraduate

Advisor(s): Robert Carson

#### **Abstract:**

**Introduction:** Autogenous free gingival grafts are frequently used for correction of mucogingival defects, increasing the width of attached gingiva, and deepening shallow vestibules. However, autogenous free gingival grafts involve the use of a second surgical site (donor site) and therefore, are often associated with increased patient morbidity as compared to the use of soft tissue allografts.

**Methods:** Two patients with posterior mucogingival defects participated in this comparative study to evaluate the success of an autogenous free gingival graft as compared to a soft tissue allograft with regard to their ability to eliminate mucogingival defects by increasing the zone of attached gingiva. One patient was treated with an autogenous free gingival graft and the other was treated with a porcine collagen matrix graft (Mucograft®) using an onlay technique.

**Results:** After 6 weeks, both types of soft tissue grafting were found to result in a similar increase in width of attached gingiva and elimination of mucogingival defects. The patient who received the free gingival graft experienced considerable discomfort in the palatal donor site. The patient who received the porcine collagen matrix graft healed with little discomfort and better esthetics as compared to the patient who received the autogenous free gingival graft.

**Conclusion:** Use of a porcine collagen matrix graft with an onlay technique resulted in an increase of attached gingiva comparable to the increase of attached gingival obtained using an autogenous free gingival graft. Autogenous free gingival grafts and porcine collagen matrix grafts can be used successfully for elimination of mucogingival defects.

Title: Complex Maxillary and Mandibular Reconstructions: Three Case Reports

Presenter(s): Jason Nicholson, Postgraduate

**Advisor(s):** Robert Carson

#### Abstract:

Patients commonly present to the clinic enquiring about tooth replacement via dental implants. Some of these cases are straightforward and require little preparation for dental implant placement. However, often bone and or soft tissue procedures are required to correct ridge deficiencies prior to implant placement. The reconstruction or preservation of the dental arch can involve procedures such as maxillary sinus lifts and lateral, as well as vertical, ridge augmentation. These procedures can involve autografts, allografts, xenografts and alloplastic grafts. In addition to grafts, biologic materials to aid in reconstruction may be included to increase the success of augmentation procedures. Three complex cases are presented here. These cases display the complexity of treating the fully edentulous arch with ridge deficiencies.

# Title: Osseoincorporation of Tantalum Coated Trabecular Metal Implants Allows for Earlier Predictable Implant Loading

**Presenter(s):** Miles Berg, Postgraduate

Advisor(s): David Buxton

#### Abstract:

For decades, researchers have studied dental implants as a way of restoring edentulous areas. Thanks to researchers such as Per-Ingvar Brånemark, often considered the Father of Modern Dental Implantology, immense strides have been made and obstacles overcome during the years, allowing for dental implants to be one of the most predictable and successful procedures done in a dental office. Today, the development of dental implants has not slowed. In fact, a new dental implant is on the horizon that may change dental implantology in the future. This dental implant has a trabecular metal sheath made of Tantalum, which surrounds the conventional titanium core. Tantalum, a highly biocompatible metal, has been used for decades in orthopedic surgeries. The porous sheath of Tantalum metal allows for both bone ongrowth and bone ingrowth. This ingrowth of bony material, which is now approved by the FDA to be labeled "Osseoincorporation," creates a much more stable implant two to four weeks post-implant placement. Osseoincorporation around the implant creates a predictable scenario in which the implant can be fully loaded after just four to six weeks with a definitive restoration. A standard implant needs to heal at least three months to allow for osseointegration before it can predictably be fully loaded and restored with a definitive restoration. The following is a case report in which two Trabecular Metal dental implants were placed and restored after six weeks post-placement.

