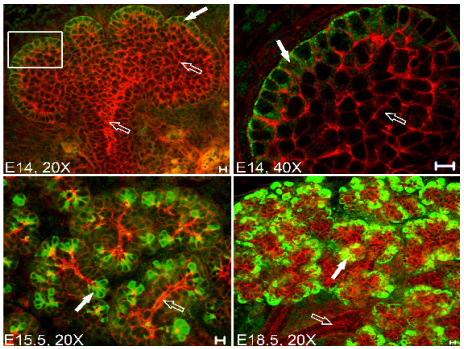
BU Goldman School of Dental Medicine

Science Day 2008

Thursday, March 27 · 9 a.m. to 5 p.m. · 100 East Newton Street



Neonatal acinar cell marker β1 identifies acinar cell precursors early in the embryonic development of the mouse submandibular gland (SMG). Immunofluorescence staining of the β1 protein (green) at embryonic day 14 (E14) is restricted to the outer cell layer of the developing buds (E14, 20X, white solid box; E14, 40X, block arrow), while the remaining cells marked by filamentous actin (F-actin, red) are negative (E14, unfilled block arrows). The β1 protein is maintained in the outer cell layer at later stages of development (E15.5, 20X, block arrow). In the cytodifferentiated SMG at E18.5, acinar cells display prominent β1 expression (block arrow), while the ducts remain negative (unfilled arrow) (contributed by Sheede Khalil and Maria Kukuruzinska, Department of Molecular and Cell Biology.)

Featuring keynote speaker, Dr. Pamela C. Yelick

Ph.D, associate professor and director, Division of Craniofacial and Molecular Genetics, Tufts University

Science Day is sponsored by the BU American Student Dental Association, the Student Research Group, and the Predoctoral Research Program.

9 a.m. to 4 p.m.

vendor exhibition

first-floor lobby and cafeteria

3M/ESPE
Allcare Dental and Dentures
Army National Guard
Aspen Dental
Brasseler USA
Colgate Oral Pharmaceuticals
Dentsply North America
Dentsply/Tulsa Dental Specialities, Inc.
Designs for Vision
Eastern Dentists Insurance Company (EDIC)
Gentle Dental Centers
Great Expressions Dental Centers
Johnson & Johnson
Kuraray America
Lexi-Comp
Massachusetts Dental Society
Nobel Biocare
Premiere Dental Products
Procter & Gamble Professional Oral Health
Shofu Dental
Sirona
Small Smiles Dentistry
Sullivan Schein Dental
Surgitel
US Army Healthcare Recruiting
Waterpick*

**Waterpick will not be in attendance. Boston University Goldman School of Dental Medicine thanks Waterpick for a product donation.*

12 to 1 p.m.

keynote research presentation

room 301

Dr. Pamela C. Yelick, Ph.D.
"Strategies for Tooth Regeneration"

Dr. Yelick studies craniofacial and dental tissue development and regeneration at Tufts University. Her approach incorporates both tissue engineering to regenerate teeth and tissues and study of the zebrafish as a developmental model.

In addition to her position as director of the Division of Craniofacial and Molecular Genetics, Dr. Yelick is an associate professor in the Departments of Oral and Maxillofacial Pathology, Genetics, and Biomedical Engineering at Tufts University. She is the current chair of the American Association of Dental Research nominating committee. Dr. Yelick received her Ph.D. in molecular biology from Tufts University and a bachelor's degree in biochemistry from Smith College.

1:30 to 4:30 p.m.

student presentations

room 309 and third-floor hallway

Poster mounting takes place in the third-floor hallway from 9 to 11 a.m.

Poster Presentations (third-floor hallway, 1:30 to 4:30 p.m.)

Predoctoral Students

Jerry Ashrafi, Hussam Batal and David Cottrell. Department of Oral and Maxillofacial Surgery: "Barrier Membranes are Not Necessary."

Prashanti Bollu and Anita Gohel. Department of General Dentistry/Radiology: "Horizontal Versus Vertical Bitewings in Opening Interproximal Contacts."

Darren Isfeld and Paula Friedman. Department of General Dentistry/Gerontology. "Emphasis on Xerostomia - quantitative evaluation of dry mouth and quality of life indicators in US dental school medical history forms: A comprehensive literature review and medical history form evaluation."

Daniel Jammal, Eva Helmerhorst and Frank Oppenheim. Department of Periodontology and Oral Biology: "Exploration of the Antifungal Activity of Parotid Secretion."

John Kiang, Anne Tanner and Christopher Hughes. Department of Pediatric Dentistry: "Cultural Assay and Identification of Acid Tolerant/Acidogenic Isolates from Severe Early Childhood Caries."

Erica Kullberg, A. Swenson, S. Rich and Judith Jones. Department of General Dentistry: "Pediatric Oral Health Related Quality of Life Better in Children and Adolescents."

Kayhan Mashouf, M. AbuAlMelh, M. Kai and Marie Tolarova. Department of Orthodontics, University of the Pacific School of Dentistry, San Francisco: "RFC1 A80G Gene Polymorphism and Nonsyndromic Cleft Lip and Palate in San Salvador."

Raffi Miller, S. Rich, N. Kressin and Judith Jones. Department of General Dentistry: "Caries Severity Affects Quality of Life in 3-4 Year Old Children."

Ismael Montane, J. Walker, S. Khalil, S. Menko and Maria Kukuruzinska. Department of Molecular and Cell Biology: "Myosin II and E-cadherin Direct Planar Cell Polarity Required for Duct Elongation During SMG Morphogenesis."

Drew Nunziata, Hatice Hasturk and Thomas Van Dyke. Department of Periodontology and Oral Biology: "Periodontal Infections and Diabetes Mellitus."

Lucas Patrick, Richard Pober and Russell Giordano. Department of Restorative Sciences/Biomaterials: "Comparison of Flexural Strength of Resin-Infused Y-TZP and Glass-Infused Y-TZP with Fully Dense Y-TZP."

Adam Swenson, E. Kullberg, S. Rich and Judith Jones. Department of General Dentistry: "Oral Health Related Quality of Life Better in Children and Adolescents with Insurance."

continued >

Postdoctoral Students

Loai AlSofi, J. Xu, Z Mason, E. Morgan, Y. Deguch, M Yamauch and Philip Trackman. Department of Periodontology and Oral Biology: " Trabecular Bone Phenotype of Lysyl Oxidase Isoforms Knowckout Mice."

Elena Black, T. Ohira, O. Kazuhiro, A. Blackwood, A. Kantarci and Thomas Van Dyke. Department of Periodontology and Oral Biology: " PAK_2 in Superoxide Generation by LAP Neutrophils."

Terinder Chahal, S. Y. Kim, E. Helmerhorst, TE. Van Dyke and Robert Gyurko. Department of Periodontology and Oral Biology: " Elevated Mitochondrial Respiration and Superoxide Production in Diabetic PMN."

Oral Presentations (room 309, 1:30 to 4:30 p.m.)

Predoctoral Students

Jason Conn and Dana Graves. Department of Periodontology and Oral Biology: "The Significance of FoxO1A in Osteoblastic Differentiation."

Chandra Manish and Paula Friedman. Department of General Dentistry/ Gerontology: "An Investigation of Attitudes and Knowledge of Dental Students Towards the Elderly."

Postdoctoral Students

Rawia Alkhunaizi, Richard Pober and Russell Giordano. Department of Restorative Sciences/Biomaterials: "Translucency Comparison of CAD/ CAM Materials."

