Development of diffusion pathway in the initial enamel caries lesion

by acid buffered solution

Yun-jung Song*, Byungduk Roh, Chanyoung Lee+

Department of Conservative dentistry, The Graduate School, Yonsei University

Abstracts

I. Objective: Carious lesions occur within the dentition in a very characteristic pattern. Initial caries of the enamel surface at stages preceding subsurface demineralization resulted in partial dissolution of the outer microsurface. These experiment suggested that there may be a very early stage where the enamel surface is opened up by acid attack. For this reason we produced enamel artificial caries lesion, to examine in the SEM the ultrastructural surface change and crystal level at early initial caries lesion in enamel.

II. Materials & Methods: In this study, enamel specimens were demineralized artificially by lactic acid buffered solution. Images were taken by a polarizing microscope and SEM in periods of 1, 2, 4, 8, 12, 24, 48 hours. Specimens, being divided into 4 groups, were immersed in lactic acid buffered remineralization solutions with different pH, lactic acid for 5, 10 days. Surface changes were observed by SEM and measured by EMS.

III. Results: The initial caries on the enamel surface occurs in the perikymata and in the enamel rod around it. The diffusion pathway in the enamel rod occurred by increasing the intercrystalline space between the enamel rod and interred enamel. Hydroxyapatite crystals were dissolved through the diffusion pathway as decalcification proceeded. They combined with each other and formed a cluster or new crystal. While the diffusion pathway was maintained in the low pH experimental groups due to decalcification and remineralization, the diffusion pathway was lower in the high pH experimental groups due to remineralization.

IV. Conclusion: The diffusion pathway in the initial enamel caries occurred by increasing the intercrystalline space between the enamel rod and interred enamel. Hydroxyapatite crystals were dissolved through the diffusion pathway combined with each other and formed a cluster or new crystal. The diffusion pathway was more increased in the low pH groups than in the high pH groups because of simultaneously being occurred decalcification and remineralization.

Yun-jung Song

Department of conservative dentistry, Yonsei university
chanyoungl@yuhs.ac
Hallym university
ss-y-j@hanmail.net
235-1 chungyangri-dong dongdaemungu
Seoul, korea
Caries protective effect of three desensitizing agents on root dentin

Subjin Sohn*1, Ho Hyun Son1, Juhea Chang2

1Department of Conservative Dentistry and Dental Research Institute, School of Dentistry, Seoul National University, Seoul, Korea
2Clinic for Persons with Disabilities, Seoul National University Dental Hospital, Seoul, Korea

Abstracts

I. Objective:
This study aimed to evaluate the caries-protective effect of three desensitizing agents and to determine the prolonged efficacy of the materials.

II. Materials & Methods:
Thirty human premolars were sectioned into quarters, and each quarter root surface was coated with one of commercial desensitizing agents (Gp 1; no treatment, Gp 2; Varnish XT, Gp 3; Seal & protect, Gp 4; Clearfil Protect Bond). Each 10 specimens were stored in water for 1 day, 30 days, 60 days, respectively, and subjected to pH cycling. Scanning electron microscopy was used to determine the demineralization bands created in the subsurface layer. Electron probe microanalysis determined the weight percentages of Ca loss in the demineralized layer. The fluoride release from the desensitizer-coated root dentin was measured in each group.

III. Results:
Without treatment, in the demineralized layer, 69.94 ± 10.04 % of Ca loss occurred from pH cycling, and the average lesion width was 13.97 ± 4.44 µm. No demineralization occurred in other groups. All three desensitizers remained intact until 60 days. Fluoride release from glass ionomer varnish was significantly higher than other adhesive-based agents (p<0.05).

IV. Conclusion:
Root surface coated with three desensitizing agents were resistant to acid challenge. Caries-protective effect of the materials seemed to be from physical barrier formation rather than fluoride releasing capacity.

