

Evaluation of single-visit endodontic and restorative treatment under general anesthesia for special needs patients

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I. Object:

The aims of this study were to evaluate the clinical outcomes of single-visit endodontic & restorative treatment under general anesthesia (GA) and to investigate factors associated with the success of restored endodontically- treated teeth.

II. Materials & Methods:

Data were collected from 381 endodontically-treated teeth (203 patients) under GA at a special care clinic due to a lack of patients' cooperation. All endodontic treatments were performed during a single day, and post-endodontic restorative treatments other than indirect crown restorations were completed on the same day. A total of 268 teeth (70.2%) were followed-up for 3 - 81 months [mean (SD): 31.5 (20.4)]. Survival was defined as the treated teeth being present in a patient's dentition while success was defined as the restoration being intact requiring no additional treatment. Statistical analysis was performed using the Kaplan-Meier analysis with Log-rank test to compare the mean survival time. Fisher's exact test was applied in the evaluation of the survival rate. SPSS version 20 was used, and a type one error rate of 0.05 was applied.

III. Results:

No differences existed between the followed-up and non-followed-up patients and their teeth in terms of demographic factors and dental conditions ($p < 0.05$). At the end of the observation period, 10 teeth had a crown fracture (survival rate: 96.3%), and 8 teeth had secondary caries (success rate: 93.3%). There was a significant difference in the survival rate of teeth with attrition or erosive defects (97.7%) and teeth without defects (90.9%) ($p < 0.05$). No significant difference was found in the relation with tooth type, periapical condition, and the presence of adjacent teeth ($p > 0.05$).

IV. Conclusion:

Single-visit endodontic & restorative treatment under GA showed high rates of survival and success for the treated teeth. GA-dental treatment may be a viable option for special needs patients with insufficient cooperation to save their dentition.

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Effect of NT-APP Deposition of monomers on Adhesion to Enamel and its durability

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I. Object:

This study investigated the effect of a pencil-type low-power non-thermal atmospheric pressure plasma (NT-APP) jet on the adhesion of composite resin to enamel and its durability.

II. Materials & Methods:

Microshear bond strengths (MSBS) of composite resin to enamel after helium (He) plasma treatment with no monomer, benzene and 1,3-butadiene were compared with that of the conventional enamel bonding. After plasma treatment of etched enamel, the adhesive of Scotchbond Multi-Purpose (3M ESPE) was applied. The MSBS were evaluated after 24 hrs from bonding and after 5,000 times of thermocycling. The data were analyzed using two-way ANOVA and *post hoc* Duncan test at a 5% level of significance. Weibull analysis was also performed.

III. Results:

According to 2-way ANOVA, the groups using plasma deposition of benzene and 1,3-butadiene exhibited significantly higher MSBS than conventional enamel bonding group ($p < 0.05$). After thermocycling, however, the MSBS decreased significantly ($p = 0.000$) and the differences between treatments were not observed. The Weibull characteristic strengths of both monomer-deposited groups also decreased to that of the control group, but the Weibull moduli of both groups maintained high values after thermocycling.

IV. Conclusion:

The plasma deposition with 1,3-butadiene or benzene enhanced the adhesion of composite resin to the enamel, but their effect on adhesion durability needs to be improved.

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Forced eruption of maxillary incisor teeth with lingual approach :a case report

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I. Introduction:

The treatment strategy of a crown-root fracture in anterior tooth is complex because of the esthetics problem. There are several different treatment options such as an orthodontic or surgical extrusion, a crown lengthening and an extraction. In this clinical case report, forced eruption with lingual approach was used in the anterior tooth to minimize esthetic impairment.

II. Case Presentation:

1. Sex/Age: M/14
2. Chief complaint (C.C): Fracture of upper anterior tooth due to hit by a ball
3. Past Dental history (PDH): N.S.
4. Present illness (P.I): Per (+), Mob (-), Pal (+), crown fracture with pulp exposure
5. Impression: Complicated crown-root fracture on #21
6. Tx plan: Forced eruption followed by post and crown of #21

III. Conclusion:

Orthodontic force eruption is a method of treatment for deeply fractured teeth to preserve natural tooth and periodontal structures. One treatment option for submerged roots is forced eruption but a major disadvantage of this technique is the necessity for the placement of an unaesthetic orthodontic appliance, especially when the tooth involved is a maxillary incisor. Forced eruption with lingual approach is a treatment modality that minimizes esthetic impairment during orthodontic treatment.