Gabrielle Fredman, M. Arita, C. Serhan and Thomas Van Dyke. Department of Periodontology and Oral Biology: "Resolvin E1, an EPA-Derived Mediator, Has Selective and Potent Actions on Human Platelets."

Emily Greenbowe, Pushkar Mehra and David Cottrell. Department of Oral & Maxillofacial Surgery: "Rigid Internal Fixation of Infected Mandible Fractures."

Xiuli Sun, E. Salih, F. Oppenheim and Eva Helmerhorst. Department of Periodontology and Oral Biology: "Activity-based Characterization of Whole Saliva Proteases Towards Histatins."

Jack Thigpen, Emily Van Heukelom and Pushkar Mehra. Department of Oral & Maxillofacial Surgery: "Antibiotic Regimens in the Management of Facial Fractures."

Wael Youssef, Richard D'Innocenzo and Pushkar Mehra. Department of Oral and Maxillofacial Surgery: "Considerations in the Management of Severe Head and Neck Infections of Odontogenic Origin."

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Student Poster presentations

Predoctoral Students

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Oral Presentations

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Chandra Manish and Paula Friedman. Department of General Dentistry/ Gerontology: "An Investigation of Attitudes and Knowledge of Dental Students Towards the Elderly."

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Barrier Membranes are Not Necessary

Jerry Ashrafi, Hussam Batal and David Cottrell,
Department of Oral and Maxillofacial Surgery, Boston University Goldman School of Dental Medicine

Abstract

The need for dental implant site development has increased steadily since the advent of endosseous implants. Prosthetically driven implant placement increased the need for alveolar bone augmentation. Guided bone regeneration (GBR) may be the most commonly utilized technique to increase alveolar bone volume in preparation for implant placement. Melcher described the need for exclusion of certain cells from a wound to insure proper healing and this principle led to the development of the use of barrier membranes. Today the use of barrier membranes is widespread and its success as a bone augmentation tool is well documented in the literature. However, as with most surgical techniques, there are specific limitations and potential complications with the use of barrier membranes which make their use less than optimal in many cases.

Understanding of the basic biologic processes of bone healing is critical to determining optimal treatment techniques. Barrier membranes, both resorbable and non-resorbable, may not provide optimal results in many circumstances and a cogent argument against the use of barrier membranes in most augmentation procedures is very plausible. Toxic degradation products, infection, inhibition of revascularization, exposure, cost, and secondary surgeries are all potential findings with the use of barrier membranes. In fact, factors such as primary closure, revascularization, scaffolding, grafting materials and the healing potential of the periosteum may be more important aspects of bone regeneration. Most circumstances of alveolar bone augmentation can be alternatively treated without the use of barrier membranes. Socket preservation, horizontal and vertical alveolar ridge augmentation, sinus lifting and other circumstances for implant site preparation can be predictably performed, with greater than 90% success, without barrier membranes in most cases. Surgeons should have training ideally adapted for the multitude of surgical options necessary for optimal dental implant site development. Confining one's surgical armamentarium to barrier membrane techniques places limitations on surgical success and may not provide patients with the most predictable results.

Horizontal Versus Vertical Bitewings in Opening Interproximal Contacts

Prashanti Bollu and Anita Gohel
Department of General Dentistry/Radiology, Boston University Goldman School of Dental Medicine

Introduction: Early diagnosis of occult lesions like incipient interproximal caries is critical to preserve healthy tooth structure. Bitewing radiographs are highly effective in opening interproximal tooth contacts and are used to provide visual detail of surfaces between adjacent teeth. Based on intraoral film position, bitewings may be classified as horizontal and vertical. **Rationale:** Vertical bitewings often do not capture the distal of canine and also fail to open all interproximal tooth contacts thus requiring re-taking the radiograph. The wider image field and more comfortable intraoral film position of horizontal bitewings may open more interproximal surfaces more consistently. A comparative analysis of horizontal versus vertical bitewings was performed to evaluate the effectiveness of each method in capturing the distal of canine and in opening interproximal tooth contacts. **Materials and Methods:** A sample of 100 horizontal and 100 vertical bitewings was randomly chosen from a teaching file of dental patient radiographs. Interproximal contacts between canine-premolar, first-second premolars, second premolar-first molar and first-second molars were observed for open versus overlapped contacts. **Results:** Stratified analysis shows that statistically significant results were observed between horizontal and vertical bitewings. While horizontal bitewings were significantly more effective in opening contacts in the canine-premolar, premolar-premolar and premolar-molar areas, vertical bitewings were found to be superior in the molar-molar areas. In capturing the distal of canine, horizontally bitewings were successful in 82.5% as compared to only 43% by vertical bitewings. The crestal bone was captured by 100% of vertical and 97% of horizontal bitewings. **Conclusions:** Horizontal bitewing radiographs are found to be highly superior to verticals in the canine and premolar area where vertical bitewings performed better in the molar area. In viewing the alveolar crestal area, both techniques performed very similar. Further research in this area could be useful in developing selection criteria when choosing the best bitewing radiograph for individual patient.

Emphasis On Xerostomia – Quantitative Evaluation Of Dry Mouth And Quality Of Life Indicators in US Dental School Medical History Forms: A Comprehensive Literature Review And Medical History Form Evaluation

Darren. M. Isfeld and Paula K. Friedman
Department of General Dentistry/Gerontology, Boston University Goldman School of Dental Medicine

Abstract

The incidence and public health impact of xerostomia, or dry mouth is increasing. Contributing factors include, but are not limited to, the use of prescribed medications, autoimmune disorders such as Sjogren's Syndrome, systemic diseases such as diabetes and head and neck radiotherapy. Xerostomia has multiple oral health consequences and affects quality of life. Identification and management of the underlying cause of a patient's xerostomia is not always possible, proving clinical management to be difficult. Comprehensive review of literature identifies numerous etiologies, symptoms, prevalence and means of clinical diagnosis and management of xerostomia, as well as its relation to systemic disease and oral sequelae. Requests were distributed to the Clinical Directors of all US dental schools to receive medical history forms to investigate whether dental school patient intake forms contained questions related to xerostomia and correspondingly, whether future dentists are educated to inquire about this quality of life issue. The response rate was approximately 43% (25/58). Of these responding dental schools only 56% (14/25) of the medical history forms directly asked patients if they suffered from xerostomia or dry mouth. As educators in the oral health sciences, and as institutions modeling the standard of care for future dental health professionals, dental schools need to place increased emphasis on the education, diagnosis, treatment and management of xerostomia. All dental school medical history forms should pose questions directly relating to xerostomia. Increased public awareness as to the detrimental affects of xerostomia should occur on patient-practitioner, institutional, and community levels. Patients, oral health professionals and dental schools should engage in measures to increase the involvement of all health professionals as stakeholders in the xerostomia silent epidemic and patient quality of life.

Exploration of the Antifungal Activity of Parotid Secretion

Daniel R. Jammal, Caterina Venuleo, Frank G. Oppenheim, Eva J. Helmerhorst
Department of Periodontology and Oral Biology, Boston University Goldman School of Dental Medicine, Boston, MA.