Suhjin Sohn
Department of Conservative Dentistry and Dental Research Institute, School of Dentistry, Seoul National University
Yeongeon-Dong, Jongno-Gu, Seoul 275-1
sohnsj74@hanmail.net
Effect of water on phase separation phenomenon of two-step total etching system

Kim, Sun-Jae*, Min, Jeong-Bum

Department of Conservative Dentistry, Chosun university, Gwang-ju, Korea

Abstracts

I. Objective:
The objective of this study was to investigate on phase change of two step total etching system by water.

II. Materials & Methods:
Three commercial two-step total etching adhesives-OptiBond Solo Plus (OPB), Single Bond Plus(SB) and Excite(EX) were used. Three adhesives were mixed with 1, 2, 3, 4 and 5 $\mu l$ distilled water(d/w) respectively. Control group was not mixed with d/w. After mixing(10s) and air-drying(30s), these samples were observed under light microscope(LM) for examination of phase change. 10 consecutive drops of adhesives were deposited on slide glass. Images were captured immediately after deposition with Standard goniometer(ramé-hartinstrumentco.,Netcong,USA). The DROPimage Advanced software(ramé-hartinstrumentco.,Netcong,USA) provided the value of contact angle. The amount of volatile part in adhesives was determined by a precision balance(OHAUS Co., 19A Chapin Road, Pine Brook, NJ 07058 USA).

III. Results:
In LM examination, OPB and Ex were observed with phase changes, but SB was not. The contact angles of OPB and Ex were higher than SB. There were no significant differences among these three experimental groups. Due to hydrophobicity of OPB and EX, they showed the phase change in less wet condition.

IV. Conclusion:
OptiBond Solo Plus and Excite are expected to be more sensitive to over-wet condition in wet bonding technique.

Kim, Sun-Jae
Department of Conservative Dentistry
Chosun university
412 Seo-Seok dong, Dong-gu, Gwang-ju,
501-825, Korea
goldwire0070@gmail.com
The effect of dentin powder and light-cure time on the degree of conversion of a self-etching adhesive

Pil-Jong Kim, Ho-Hyun Son, Byeong-Hoon Cho*

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

Abstracts

I. Objective: Self-etching adhesives are widely used in modern adhesive dentistry due to their convenience. However, initial degree of conversion (DC) is low due to reaction between acidic self-etching monomers and basic amine activators. This study investigated the hypothesis that the DC of self-etching adhesives be increased in vivo because of neutralization of self-etching adhesives by dentin. The objective of this study was to evaluate the effect of the amount of dentin powder, light-curing time, and agitation time on the polymerization of a self-etching adhesive.

II. Materials & Methods: Dentin powder was obtained by grinding extracted teeth and used in dry powder form. According to each variable, such as the amount of dentin powder, light-curing time, or agitation time of the adhesive with dentin powder, the DC of Adper Prompt (3M ESPE, USA) was measured using FT-IR spectrophotometer, immediately after curing, and at 48 hours after curing.

III. Results: The amount of dentin powder affected the initial degree of conversion (p < 0.05) and have a positive correlation (r =0.840, p = 0.001), but there was no significant difference in the degree of conversion at 48h after curing. Light-curing time affected the degree of conversion measured both immediately and at 48h after curing (p < 0.05) and have positive correlations with both of them (immediate, r =0.806, p = 0.002; at 48h, r = 0.779, p = 0.003). The agitation time of the adhesive with dentin powder did not affected to the degree of conversion of the self-etching adhesive.

IV. Conclusion: When a self-etching adhesive is used for dentin bonding, it would be better to light-cure for a longer time than the recommendation by manufacturer for obtaining better polymerization.