Title: Case Presentation - Fixed Detachable Hybrid Dentures

**Presenter(s):** Chris Hopkins, Postgraduate

**Advisor(s):** David Buxton

#### Abstract:

Dental implants have created a variety of new treatment options for edentulous patients. Traditionally the only way to replace missing teeth in an edentulous arch was with a conventional denture. Conventional dentures are an acceptable treatment option for some, but many patients have problems with retention, stability, and comfort. Patients with xerostomia or atrophied alveolar ridges are likely to complain of problems with retention. Because dentures are tissue-borne, they lack the stability and chewing efficiency of natural teeth. Many patients object to having acrylic cover the palate and complain of a reduced ability to taste foods with conventional dentures.

Dental implants provide a rigid platform that allows the fabrication of a prosthesis which eliminates many of the common complaints of denture wearers. The fixed detachable "hybrid" denture is a combination of a conventional acrylic denture built around a rigid metal framework which attaches to implants directly or indirectly via abutments. The prosthesis is supported and retained by implants, which allows the majority of the acrylic found on a conventional denture to be eliminated and it greatly enhances the stability and functionality of the prosthesis.

Not all edentulous patients are candidates for a fixed detachable prosthesis. Patients must have at least 24 mm of vertical interarch space available to accommodate the thickness of the metal substructure, gingival acrylic, and denture teeth. Patients must be able to have at least four dental implants placed for each arch that is to be restored. Because of the greater complexity and number of components involved, a fixed detachable prosthesis takes longer to complete and is more expensive than a conventional denture.

This project documents the process of treating a fully edentulous patient with a severely atrophic ridge by placing four dental implants in each arch and restoring them with fixed detachable hybrid dentures.

Title: Incorporating Esthetic Crown Lengthening in the Restoration of Upper Anterior

Teeth: A Case Study

**Presenter(s):** Courtney Johnson, Postgraduate

Advisor(s): David Buxton

#### Abstract:

The aim of this case study is to explore the advantages of incorporating esthetic crown lengthening in the restoration of anterior teeth. When restoring anterior teeth to more ideal dimensions and color, the dental surgeon should consider incorporating esthetic lengthening in this process. Esthetic crown lengthening can eliminate the need for full coverage restoration of teeth or accompany their restoration in order to create a more esthetic smile. The procedure itself offers high yield with minimal surgery and recovery time. A case study was used apply the principles of esthetic crown lengthening in restoring the anterior teeth of a patient with short clinical crowns and a "gummy" smile. The patient was unhappy with her gingival display upon smiling and her "short" teeth. The patient was a candidate for esthetic crown lengthening and facial alveoloplasty of bone, diagnosed by locating the cemento-enamel junction, to create ideal dimensions of the upper anterior teeth that better matched her existing fixed restorations. Esthetic crown lengthening was completed and allowed to heal over a 10 week period. The patient's finances limited the restorative treatment to direct bonding of composite restorations after gingival healing. More ideal tooth shapes and evening of color were accomplished on the patient's upper anterior teeth with composite material. The combination of addressing her excessive gingival display as well as her dental esthetic problems created a cost effective way of creating a more ideal smile for the patient.

#### Title: Increasing Vertical dimension of Occlusion to achieve esthetics and function

**Presenter(s):** Drew Hendrix, Postgraduate

**Advisor(s):** David Buxton

#### Abstract:

With a growing elderly population, short clinical crowns and worn teeth are becoming more prevalent in today's society. This increase in prevalence generates an increase demand for cosmetic and functional procedures to treat these dentitions. There are several approaches for treating the severely worn dentition, crown lengthening, orthodontics, fixed or removable prosthetics or a combination of all of the above. After careful diagnosis and evaluation, it was determined that our patient could be restored to function with a combination of fixed and implant retained prosthetics.

This is a case report of a 74 year old male who presented with severely worn dentition. Clinical evaluation and evaluation of precisely mounted study models revealed that the patient's CR and his acquired maximum intercuspation were not in harmony but CR and first contact provided ample room for conventional restorations. No indications of joint pathology existed.