When local or general predisposing factors are present, *Candida* species, which are oral opportunistic pathogens, can cause acute or chronic oral infections. In healthy subjects, saliva may play a crucial role in maintaining oral fungal homeostasis. Components of human salivary secretions so far identified to display antifungal activity *in vitro* include lysozyme, lactoferrin and histatins. **Aim:** To explore more systematically the antifungal spectrum of parotid secretion (PS) using various treatment and fractionation approaches. **Methods:** PS was collected from two orally healthy individuals and subjected to three different treatments: 1) no treatment (native PS); 2) boiling, centrifugation and removal of precipitate; 3) boiling followed by incubation of the supernatant with cation-exchange resin. The protein composition of all PS fractions was investigated by cationic and SDS-PAGE. Antifungal activity was evaluated in a fungal growth inhibition assay with *C. kefyr* as the test organism. Mass spectrometric analysis (LC-ESI-MS/MS) was carried out in order to identify proteins that may be responsible for antifungal activity. **Results:** Native and boiled PS displayed inhibiting concentration IC_{50} values of 18.5 ± 9.9 µg/ml and 17.0 ± 10.9 µg/ml, respectively. Incubation of boiled PS supernatant with cation-exchange resin removed the positively charged proteins and resulted in an IC_{50} value of 19.4 ± 6.5 µg/ml. **Conclusions:** The antifungal activity in PS is heat-stable and thus likely conferred by non-enzymatic components that are conformation-independent. Furthermore, the active agent appears to be a negatively charged protein. Mass spectrometric analysis identified zinc-□-2- glycoprotein, lactotransferrin, and agglutinin as potential candidates for the observed antifungal activity.

Supported by NIH/NIDCR grants DE05672, DE07652, DE16699 and DE18132.

Cultural Assay and Identification of Acid Tolerant/Acidogenic Isolates from Severe Early Childhood Caries

John P. Kiang, Anne C. Tanner and Chris V. Hughes
Department of Pediatric Dentistry, Boston University Goldman School of Dental Medicine

Abstract

1. Acid-Tolerant (Aciduric) microbiota of S-ECC. This aim compared the counts and proportions of bacteria growing on Acid agar pH5, with those from blood agar (pH7) from S-ECC and caries-free children. 2. Acidogenic microbiota of S-ECC. This aim compared the final pH of (a) samples and (b) isolates from children with S-ECC and caries-free children. **Methods:** Forty-one patients, aged 2-5 were selected from a pool of pediatric dental patients at Boston Medical Center in Boston, Massachusetts. Clinical examination and measurements were taken. Fifteen patients were categorized as Caries Free, and 35 patients exhibited severe early childhood caries. Patients with S-ECC received dental treatment under general anesthesia. Samples were taken from all patients in three regions: Anterior/Incisor (I), Posterior/interproximal Molar (M) tooth and Tongue (T). Each sample was dispensed, diluted, and plated onto Acid (pH5) Agar, and Blood Agar (pH7) and TYCSB. The media were grown in anaerobic incubation and then counted. S. *mutans* colonies were identified and isolated from each form of media. PCR was used to identify S. *mutans*. Patients enrolled in the study were instructed to return for 3 month, 6 month, and 1 year recall examinations. **Results:** Study Population: S-ECC children and caries free children age 2-5 years were recruited from Boston Medical Center. Consent was obtained from adult caregivers. S-ECC children were treated under general anesthesia. Children taking antibiotics were excluded from the study.

Clinical Measurements: The number of primary teeth present, extent of caries, Gingival and Plaque Indices, and gingival bleeding by tooth surface were recorded. Demographic information and diet were assessed by survey.

Microbiology: Plaque samples from Anterior tooth, Posterior tooth and Tongue were collected and cultured anaerobically on TYCSB, acid agar (pH 5) for acid-tolerant species, and Blood agar (pH 7) for the dominant cultural species. Colonies on Acid and blood agars were counted and 50 colonies from each agar from each subject were isolated. PCR analysis was done on suspected isolated S. *mutans* colonies. **Conclusions:** The increase in *S. mutans* levels from caries-free to caries to children with recurrent caries suggests that *S. mutans* risk factor for caries. The higher levels for children lost to monitoring suggests may also have recurrent caries. The higher levels of total acid counts only from lost to monitoring suggests that the lost children may at highest risk for caries, from *S. mutans* or other acidogenic species. Proportions of baseline *S. mutans* relative to total acid and blood counts increased from caries free to caries post therapy, suggesting increased risk for disease with increase *S. mutans*.The increase levels of *S. mutans* and total acid counts, also and proportions of *S. mutans* from children lost to monitoring suggest they may have recurrent caries, and likely increase plaque (poor oral hygiene).

Supported by NIH/NIDCR grant # DE-015847

Pediatric Oral Health Related Quality Of Life In Children And Adolescents

Erika F. Kullberg, Adam Swenson, Sharron E. Rich and Judith A. Jones
Boston University, Schools of Dental Medicine and Public Health

Background: A Pediatric Oral Health Quality of Life (POHQOL) questionnaire is currently being developed through a cross-sectional study of oral health in children and adolescents from a variety of backgrounds. The purpose of this project is to examine the association of caries, sealant status and age on POHQOL in low income children from Boston. **Methods:** Consenting parents and children (N=155) from four community health centers and one school dental clinic completed questionnaires and received oral screening. Surveys targeting specific age groups: pre-school (2-6), school-age (7-10), and pre-teens (11-13) were administered to assess the effects of oral conditions on quality of life in children and their families. Basic oral screening exams (ASTDD) were conducted by a dentist or dental student indicating the presence or absence of untreated caries and sealants. The outcomes of interest included the Pediatric Oral Health Quality of Life score (POHQOL) and a single item self-report of oral health (OH1). The OH1 question states, “How would you rate the health of your teeth and gums?” with possible answers being, “excellent,” “very good,” “good,” “fair,” or “poor.” The POHQOL score was calculated from twenty items. For each item, the questions “how often” and “how bothered” were asked. Individual impact scores were calculated from the product of the presenting problem and the amount bothered. The POHQOL score equaled the sum of the impact scores which was then compared to sociodemographic predictors, specifically age, caries, and sealant status. **Results:** Parent reported POHQOL ($p=0.007$) and OH1 scores ($p=0.004$) were worse for children with untreated caries. However, children’s self report of oral health did not vary based on caries status. There were no differences in POHQOL or OH1 scores on the basis of the presence or absence of sealants. **Conclusion:** Untreated caries is associated with worse quality of life in children as reported by their parents.

This work was supported by Grant # U54 DE14264 and K24 DE018211 from the National Institute of Dental and Craniofacial Research.

RFC1 A80G Gene Polymorphism And Nonsyndromic Cleft Lip And Palate In San Salvador

Kayhan Mashouf, Manal Abu Al-Melh, Marcus Y. Kai and Marie M. Tolarova
Pacific Craniofacial Genetics Laboratory, University of the Pacific Arthur A. Dugoni School of Dentistry, San Francisco, California, USA

Etiology of nonsyndromic cleft lip and palate (NCLP) consists of environmental and genetic factors, including folic acid intake and metabolism. Genes involved in the metabolism of folic acid have been considered as candidate genes for NCLP. **Objectives:** Our study focused on a possible role of the reduced folate carrier 1 (RFC1) gene, whose product is involved in transporting folate across the cell surface membrane, in etiology of NCLP. We studied the polymorphism at nucleotide 80 (A80G). **Methods:** We investigated a sample of individuals affected with NCLP (n=75) and a sample of unaffected individuals (n=53) from the same location. Cases and controls were identified during Rotaplast medical missions in San Salvador, El Salvador, in 2005. Diagnosis of cleft was determined by physical examination. DNA was isolated from dry blood spots on filter paper. RFC1 A80G genotypes were established by PCR amplification and single nucleotide conformational polymorphism detected by polyacrylamide gel electrophoresis. **Results:** Significant difference (χ^2, p=0.0332) was found in genotype distributions between cases and controls. In cases, 14.67% individuals had A80/A80 genotype, 38.67% had G80/G80 genotype, and 46.67% were heterozygotes (A80/G80). Proportions of genotypes in controls were 32.08% A80/A80, 22.64% G80/G80, and 45.28% A80/G80. The A allele frequency was 0.380 for cases and 0.547 for controls, while the G allele frequency was 0.620 for cases and 0.452 for controls (χ^2, p=0.0117). **Conclusion:** Results of this study suggest that the G allele at nucleotide 80 of the RFC1 gene contributes to the etiology of NCLP in San Salvador. Additional studies are in progress.