Byeong-Hoon Cho
Department of Conservative Dentistry
Schoo of Dentistry
Seoul National University
28 Yeongeon-dong, Jongro-gu, Seoul
110-749, Korea
chobh@snu.ac.kr
Effect of various solutions on discoloration of nanocomposite resins

Jeong-Kil Park*, Chul-Kyu Choi, Bock Hur, Hyeon-Cheol Kim, Yong Hoon Kwon

Department of Conservative Dentistry, Pusan National University, Yangsan, Korea

Abstracts

I. Objective: The purpose of this study was to test the effect of staining solutions on the discoloration of dental nanocomposite resins that have various shades.

II. Materials & Methods: Three different nanocomposite resins (Ceram X, Grandio, Z350) were chosen, and filled in a metal ring mold (height: 2 mm, inner diameter: 8 mm). The top and bottom surfaces were covered with a thin glass slide, light polymerized for 40 seconds under 1000 mW/cm² condition, and then aged for 24 hours at 37 degree in a chamber. After 24 hours, the initial color of specimens was measured using a spectrophotometer under the %R (Reflectance) mode. After that, specimens were immersed in 4 different test solutions (distilled water (DW), coffee (CF), 50% ethanol (50ET), and green tea-brewed (GT)) 7 hours/day for 3 weeks. After that, the second %R measurement was performed. Based on the CIEL*a*b* color coordinate values from the %R, color difference ($\Delta E^*$) was obtained. The calculated $\Delta E^*$ values were statistically analyzed by a 2-way ANOVA at a significance level of 0.05.

III. Results: After being immersed for 3 weeks, specimens immersed in DW, 50ET, and GT showed a slightly increased the $L^*$ value regardless of product and shade. CF decreased the $L^*$ value and increased the $b^*$ value in specimens. DW, 50ET, and GT induced perceivable (noticeable) color change. On the other hand, CF induced marked (appreciable) color change ($\Delta E^*$: 3.1~5.6) in most specimens.

IV. Conclusion: Coffee induced an unacceptable range of color change in dental nanocomposite resins. To prevent or reduce such discoloration, a gentle brushing after taking coffee is needed to minimize the adsorption of brown colorant on the surface.

Jeong-Kil Park
Department of Conservative Dentistry
School of Dentistry
Pusan National University
3-3, Beomeo-Ri, Mulgeum, Yangsan, Gyeongnam
**In vitro** measurement of the mechanical properties of resin infiltrant: Penetration pattern, Viscosity, Surface roughness, Microhardness

Seung-Hyun Hong *, Mi-Kyung Yu, Kwang-Won Lee

Department of Conservative Dentistry, School of Dentistry, Chonbuk National University

**Abstracts**

I.**Objective:** White spot, considered to be early caries lesion, has been shown to be associated with increased enamel porosity. Instead of removing porous dental hard tissue at a later stage of disease progression, "filling" microspaces of the lesions at a much earlier stage of development has been considered.

In this study, we evaluated the viscosity of resin infiltrant and several adhesives (Scotchbond Multi-Purpose, Clearfil SE bond, All-bond 2, All-bond 3). We observed the penetration of the resin infiltrant into natural initial caries by SEM and CLSM, and measured the surface roughness and the microhardness on permanent teeth before and after applying resin infiltrant into initial enamel caries.

II.**Materials & Methods:** The viscosity measurements of resin infiltrant and adhesives were performed using a cone-plate viscometer. And extracted human teeth showing white and brown spot lesions with applying resin infiltrant(with or without fluorescence dye) were cut across the lesion perpendicular to the surface and these were observed by SEM and CLSM. Twenty extracted teeth showing initial lesions were collected and evaluated the surface roughness of initial caries with and without applying resin infiltrant. Ten extracted teeth showing initial lesions were collected, cut across the lesions perpendicular to the surface and evaluated the microhardness of initial caries before and after applying resin infiltrant.

III.**Results:** The viscosity (cP) was observed for resin infiltrant(623.34), Clearfil SE bond(713.92), and All-bond 3(1800.12). An application procedure of resin infiltrant increased the surface roughness and the microhardness insignificantly ($p>0.05$), when compared to non-applicated specimens.