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Management of traumatized anterior tooth by multidisciplinary approach for esthetic enhancement

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I. Introduction: Treatment of fractured teeth depends on the level of the fracture line and the amount of remaining tooth. If the fracture margin is located subgingivally, forced eruption can be considered as one of the treatment choices. However, because the coronal movement of the gingival attachment during the extrusion process, it is necessary to recontour the gingival line. Also, the presence of pre-existing diastema causes esthetic problems on the restoration of tooth. This case report presents esthetic management of traumatized anterior tooth using forced eruption, composite resin restoration on the adjacent tooth and gingivectomy.

II. Case Presentation:

1. Sex/age : M/44
2. Chief Complaint (C.C) : Crown fracture on #21
3. Past Dental History (PDH) : Tooth fracture by trauma, 2 days ago
4. Present Illness (P.I) : Complicated crown-root fracture on #21
Per (+), Pal (-) Mob (0), Cold (+), EPT (5/64)
Interdental space between #11 and #21
5. Impression : Complicated crown-root fracture on #21
6. Tx. Plan : Root canal treatment on #21, Forced eruption on #21, Gingivectomy on the maxillary anterior teeth
Composite resin restoration on #11, All-ceramic crown on #21

III. Conclusion: In this case, there were some limitations on the restoration of fractured tooth because the dentition possessed pre-existing esthetic problems like high lip line and diastema. Improper gingival line of the anterior teeth was corrected by gingivectomy which results in the esthetic gingival contour. And the use of direct bonding restoration on the adjacent tooth provided the symmetrical and harmonious arrangement of the dentition. The key factors in a successful functional and esthetic rehabilitation of complicated crown fracture are multidisciplinary approaches. In addition to forced eruption, more satisfying esthetic results could be obtained with concern, such as gingivectomy and direct bonding restoration.

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Analysis of temperature rise of bulk-fill composite and flowable composite during photocuring according to the thickness increment

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I. Object: The purpose of this study was to examine ordinary flowable composite resin and flowable bulk-fill composite resin which had been reported to exhibit difference in curing properties through polymerization heat analysis.

II. Materials & Methods: After cutting the acrylic plate, which ranged from 0.5 mm to 5.0 mm with a thickness difference of 0.5 mm, a hole was perforated with a diameter of 5.5 mm at the center. Then, acrylic plate with a thickness of 0.5 mm, the identical size, was attached to one side, and the mold was formed in the shape of cavity with one side for resin injection being blocked. G-aenial Flo (GF, GC, Japan), the high flowable composite resin, and SDR (SDR, Dentsply Caulk, USA), the high flowable bulk-fill resin, were injected into acrylic mold. Light polymerization was performed for 80 seconds after fixing the polymerization tip of Dr's Light (GoodDoctors Co., Seoul, KOREA), the curing light with radiation intensity of 1787 mW/cm², temperature changes which resulted from polymerization of injected high flowable composite resin were measured at 30 frames per second by using FLIR SC620 (FLIR Systems AB, Stockholm, Sweden), the infrared thermal imaging camera. Then, the pattern of temperature rise by time was analyzed. Based on maximum temperature rise point, the temperatures on same line up to 2.5 mm towards both sides were compared by time.

III. Results: Maximum temperature rise was reduced in SDR up to the thickness of 2.0 mm as thickness increased, but no significant change was observed in the thickness ranging 2.0 mm to 5.0 mm. In all of 2 different types of resin, rapid temperature rise was observed from initiation of polymerization up to 5 seconds in the thickness below 1.5 mm and the temperature rise decreased, and constant temperature rise was observed up to 80 seconds. Maximum temperature was measured at 80 seconds although similar pattern of temperature elevation was exhibited in the thickness of 2.0 mm. Temperature peak arrival time in the thickness above 2.0 mm was found to be longer as thickness increased. In relation to peak temperature arrival time, GF reached peak temperature at 16.58 seconds in the thickness of 2.0 mm and 29.67 seconds in the thickness of 5.0 mm while SDR reached peak temperature at 8.93 seconds in the thickness of 2.0 mm and 12.93 seconds in the thickness of 5.0 mm, suggesting that SDR reached peak temperature faster than GF ($p < 0.01$).