The fieldwork in San Salvador was supported by Rotaplast Intl., Inc., DNA analysis by Pacific Craniofacial Genetics Laboratory, University of the Pacific Arthur A. Dugoni School of Dentistry, San Francisco, California, USA

Caries Severity Affects Quality of Life in 3-4 Year Old Children

Raffi Miller, Sharron Rich, Nancy Kressin, Judith Jones
Department of General Dentistry, Boston University School of Dental Medicine

Objectives: Despite an increase in preventive measures, disparities remain in dental caries rates across America. We are developing a Pediatric Oral Health Quality of Life (POHQOL) questionnaire to examine the impact of dental caries on parent reports of their children's quality of life. This study examined the use of our parent-report on child questionnaire in a pre-school age population and examines if there are differences in quality of life among young children based on caries status, as well as sociodemographic and behavioral factors. **Methods:** Parents/guardians of 396 children aged 6 months to 4 years were interviewed at the Floating Hospital for Children in Boston, Massachusetts between August 2003 and January 2008. The interviews asked sociodemographic, behavioral, and quality of life questions; these data were paired with those from non-invasive dental examinations of the children. Analyses examined the relationship of caries status defined three ways: white lesions (WL), early childhood caries (ECC), and untreated caries (UC), on parent-reported oral health-related quality of life. **Results:** Untreated caries and ECC were related to age group, with 3-4 year olds having significantly higher caries rates than 1-2 year olds. Lower income and lack of insurance coverage were related to caries presence; using fluoridated toothpaste and visiting a dentist were more common in children with ECC and UC. Selected POHQOL items (pain, fear, trouble eating) were more frequent in 3-4 year olds with ECC and UC. Impact scores were higher in older children with ECC and UC, but not WL, compared to those without caries; POHQOL findings in 1-2 year olds appeared unrelated to caries. **Conclusion**: Untreated caries and ECC were associated with selected POQOL items in 3-4 year olds but not 1-2 year olds; however, the presence or absence of white lesions was not associated with quality of life.

This study was supported by NIDCR U54 DE014264, K24 DE000419, and K24 DE018211.

Myosin II and E-cadherin direct planar cell polarity required for duct elongation during SMG morphogenesis

Ismael Montane[1], Janice Walker[2], Sheede Khalil[1], A. Sue Menko[2] and Maria A. Kukuruzinska[1]

[1]Department of Molecular and Cell Biology, Boston University School of Dental Medicine, Boston, Massachusetts and [2]Department of Pathology, Anatomy and Cell Biology, Thomas Jefferson University, Philadelphia, Pennsylvania

Abstract

Our recent studies have shown that patterns of acinar and ductal cell fates are determined early in the embryonic morphogenesis of the mouse submandibular gland (SMG), with cells in the outer layer of the terminal buds representing acinar progenitors and the interior cells destined for ductal fate. During morphogenesis, presumptive ducts are extended from the initial stalk region into the proximal regions of the developing buds. The mechanism responsible for duct elongation during morphogenesis, however, has not been elucidated. Previously, we showed that as the interior bud cells reorganize and undergo differentiation into duct cells they acquire prominent E-cadherin junctions, cease to proliferate and express the duct-specific marker, K7. Also, ductal lumen formation requires E-cadherin function and signaling through Src and PI3K pathways. We now show that before being organized into presumptive ducts, cells in the proximal regions of the buds displayed prominent F-actin staining that was coincident with myosin II but preceded the acquisition of organized E-cadherin staining. Cells enriched for F-actin and myosin II were organized into multicellular rosettes, such as form during planar cell polarity-driven axis elongation. Inhibition of E-cadherin function led to the accumulation of multicellular vertex structures indicating that E-cadherin was required for the rosette-resolution step during directional axis elongation. Thus, in addition to being critical in the establishment of apical basal polarity and ductal cell survival, E-cadherin junctions play an important role in planar cell polarity that drives the extension of the presumptive ducts during SMG morphogenesis.

Supported by NIH grants DE014437 and DE010183 (MAK) and EY014798 (ASM).

Analysis of Student Dental Plan

Kevin C. Nietzer and Paula Friedman
Boston University School of Dental Medicine

Abstract

The Boston University Student Dental Plan is available to students in the Boston area. Many students take advantage of this very affordable access to high quality dental care. While many students are enrolled in this program, there are many students that are not, and we will be determining, thru our research analysis, who is using the dental plan, how effectively the program is operating, and who else we can extend this coverage to. It is our aim to determine the following: Percentage utilization of the student dental plan, number and types of services received, demographics of the patient population, administering a patient satisfaction survey and analyzing the results, interviewing member institution administrators about their level of satisfaction with the plan and suggestions for modifications, and exploring whether there might be additional institutions interested in joining. Results will help determine the effectiveness, utilization, weaknesses and success of the SDP.

Periodontal Infections And Diabetes Mellitus

Drew Nunziata, Hatice Hasturk and Thomas Van Dyke
Department of Periodontology and Oral Biology, Boston University Goldman School of Dental Medicine

Objective: The aim of the study is to assess the overall health benefits of incorporating an assessment of oral disease as part of the evaluation of patients with diabetes mellitus. **Methods:** 186 adults with Type 1 diabetes mellitus of long duration (>50 years) are enrolled to validate a questionnaire consisting of 8 questions previously shown to predict periodontal disease in epidemiologic studies and to assess the oral condition by clinical examinations. All subjects were given a general oral mucosa examination, determination of decayed, filled and missing teeth using DMFT index, and clinical periodontal measurements including probing depth (PD), clinical attachment level (CAL), gingival Index (GI), plaque index (PI) and bleeding on probing (BOP). Subgingival plaque samples for analysis of oral microbiota and peripheral blood samples to evaluate the inflammatory markers including TNF-α, IL-1β and C-reactive protein (CRP) were collected. **Results:** To date, eleven subjects (5 males and 6 females) have been enrolled and clinical data and sample collection have been completed. The subjects were Caucasian and non-smokers with an age range of 54-85 years. Oral examinations revealed no indication of oral diseases with the exception of stomatitis on the edentulous area due to removable dentures in one subject. In addition, the average PD, CAL, GI, PI and BOP revealed no indication of current periodontal inflammation (1.89, 2.56, 1.12, 0.45, and 0.14, respectively). However, the overall gingival recession was common in these patients (average 0.8 mm) indicating attachment loss due to previous history of periodontal disease (50% of patient indicated previous periodontal treatment). **Conclusions:** The relationship of periodontal disease in adults with Type 1 diabetes mellitus has not been adequately studied; hence this study will furnish needed information about the relationship of periodontal disease to Type 1 diabetes mellitus in adults. Furthermore, samples obtained from these subjects will be used for future genetic and microbiological analyses.