IV.**Conclusion:** Resin infiltrant which is easy to penetrate into initial caries lesion had low viscosity. Resin infiltration did not have surface smoothening effect after its application. Therefore, it had to be polished. And resin infiltration made early caries lesions harder, insignificantly. Accordingly, resin infiltration did not seem to have hardening effect.

Seung-Hyun Hong
Department of Conservative dentistry
School of Dentistry
Chonbuk National University
664-14 1ga, Deokjin-Dong, Jeonju-City, Jeonbuk,
561-756, South Korea
endo@chonbuk.ac.kr
The analysis of the heat of polymerization generated from composite resin curing according to the curing mode of lighting unit

Ji-Youn Kang*, Su-Hi Go, Kyu-Jeong Cho, Won-Mann Oh, Yun-Chan Hwang, In-Nam Hwang

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

Abstracts

I. Objective: This study was aimed to measure the heat of polymerization, generated when polymerizing resin composite, in various curing modes of halogen and LED light-curing units and to examine the relationship among polymerization, curing depth, curing light intensity, and mode of polymerization.

II. Materials & Methods: In each of rectangular Teflon and ceramic blocks, a class II cavity-like cavity, 5 mm x 5 mm x 4 mm in dimension, was formed. The cavity wall of the ceramic block was treated with hydrofluoric acid, silane, and bonding agent. The proximal side of the cavity was covered with cover glass, and a shield was placed on top of it. Each cavity were filled with flowable composite resin AELITE FLO (Bisco, Schaumburg, IL, USA) and then cured in various curing modes for 20 seconds with the halogen (Optilux 501) and LED(Dr’s Light) light-curing units, 1 mm apart from the block. During and after the curing, temperature was measured with an infra-red thermography camera at 10 spots for every 0.2 seconds for each spot for 40 seconds. 5 out of the 10 spots were assigned in the periphery of the cavity, while another 5 were assigned in the center.

III. Results: The temperature was the highest at the spot that was 2 mm deep, followed by the 1 mm-deep spot. Except for the soft-start and pulse soft-start modes, the temperature was the highest from 9 to 11 seconds for the LED unit. The temperature was the highest at the center in the same depth. The temperature was relatively low at the spots where the sample was bonded to the cavity.

IV. Conclusion: There was no difference in temperature rise between halogen and LED curing units if the light intensity was similar. For the same unit, the temperature rose higher in the mode of greater light intensity than in the mode of less light intensity.

Ji-You Kang
Department of Conservative Dentistry, School of Dentistry, Chonnam National University
300 Yongbong-dong, Buk-Gu, Gwangju
530-5628, Korea
newview1@hanmail.net
The change in color and opacity by degree of conversion of the light curing resin

Su-Hee Go*, Ji-youn Kang, Jin-Ah Kim, Su-Jung Park, Won-Mann Oh, Yun-Chan Hwang, and In-Nam Hwang

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

Abstracts

I. Objective: In this study, we measured the change of color and translucency and Vickers hardness of composite resin during polymerization and analyzed correlation among them.

II. Materials & Methods: We used Filtec Z250 and Vitalescence, and shades A1 and A3 were prepared, respectively. Four specimens were fabricated for each shade. The color (CIE L*, a*, b*), opacity, and Vickers hardness of the resins were measured before their polymerization. The measurements were made again for every 10 seconds during 60-second curing. The values were re-measured after additional curing of the resins with UnixXS after 120-second curing and after following 2-week storage at room temperature.

III. Results: Immediately after the curing, the L* values of the resins substantially decreased, and then leveled off. The b* values initially decreased, then soared at the additional polymerization, and then decreased again. The a* values initially increased but then leveled off for the Vitalescence group and increased slightly at the additional curing for the Z250 group. The opacity decreased significantly after 10-second polymerization (P<0.01), then showed no great change, then decreased at the additional polymerization, and increased after the 2-week storage. High correlation between Vickers hardness and a* and b* values were found (R>0.8).