IV. Conclusion: Bulk-fill high flowable composite resin is expected to be capable of polymerization at deeper depth in shorter polymerization time, compared to ordinary high flowable composite resin. However, more in-depth research would need to be conducted to examine relationship with polymerization rate in the period ahead.

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Interdisciplinary treatment of white spot lesion : A case report

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I. Introduction:

White spot lesions are early signs of demineralization under intact enamel, and some of labial white spots are associated with fixed orthodontic treatment. White spot lesions may be an esthetic problem for some patients. Various treatment options for white spot lesion have been suggested including bleaching, resin infiltration, microabrasion, megabrasion, direct resin restoration, porcelain laminate veneer, and all ceramic crown. The conventional treatment approach of white spot lesion is based on restoration, which, in most instance, is quite invasive.

This case report presents the management of white spot lesions based on minimal invasive treatment technique using bleaching, resin infiltration, microabrasion.

II. Case Presentation:

< Case >

1. Sex / Age : F / 27
2. Chief Complaint(C.C) : Whitish discoloration on anterior teeth
3. Present Illness(P.I) : White spot lesions on #13,12,11,21,22,23
4. Impression : Enamel decalcification
5. Tx. plan : 1) #13-23 enamel microabrasion
2) Nightguard vital bleaching on upper anterior dentition
3) Resin infiltration on superficial irregularities

III. Conclusion:

There is limit to manage all cases of white spot lesions using one single method. Thus, combination of various treatment options and modification of treatment sequence should be considered for minimal invasive management of white spot lesion.

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The effect of lithium disilicate thickness on the bond strength between resin cement and ceramic

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I. Object:

This study aimed to evaluate the effect of thickness of lithium disilicate restoration on the bond strength between resin cement and ceramic cemented using a universal adhesive.

II. Materials & Methods:

Twelve 12×14×5mm e. max CAD (shade A3 LT) specimens were fabricated and sintered. The specimens were embedded into acrylic resin and polished. The surface of specimens was treated with 4% hydrofluoric acid for 4 min, and was applied with Single Bond Universal (3M EPSE). Pre-cured composite resin cylinders with a diameter of 0.8mm (n=20) were cemented using Rely X ultimate (3M EPSE). The specimens were polymerized with light curing (800mW/cm²) as followed; Group A: control, without lithium disilicate plate being covered on the cemented cylinders; Group B: with a 2mm-thick lithium disilicate plate; Group C: with a 4mm-thick lithium disilicate plate. The specimens were stored in water for 24 h and subjected to a micro-shear bond strength test. Analysis of variance (ANOVA) and Turkey's multiple-comparison test were applied to identify the statistical significance (p<0.05).

III. Results:

Group A showed the highest bond strength (16.89 ± 3.91 MPa) followed by Group B (16.50 ± 4.39 MPa). Both groups did not show a significant difference. Group C showed the significantly lower bond strength (11.53 ± 3.85 MPa) than other groups (p<0.05).

IV. Conclusion:

The 2 mm thickness of restorations recommended by the manufacturing company did not affect the bond strength between the resin cement and lithium disilicate ceramic. But a higher thickness of ceramic decreased the bond strength.

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Management of crown-root fracture using mini tube appliance(MTA) and superelastic wire with indirect method

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I. Introduction:

Fracture of the tooth below the gingival attachment or crest of the alveolar bone presents a very difficult restorative problem. Preservation of the gingival biologic width and crown ferrule are critical for the long term success of the treatment. Forced eruption is a treatment option for the teeth with subgingival fracture line.