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Comparison of flexural strength of resin-infused Y-TZP and glass-infused Y-TZP with fully dense Y-TZP

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Abstract

Background: Zirconia is beginning to gain popularity in dentistry as replacement material for metal, especially in fixed prosthetics. Among different kinds of zirconia, yttria-stabilized tetragonal zirconia polycrystals (Y-TZP) is believed to be most ideal replacement for metal due to its tooth-like color, excellent biocompatibility and high fracture resistance**. Purpose:** Fabricate several new interpenetrating phase materials which may be more stable and resistant to fracture than fully dense zirconia. Interpenetrating phase materials are composite materials where each phase is continuous throughout the microstructure. **Methods and Materials:** Mechanical properties of zirconia matrix interpenetrating phase materials were determined using a three point bend test. Two different types of Y-TZP material, a powder form and pre-sintered VITA YZ blocks were used. The powder was pressed into blocks and partially sintered with two different temperatures to produce similar densities as the pre-sintered blocks. All the blocks were infused with resin or glass-zirconia powder to generate our interpenetrating phase materials except for one YZ block that would be used as control. **Results:** The mean flexural strength of the resin-infused Y-TZP was higher for the powder Y-TZP (143.72 ± 9.5MPa and 150.14 ± 21.6MPa) than the YZ blocks (82.43 ± 31.71MPa). In contrast, for the glass-infused Y-TZP, the YZ blocks mean flexural strength was notably higher (382.09 ± 134.71MPa) compared to the powder Y-TZP (292.02 ± 124.32MPa and 298.48 ± 97.21MPa). However, the mean flexural strengths of all the fabricated interpenetrating phase materials were significantly lower than the control, fully dense Y-TZP (877.99 ± 122.38MPa). ANOVA statistical analysis was performed to verify that the flexural strengths of each material is statistically different from one another. Weibull analysis was also executed to confirm the reproducibility of the results (all samples had $\beta \geq 2.18$). **Conclusion:** The flexural strength of the fully dense Y-TZP was significantly higher than all the interpenetrating phase materials made from Y-TZP ($p < 0.0001$).

Oral Health Related Quality Of Life Better In Children And Adolescents With Insurance

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Background: A Pediatric Oral Related Quality of Life (POHQOL) questionnaire is currently being developed through a cross sectional study of oral health in children and adolescents aged 2-6, 8-10, 11-13, and 14-17. The purpose of this project was to examine the effects of sociodemographic characteristics on parent and child reported quality of life in low income areas of Boston. **Methods:** Consenting parents and children (N=155) from four community health centers and one school dental clinic completed questionnaires and oral screenings. Sociodemographic predictors of POHQOL included age, race, child's birthplace, language preferred by parent, and insurance coverage. POHQOL was measured using a 20-item questionnaire assessing how often problems occurred and how much those problems bothered the child. POHQOL scores for each item are the product of the how often and how bothered scores. Resulting item scores were summed to get the total impact (POHQOL) score. The survey instrument also contained the single item self-report (OH1) question: "How would you rate the health of your teeth and gums?" Possible answers were "excellent," "very good," "good," "fair," or "poor." **Results:** There was no significant differences in OH1 date by parent report on child or the child self report. However the more sensitive POHQOL scores from parent report-on-child were higher for Spanish speaking parents than those who spoke Portuguese (p=0.017). Also, White and African American children reported worse POHQOL scores (p=0.014) than Hispanic children and those of mixed race or other races. **Conclusion:** It appears that parents who prefer to speak Spanish report worse oral health in their children than those who prefer Portuguese. Worse oral health was reported by white and African American children than in Hispanic or other children

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Trabecular Bone Phenotype of Lysyl Oxidase Isoforms Knockout Mice

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Objectives: Lysyl oxidases constitute a family of enzymes responsible for the formation of cross links in collagen and elastin. The importance of collagen in the structural and mechanical properties of bone has led us to investigate the hypothesis that the absence of one or more of these enzymes could lead to a significant bone phenotype. This phenotype could resemble osteoporosis or diabetic bone disease. **Methods:** Bones from 12-week old mice (8 males and 6 females) with the genotype LOX+/-, LOXL1 -/- were analyzed. 16 wild type mice (8 males and 8 females) were used as controls. µCT was used to analyze the trabecular and cortical bone structure in distal metaphysis and mid-diaphysis regions, respectively, of the left femur. The femora were subsequently tested to failure in torsion. Lower arm bones were used for cross-link analysis. Two way factor ANOVA was used for statistical analysis with *P* value less than 0.05 for significant differences. **Results:** µCT analysis of the trabecular bone in distal metaphysis of the knockouts showed decreased relative bone volume, connectivity density and mineral density and increased trabecular spacing. Cortical bone in the mid-diaphysis region of the knockouts showed decreased relative bone volume and mineral density and increased cortical thickness and polar moment of inertia. Mechanical testing data showed increased torsional strength in the knockout mice. Cross link analysis showed that the total number of LOX-catalyzed aldehyedes was significantly lower in the knockout mice. Correlation analysis showed that the decrease in hydroxylysine aldehydes in the knockout mice is correlated with the decrease in connectivity density (0.62). **Conclusions:** LOX+/- LOXL1-/-mice develop a significant bone phenotype characterized by porosity and spacing between the trabeculae. This could predispose them to micro fracture and to be easily resorbed during bone turnover.

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PAK_2 in Superoxide Generation by LAP Neutrophils

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Abstract

LAP PMN exhibit increased secretion of superoxide (O_2^-) and pro-inflammatory mediators. $p47^{phox}$, a subunit of the NADPH oxidase and central in O_2^- generation is phosphorylated in resting LAP PMN. P21-activated kinases (PAKs) are ubiquitous serine/threonine protein kinases downstream of activated Rac or Cdc42 involved in regulation of cytoskeletal architecture, cell cycle progression, motility, and stress response in a variety of cell types. *In vitro* PAK_2 directly phosphorylates $p47^{phox}$; however, PAK_2 pathways in neutrophils are largely unknown. **Objectives:** to determine the role of PAK_2 in O_2^- generation by LAP PMN. **Methods:** Peripheral blood neutrophils were isolated by Ficoll-Hypaque gradient centrifugation; protein phosphorylation was assessed by Western blot; O_2^- generation was assessed by superoxide dismutase-inhibitable cytochrome c reduction. Co-immunoprecipitation and confocal microscopy were employed to assess protein-protein interactions. Since, human PMN are short lived cells *in vitro* and transfection experiments are impractical, Tat, an HIV protein functional domain that transduces proteins through plasma membrane, and PAK_2 fused constructs were produced by classical cloning techniques to introduce active PAK_2 into human PMN. **Results:** PAK_2 is activated (hyperphosphorylated) in LAP neutrophils. PAK_2 co-localizes with $p47^{phox}$ *in situ*, by both co-immunoprecipitation and confocal microscopy. PAK_2 is downstream of PI3-kinase in human neutrophils as demonstrated by wortmannin inhibition. Transduction of Tat-PAK_2 constructs (PAK_2 auto-inhibitory domain, constitutively active or kinase dead) revealed intracellular protein after only 5 minutes of incubation. Transduced PAK_2 phosphorylates $p47^{phox}$ in human neutrophils, with subsequent O_2^- generation. **Conclusion:** TAT-fusion protein transduction technology is a valuable method for investigating signaling pathways in short-lived cells. LAP neutrophils are primed to produce excessive O_2^-. PAK_2 is directly upstream of $p47^{phox}$ leading to O_2^- production. PAK_2 is pre-activated in LAP PMN and is in the direct pathway leading to priming of LAP PMN and pre-assembly of the NADPH-oxidase through early phosphorylation of $p47^{phox}$.
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Elevated Mitochondrial Respiration and Superoxide Production in Diabetic PMN

