

## Effect of surface roughness on the color of silorane-based composite

○Joong-Hee Ahn\*, Soon-Ham Jang, Aromi Kang, Sung-Ae Son, Bock Hur, Jeong-Kil Park

*Department of Conservative Dentistry, School of Dentistry, Pusan National University, 626-770, Yangsan, Korea*

**I. Object:** This study examined the effect of surface surface roughness on the color of silorane-based composite exposed to staining solutions.

**II. Materials & Methods:** Two methacrylate-based resin composite (Filtek Z250, Filtek Z350) and one silorane-based resin composite (Filtek P90) were light cured for 20 seconds and polished with SIC paper (#320, #600, #1000). The color of the specimens was measured in %R (reflectance) mode before and after immersing the specimens in coffee as test solution for 7 days. The value difference ( $\Delta L^*$ ) and the color difference ( $\Delta E^*$ ) was obtained based on the CIEL\*a\*b\* color coordinate values. Data were statistically analyzed by ANOVA and Scheffe's test.

**III. Results:** when resin composites were polished with same roughness SIC paper, P90 exhibited significantly lower color and value difference than Z250, and Z250 exhibited significantly lower color and value difference than Z350 ( $p < 0.05$ ). The surface roughness did not significantly influence the color and value stability of the same resin composite ( $p > 0.05$ ).

**IV. Conclusion:** The surface roughness did not significantly influence the color stability of silorane-based and methacrylate-based composite. The silorane-based composite exhibited better color stability than methacrylate-based composite

### Joong-Hee Ahn

Department of Conservative Dentistry,  
School of Dentistry,  
Pusan National University  
626-770, Yangsan, Korea  
ahn1985@hanmail.net

## **Influence of the type and thickness of dental ceramic on the light transmittance and light-spectrum**

○Jae-Geun Kim\*, Su-Mi Shin, Sun-Young Kim

*Department of Conservative Dentistry, Graduate School of Dentistry, Kyung Hee University, Seoul, Korea*

### **I. Object:**

In this study we investigated the influence of the ceramic type and thickness on light transmittance, light spectrum.

### **II. Materials & Methods:**

We used five different kinds of CAD/CAM blocks (IPS Empress CAD LT / HT, IPS e.max CAD LT /HT, Vita Mark II) with shade A2. From CAD/CAM blocks the ceramic plates were prepared with 10×10 mm squares and 0.5, 1.0, 2.0, and 4.0 mm thickness. We used three ceramic plates per type and thickness.

We evaluated transmitted light and light spectrum through each ceramic plate. Photodetector (918D-SL-OD3) connected to the optical power meter (Model 1918-C) was used to measure the intensity of LED light cure unit (bluephase G2). A fiber optic spectrometer (Avaspec-3648) was used to obtain light spectrum.

### **III. Results:**

Ceramic type and thickness had a significant effect on transmitted light ( $p<0.001$ ). Statistical significance was observed in interaction between ceramic type and thickness ( $p<0.001$ ). The transmitted light percentage through the ceramic of which thickness is over 0.5mm was less than 30 % and decreased exponentially with increasing ceramic thickness.

### **IV. Conclusion:**

The transmitted light, light spectrum had been dramatically changed by ceramic type and thickness.

### **Jae-Geun Kim**

Department of Conservative Dentistry,  
Kyung Hee University Dental Hospital  
1 Hoegi-dong, Dongdaemun-gu, Seoul  
130-701, Korea  
Geun0422@naver.com

## Comparison and Evaluation of Two Dental Spectrophotometers using the different principle

○Ji-A Kim<sup>1\*</sup>, Young-Hoon Kim<sup>2</sup>, Young-Sang Song<sup>1</sup>, Hoon-Sang Chang<sup>1</sup>, Yun-Chan Hwang<sup>1</sup>, Won-Mann Oh<sup>1</sup>,  
In-Nam Hwang<sup>1</sup>

<sup>1</sup>Department of Conservative Dentistry, School of Dentistry, Chonnam National University, Gwangju, Korea

<sup>2</sup>School of Dentistry, Chonnam National University, Gwangju, Korea

**I. Object:** For conservative restoration, choosing the right hue is critical in satisfying the patients and dentists. Although the conventional method of comparing the tooth color with the naked eye has been widely used, recently the development of spectrophotometer has brought the technique of choosing the hue with the help of a device. Since not enough research has been done on the accuracy of this technique, this study compared and evaluated the accuracy of ShadeEye NCC (SHOFU) and Crystaleye Spectrophotometer (OLYMPUS).

**II. Materials & Methods:** For the experiment, we took an alginate impression of the maxillary teeth. We produced an OmniBack model from the yellow stone cast model. The Universal light curing resin (Charisma, Heraeus Kulzer, German) was used in #14 to #24 and then light-cured afterwards. The resin had 3 different shades, A1, A3.5, and B2. Therefore, a total of 24(3\*8) tooth models were produced. ShadeEye NCC was used for shade measurement, and Crystaleye Spectrophotometer was also used for additional shade analysis. Using digital image-processing software, we were able to create a 2 dimensional image from Crystaleye spectrophotometer and the shade map of each tooth was produced. While ShadeEye NCC could measure only a single shade value from one tooth, Crystaleye Spectrophotometer could measure shade values from 3 different areas (cervical, middle, incisal) from one tooth.