IV. Conclusion: The results suggest that a* and b* could be used as a measurement for evaluating the degree of conversion and that shade guide should be fabricated in accordance with the color of resin after certain time period or from the same material.

Su-Hee Go
Department of Conservative Dentistry
School of Dentistry, Chonnam National University
300 yongbong-dong, Buk-gu, Gwangju
530-5628, Korea
Gosh77@hanmail.net
The evaluation of canal curvature at merging point in Type II mesial canals of mandibular molars

Yun, Hye-Rim *, Ho-kek Hwang,

Department of Conservative Dentistry, Chosun university, Gwang-ju, Korea

Abstracts

I. Objective:
The mesial canals of mandibular molars coalesce to form one major foramen with abrupt angle in 49% of the cases. The file to navigate the abrupt curvature will be forced possibly leading to instrument separation. The purpose of this study is to evaluate the curvature at merging point in Vertucci's type II mesial canals of mandibular molar using the radius and angle of curvature.

II. Materials & Methods:
Total 115 mandibular molar teeth were selected without making any age and sex discrimination. Following a standard endodontic access in the teeth, their distal roots were removed and 10 or 15 file were introduced into the mesiobuccal and mesiolingual canals of the teeth. We took radiographs of the teeth in the bucco-lingual view and mesio-distal view. Root canals were classified according to Vertucci's classification. In our study, we selected Vertucci's type II and divided two subgroup; IIa and IIb. Specimens of two subgroup were examined the radius and angle of curvature. The results were statistically analyzed using ANOVA test at p<0.05 level.

III. Results:
In Vertucci's type IIa group, radius of mesiolingual canal curvature were significantly smaller than mesiobuccal canal. But, no significant correlation was seen in Vertucci's type IIb group. On the angle of curvature, there were no significant difference in both group.

IV. Conclusion:
In Vertucci's type IIa, ML canals are more abrupt curvature in merging point. Therefore, clinician should be consider abrupt curvature of type II mesial root in mandibular molars to prevent the instrument separation

Yun, Hye-Rim
Department of Conservative Dentistry
Chosun university
412 Seo-Seok dong, Dong-gu, Gwang-ju,
501-825, Korea
drhl2001@naver.com
In vivo assessment of MB root anatomy of maxillary permanent molars using CBCT

Jin-Hee Lee¹*, Kee-Deog Kim², Wonse Park², Kee-Yeon Kum¹

¹Department of Conservative Dentistry, College of Dentistry, Seoul National University, Seoul, Korea
²Department of Advanced General Dentistry, College of Dentistry, Yonsei University, Seoul, Korea

Abstracts

I. Objective: The use of CBCT provides noninvasive and 3-dimensional reconstruction imaging for use in endodontic application and morphologic analysis. This study investigated the incidence of second mesiobuccal (MB2) canal in maxillary permanent molars in Korean population using cone-beam computed tomography (CBCT) images and analyzed it by gender and tooth position. The root canal configurations of MB root was also assessed.

II. Materials & Methods: A total of 400 maxillary 1st and 2nd molars from 100 subjects (78 males and 22 females) were evaluated. Three dimensional CBCT images of 400 maxillary molars were analyzed for the detection of MB2 canal and canal configuration was classified according to the Weine’s classification. The correlation between gender or tooth position and the incidence of MB2 canal was statistically analyzed.

III. Results: For maxillary 1st molars, 27% showed single canal, 70.5% showed two canals (Type II, III, IV), and 2.5% showed three canals. For maxillary 2nd molars, 41.5% showed single canal, 57% showed two canals (Type II, III, IV), and 1.5% showed three canals. There was no significant correlation of gender and tooth position with the incidence of MB2 canal in both 1st molar and 2nd molar (p < .05).