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Oxidative stress is a major pathogenic mechanism leading to the complications of diabetes. Zymosan A-elicited PMN isolated from diabetic Akita mice release more superoxide compared to wild type (WT) PMN. **Objectives:** As mitochondrial superoxide production is increased in endothelial cells in diabetes, we hypothesized that mitochondria contribute to the elevated free radical production in PMN as well. **Methods:** Oxygen consumption by zymosan A-elicited murine peritoneal PMN was measured using a biological oxygen monitor model 5300 equipped with a 5331 standard oxygen probe (YSI). Mitochondria were labeled with rhodamine123 and mitochondrial superoxide production was determined with MitoSox Red staining followed by flow cytometry (FACScan). Results: Oxygen consumption is increased in Akita PMN (0.23 ± 0.16 nmol O_2/min*10^6 cells) compared to WT (0.11 ± 0.09 nmol O_2/min*10^6 cells, $P < 0.05$, n = 7). The number of mitochondria per PMN as determined with Rhodamine 123 staining and flow cytometry is similar in Akita and WT PMN (WT: 27.46 ± 6 Akita: 23.07 ± 3.85 arbitrary fluorescence units, $P = 0.96$). Mitochondrial superoxide production is elevated in Akita PMN by 23%, approaching statistical significance as determined with MitoSox Red staining followed by flow cytometry (WT: 39.28 ± 11.58, Akita 48.44 ± 10.98 arbitrary fluorescence units, n = 6, $P = 0.055$). **Conclusion:** Mitochondrial respiration is accelerated in diabetic Akita PMN. The relative number of mitochondria in PMN is not altered by chronic hyperglycemia. However, the accelerated respiratory rate results in increased superoxide production. Thus, leukocytes may contribute to micro vascular free radical damage not only with superoxide from NADPH oxidase, but also with superoxide of mitochondrial origin.

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The Significance of FoxO1A in Osteoblastic Differentiation

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Abstract

The FOXO, or Forkhead Box-containing protein, family (FoxO1/FKHR, FoxO3a/FKHRL1, FoxO4/AFX, and FoxO6) is a structurally related group of winged helix transcriptional factors. These factors have been shown to regulate a variety of critically important cellular processes including apoptosis, metabolism, DNA repair, cell cycle arrest, differentiation, and defense against oxidative stress. For these events to occur FOXO requires dephosphorylation and translocation to the nucleus, where it acts by binding to specific DNA sequence regions, thereby functioning as a transcriptional activator. FOXO is deactivated via phosphorylation by the Akt family of proteins in response to insulin, by this means being retained in the cytosol unable to act on its target. While FOXO's mechanism and method is emerging in recent literature, it is not yet clear the role it plays in assorted cell lines. This fact, teamed with FOXO's apparent encompassing and dynamic regulatory mechanism, was the foundation of this project. The aim was to determine FOXO's significance in mesenchymal cells, specifically in the differentiation of osteoblasts. A clonal murine calvarial-derived cell line (MC3T3-E1) was used which performs a developmental progression similar to osteoblasts. It exhibits early proliferation without differentiation followed by osteoblastic differentiation with the expression of alkaline phosphatase, formation of extra cellular matrix and the production of osteocalcin.
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An Investigation of Attitudes and Knowledge of Dental Students Towards the Elderly: 2006-2008

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Background: According to ADA updates there was 12% increase in the population of people over 65 years of age between1990 and 2000. It is estimated that the population of people above 65 years will continue to increase for the next 25 years.This substantiates the fact that next era can be seen as the decades of the BABY BOOMER. However, it is unclear whether oral health providers will be prepared with the knowledge, skills, and attitudes necessary to address the burgeoning oral health needs of the aging population. **Rational:** This study compares attitudes and knowledge of two types of dental students over the past three years. Participants included both traditional and international (Advanced Standing) dental students (dentists licensed in other countries who are currently enrolled in an accelerated two-year U.S. degree curriculum) enrolled in a required dental school geriatrics and gerontology course. **Method:** Palmore's Facts on Aging Quiz (FAQ) was used to measure the attitudes and knowledge of the participants towards elders. The anonymous quiz comprised 25 true or false questions addressing various aspects of aging. The FAQ was administered to all the participants (N=443) at the beginning of the first day of the course. **Findings:** Overall findings suggest that there is lack of understanding of attitude and knowledge of dental students (Advanced standing and traditional DMD) towards elders. Significant difference in attitude and knowledge towards elders among the groups is also noted. **Conclusions:** We concluded that additional research is needed to confirm or refute our trends on a national scope. If this trend is confirmed, dental educators would be alerted to continuing necessity of countering the students' potential negative biases as well as a lack of basic knowledge about elders.

Translucency Comparison of CAD/CAM Materials

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Objective: To compare the translucency of eight core and five full-contour CAD/CAM materials using reflectance contrast ratio as a method of measurement.**Methods:** Seven core materials were tested: a.Lava (3M/ESPE); b.Incoris ZI (Sirona); c.YZ-55 (Vita); d.Cercon (Dentsply); e.Inceram Spinell (Vita); f.Inceram Alumina (Vita); g. Inceram Zirconia (Vita). Five full-contour materials were tested: a.Paradigm C(3m/ESPE); b. Vitamark II (Vita); b.E.max CAD (Ivoclar); c,d.Empress CAD HT and Empress CAD LT(Ivoclar). Reflectance measurements of core and full contour materials were determined on disc specimens 0.5 and 1.5mm thick, respectively. By sectioning the blocks of relevant materials, specimens were produced. Lava, Incoris ZI, YZ-55 and Cercon specimens were sintered , Inceram specimens were glass infused and e.max CAD specimens were fired for crystallization according to manufacturer instructions. All specimens were tested in a spectrophotometer (i5,X-Rite, GretagMacbeth) across the visible spectrum (400-700nm) with CIE standard illuminant D65. Contrast ratios (CR) were calculated from the luminous reflectance of the specimens on a black surface (Yb) to the reflectance on a white surface (Yw), (CR=Yb/Yw). One way analysis of variance (ANOVA),two sample t-test and Satterthwaite-Welch t-test were used.

Results: Mean contrast ratios are shown below:

Core Materials	**Lava**	**Incoris ZI**	**YZ-55**	**Cercon**	**Inceram Spinell**	**Inceram Alumina**	**Inceram Zirconia**
Contrast Ratio	0.69 (0.024)	0.9 (0.006)	0.71 (0.01)	0.77 (0.017)	0.65 (0.07)	0.77 (0.02)	0.99 (0.16)
Full contour materials	**Paradigm C**	**VitamarkII**	**E.max CAD**	**Empress CAD HT**	**Empress CAD LT**		
Contrast Ratio	0.69 (0.009)	0.71 (0.02)	0.83 (0.007)	0.69 (0.01)	0.76 (0.014)		

Conclusion: ANOVA test revealed differences between both groups of materials. At α =0.05 Anova and t-tests indicate the following ranking of materials according to contrast ratio (from most translucent to most opaque). Core materials: Inceram Spinell > Lava, YZ-55 >Cercon, Inceram Alumina >Incoris ZI >Inceram Zirconia. Full contour materials: Paradigm C,VitamarkII,Empress CAD HT > Empress CAD LT >E.max CAD.