### III. Results

1. In the result from ShadeEye NCC, A3.5 and B2 showed 100% of reproducibility, while A1 showed incoherent result, which were alternated by C1 and D2.
2. The middle portion of the tooth relatively showed a constant reproducibility, while the incisal/cervical portion showed an inferior reproducibility.
3. The incisors showed higher reproducibility compared to the premolars in the result from Crystaleye Spectrophotometer.
4. The color distribution varied according to the anatomical form and the labial curvature of the tooth, in the result from Crystaleye Spectrophotometer.

**IV. Conclusion:** This result shows that ShadeEye NCC has an excellent reproducibility with a very low accuracy while Crystaleye Spectrophotometer has a fair reproducibility with a better accuracy compared to ShadeEye NCC. Since both devices showed unreliable accuracy anyway, it is required for any clinicians who use these devices to be more careful and critical about the result.

### Ji-A Kim

Department of Conservative Dentistry, School of Dentistry, Chonnam National University  
Yongbong-ro33, Bukgu, Gwangju, Korea, 500-757  
jakimmin@naver.com

## **Degree of conversion of light –cured resin cement depending on the type and thickness of dental ceramic.**

○Jae-Pil Choi\*, Kyoung-Kyu Choi, Duck-Su Kim

*Department of Conservative Dentistry, Graduate School of Dentistry, Kyung Hee University, Seoul, Korea*

### **I. Object:**

The aim of this research was to investigate the influence of the ceramic type and thickness on degree of conversion of light-cured resin cement

### **II. Materials & Methods:**

#### 1. Preparation of Dental Ceramic plate

Five different kinds of CAD/CAM blocks (IPS Empress CAD LT / HT, IPS e.max CAD LT / HT, Vita Mark II) with shade A2 were prepared. The ceramic plates (10×10 mm squares with 0.5, 1.0, 2.0, and 4.0 mm thickness) were fabricated from CAD/CAM blocks. Three ceramic plates per type and thickness were prepared.

#### 2. Measurement Degree of Conversion

The degree of conversion of the light-cured resin luting material (Variolink N base) was evaluated using fourier transform infrared spectroscopy (Spectrum 100). Five specimens were prepared for each ceramic plate. Light curing was done for 40 seconds with direct contact on the top of ceramic plate which resin cement film was placed underneath. The control group was defined by direct light curing without ceramic plate.

### **III. Results:**

Ceramic type and thickness had a significant effect on degree of conversion of light-cured resin cement ( $p<0.001$ ). Statistical significance was observed in interaction between ceramic type and thickness ( $p<0.05$ ).

### **IV. Conclusion:**

Ceramic type and thickness had significant influence on the degree of conversion of light-cured resin cement.

### **Jae-Pil Choi**

Department of Conservative Dentistry,  
Kyung Hee University Dental Hospital  
1 Hoegi-dong, Dongdaemun-gu, Seoul  
130-701, Korea  
Craftcjp@naver.com

## The Effect of Surface Pre-Treatment on the Microtensile Bond Strength of Self-Adhering Composite Resin

○In-Soo Lee\*, Sung-Ae Son, Eun-Ha Kim, Bock Hur, Jeong-Kil Park

*Department of Conservative Dentistry, School of Dentistry, Pusan National University, 626-770, Yangsan, Korea*

**I. Object:** The present study examined the effects of various surface pre-treatments on the dentin and enamel surface of the Dyad flow, a newly introduced self-adhering composite resin, using a microtensile bond strength ( $\mu$ TBS) test.

**II. Materials & Methods:** Extracted twenty four non-carious human permanent molars were divided into 8 groups according to surface pre-treatment; group E1 & D1: no treatment, group E2: acid etching with phosphoric acid, group D2: conditioning with polyacrylic acid, group E3 & D3: Optibond All-in-one (Kerr), group E4 & D4: Clearfil SE bond (Kuraray). After respective surface pre-treatment Dyad flow was applied to each tooth. The restored teeth were sectioned to make 15 specimens in each group after stored in distilled water at room temperature for 24 hours. Microtensile bond strength and failure mode were evaluated in all specimens.

**III. Results:** In the group E1 and D1 pre-testing failure occurred during the sectioning procedure, hence the  $\mu$ TBS couldn't be recorded. In the enamel group, group E2 showed the lowest  $\mu$ TBS and E3 showed the highest value. The bond strength of E2 was significantly lower than that of E3 and E4 ( $p<0.05$ ). Similarly, in the dentin group, group D3 showed the highest  $\mu$ TBS followed in order by D4 and D2. Group D2 showed significantly lower value than that of D3 and D4 ( $p<0.05$ ). Adhesive failure was the most common failure pattern, and cohesive fracture was observed in some specimens.

**IV. Conclusion:** A pre-treatment involving acid etching or adhesive is recommended when Dyad flow as a self-adhering composite resin is used.