II. Case Presentation:

< Case 1 >

1. Chief complaint(C.C) : My upper tooth were broken.
2. Present Illness(P.I) : Crown-root fracture with pulp exposure of #21 (air(-),per(+),mob(-),EPT(-))
3. Impression : Crown-root fracture with pulp exposure of #21
4. Tx.plan :
 1. Non-surgical root canal treatment of #21 and post, core build up of #21
 2. Forced eruption of #21 with MTA and .012 Ni-Ti wire with indirect method
 3. Resin build up of #11 for space closure(between #11 and #21) and crown restoration of #21

< Case 2 >

1. Chief complaint(C.C) : My upper tooth were broken.
2. Present Illness(P.I) : Crown-root fracture with pulp exposure of #12 (air(+),per(+),mob(-),EPT(+))
Subluxation of #11 (air(+),per(+),mob(-),EPT(-/-))
3. Impression : Crown-root fracture with pulp exposure of #12, Pulp necrosis of #11
4. Tx.plan :
 1. Non-surgical root canal treatment on #11,12 and post, core build up of #12
 2. Forced eruption of #12 with MTA and .012 Ni-Ti wire with indirect method, Crown restoration of #12

III. Conclusion:

Provisional core build up and forced eruption with MTA and superelastic wire have shown good clinical results and patient's satisfaction. It allows an esthetic provision during extrusion period and requires the minimum of specialized orthodontic materials and skills. In addition, placement of MTA using indirect method could minimize intraoral working time and reduce patient's discomfort. Forced eruption with MTA and superelastic wire with indirect method can be suggested as a simple treatment option dealing with traumatic injuries of anterior teeth.

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Management of immature permanent molar with apical periodontitis

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I. Introduction:

Conventionally, treatment option for infected, non-vital, immature teeth with open apex includes apexification with calcium hydroxide. But this treatment requires long-term application of calcium hydroxide and multiple visit over 6 months before completion of root-end closure. Today, as an alternative to apexification with calcium hydroxide, placement of an apical barrier using mineral trioxide aggregate(MTA) is widely used. More recently, pulp revascularization is introduced for new treatment option for necrotic open apex teeth. When this treatment option is not indicated for the teeth, MTA barrier may be another treatment option. This case report will present successful root canal treatment of immature tooth which has 3 canals in mesial root and distal root with open apex.

II. Case presentation:

1. Sex/Age: M/12Y
2. Chief Complaint: Evaluation and treatment on #36 (referred from local dental clinic)
4. Present Illness: pain (-), percussion (+), mobility (-), periapical lesion with open apex on #36
5. Dx.: Pulp necrosis(Prior RCT) with chronic apical periodontitis on #36
6. Tx. plan: Apexification on #36

III. Conclusion:

Several previous studies have confirmed successful outcomes including healing of periapical lesions in most of immature teeth that were treated with an MTA apical plug . Although treatment with MTA barrier does not appear to improve lengthening and thickness of root canal wall, clinical outcome is successful without any signs and symptoms and periapical radiolucency. When immature teeth have roots which have closed apex and open apex each, conventional root canal treatment and MTA apexification can be applied in a manner together.

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Efficacy of various irrigation methods for the removal of Ca(OH)₂ paste in the root canal

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I. Object:

The aim of this study was to compare the removal efficacy of Ca(OH)₂ paste in the apical part of the root canal among three irrigation methods; conventional syringe, sonic and ultrasonic irrigation methods.

II. Materials & Methods:

90 extracted single-rooted teeth were prepared and PROTAPER·NEXT™ (Dentsply Maillefer, Ballagiues, Switzerland) was used up to X3 for root canal shaping. The crowns were removed horizontally at the cemento-enamel junction with a diamond disk. The roots were split longitudinally without damaging the root canal. Between two longitudinal section of roots, the wider one was chosen to make standardized groove at the apical 3rd. Then, Ca(OH)₂ paste (Calcipex II, Nishika, Shimonoseki, Japan) was placed into the standardized groove. Finally, split two sections of roots were reassembled by using melted sticky wax. All samples were randomly divided into 3 groups: conventional syringe irrigation, sonic irrigation (Endoactivator, Dentsply Tulsa Dental, Tulsa, OK) and ultrasonic irrigation (DH tip, ependent, Seoul, Korea). As a irrigant, 5mL 2.5% NaOCl was used. Evaluation of the measurement of remaining Ca(OH)₂ paste was done under a dental operating microscope (Global, St. Louis, MO) at 19X magnification. The amount of remaining Ca(OH)₂ paste was scored by using 4 steps scale described in van der Sluis et al: score 0, the groove is empty; score 1, Ca(OH)₂ paste is present in less than half of the groove; score 2, Ca(OH)₂ paste covers more than half of the groove; and score 3, the groove is completely filled with Ca(OH)₂ paste. The results were statistically evaluated using Kruskal-Wallis and Mann-Whitney test. The level of significance was set at $\alpha=0.05$.

