

# 2017 Graduate Research Presentations

9:00

Welcome & Introductions

9:15

Antibiofilm effects of double antibiotic pastes used in regenerative endodontics against bacterial isolates obtained from mature and immature teeth with

pulpal necrosis

Dr. Alex Troxel DDS  
University of Indiana

9:30

Cyclic Fatigue and Finite  
Element Analysis of  
Superelastic Endodontic Rotary  
Instruments

Dr. Hussam Ahmed  
Detroit Mercy Dental

9:45

Pharmacologic Management of  
Endodontic Pain by  
Dental Practitioners

Dr. Carmel P. Gleis  
University of Louisville

10:00

The Association Between the  
Anatomical  
Landmarks of the Pulp  
Chamber Floor and the  
Prevalence of Middle Mesial  
Canals in Mandibular  
First Molars: an In-vivo CBCT  
Analysis

Dr. Navid Akbarzadeh  
Case Western Reserve

10:15

Does an Incision and Drainage  
Need to Be  
Performed Following  
Emergency Root Canal  
Treatment? A Prospective,  
Randomized, Single-  
blind Study

Dr. Hannah Beus

(presented by Dr. Jake  
Judy)

The Ohio State University

10:30

Break

11:00

Reduction of *Enterococcus*  
*faecalis* Biofilm by Blue

Light and Sodium Hypochlorite

Dr. D. Kwan

Indiana University

11:15

# Release of PDGF from A-PRF, When Layered With Bioceramics

Dr. Tanaya Kumar  
Detroit Mercy Dental

11:30

# Association of End Stage Renal Disease with Radiographically and Clinically Diagnosed Apical Periodontitis: A Hospital-based Study

Dr. Khalid Sahly  
Case Western Reserve

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11:45

# OAE Business Meeting

12:00

Lunch

1:15

Correlation between Presence  
of Apical Periodontitis  
and Untreated Canals in  
Endodontically Treated  
Teeth Using CBCT Imaging  
Assessment

Dr. Mathilde Clairet  
University of Louisville

1:30

Effect of nitrous  
oxide/intranasal ketorolac  
combination on the success of  
the inferior alveolar  
nerve block in patients with  
symptomatic irreversible  
pulpitis.

Dr. Daniel Stentz  
The Ohio State University

1:45

The residual antibacterial  
effects of antimicrobials  
used in endodontic  
regeneration against biofilm

bacteria obtained from  
immature and mature teeth

Dr. Jordon C. Jacobs  
Indiana University

2:00

Biocompatibility of 2 Hydroxy  
IsoCaproic Acid  
(HICA) as a potential intra -  
canal medicament: An  
in Vitro Analysis

Dr. Yashika Pande  
Detroit Mercy Dental



Antibiofilm effects of double antibiotic pastes used in regenerative endodontics against bacterial isolates obtained from mature and immature teeth with pulpal necrosis

Alex Troxel DDS, Ygal Ehrlich DMD, Kenneth Spolnik DDS, MS, Josef S. Bringas DMD, DDS, MS, Richard L. Gregory PhD, and Ghaeth Yassen BDS, MSD, PhD

Objective: This study investigated the antibacterial effect of low concentrations of double antibiotic paste (DAP) loaded into a methylcellulose system against bacterial biofilms obtained

from mature and immature teeth with necrotic pulps

Methods: Standardized radicular dentin specimens were randomly divided into six

experimental groups (n=20). Group 1: 5mg/mL DAP treatment. Group 2: 1mg/mL DAP

treatment. Group 3: Calcium hydroxide (Ca(OH)

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) treatment. Group 4:

Methylcellulose. Group

5: No treatment. Group 6: No

bacteria or treatment. Clinical

bacterial isolates were obtained

from mature and immature teeth

with necrotic pulps indicated for

endodontic regeneration and

routine endodontic treatment,

respectively. Specimens in each

group were inoculated with

either bacterial isolates (n=10) and incubated anaerobically for 3 weeks. Specimens were then treated for one week with the assigned group treatment.

Treatments were rinsed with sterile saline and biofilms were detached and spiral plated using biofilm disruption assays. Wilcoxon Rank Sum tests followed by pairwise comparisons were used for statistical analyses.

Results: Treatment of infected dentin with 1 mg/ml of DAP, 5 mg/mL of DAP, and Ca(OH)

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demonstrated significant and substantial antibiofilm effects in comparison to untreated control

groups or groups treated with placebo paste. Furthermore, 1 mg/mL of DAP caused complete eradication of biofilm obtained from mature tooth with necrotic pulp. However, the same concentration was not able to completely eradicate the biofilm obtained from the immature tooth.

Conclusion: Low concentrations of DAP (1-5 mg/mL) loaded into a biocompatible methylcellulose system demonstrated significant antibacterial effects against biofilm obtained from both mature and immature teeth with necrotic pulps.

# Cyclic Fatigue and Finite Element Analysis of Superelastic Endodontic Rotary Instruments

Ahmed H, Paurazas S, Askar M,  
Braud J

Introduction: The introduction of  
nickel-titanium (NiTi)  
instrumentation to the field of

endodontics has significantly increased treatment success and decreased treatment mishaps. However, regardless of flexibility and structural strength, all NiTi files are prone to fracture due to cyclic bending fatigue or torsional overload. As a result, various methods have been developed to effectively evaluate mechanical properties of endodontic rotary instruments.

**Aim:** The aim of this study is to determine the number of cycles to failure (NCF) and the locations of failure of the following systems: Hyflex CM (Coltene-Whaledent), EdgeEndo (EdgeEndo), V-Taper (SS White) and Vortex Blue (Dentsply Tulsa Dental Specialties). In vitro

experimentation will be completed for each rotary system. Selected areas of weakness will be identified to make appropriate recommendations towards improvement of the thermomechanical properties of the respective rotary instruments.