**In-Soo Lee**

Department of Conservative Dentistry,

School of Dentistry,

Pusan National University

626-770, Yangsan, Korea

Islee0607@hanmail.net

## Measurement of internal adaptation of composites using micro-CT and its correlation with polymerization shrinkage

○Hyunjoo Kim\*, Sungho Park

*Microscope Center, Department of Conservative Dentistry, Yonsei University, Seoul, Korea*

**I. Object:** In the present study, the internal adaptation of dentin-composite interfaces with various composite under thermo-mechanical loading were analyzed non-destructively using micro-CT, compared with microgap analyzed after sectioning. And correlation with polymerization shrinkage strain, stress was evaluated.

**II. Materials & Methods:** Four condensable resin (Gradia direct, Filtek P90, Filtek Z350, Charisma) and two flowable resin( SDR, Tetric N-flow) was used. First, polymerization shrinkage strain and stress were measured. To evaluate the internal adaptation, tooth specimen were immersed in a 25% silver nitrate solution and micro-CT was performed before and after thermo-mechanical loading. Silver nitrate penetration (%SP) was measured. After section the specimen bucco-lingually and rhodamine penetration, rhodamine penetration(%RP) was measured using stereomicroscope. One way ANOVA was used to compare the polymerization shrinkage strain, stress, %SP, %RP between the groups in 95% confidence level. A paired T-test was used to compare %SP before and after thermo-mechanical loading. Pearson correlation analysis was used to evaluate correlation between the result in 95% confidence level.

**III. Results:** Polymerization shrinkage strain showed  $P9 < Z3 \leq GD < CH \leq SD < TF$  ( $p < 0.05$ ), polymerization shrinkage stress showed  $P9 \leq GD \leq Z3 \leq CH \leq SD < TF$  ( $p < 0.05$ ), %SP showed  $P9 \leq GD \leq Z3 < CH \leq SD < TF$  ( $p < 0.05$ ) before loading,  $P9 \leq GD \leq Z3 \leq CH \leq SD < TF$  ( $p < 0.05$ ) after loading, and there was a significant difference between before and after loading in all groups ( $p < 0.05$ ). There was a positive correlation between %SP and %RP ( $r = 0.810$ ,  $p < 0.001$ ).

**IV. Conclusion:** Conventional method evaluated by dye penetration and sectioning showed various results according to laboratory factor. Using micro-CT technique, internal adaptation was evaluated nondestructively and showed regular result repeatedly and quantitative analysis was possible.

### Sungho Park

Microscope Center, Department of Conservative Dentistry,  
Yonsei University  
50 Yonsei-ro, Seodaemun-gu, Seoul  
120-752, Korea  
sunghopark@yuhs.ac

## Effect of different etching time and concentration on microshear bond strength of CAD/CAM glass-ceramic blocks to composite resin

○Yookyung Kim\*, Byoungduck Roh

*Department of Conservative Dentistry, Yonsei University, Seoul, Korea*

**I. Object:** Optimal surface preparation techniques for chemical and/or mechanical bonding to ceramic substrates are crucial in order to ensure clinical success when placing indirect ceramic restorations. The purpose of this article is to evaluate the effect of different etching time and concentration on microshear bond strength of two different CAD/CAM glass ceramic blocks to composite resin.

**II. Materials & Methods:** 140 ceramic plates were prepared, 70 from leucite based IPS Empress<sup>®</sup> CAD and another 70 from lithium disilicate based e.max<sup>®</sup> CAD. The ceramic surfaces were assigned into 7 groups of different surface treatments. The variables were the hydrofluoric acid etching time (0, 20, 60, 120 seconds and 10 minutes) and the concentration of the gel (5% and 9.5%). After composite resin bonding, microshear bond test was carried out using INSTRON universal testing machine and all debonded specimens were observed under X40 stereoscope. Additionally specimens in each group with different hydrofluoric acid surface treatment were observed under scanning electron microscope for detailed evaluation of surface morphology.

**III. Results:** The mean microshear bond strength of IPS Empress CAD and e.max CAD was 43.38 and 36.43 MPa, respectively. In Empress blocks, all groups were homogenous with no statistical differences. Altered hydrofluoric acid etching time and concentration did not influence the results. However in e.max blocks, higher bond strength was associated with longer etching time and higher hydrofluoric acid concentration. In Empress blocks, cohesive fractures within ceramic occurred most frequently. On the other hand in e.max blocks, the failures were predominantly adhesive.

#### **IV. Conclusion:**

- (1) In IPS Empress CAD, hydrofluoric acid conditioning time and concentration did not influence the microshear bond strength decisively.
- (2) In IPS e.max CAD, changing etching time and concentration had stronger effect on the surface microstructure, therefore resulted in positive relationship with microshear bond strength.