III. Results:

The results showed that the groups treated with sonic(group2, 0.8 ± 0.81) and ultrasonic(group3, 1.0 ± 1.02) devices had significantly effective in removing Ca(OH)₂ paste from groove than the group treated with conventional syringe irrigation(group1, 1.53 ± 0.82)($P<0.05$). However, there was no significant difference between sonic and ultrasonic irrigation group.

IV. Conclusion:

The use of additional(sonic and ultrasonic) irrigation protocols enhanced Ca(OH)₂ paste removal when compared with the use of only conventional syringe irrigation in root canal.

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Healing of Intra-alveolar Root Fractures Followed by Endodontic Treatment with MTA

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I. Object:

The purpose of this retrospective study was to evaluate the healing type and to assess the outcome of intra-alveolar root fractures followed by endodontic treatment with mineral trioxide aggregate (MTA) as a filling material.

II. Materials & Methods:

The clinical database of the Department of Conservative Dentistry at Yonsei University Dental Hospital, Seoul, Korea, was searched for patients with histories of intra-alveolar root fractures and endodontic treatments with MTA between October 2005 and September 2014. The radiographic healing at the fracture line was evaluated independently by two examiners, classified into four types according to Andreasen and Hjørting-Hansen:

- (1) Healing with calcified tissue
- (2) Interposition of connective tissue
- (3) Interposition of connective tissue and bone
- (4) Interposition of granulation tissue without healing.

The criteria for “healing” included the absence of clinical signs and/or symptoms and radiographic evidence of healing with calcified tissue, connective tissue, or connective tissue and bone. The criteria for “non-healing” included any clinical signs and/or symptoms or radiographic evidence of interposition of granulation tissue without healing.

III. Results:

Of the 22 root-fractured teeth received endodontic treatment with MTA, 19 cases came for follow-up after a period of at least 3 months. 17 of the 19 teeth (89.5 %) exhibited healing of the root fractures. For each healing type, 7 teeth (36.8%) showed healing with calcified tissue, 8 teeth (78.9%) showed interposition of connective tissue, 2 teeth (10.5%) showed interposition of connective tissue and bone, and 2 teeth (10.5%) showed interposition of granulation tissue without healing.

IV. Conclusion:

Within the limitations of this study, intra-alveolar root fractures showed satisfactory healing outcomes after endodontic treatment with MTA. MTA could be considered as a suitable filling material for the endodontic treatment of intra-alveolar root fractures.

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Biological Properties of EndoSequence Bioceramic Root Repair Materials

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I. Object:

EndoSequence Root Repair Material (ERRM) (Brasseler USA, Savannah, GA, USA) is a calcium phosphate silicate material with a bioceramic component. To overcome the basic handling difficulties associated with MTA, ERRM comes premixed in a ready-to-use container. The aim of this study was to compare the biological properties of MTA and ERRM.

II. Materials & Methods:

MC3T3-E1 cells were cultured in recommended culture conditions and exposed to the test materials. The cell viability was evaluated by XTT assay. The expressions of alkaline phosphatase (ALP) and osteocalcin (OCN) at gene level were detected by real-time PCR. Osteogenic differentiation and mineralization were measured by ALP staining method. Each experiment, containing triplicate independent samples, was repeated at least twice, and qualitatively identical results were obtained. One-way analysis of variance followed by Tukey's Post Hoc test was used to determine any statistically significant differences according to the test materials with the use of SPSS 18.0 software program (SPSS, Chicago, IL). Differences were considered significant at $p < .05$.

III. Results:

Cell viability of ERRM in dilutions of 1, 1/2 and 1/4 was lower than MTA ($p < .05$). There was no statistically significant difference in cell viability between materials in dilutions of 1/10 ($p < .05$). The mRNA level of osteogenic genes increased significantly in MTA and ERRM group compared to the control ($p < .05$). MTA and ERRM led to an increase in ALP staining compared to the control.