Resolvin E1, an EPA-Derived Mediator, Has Selective and Potent Actions on Human Platelets

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Introduction: Periodontal disease induced by bacterial infection is a chronic inflammatory malady that has been linked to the occurrence cardiovascular diseases and thrombus formation. It is well-appreciated that diets rich in omega-3 fish oils reduce the risk of coronary events, but the mechanisms responsible have yet to be elucidated. Resolvins are bioactive enzymatic products endogenously synthesized from omega-3 fatty acids that possess potent anti-inflammatory and pro-resolving actions. **Objective:** Since platelet aggregation and thrombus formation are central in the pathogenesis of cardiovascular disease, the actions of resolvins on agonist stimulated platelet aggregation were investigated. **Methods:** Platelet rich plasma (PRP) and platelets were isolated from healthy human volunteers. PRP was first incubated (15 min, 37°C) with Resolvin E1 (RvE1), Δ6, 14-*trans* RvE1, chemerin, a peptide ligand for ChemR23, or vehicle prior to addition 10uM ADP, 1.5 □g/mL collagen or 0.5uM U46619. Platelet aggregation was monitored by changes in light transmittance of stirred (400 rpm) PRP using a dual channel aggregometer. FACS analysis was performed to detect surface expression of ChemR23, a receptor for RvE1. Statistical significance was assessed by 2-tailed Student's *t* test. **Results:** RvE1 (1nM-1□M) selectively blocked platelet aggregation. In human platelet-rich plasma, RvE1 blocked ADP-stimulated platelet aggregation in a concentration dependent manner (IC50 ~10nM, n=6). In comparison, RvE1 blocked thromboxane receptor agonist U46619-induced (n=6) but not collagen-stimulated (n=3) aggregation. A biologically inactive isomer, Δ6,14-trans-RvE1 (100nM, n=3), did not block ADP-stimulated aggregation. Also, RvE1 (1nM-1□M) blocks thromboxane generation (n=6) but does not compete with SQ-29548 (thromboxane receptor antagonist) for TP□ (thromboxane receptor) binding. ChemR23, a receptor for RvE1's actions was expressed on both human megakaryocytes and isolated human platelets. Chemerin, a peptide ligand for ChemR23, also inhibited ADP-stimulated platelet aggregation but at micromolar concentrations. **Conclusion:** RvE1 demonstrates potent anti-platelet actions that may underlie some of the beneficial actions of the omega-3 fatty acids such as EPA in humans, specifically those associated with cardiovascular diseases.
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Rigid Internal Fixation of Infected Mandible Fractures

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Purpose: To evaluate treatment outcomes of rigid internal fixation for management of infected mandible fractures. **Patients and Methods:** A retrospective chart review of infected mandible fracture cases managed by a single oral and maxillofacial surgeon at a level I trauma center over a seven year period was accomplished by independent examiners. All patients were treated with incision and drainage, culture and sensitivity testing, extraction of non-salvageable teeth, placement of MMF when possible, fracture debridement and decortication, rigid internal fixation of the mandible by an extraoral approach, and antibiotic therapy. Medical and social history was contributory in the majority of patients. Analysis was completed based on evaluation of patients with soft tissue infected fractures versus those with hard tissue infected fractures (biopsy-proven osteomyelitis). **Results:** 44 patients were included in this study with an average follow-up time of 18.2 months from the date of surgery (minimum 3 months). The treatment protocol was found to be successful in 100% of 18 patients with soft tissue infected mandibular fractures and 92% or 24 of 26 patients with hard tissue infected fractures. **Conclusions:** A protocol consisting of concomitant incision and drainage, mandibular debridement, fracture reduction and stabilization with rigid internal fixation can be effectively used for single-stage management of infected mandible fractures.

Activity-based Characterization of Whole Saliva Proteases Towards Histatins

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Abstract

Whole saliva-associated proteolysis has been well recognized but poorly characterized. Substrate degradomes have been used successfully as a fingerprint to elucidate the interaction between a protease and its substrate. In this respect, salivary histatins, being highly homologous in primary structure and sensitive to proteolysis in the oral cavity, are excellent substrates for such evaluations. To determine the targeted cleavage sites, synthetic histatins were exposed to whole saliva enzymes for various time intervals, and the resultant digests were analyzed by RP-HPLC and by LC-ESI-MS/MS. The differential proteolytic susceptibilities of histatin 1, 3 and 5 were first quantitated by determination of the overall kinetic parameters. The K_m values for histatin 1, 3, and 5 were 47 □mole.l^{-1}, 12 □mole.l^{-1}, and 5 □mole.l^{-1}, respectively, and the V_{max} values were 15 nmole.l^{-1}.s^{-1}, 21 nmole.l^{-1}.s^{-1}, and 17 nmole.l^{-1}.s^{-1}, respectively. Inhibitor profiling showed that PMSF and EDTA were most effective, suggesting that serine and to a lesser extent metallo proteases play a definitive role in the degradation of histatins. Real time monitoring of the appearance and disappearance of fragments allowed the identification of the first targeted enzymatic cleavage sites as K13 and K17 in histatin 1, R25, Y24, and R22 in histatin 3 and Y10, K11, R12, K13, H15, E16, K17, and H18 in histatin 5. Subsequent cleavage sites were F26 in histatin 1, and Y10, K11, R12, K13, K17 and H18 in histatin 3. Among the first targeted sites were Y/F-X-X-K↓, RGYR↓, HRGY↓, HSHR↓. In conclusion, the definitive cascade for histatin proteolysis by whole salivary proteases is presented as well as distinct specificities of the proteases involved.

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Antibiotic Regimens in the Management of Facial Fractures

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Statement of Problem: The effectiveness of perioperative antibiotics in treatment of mandibular fractures is well established. However, there is no consensus on the role and duration of postoperative antibiotics in maxillofacial fractures. Orthopedic literature supports pre/perioperative antibiotics for open fractures, but varied durations of postoperative antibiotics are advocated. Multiple studies confirm the benefit of perioperative antibiotics for preventing postoperative infection in general surgical procedures; postoperative antibiotics are not routinely recommended. While literature from orthopedic and general surgery highlight the controversy, direct comparison to facial trauma is impossible. Given the high level of concern for antibiotic overuse, it's fitting that an evidence based protocol for antibiotic use in management of the full scope of fractures treated by oral and maxillofacial surgeons be developed. To this end, a retrospective review of all maxillofacial trauma at our institution was undertaken in order to identify protocols in use, infection rate, and influence of antibiotics on infection rate. **Patients and Methods:** Retrospective review of electronic medical records pertaining to facial trauma patients treated by multiple Board Certified Oral and Maxillofacial Surgeons at an urban level I trauma center from July 1, 2004 through June 31, 2007 was accomplished. A Microsoft Excel spreadsheet was created to collate observations.
Inclusion Criteria: 1) At least 1 maxillofacial fracture (isolated dentoalveolar, nasal, and skull fractures excluded); 2) All management at one institution; 3) Minimum of 1 month and maximum of 2 months follow up after trauma; 4) Complete records available. Data Recorded: Gender, age, medical and social history, nature of trauma and associated injuries, time from injury to surgery, method of treatment, antibiotic regimen, compliance with follow up, presence and management of infection. **Method of Data Analysis:** 151 patients met inclusion criteria. Clinic and radiographic records were reviewed for antibiotic therapy type and duration, incidence of infection, and fracture healing. **Results:** Of the 151 patients evaluated, 85 required surgical management. Forty-three (51%) underwent open reduction with internal fixation; all others were managed with closed reduction and maxillomandibular fixation. Five patients (3%) developed postoperative infections. 4/5 were soft tissue infections following open treatment of compound mandibular fractures. All resolved with local wound care and oral antibiotics. One patient with a compound mandible fracture became infected preoperatively; surgery on this patient was delayed 5 days due to concomitant injuries and antibiotic prophylaxis was not initiated. The patients was successfully managed with surgical incision and drainage and closed reduction reduction oif fractures with intravenous antibiotic therapy. Antibiotic protocols varied among attending surgeons. Protocols ranged from none for closed midface fractures to intravenous antibiotics from the time of admission through surgery with up to 10 days postoperative oral antibiotics. All patients that

underwent open reduction received a minimum of one intravenous dose preoperatively. No specific antibiotic protocol was associated with a higher rate of infection.