#### **Byoungduck Roh**

Department of Conservative Dentistry,  
Yonsei University  
50 Yonsei-ro, Seodaemun-gu, Seoul  
120-752, Korea  
Operatys16@yuhs.ac

## Cytotoxicity of a Novel Mineral Trioxide Aggregate based Root Canal Sealer

○Ryan Jin-Young Kim<sup>1\*</sup>, Ho-Hyun Son<sup>2</sup>, Seung-Ho Baek<sup>2</sup>, Joo-Hee Shin<sup>3</sup>

<sup>1</sup>*Department of Conservative Dentistry, Seoul National University Dental Hospital, Seoul, Korea*

<sup>2</sup>*Department of Conservative Dentistry, School of Dentistry, Seoul National University, Seoul, Korea*

<sup>3</sup>*Department of Conservative Dentistry, Korea University Guro Hospital, Seoul, Korea*

**I. Object:** The aim of this in vitro study was to evaluate the cytotoxicity of EndoSeal which is a novel mineral trioxide aggregate based root canal sealer, in comparison with two commonly used sealers, AH Plus and Sealapex.

**II. Materials & Methods:** Twelve specimens (0.1 cc) from each sealer were immersed individually into each well of 96-well culture plates containing 200 µL of DMEM for 1, 3, and 7 days to obtain sealers' eluates. For cytotoxicity assay, MG-63 and human gingival fibroblasts at a density of  $1 \times 10^4$  cells in 100 µL of DMEM were incubated with eluates. Cell metabolism was evaluated by WST-1 assay and the data were analyzed statistically by Kruskal-Wallis test and Tukey-Kramer test. For cell adhesion assay, disc specimens (6mm diameter, 2mm thickness) were fabricated from EndoSeal and AH Plus. MG-63 and human gingival fibroblasts were seeded on the discs, and after overnight incubation, cell morphology and cell adhesion were examined by scanning electron microscopy.

**III. Results:** All root canal sealers tested were very cytotoxic on day 1. AH Plus showed a gradual decline in cytotoxicity against MG-63, while EndoSeal demonstrated a gradual reduction in cytotoxicity against both MG-63 and human gingival fibroblasts. Sealapex retained high cytotoxic activity throughout an observation period on both cells. Both cells on EndoSeal were much larger, flattened with rough cell margins compared to those on AH Plus under SEM examination.

**IV. Conclusion:** EndoSeal demonstrated the lowest cytotoxicity on MG-63 and human gingival fibroblasts compared to AH Plus and Sealapex.

### Ryan Jin-Young Kim

Department of Conservative Dentistry,  
Seoul National University Dental Hospital  
275-1 Yeongseon-Dong, Jongno-Gu, Seoul, Korea  
ryankim05@gmail.com



## A Micro-Computed Tomography Study of Canal Configurations of Maxillary First Molar Mesiobuccal Root with Multiple Canals

○Seok Woo Chang<sup>1\*</sup>, Kee Yeon Kum<sup>2</sup>

<sup>1</sup>Center for Health Promotion, Samsung Medical Center, Sungkyunkwan University School of Medicine, Seoul, Korea

<sup>2</sup>Department of Conservative Dentistry, Dental Research Institute and BK21 Program,  
School of Dentistry and Seoul National University, Seoul, Korea

### I.Object:

Detailed information of complex anatomical configuration of mesiobuccal (MB) root is essential for successful endodontic treatment in maxillary first molars. The aims of this study were to investigate the configuration types present in multiple-canaled MB roots of maxillary first molars using micro-computed tomography ( $\mu$ CT) and to evaluate whether current configuration classifications are needed for additional modification for in-depth morphology study of MB root canal system.

### II. Materials & Methods:

One hundred and fifty four extracted human maxillary first molar MB roots were scanned by  $\mu$ CT (Skyscan) and their canals were reconstructed by three-dimensional modeling software. Root canal configurations were categorized according to the classifications proposed by Weine and Vertucci. Canal configurations that did not fit into two classifications were categorized as non-classifiable.

### III. Results:

One hundred and thirteen (73.4%) MB roots had multiple canals. The most predominant canal morphology had 2 orifices and two foramens. Thirty-three (29.2%) and twenty (17.7%) MB roots had configuration types that were non-classifiable according to the Weine and Vertucci classification, respectively.

### IV.Conclusion:

The present  $\mu$ CT study confirms the complexity of MB canal anatomy of the maxillary first molar and suggests that additional modification of current configuration classifications may be needed to more accurately reflect the morphology configurations of MB roots.

### Kee Yeon Kum

Department of Conservative Dentistry,  
Dental Research Institute and BK21 Program,  
School of Dentistry and Seoul National University  
28-2 Yeongeon-Dong, Chongno-Ku Seoul 110-749, South Korea  
Tel.: (82) 2-2072-2656  
Fax: (82) 2-2072-3849  
E-mail: kum6139@snu.ac.kr

## Shaping ability of WaveOne Single File Reciprocating Technique using Micro-Computed Tomography

○Yeonjee Yoo\*, Sung-Yeop You, Woocheol Lee, Seung-Ho Baek

Department of Conservative Dentistry, School of Dentistry, Seoul National University, Seoul, Korea

### Abstract

Introduction: The single file Nickel-Titanium (NiTi) rotary instrumentation technique using reciprocating motion has been gaining concern; however, there is limited information on the shaping quality of this technique. Therefore, the purpose of this study was to evaluate the shaping ability of the WaveOne single file technique in curved canals by using a micro-computed tomography (micro-CT). Method: Twenty canals from 20 extracted maxillary molars were used. The canals were prepared with reciprocating motion by using WaveOne Primary files (n=20). All teeth were scanned before and after the instrumentation using the micro-CT system with an isotropic resolution of 16 $\mu$ m. Changes in Structure Model Index (SMI), curvature, root canal volume, surface area and degree of transportation were measured from the cross-sectional images of the prepared canals. Results: The straightening value of WaveOne was  $27.30 \pm 10.91$  % and the transportation values were -0.26, -0.03, 0.06, and 0.07 at 1mm, 2mm, 3mm, and 5mm level, respectively.. Conclusion: The single file technique using the reciprocating motion did not result in an increased apical transportation in curved canals. WaveOne reciprocating file might be safely used in the curved canals without worrying of canal transportation.