IV. Conclusion:

ERRM had similar biological properties when compared with MTA, suggesting that ERRM can be desirable alternative to MTA for root-end filling material.

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Reconstruction of Fractured Tooth Using a Thermoplastic Template

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I. Introduction:

In case of a substantial loss of tooth structure due to injury, direct composite resin restoration can be a good treatment option in terms of conservation of the tooth, cost and time. However, direct restoration of the missing structure can be challenging without any guidance, and in this regard, a putty index fabricated from a diagnostic wax-up is widely favored by dentists in clinical settings. The problem with a putty index is, though, it cannot provide guidance for the facial surface of the restoration. Because the facial surface is what determines the esthetics of the restoration, designing the facial contour of the restoration without any guidance can be overwhelming, especially for less experienced dentists. Use of a customized vacuum formed template has been introduced to solve this problem, and many successful clinical case reports have been published. In this case report, a maxillary incisor with a class II crown fracture was restored with packable and flowable composite resin using a thermoplastic template.

II. Case Presentation:

1. Sex/age: M/30Y
2. Chief Complaint (C.C): I fell down and fractured my tooth. I have no pain or discomfort.
3. Past Dental History (PDH): Temporary restoration on #21 with Glass Ionomer cement (yesterday, ER)
4. Present Illness (P.I): per(-), mob(-) cold(+) on #21
with Class II crown fracture
5. Impression: Class II crown fracture on #21
6. Tx Plan: Impression taking for a template fabrication and composite resin filling on #21

III. Conclusion:

Fabrication of a thermoplastic template requires many additional steps including impression taking, cast fabrication, diagnostic wax-up, and cast duplication, and this might be thought as inefficient. However, in chair-side, use of a thermoplastic template was able to save both time and effort. The contour of the restoration was close to the diagnostic wax-up which was previously confirmed with the patient, and the patient was satisfied with the result. However, during this procedure, some composite resin had flowed into the interproximal regions. Even though it could be easily scraped off with a blade, a modification of the template to cover only the facial side could have been considered for a better outcome.

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Clinical management of horizontal mid-root fractures in maxillary anterior teeth

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I. Introduction:

Root fractures are combined injuries of pulp, dentin, cementum, and periodontal ligament. They have been reported to occur in 0.2% to 7% of all traumatic injuries to teeth. The location of the root fracture had a strong significant effect on tooth survival. The prognosis of injured teeth involving horizontal mid-root fractures is poor and depends heavily on pulpal vitality, periodontal health and the repositioning of the tooth to its original position. This case report presents the clinical management of horizontal mid-root fractures in maxillary anterior teeth.

II. Case Presentation:

<Case 1>

1. Sex/Age : M/16
2. Chief Complaint (C.C) : For evaluation of #11 (Referred from L/C)
3. Present Illness (P.I) : Per(++), mob(+), EPT(+) on #11, Per(+), mob(+), EPT(+) on #21, 22
4. Impression : Horizontal root fracture on #11, Subluxation on #21, 22
5. Tx plan : Splinting and follow-up for evaluation of RCT #11, 21, 22

<Case 2>

1. Sex/Age : M/18
2. Chief Complaint (C.C) : For evaluation of #11, 21, 22 (Referred from OMS)
3. Present Illness (P.I) : Per(+), mob(+++), EPT(-), cold (-) on #21, Per(-), mob(+), EPT(+), cold (+) on #11, 22
4. Impression : Horizontal root fracture on #21, Uncomplicated crown fracture on #11, 22
5. Tx plan : Splinting and follow-up for evaluation of RCT #21, Resin filling on #11, 22

III. Conclusion:

The prognosis of the root fractured tooth is influenced by variable factors, such as the patient's age, stage of root growth, mobility of the coronal fragment, and diastasis of the fragments. In case 1, fractured tooth presented positive pulp sensitivity healed with calcified tissue. But pulpal necrosis developed in case 2, root canal therapy is applied only to the coronal fragment using MTA. So far, these cases of horizontal mid-root-fractured teeth which were carefully monitored have a favorable prognosis.

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Long term Results Comparing MTA and Super EBA for Root-end Sealing in Endodontic Microsurgery

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I. Object:

The purpose of the present study was to evaluate and compare the long-term clinical outcomes of endodontic microsurgery when Mineral trioxide aggregate (MTA) and Super Ethoxy-Benzoic Acid (Super EBA) were used as root-end filling materials in a prospective randomized controlled study.