Conclusion: There seems to be no consensus on use of antibiotics in management of facial fractures among board certified oral surgeons at an urban level one trauma center. Our study showed that no one specific antibiotic protocol has a direct correlation to postoperative infection rates. All infections involved compound fractures involving dentoalveolar segments. Given the high level of concern for antibiotic overuse and resistance development, the results of this study has facilitated outcome assessment of a prospective trial of standardized protocol for antibiotic use in facial fractures our institution. We have now instituted a strict protocol at Boston University Medical Center for use of antibiotic therapy in maxillofacial fracture treatment through the Trauma Service. The protocol eliminates antibiotic use in closed midface trauma that is managed conservatively and limits antibiotic administration to one preoperative dose only for all fractures operated within 72 hours of injury; Initial results are encouraging.

Considerations in the Management of Severe Head and Neck Infections of Odontogenic Origin

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Purpose: To assess the efficacy of two common antibiotic therapy regimens and evaluate the relationship of four clinical parameters as possible predictors of duration of inpatient hospitalization in the management of severe fascial space infections of odontogenic origin**. Materials and Methods:** A retrospective analysis of treatment records of 93 patients who required admission to the Oral and Maxillofacial Surgery Service at Boston Medical Center between Jan 2000 and June 2007 with a diagnosis of severe head and neck infection of odontogenic origin was performed. Inclusion criteria included: 1) Presence of an odontogenic infection requiring inpatient hospitalization, 2) Plain films and a head/neck contrast CT scan preoperatively, 3) Incision and drainage with drain placement within 24 hours of admission, 4) Removal of the odontogenic etiology during surgery, and 5) Obtaining culture specimens. After surgery, all patients empirically received either intravenous Clindamycin (Group 1) or intravenous aqueous Penicillin G and Metronidazole combination therapy (Group 2). Once discharged from the hospital, oral antibiotic therapy (clindamycin- Group 1, and penicillin VK- group 2) was prescribed for a total of 7 days as outpatient therapy.
Antibiotic efficacy was evaluated on the basis of the following criteria: length of hospital stay, rate of antibiotic failure, and cost of treatment. Criteria for "treatment failure" included poor clinical progress despite a repeat CT scan showing adequate drainage without new collections and when culture/sensitivity results were outside the prescribed antibiotic's spectrum. Additionally, the following four parameters were evaluated to assess their possible use as predictors to length of inpatient hospitalization: 1. Loculation (rim-enhancing fluid collection) on CT scan, 2. Lymphoadenopathy (LAN), 3. Medical co-morbidities (ASA classification status), and, 4.WBC.
Results: 79 of the 93 patients met the criteria, and were included in the study. 72 % of patients were treated with clindamycin, while 28% of patients received Penicillin/Flagyl therapy.

	Average age	Gender % (♂/♀)	Avg. WBC	ASA I	ASA II	ASA III	Anatomical Spaces Low/Med/High
Group 1(n=57)	32.68	63/37	19.3	35.3%	49.4%	15.3%	5.2/84.7/10.1%
Group 2 (n=21)	32.42	48/53	17.4	38.2%	38.7%	23.1%	4.7/76.1/19.1%

Culture results	Gram Positive	Gram Negative	Aerobic	Anaerobic
Group 1	75.9%	71.4%	75.1%	71.1%
Group 2	66.3%	47.9%	66.1%	47.3%

	Avg. hospital stay (days)	ABX Failure (%)	$ Cost- Abx Tx (in house)	$ Cost- Abx Tx (outpt)	Hospital bed cost
Group 1 (n=57)	5.87	3.5	$ 175.21	$ 52.50	$ 6280
Group 2 (n=21)	6.57	4.7	$ 82.64	$ 16.00	$ 7029

	Loculation		LAN		ASA status			WBC		
	+ N=60	- n=19	+ n=50	- n=29	I n=31	II n=37	III n=11	12-16 n=30	16-20 n=32	20-24 n=17
Average hospital stay (days)	5.94	6.41	6.16	6.60	6.75	6.40	6.54	6.01	6.76	6.16

Conclusions:
Based on the results of this study:

1.Despite multiple recent reports in the medical literature recommending the use of more potent antibiotics for management of severe fascial space infections, clindamycin or penicillin-metronidazole therapy remain effective as empiric first-line treatment in severe infections of odontogenic origin.

2. Presence or absence of loculations on Ct scans, cervical lymphadenopathy, systemic medical co-morbidities, or elevated WBC has no significant correlation to the length of hospitalization in patients with severe infections of odontogenic origin that undergo prompt surgical drainage and perioperative intravenous antibiotic therapy.

BUGSDM Science Day 2008 Winners

Predoctoral Oral Presentation: Jason Conn DMD 10
Jason Conn, Michelle Siqueira and Dana Graves. Department of Periodontology and Oral Biology: *The Significance of Fox01A in Osteoblastic Differentiation*

Predoctoral Poster Presentation: Daniel Jammal DMD 10
Daniel Jammal, Eva Helmerhorst and Frank Oppenheim. Department of Periodontology and Oral Biology: *Exploration of the Antifungal Activity of Parotid Secretion*.

Postdoctoral Poster Presentation: Terinder Chahal MSD 10
Terinder Chahal, S. Y. Kim, E. Helmerhorst, TE. Van Dyke and Robert Gyurko. Department of Periodontology and Oral Biology: *Elevated Mitochondrial Respiration and Superoxide Production in Diabetic PMN*.

Postdoctoral Oral Presentation: Gabrielle Fredman Ph.D. 10
Gabrielle Fredman, M. Arita, C. Serhan and Thomas Van Dyke. Department of Periodontology and Oral Biology: *Resolvin E1, an EPA-Derived Mediator, Has Selective and Potent Actions on Human Platelets*.

ADA/Dentsply Student Clinician Award: Ismael Montane DMD 10
Ismael Montane, J. Walker, S. Khalil, S. Menko and Maria Kukuruzinska. Department of Molecular and Cell Biology: *Myosin II and E-cadherin Direct Planar Cell Polarity Required for Duct Elongation During SMG Morphogenesis*.

Science & Engineering Day – Dean's Award
Elena Black, T. Ohira, O. Kazuhiro, A. Blackwood, A. Kantarci and Thomas Van Dyke. Department of Periodontology and Oral Biology: " PAK2 in Superoxide Generation by LAP Neutrophils."