### Yeonjee Yoo

Fellow

Dept. of Conservative Dentistry

Seoul National University Dental Hospital

School of Dentistry, Seoul National University

101 daehak-ro, Jongno-gu, Seoul, 110-768, Korea

dusw0808@hanmail.net

## **Biocompatibility of various pulp capping materials for dentin regeneration**

○Bin-Na Lee\*, Hoon-Sang Chang, In-Nam Hwang, Won-Mann Oh, Yun-Chan Hwang

*Department of Conservative Dentistry, School of Dentistry, Chonnam National University, Gwangju, Korea*

**I. Object:** The purpose of this study was to compare the cytotoxicity of GIC, IRM, ProRoot MTA and Ortho MTA using XTT assay and scanning electron microscopic (SEM) examination. This study was designed to evaluate the clinical feasibility of various pulp capping materials.

**II. Materials & Methods:** This study was carried out using MG-63 cells derived from a human osteosarcoma. In order to quantitatively evaluate the cytotoxicity of test materials, XTT assay was used. The cells were exposed to the extracts and incubated. Cell viability was recorded by measuring the optical density of each test well in reference to controls. Each specimen was examined by scanning electron microscopy for observing the cell morphology.

**III. Results:** XTT assay demonstrated that cell viability of ProRoot MTA was higher than that of GIC and Ortho MTA at all time points. IRM showed significantly lower cell viability than the other groups at all time points. The SEM analysis revealed that elongated, dense, and almost confluent cells were observed in the cultures of GIC, Ortho MTA and ProRoot MTA specimens. On the contrary, cells on the surface of IRM were round in shape and the number and the density of the cells was much smaller than that in the other groups.

**IV. Conclusion:** ProRoot MTA and GIC showed good biocompatibility in this study. However, Ortho MTA showed lower biocompatibility compared to ProRoot MTA and GIC. In order to improve the biocompatibility of Ortho MTA, further studies are needed to evaluate its clinical use.

**Bin-Na Lee**

Department of Conservative Dentistry, School of Dentistry, Chonnam National University  
Young-bong ro 33, Bukgu, Gwangju, Korea, 500-757  
wishwishu@gmail.com

## The effect of capping material and clinical factors on the success of direct pulp capping

○Jae-hoon Jung\*, Il-young Jung

*Department of Conservative Dentistry, Yonsei University, Seoul, Korea*

### **I. Object:**

1) Survival rate of direct pulp capping, 2) Effect of Dycal and MTA as a pulp capping agent on success, 3) Effect of preoperative symptom, patient age, tooth position, kind of temporary filling material, class of cavity, type of final restoration and so on in carious exposure cases in department of conservative dentistry, Yonsei university.

### **II. Materials & Methods:**

187 direct pulp capped cases were collected done in Yonsei dental hospital from November, 2007 to October, 2010. Using Kaplan-Meier method, survival rate was calculated and by Log rank test and Breslow test univariate analysis was done to know the effect of various factors on success at  $p < 0.05$  level. Multivariate analysis was done by Cox's proportional hazard regression analysis.

### **III. Results:**

Survival rate of direct pulp capping was 73% after 1 year and 67% after 2 years. MTA represented slightly better results but there was no statistically significant difference. Preoperative symptom, patient age, class of cavity and type of final restoration were factors that have significant difference on survival rate of direct pulp capped teeth ( $p < 0.05$ ). Younger patient was more related to success. Class 2 cavity was more related to failure than class 1 cavity in posterior teeth. There was more failure if there's no final restoration or full veneer crown was done.

### **IV. Conclusion:**

Careful case selection must be done first and though consideration about factors that may affect success or fail of direct pulp capping, maybe we can get higher survival rate.

### **Jae-hoon Jung**

Resident, Department of Conservative Dentistry, Yonsei University

50 Yonsei-ro, Seodaemun-gu, Seoul

120-752, Korea

266748@yuhs.ac

## Preoperative and In-treatment Factors for the Prognosis of Intentional Replantation

○Sin-Yeon Cho\*, Seung-Jong Lee

*Microscope Center, Department of Conservative Dentistry, Yonsei University, Seoul, Korea*

**I. Object:** The purpose of this study was to evaluate the preoperative and in-treatment factors that affect the prognosis of the intentional replantation. In addition, the success rate of intentional replantation treated with modern biocompatible materials and microscopic surgical techniques was examined.