IV. Conclusion: Maxillary 1st and 2nd molars in Korean population showed high incidence of MB2 canal and CBCT imaging would be a useful tool for study of root canal anatomy.

Jin-Hee Lee
Department of Conservative Dentistry
College of Dentistry
Seoul National University
25-9 Yongun-Dong, Chongno-Gu, Seoul 110-749, Korea
eehnj00@naver.com
Effects of canal enlargement and irrigation needle depth on the cleaning of the apical third of root canal system

Ho-Jin Moon*, Chan-Eui Hong

Department of Conservative Dentistry, School of Dentistry, Dankook University

Abstracts

I. Objective: A major challenge in clinical endodontics is the preparation of the apical third region of the root canal system. Because of its anatomy, irrigating needle approach is often difficult to the apical canal, resulting in a reduced effect of the irrigating solutions.

The aim of this study was to test the hypothesis, that the mechanical effectiveness of irrigation in removing smear layer in the apical third of root canal system is dependent on the depth of placement of the irrigation needle into the root canal and the enlargement size of the canal.

II. Materials & Methods: Eighty sound human lower incisors were selected. The teeth were divided into eight groups according to the enlargement size (#25, #30, #35, #40) and the needle penetration depth (3 mm, 9 mm). Each canal was enlarged to working length with Profile .06 Rotary Ni-Ti files. Root canals in all groups were irrigated with 5.25% NaOCl using 30 gauge needle after each instrumentation. Then, each canal received a final irrigation with 3 ml 3%(pH 9) EDTA for 4 min, followed by 5 ml of 5.25% NaOCl at different level (3 mm, 9 mm) from the apex.

Each root was split longitudinally in a mesiodistal direction. Each specimen was prepared for the scanning electron microscope. Photographs of the 3mm area from the working length of each canal with a magnification of x250, x500, x1000, x2500 were taken for the final evaluation.

In a blind manner, three investigators scored the degree of smear layer on the surface of the root canal wall or in the dentinal tubules. After scoring the photographs, the information was recorded and analyzed statistically.

III. Results & Conclusion: From the result of this study, effectiveness of irrigation depends on the aspect of the depth of the needle and the enlargement size of the apical canal. Based on this study model, the removal of smear layer from the apical portion of root canals was effectively accomplished with apical instrumentation to #35/40 .06 taper file and 3 mm needle penetration from the working length.

Ho-Jin Moon
Department of Conservative Dentistry, Dankook University Dental Hospital, School of Dentistry, Dankook University.
San 7-1 Sinbu-dong, CheonAn, Choong-nam
330-714 Korea (south)
alkydes@dankook.ac.kr
Analysis of para-chloroaniline after chemical interaction between alexidine and sodium hypochlorite using mass spectrometry

Sang-Min Lim¹*, Hyeon-Shik Kim¹, Seung-Hyun Han², Yoon Lee¹³, So-Ram Oh¹, Yu-Gu¹, Kee-Yeon Kum¹

¹Department of Conservative Dentistry, ²Department of Oral Microbiology and Immunology, Dental Research Institute, BK 21 Program, School of Dentistry, Seoul National University, ³Yonsei University Wonju Medical College Korea

Abstracts

I. Objective: Recent studies demonstrated that the combination of chlorhexidine (CHX) and sodium hypochlorite (NaOCl) resulted in the formation of a precipitate, para-chloroaniline (PCA) which is a known carcinogen. Alexidine (ALX) is a kind of biguanides like CHX, but has stronger detoxification effect against the bacterial virulence factors such like lipoteichoic acid and lipopolysaccharide compared with CHX. The purpose of this study was to determine whether PCA was formed after chemical interaction between ALX and NaOCl using mass spectrometry.