II. Materials & Methods:

The Patients who previously evaluated 1-year follow-up were recalled 4 years after endodontic microsurgery, and treated teeth were classified as healed or not healed based on clinical and radiological examination. Two different root end filling materials, MTA and Super EBA were to be compared.

III. Results:

A total of 148 teeth (from 192 teeth were examined at the 12-month) were re-examined at the 4-year follow-up; 62 teeth were in the MTA group, and 86 teeth were in the Super EBA group. The overall recall rate was 77%. The overall success rate was 89.2%, and the success rates in the MTA and Super EBA groups were 90.3% and 88.4%. The statistical analysis of these success rates did not show any significant difference between the groups ($P = .793$).

IV. Conclusion:

In this long term prospective randomized controlled study, there was no significant difference in the clinical outcomes of endodontic microsurgery when MTA and Super EBA were used as root end filling materials.

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Combined Nonsurgical and Surgical Endodontic Therapy in the Treatment of Dens Invaginatus Type II

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I. Introduction:

Type II dens invaginatus is invagination is enamel-lined and extends into the pulp chamber but remains within the root canal Twith no communication with the periodontal ligament. Combined surgical treatment should be performed only when the conservative treatment has failed. When nonsurgical treatment is impractical the endodontic therapy should be complemented by surgery. This case report describes the use of combined nonsurgical and surgical approaches in the treatment of type II dens invaginatus.

II. Case Presentation:

<Case 1>

1. Sex/age : F/10
2. Chief Complaint (C.C) : No pain, referred from the department of pediatric dentistry due to abscess on #41
3. Past Dental History (PDH) : Initiated RCT on #41 two weeks ago due to spontaneous pain
4. Present Illness (P.I) : Per (+), Pal (+), Mob (1), Probing depth (543/633)
5. Treatment plan : Root canal treatment on #41

<Case 2>

1. Sex/age : M/15
2. Chief Complaint (C.C) : No pain, unusual root canal configuration on #22
3. Past Dental History (PDH) : Incision and drainage on labial gingiva above #22 one month ago
4. Present Illness (P.I) : Per (-), Pal (+), Mob (0), Probing depth (222/222)
5. Treatment plan : Root canal treatment on #22

III. Conclusion:

Type II. Irregularities in root canal system in this case, including isthmus and c-shaped root configuration, are inaccessible for instruments, irrigation solution, and medicament, which finally lead to the failure of conventional root canal treatment. Therefore combined nonsurgical and surgical approaches would be a better option for complete disinfection of the complex root configuration than nonsurgical treatment only.

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Effect of bonding of post to root canal dentin on stress distribution : FEA

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I. Object: Clinically, FRC(Fiber-Reinforced Composite) post is available instead of metallic post in the dentin and adhesion of dental root through the adhesion with the modulus of elasticity similar to the dentin. In this study, investigate how adhesion status of dentin and post and the material of post affected the dispersion in aspect of stress induced within the root canal of post by using the finite element analysis method.

II. Materials & Methods: This study was to survey and produce extracted natural tooth and model tooth for the finite element model of upper central incisor which lost the tooth crown completely with the ceramic crown, composite resin core, cylindrical-shaped titanium(Ti) or FRC post.

To design the finite element model, applying the load of each 100 N to the incisal edge parallel to the tooth axis by each model(P1) and to the center of lingual surface at an angle of 45 degrees to the tooth axis (P2).

III. Results:

1. FRC post showed stress concentration at the bottom of post with the adhesion under P1 load, but the phenomenon of stress concentration on the top without the adhesion. Under P1 load, FRC post has shown less distribution of stress than surround dentin, but the Ti post showed larger distribution of stress than surround dentin.
2. Under bonded status, the stress concentration occurred at the same point in dentin with both materials. Under debonded status, FRC post showed the stress concentration at the same point in dentin with both materials were not adhered. Ti post showed the stress concentration in the part of dentin contacting with labial side on the bottom of post.
3. The case adding P2 load has shown several times through dozens of times larger stress concentration in the whole model and dentin than that of case adding P1 load. In the post showed that both materials increase a little in case with adhesion, but the stress concentration of post under P2 load increased remarkably in a state without adhesion.