**II. Materials & Methods:** The treatment data were collected from 139 cases of patients with a history of intentional replantation performed by two operators between March 2000 and July 2010. All cases had at least one year of follow-up before being evaluated. Pre-operative and in-treatment factors were recorded. The relationship between the pre-operative and in-treatment factors and the treatment outcomes was evaluated by bivariate analyses (chi-squared or Fisher exact tests).

**III. Results:** The overall success rate within the experimental period was 64.8% (90/139). Cases with purely endodontic factors showed a success rate of 78.3% (47/60). Cases with perio-related factors showed a success rate of 54.4% (43/79). In the cases with root defects, teeth with cervical defects and furcation defects had higher success rates than those with sub-alveolar and through-alveolar root defects ( $p < 0.05$ ). With regard to the periodontal factors, teeth with 0 or 1 pre-existing pocket over 6 mm had a high success rate (80% and 75%, respectively), but teeth with two or more pockets had a low success rate (19.1%) ( $p < 0.05$ ). In cases with purely endodontic factors, age under 30 years and the MTA retro-filled cases showed significantly more failures ( $p < 0.05$ ).

**IV. Conclusion:** Intentional replantation is a promising procedure provided that the correct indications are applied. Teeth with two or more deep periodontal pockets or with through-alveolar defects should be re-considered for intentional replantation.

**Seung-Jong Lee**

Microscope Center, Department of Conservative Dentistry,

Yonsei University

50 Yonsei-ro, Seodaemun-gu, Seoul

120-752, Korea

sjlee@yuhs.ac

## Treatment of 2nd mandibular molar presenting with Periapical Cemental Dysplasia: A case report

○Eung-kyung Lee\*, Dong-hoon Shin, Yong-bum Cho

*Department of Conservative Dentistry, Dankook University, Cheonan, Korea*

### I. Introduction:

Periapical cemental dysplasia (cementoma; periapical osteofibrosis) is a lesion of rather common occurrence. The etiology of the lesion is not known, although it has been suggested that mild chronic trauma; however this is controversial.

Periapical cemental dysplasia is most commonly described as occurring in mandibular anterior teeth, and occasionally in mandibular molars, of black females over the age of 20. The lesions are almost always asymptomatic and are associated with vital teeth. Intraorally, yellowish bone-like material may be present, protruding through the oral mucosa and communicating with the oral cavity. This perforation will often result in a low-grade secondary infection, ultimately causing the patient to become symptomatic. Area of the jaw may undergo expansion.

Unless symptoms are noted, management consists of making a diagnosis and then periodic clinical and radiographic examinations to reconfirm the diagnosis. Once a patient has become symptomatic, treatment of secondary infection is very difficult, and antibiotics are not effective.

### II. Case Presentation:

1. Sex/Age : F/40
2. Chief Complain (C.C) : Discomfort during biting on lower left molar  
Referred from Dept. of Oral and Maxillofacial Surgery
3. Past Dental History (PDH) : Am. Restoration on # 37, 47 about 7years ago  
Crown restoration on #46 about 2years ago
4. Present Illness (PI) : per(-), cold(+), mob(-), EPT(+), bite(+, dull & lingering pain), Normal pocket depth on #37  
Radiopaque periapical lesion with a thin radiolucent border on #37 distal root
5. Impression : Secondary caries (?), Periapical osseous-fibrous lesion  
R/O Periapical cemental dysplasia
6. Treatment Plan : (1) ZOE sedation & Resin restoration or Non-surgical RCT or Surgical enucleation  
(2) Periodic follow-up check

### III. Discussion:

In endodontics, the periradicular diagnosis of cemental dysplasia can be difficult. Proper pulpal testing is critical. The periapical presentation of this disorder can be easily misinterpreted as pathological, and this may lead to unnecessary treatment.

The significance of this case lies in the fact that there was symptomatic lesion. Root canal treatment was planned for relieving the pain. After root canal treatment performed, the patient's chief complaint was resolved. In fact, a pathologic lesion was probably not present because of the status of the pulp at the time of the treatment.

However, if a subsequent lesion does develop because of recontamination, it will be based on the patient's presenting symptoms and CBCT. If previous endodontic treatment has been performed and a sinus tract is noted, further evaluation and surgical intervention must be given, because it may not be related to periapical involvement.

### Eung-kyung Lee

Resident

Dept. of Conservative Dentistry

Dankook University Dental Hospital

School of Dentistry, Dankook University

Dandaelo 119, Dongnamgu, cheonan, Chungnam, Korea (South)

Tel; +82-41-550-1961

monjicon@gmail.com

## Hemisection of mandibular molars : two cases

○Soo-jung Park, Dong-hoon Shin

*Department of Conservative Dentistry, Dankook University, Cheonan, Korea*

### I. Introduction:

Hemisection of a mandibular molar may be a suitable treatment option when the severe damage is restricted to one root and the other root is healthy. This procedure represents a form of conservative dentistry, aiming to retain as much of the original tooth structure as possible. This report describes and illustrates cases in which the mesial or distal root was part of a fixed prosthesis.