II. Materials & Methods: For analysis of color change and precipitates, 10 tested solutions were made: 4% NaOCl, 1% ALX, 2.5% CHX, 0.5% PCA, 4% NaOCl with 2.5% CHX, 4% NaOCl with 1% ALX, 4% NaOCl with 0.5% ALX, 4% NaOCl with 0.25% ALX, 4% NaOCl with 0.125% ALX, 4% NaOCl with 0.0625% ALX. Mass spectrometry was performed to detect PCA in the mixture of 1% ALX and 4% NaOCl.

III. Results: Red-brown precipitate (PCA) was formed after mixing NaOCl and CHX, and 128 peak known as PCA was detected in mass spectrometry analysis. The color of the mixed solution of NaOCl and ALX was changed from yellow to white as ALX concentration decreased. In mass spectrometry, the peak of PCA (128) was not detected in mixed solutions of ALX and NaOCl.

IV. Conclusion: These results suggest that the combination of NaOCl and ALX does not result in the formation of PCA. However, further study is needed to evaluate the antimicrobial effect of ALX as a root canal disinfectant.

Kee-Yeon Kum, DDS, PhD, Associate Professor
Department of Conservative Dentistry,
Dental Research Institute and BK 21 Program, School of Dentistry,
Seoul National University,
25-9 Jongro-Gu Yungun-Dong,
Seoul, Korea
Tel: 82-2-2072-2651, Fax: 82-2-2072-3859

kum6139@snu.ac.kr
Mechanical properties of novel composite using Portland cement for root-end retro-filling material

Hyeon-Cheol Kim*, Sang-Jin Lee, Jiwan Yum, Jeong-Kil Park, and Bock Hur

Dept. of Conservative Dentistry, School of Dentistry, Pusan National University, Yangsan, Korea

Abstracts

I. Objective: MTA fulfills many of the ideal properties of a root-end filling materials. But MTA has poor handling characteristics and initial wash-out problems due to long setting time in clinical using. The aim of this study was to compare the apical sealing ability and mechanical properties of MTA, MTA - AH plus mixture (AMAT) and experimental Portland cement - epoxy resin composite (EPPC) for root-end retro-filling material.

II. Materials & Methods: Forty-nine extracted roots were instrumented and obturated with warm vertical condensation gutta-percha and AH plus root canal sealer. Each root was apically resected (3mm) and the apex was prepared with low speed diamond bur to 3mm depth. Roots were randomly divided into 3 groups of 15 roots each. Groups are MTA, AMTA, EPPC as retrograde filling materials (4 roots were used as control). Following immersion 1% methylene blue dye for 72 hours, the roots were vertically sectioned with slow speed disc and photos were taken for apical microleakage evaluation. All groups were measured for setting time with Vicat apparatus and digital radiographs were taken to evaluate aluminum equivalent thickness using aluminum step wedge. The results from each category were compared between groups using one-way ANOVA and Scheffe’s post hoc comparison at the significance level of 95%.

III. Results: AMTA and EPPC showed less microleakage than MTA group. AMTA showed the highest radiopacity than other groups and the novel EPPC had 5 mm aluminum thickness radiopacity. EPPC had the shorter setting time (initial; 62 min, final; 83 min) than other groups while the MTA had the longest setting time.

IV. Conclusion: Under the condition of this study, the novel composite using Portland cement and epoxy resin for root-end retro-filling material may useful with the properties of favorable leakage resistance, radiopacity and short setting time.

Hyeon-Cheol Kim, DDS, MS, PhD
Department of Conservative Dentistry
School of Dentistry
Pusan National University
3-3, Beomeo-Ri, Mulgeum, Yangsan, Gyeongnam
626-810, Korea (South)
golddent@pusan.ac.kr
Endodontic treatment of a maxillary lateral incisor

Hyo-Jin Hwang*, Dong-Hoon Shin

Department of Conservative Dentistry, Dankook University, Cheonan, Korea

Abstracts

I. Introduction: Dens invaginatus is a developmental anomaly resulting from epithelial invagination of the tooth crown prior to calcification. It shows multiple morphological variations of crown and root formation. This leads to caries, pulpal and periodontal involvement with necrosis. Therefore, early diagnosis and prevention are the utmost importance. Maxillary permanent lateral incisors are the most commonly involved teeth. There may also be an associated talon cusp or grooving of the palatal enamel, coincident with the entrance of the invagination. Because of abnormal anatomical configuration, it is too difficult to treat these teeth. In the present cases, endodontic treatment of a maxillary lateral incisor associated with periapical lesion or Talon cusp will be discussed.