IV. Conclusion: In this study, FRC post with the similar elasticity of tooth structure that properly adhere to the tooth structure did not sustain damage of surrounding tissue according to the stress concentration on post. Otherwise, post with higher modulus elasticity material(metallic post) than dentin can result unfavorable stress concentration with the strong possibility of causing damage to the surrounding tissue without adhesion to the tooth structure.

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Management of complicated crown-root fracture by surgical extrusion with 180° rotation

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I. Introduction:

Crown-root fractures are frequently difficult to treat and prognosis is unpredictable. A number of techniques, such as crown lengthening, orthodontic or surgical extrusion, have been described for treatment of crown-root fractures. To restore the biological width, surgical extrusion can be chosen when osteotomy/osteoplasty and dental traction are not viable. This case report presents the management of crown-root fracture on the anterior teeth through surgical extrusion with 180° rotation with good results in two patients.

II. Materials, Methods & Results:

The first case involves a 39-year-old female who was broken left central incisor as a result of accident on the stairs. Intraoral and radiographic examinations revealed a complicated crown fracture. After removal of the fracture fragment, the tooth margin was subgingival and extended apically to the alveolar crest on the palatal aspect. The distance from the gingival margin to the fracture margin was approximately 2 mm. The second case involves a 21-year-old male who was broken right central incisor after fell during sports practice. On evaluation was observed complicated crown fracture with invasion of biological width through the palate. After removal of the fracture fragment, the distance from the gingival margin to the fracture margin was approximately 3 mm. For both cases, surgical extrusion with tooth rotation consisted of extraction, 180° rotation and replantation, thus restoring the biological width. Two patients were followed up for 8 and 7 months respectively. There were no radiographic and clinical signs of progressive root resorption, marginal bone loss nor periapical lesion in these cases.

III. Conclusion:

For treatment of crown-root fractures, one should have knowledge about the more safe alternatives, which present a better prognosis, in order to maintain the damaged structures at health condition, aesthetically and functionally. The surgical extrusion takes less time than other techniques, enables more precise identification of the fracture line after extraction, and maintains the esthetic properties of the fractured and adjacent teeth, whereas a gingivectomy or crown lengthening in the anterior region may compromise esthetics. Surgical extrusion with 180° rotation would be considered for the treatment of teeth with crown-root fracture.

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Management of complicated crown-root fracture of maxillary anterior tooth

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I. Introduction:

The crown-root fracture of anterior tooth is common in cases of dental trauma. When the fractured line is subgingival margin, there are many difficulties in restoration. Various treatment options could be considered. This case report presents the surgical management of complicated crown-root fracture of maxillary anterior teeth.

II. Case Presentation:

< Case 1 >

1. Sex/age : M/23

2. Chief Complaint(C.C) : Maxillary anterior tooth was broken due to slip down injury

3. Present Illness(P.I) : #11 Complicated crown-root fracture with pulp exposure Per(+) Mob(-)

#21 Horizontal Crown fracture with pulp exposure Per(+) Mob(-)

4. Impression : #11 Complicated crown-root fracture, #21 Horizontal Crown fracture

5. Tx. Plan : #11 Surgical extrusion (with 180° rotation) + RCT + Crown

#21 RCT + Reattachment of fragment using fiber-reinforced post

< Case 2 >

1. Sex/age : F/54

2. Chief Complaint(C.C) : Maxillary anterior tooth was broken due to traffic accident

3. Present Illness(P.I) : #11 Complicated crown fracture with pulp exposure and Intrusion state Per(+) Mob(-)

#21 Incisal edge crown fracture Per(+) Mob(-)

4. Impression : #11 Complicated crown-root fracture and intrusion, #21 Incisal edge crown fracture

5. Tx. Plan : #11 Surgical extrusion and repositioning + RCT + Crown, #21 Resin build up

III. Conclusion:

Surgical extrusion can be suggested as an appropriate treatment option in the management of complicated crown-root fracture in permanent anterior teeth. Surgical extrusion is a one-step and less time-consuming procedure that allows dentist to examine the root fractured surface. These cases were restored by surgical extrusion successfully.

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