Methods: One hundred and twenty superelastic rotary files will be evaluated via in vitro experimentation. The null hypothesis is that there will be no difference between the various groups for the NCF and the level of file fracture. Four experimental groups were tested: Group HCM (Hyflex CM) size 25/.06 25mm (Coltene-Whaledent) (n=30), Group EF (X7 EdgeFiles)

size 25/.06 25mm (EdgeEndo) (n=30), and Group VT (V-Taper) size 25/.06 25mm (SS White) (n=30) and Group VB (Vortex Blue) size 25/.06 25mm (Dentsply Tulsa Dental Specialties) (n=30). The analysis of variance and ANOVA with p-value ( $p < .05$ ) will be utilized to analyze the results of the in vitro and virtual experiments.

Results: With respect to the average NCF, only group EF vs VB and group EF vs HCM showed a statically significant difference ( $p < .05$ ). All the remaining groups showed no significant difference. Comparing the average length of the fractured segment from the tip of

the instrument, all groups showed a statically significant difference except for Group EF vs HCM and Group VB vs VT Both groups VB and VT showed a greater consistency of fracture at the point coronal to the canal curvature. All the VT files fractured above the point of canal curvature. On the other hand, none of the HCM files fractured above the point of canal curvature except for one.

Conclusion: Final conclusions will be drawn after phase two of the study is completed.

# Pharmacologic Management of Endodontic Pain by Dental Practitioners

Carmel P. Gleis, DMD, John-Eric  
Cercek, DMD, Bakeerathan  
Gunaratnam, PhD, and Stephen  
J. Clark, DMD

Division of Endodontics,  
Department of Oral Health and  
Rehabilitation

University of Louisville School of  
Dentistry

## Abstract

Objective: Successful management of endodontic pain is an important concern for patients and clinicians. Prescription drug monitoring programs (PDMP) have been implemented in

some states to track controlled substance prescriptions and potentially may have changed the prescribing habits or recommendations for medications that dental practitioners use to manage

pain of endodontic origin. The purpose of this study was to survey dental clinicians who perform endodontic treatment as to the medications that they recommend or prescribe for endodontic pain.

Methods: Following IRB approval, an online survey was sent to 2,369 dentists licensed in Kentucky to assess their postoperative analgesic/antibiotic recommendations for scenarios

describing different pulpal and periapical diagnoses requiring endodontic treatment.

Results: 177 respondents (7.5%) who perform endodontic treatment completed the survey.

The most prescribed first drugs of choice for each diagnosis were 1) Ibuprofen and 2)

Acetaminophen (APAP) with hydrocodone. The most prescribed antibiotic for all scenarios was Amoxicillin. There was a significant difference ( $p < 0.05$ ) between general dentists (GD) and endodontists in prescribing an antibiotic for a diagnosis of symptomatic irreversible pulpitis/symptomatic apical periodontitis (SIP/SAP) with 61% (83/136) of GD and only 10%

(2/21) of endodontists prescribing an antibiotic for SIP. 74% (97/131) of GD and only 9% (2/22) of endodontists ( $p < 0.05$ ) prescribed an antibiotic for pulp necrosis/chronic apical abscess (PN/CAA) ( $p < 0.05$ ). APAP with hydrocodone was still recommended in significant amounts for each pulpal/apical diagnosis scenario, ranging from a high of 41% for PN with AAA to a low of 10% with PN with CAA (which was described in this scenario as “no pain”).

Conclusion: Ibuprofen was most frequently recommended in this study for all pulpal/apical diagnoses. Antibiotics were inappropriately prescribed by a significant number of general

dentists for SIP with SAP and PN with CAA.

The Association Between the Anatomical Landmarks of the Pulp Chamber Floor and the Prevalence of Middle Mesial Canals in Mandibular First Molars: an In-vivo CBCT

Analysis

Navid Akbarzadeh DMD, André K. Mickel, DDS, MSD, Martin Palomo, DDS, MS, Anita

Aminoshariae DDS, MS, Ali Syed BDS, MS, Navid Khalighinejad BDS

Introduction: The success of endodontic treatment depends on the effective reduction of microbes from root canals.

However, anatomical complexities such as presence of a middle mesial canal (MM) could make this task more challenging. Various studies have evaluated the prevalence of MM in mandibular first molars (M1). However, no study has investigated the association between anatomy of the mesial root/pulp-chamber floor and the prevalence of MM using CBCT. Purpose of this study was to investigate the prevalence of MM and its association with pulp-chamber floor's anatomical landmarks. We hypothesized that the longer

the distance between MB-ML orifices, the higher the prevalence of MM.

Methods: After reviewing 251 CBCT records of patients, the following data was recorded: age, presence of MM, MB-ML distance and Weine anatomical classification.

Data was analyzed using binary-logistic-regression( $\alpha=0.05$ ).

Results: The overall prevalence of MM was 5.8%. The mean MB-ML distance was 3.5mm.

MM was 2 times more likely to be present in cases when MB-ML distances  $>3.5$ mm (OR=2.1;P=0.043). MM was 5 times more likely to be present when MB and ML canals joined-

Weine class II (OR=5.2; P=0.001).

We also reported that on average, MM orifice was 1.7mm from the danger zone.

Conclusion: Anatomical landmarks of the pulp-chamber floor could act as a reliable predictive factor for the presence of MM. This knowledge of anatomical clues may serve to better direct endodontists in locating MM, which could prevent excessive removal of tooth structure.

Keywords: Endodontics, Radiography, Cone Beam Computed Tomography, mandibular first molar, middle mesial canal