The sequence of treatment for this patient consisted of first splint therapy to test his joint comfort and insure the patient could tolerate his mandibular position. Once comfort was confirmed, provisional restorations and occlusal build-ups in composite were fabricated using the mounted diagnostic wax-ups. Implants were placed to provide future posterior support and function as case progresses. Working models for the restorations were acquired using Itero digital impression technology. Critical to this case was maintaining the newly established VDO and CR while restorations were being fabricated. Final restorations were fabricated out of pressed lithium disilicate with the exception of the canines where PFM's were used to accommodate cuspid rise occlusion. The success of this case could not have occurred without a proper diagnosis, pretreatment planning, proper sequencing and maintaining proper jaw relations throughout the treatment.

Title: Restoration of Disarticulation Resections of the Mandible for Pathology with Patient-Fitted Custom Total Joint Replacement

**Presenter(s):** Peter Carlson, Postgraduate

**Advisor(s):** Steven Sullivan

#### Abstract:

Disarticulation of the condyle during mandibular resection is required if the pathologic lesion involves the condylar head or to obtain appropriate surgical margins. A disarticulation resection may also be performed if there is inadequate condylar head remaining to provide a stable site for reconstruction. Once the disarticulation resection has been performed, the surgeon has many different options to reconstruct the condyle, with the final goal to restore mandibular function and maintain facial form. Some of these options include costochondral graft, titanium plate with prosthetic condylar head, allogeneic mandible, or even an autogenous metatarsal graft.

Another treatment option for reconstruction is total temporomandibular joint replacement. Total temporomandibular joint replacement using a patient custom-fitted system (TMJ Concepts) has been in use since the 1990's and has been shown to be both safe and effective. While historically reserved for treating patients with temporomandibular joint disorders, total joint replacement is an effective treatment option in reconstruction after disarticulation resection. This is a case report of three separate cases in which patients presented with pathology (recurrent multicystic ameloblastoma, recurrent odontogenic keratocyst and juvenile ossifying fibroma (trabecular type)) requiring disarticulation resection and subsequent reconstruction using custom-fitted total temporomandibular joint replacement.

This study was presented at the ASTMJS Annual Meeting, March 2013.

#### Title: In vitro evaluation of dental enamel exposed to medicines used in pediatric cardiology

**Presenter(s):** Gokay Karapinar, DS4 (Istanbul University, Faculty of Dentistry)

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#### Abstract:

Our objective is to evaluate dental enamel exposed to medicines (acetylsalicylic acid, furosemide, captopril, propranolol) used in pediatric cardiology, in vitro. Medicine tablets were crushed in a mortar and dissolved in 10 ml distilled water. The pH values of the medicines were measured with pH meter. Bovine teeth which were divided into 37 enamel blocks were used in the experiment. Enamel blocks were randomly distributed into 6 groups. In order to immerse in the medicine solutions, 7.065 mm² windows were opened on every enamel block. Two windows were opened on one of the blocks to enable observation of differences between medicine-exposed block and the one with clean surface in Scanning Electron Microscope (SEM).

Groups: Group I: acetylsalicylic acid, Group II: furosemide, Group III: captopril, Group IV: propranolol, Group V: 10 mM citric acid (control), Group VI: distilled water.

Every tooth was put into the cell cultivation chambers which contain 500  $\mu$ L medicine solution and then kept in the chambers for thirty minutes. Afterwards, dissolved phosphate was determined spectrophotometrically. The pH values varied between 2.96 and 5.10. Acetylsalicylic acid (75 mg) tablet water solution showed the lowest pH. The highest dissolved phosphate obtained for Captopril (25 mg) tablet solution 0.3192  $\mu$ g and for acetylsalicylic acid (75 mg) tablet water solution 0.2977  $\mu$ g, respectively. Scanning electron microscopy analysis showed prominent erosive patterns. Especially acetylsalicylic acid, captopril, propranolol and less in amount furosemide pointed out an erosive effect on dental enamel. Considering the long term and regular usage, this study demonstrated erosive potential of these medicines.

This study was presented at the 2012 Istanbul University Faculty of Dentistry Scientific Meeting.