II. Case Presentation:

<Case 1>
1. Sex/ Age: M/14
2. Chief Complaint (C.C): pain on anterior tooth
3. Past Dental History (PDH): N.S.
4. Present Illness (PI): sinus tract (+), palpation (+) on #12
5. Impression: pulp necrosis on #12
6. Tx. Plan: root canal treatment

<Case 2>
1. Sex/ Age: M/21
2. Chief Complaint (C.C): refer from department of orthodontics
3. Past Dental History (PDH): orthodontic treatment
4. Present Illness (PI): EPT (-), cold (-), mob (+)
   Root external resorption, talon cusp and dens invaginatus, root canal calcification on #12
5. Impression: pulp necrosis on #12
6. Tx. Plan: root canal treatment

III. Conclusion: The lack of knowledge about possible root canal anatomical configurations can cause a disadvantage for dentists, resulting in an unsuccessful endodontic treatment. A careful clinical and radiographic examination should be conducted to identify dens invaginatus. Non-surgical root canal treatment of the invaginated canal proved successful in promoting the healing of an associated pulp necrosis and sinus tract.

Hyo-Jin
Department of Conservative Dentistry,
Dankook University Dental Hospital,
School of Dentistry, Dankook University.
San 7-1 Sinbu-dong, Cheon-an, Choong-nam, 330-714 Korea (south)
hhj1013@hanmail.net
Conservative treatment for young permanent teeth with necrotic pulps

Il-seok Song*, Ho-jin Moon, Yong-bum Cho

Department of Conservative Dentistry, Dankook University, Cheonan, Korea

Abstracts

I. Introduction: In immature teeth with necrotic pulps, the conventional treatment method was an apexification with calcium hydroxide. Revascularization of necrotic pulps, however, became an alternative conservative treatment option for young permanent teeth with immature roots. When an extremely large communication from the pulp space to the periapical tissues exists, it may be possible for gaining abundant blood supply. The following cases describe a revascularization of immature permanent tooth with a necrotic pulp.

II. Case Presentation:

1. Sex/age: F/10
2. Chief Complaint (C.C): I have a biting pain
3. Past Dental History (PDH): N.S
4. Present Illness (P.I): Per (+), Pal(+), Mob(-), Sinus tract (+) on #46 buccal gingiva
5. Impression: Dens evaginatus on #45
6. Tx Plan: Root canal treatment on #45

II. Case Presentation:

1. Sex/age: F/13
2. Chief Complaint (C.C): I have an inflammation at the #14 buccal gingiva
3. Past Dental History (PDH): N.S
4. Present Illness (P.I): Per (+), Pal(+), Mob(-), Sinus tract (+) on #14 buccal gingiva
5. Impression: Dens evaginatus on #14
6. Tx Plan: Root canal treatment on #14

III. Conclusion: Revascularization is in the spotlight as a conservative option in immature permanent tooth with open apex. It has advantages such as consistent root development, reinforcement of root with increased dentin wall thickness, and short treatment period. Revascularization is a promising treatment in young permanent teeth with necrotic pulps and it guarantees the long-term prognosis.

Song Il-seok
Department of Conservative Dentistry,
Dankook University Dental Hospital,
School of Dentistry, Dankook University.
San 7-1 Sinbu-dong, Cheon-an, Choong-nam
330-714 Korea (south)
endosong@gmail.com