### II. Case Presentation

<Case1>

1. Sex/age : F/56
2. Chief Complaint (C.C) : gingival swelling and pus discharge on #47 (referred from Dept. of Periodontics)
3. Past Dental History (PDH) : previously root canal treatment on #47
4. Present Illness (P.I) : buccal fistula(+), mob(-), bite test(+), J-shaped alveolar bone loss on #47
5. Impression : Vertical root fracture on mesial root of #47
6. Tx plan : re-RCT, hemisection of mesial root on #47, bridge on #46-47

<Case2>

1. Sex/age : F/60
2. Chief Complaint (C.C) : “I have felt discomfort on lower right molar area”
3. Past Dental History (PDH) : previously root canal treatment on #46, 47 (7~8 years ago)
4. Present Illness (P.I) : pus discharge, mob(-) on #46
5. Impression : Chronic apical periodontitis on distal root of #46  
Severe alveolar bone resorption on distal root of #46
6. Tx plan : Hemisection of distal root on #46, bridge on #46-47

### III. Conclusion

Hemisection allows for physiologic tooth mobility of the remaining root, which is thus a more suitable abutment for fixed prosthesis than an osseointegrated counterpart. Hemisection may be a suitable alternative to extraction and implant therapy and should be discussed with patients during consideration of treatment option. And the prognosis will be predictable if certain basic considerations (such as patient's oral hygiene status, caries index, medical status, accessibility of root furcation and bone support) are taken into account.

### Soo-jung Park

Resident

Dept. of Conservative Dentistry

Dankook University Dental Hospital

School of Dentistry, Dankook University

Dandaelo 119, Dongnamgu, cheonan, Chungnam, Korea (South)

Tel; +82-41-550-1961

**Long-term follow up after endodontic microsurgery:  
The changing patterns between one year and over four years' follow up**

○Taekjin Nam\*, Minji Kang, Jaehoon Jung, Euseong Kim

*Microscope Center, Department of Conservative Dentistry, Yonsei University, Seoul, Korea*

**I. Object:** The aim of this study is to examine and compare the post-surgical results of the endodontic microsurgery under two time frames, one-year follow up, and over four years after the surgery. We analyzed patterns of stability, healing, deterioration, and the causes of failure of microendodontic surgery.

**II. Materials & Methods:** The clinical database of the Department of Conservative Dentistry at the College of Dentistry, Yonsei University in Seoul, Korea, was searched for patients with a history of endodontic microsurgery performed from 2004 to 2007 and evaluated clinically and radiographically at the point of one-year and over four years after endodontic microsurgery. Evaluations were performed using the Molven criteria.

**III. Results:** Among the 550 cases with endodontic microsurgery, 103 cases were included in this study. Of the 92 cases classified as success at one-year, 89 cases (96.7%) remained so, whereas 3 cases (3.3%) regressed to failure at long-term follow up. Conversely, of 11 cases regarded as failure at one-year, 3 cases (27.3%) progressed to success group. After long-term follow up, the failure group after one-year follow up did not become more healed or deteriorative than the success group.

Of the 11 cases classified as failure, 8 cases were evaluated as failure after one-year follow up. Three cases that were evaluated as complete healing at one-year follow up by Molven criteria were extracted. Of these 3 cases, 2 cases were extracted because of vertical root fracture; the other case was extracted because of prosthetic problem.

**IV. Conclusion:** In spite of limitations, through this study, we were able to conclude that long-term outcomes of endodontic microsurgery can be predicted by one-year outcomes.

**Euseong Kim**

Microscope Center, Department of Conservative Dentistry,  
Yonsei University  
50 Yonsei-ro, Seodaemun-gu, Seoul  
120-752, Korea  
andyendo@yuhs.ac



## Periapical status related to the quality of coronal restorations and root fillings in Korean population

○Ji-Hyun Jang\*, Mina Park, Euseong Kim

*Microscope Center, Department of Conservative Dentistry, Yonsei University, Seoul, Korea*

**I. Object:** The purpose of this study was to evaluate the relationship of the quality of the coronal restoration and of the root canal obturation on the radiographic periapical status of endodontically treated teeth in Korean population.

**II. Materials & Methods:** Full-mouth radiographs and periapical radiographs from new patients at Dental Hospital of Yonsei University College of Dentistry were examined. A total of 1030 endodontically treated teeth restored with a full veneer crown type restoration were evaluated by two independent examiners. The quality of endodontic and the periapical status of endodontically treated teeth were evaluated by radiographic criteria. The quality of coronal restorations of endodontically treated teeth were evaluated by radiographic criteria and by reviewing the intraoral examination records as well. Each root filling was categorized as good (GE) or poor (PE), and coronal restoration was categorized as good (GR) or poor (PR). The periapical status was categorized as "absence of periradicular inflammation" (API) or "presence of periradicular inflammation" (PPI).

**III. Results:** The API rate for all endodontically treated teeth was 59.1%. Both qualities of the endodontic filling and coronal restoration affected significantly the periapical status and there is no significant difference in the odds of API between 2 parameters. The difference of API rate of the group with good endodontic filling (GE, 75.5%) and the group with poor endodontic filling (PE, 50.1%) was statistically significant. The difference of API rate of the group with good restoration (GR, 65.3%) and the group with poor restoration (PR, 45.7%) was statistically significant. API of the GE+GR group (82.3%) was statistically significantly different from other three groups (GE+PR, 56.3%, PE+GR, 54.7%, PE+PR, 41.2%), and API of the PE+PR group was statistically significantly different from GE+PR and PE+GR.

**IV. Conclusion:** A periapical health of endodontically treated teeth depends on both the quality of the endodontic treatment and of the coronal restoration in Korean population.

### **Euseong Kim**

Microscope Center, Department of Conservative Dentistry,  
Yonsei University  
50 Yonsei-ro, Seodaemun-gu, Seoul  
120-752, Korea  
andyendo@yuhs.ac

## Continuing root formation following apexification : a case report

Department of Conservative dentistry, KooAllDam Dental Hospital, Incheon, Korea  
○Kyoung Ae Choi\*, Jung-Hwan Seol, Kisoo Chung

### Introduction

Endodontic treatment options for an immature tooth with pulp necrosis consist of apexification, apical barriers or revascularization. And apexification is defined as a method to induce a calcified barrier in a root with an open apex or the continued apical development of an incomplete root in teeth with necrotic pulp.

Following apexification case shows a rare follow-up result which shows the repair potential of a immature tooth and the capacity for continued root development even after endodontic instrumentation of the root canal

### Case Presentation

An 11 year old boy had a complaint of severe spontaneous pain on his right lower area and he said he didn't sleep last night because of pain.

Clinically, there was fractured dens evaginatus on mandibular right 2<sup>nd</sup> premolar.

Electronic Pulp Testing, cold test and mobility test was negative and severe pain on percussion.

It could be speculated that the cause of pulp necrosis was bacterial infection through fractured dens evaginatus and It was diagnosed as pulp necrosis with symptomatic apical periodontitis.

Apexification was planned. This approach was followed intracanal medicament of calcium hydroxide.

The calcium hydroxide was replaced every 2 to 3 months as a routine until the apex was closed.

Root-end closure was determined by gently probing beyond the established working length with an endodontic file.

8 months after the first appointment, Root canal obturation was performed with gutta percha.

A follow up for a period of 41months revealed additional root formation and apical closure.

### Conclusions

In the present case, continued normal root formation was seen.

For immature tooth, possible reasons for further root development even after endodontic instrumentation are that although the root canal was instrumented, some odontoblasts and pulp cells may have been left intact. And it also may be associated with the maintenance of HERS (hertwig's epithelial root sheath) integrity.

### Kyoung Ae Choi

Dept. of Conservative Dentistry,

KooAllDam Dental Hospital

Bupyong 1 Dong, Bupyong Gu, Incheon, 463-011, Korea

Tel; +82-32-528-6030, Fax; +82-32-511-5344

jessy55@daum.net

## Nonsurgical endodontic treatment of the tooth associated with a large periradicular lesion using MTA

○Young-Sang Song\*, Hoon-Sang Chang, Yun-Chan Hwang, In-Nam Hwang, Won-Mann Oh

*Department of Conservative Dentistry, School of Dentistry, Chonnam National University, Gwangju, Korea*

**I. Object:** An ideal endodontic repair material should seal the pathways of communication between the root canal system and its surrounding tissues. In addition, it should be nontoxic, noncarcinogenic, nongenotoxic, biocompatible, insoluble in tissue fluids, and dimensionally stable. Mineral trioxide aggregate (MTA) satisfies these conditions. The following cases describe the nonsurgical endodontic retreatment of a tooth associated with a large periradicular lesion and treated with a triple antibiotic paste for disinfection and MTA as an apical plug.

### II. Cases

#### Case 1

1. Sex/age : M/10,
2. Chief Complaint(C.C) : Referred from L/C for RCT on #22
3. Past Dental History(PDH) : Amalgam filling on #14,15,16,24,25,26,34,35,36,44,45,46
4. Present Illness(P.I) : #22 P/R (-), Mo (+), sinus tract(+)
5. Impression : Radicular cyst a/w #22 with immature root
6. Tx plan : Nonsurgical endodontic treatment with triple antibiotics and MTA on #22

#### Case 2

1. Sex/age : M/12,
2. Chief Complaint(C.C) : Pain of right maxillary incisor (fall down trauma 1 year ago)
3. Past Dental History(PDH) : Resin filling on #11 (1 years ago, L/C)
4. Present Illness(P.I) : #11 P/R (+), Mo (+), Air(+), Cold(+)
5. Impression : Radicular cyst a/w #11, 22 with immature root (involving apex of #12)
6. Tx plan : Nonsurgical endodontic treatment with triple antibiotics and MTA #11,12

**III. Conclusion:** The success of nonsurgical endodontic treatment is based on appropriate cleaning, shaping, antisepsis, and filling of the root canal. MTA has a variety of potential uses, including as a material of root canal obturation. It has superior biocompatibility with periodontal tissues, excellent sealing ability in the presence of moisture, and appropriate mechanical properties as an apical sealing material.

### Young-Sang Song

Department of Conservative Dentistry, School of Dentistry, Chonnam National University  
Yongbong-ro33, Bukgu, Gwangju, Korea, 500-757  
sys0925@hanmail.net