

Single Visit Endodontic Treatment on Complicated Crown Fracture Caused by Dental Trauma: Case Report

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Abstract:

Background: Conservative nonsurgical treatment of endodontically involved teeth consisting of complete biomechanical cleansing, shaping and obturation of the root canal system during one visit was defined as single visit endodontic treatment.

Case report: A 25-year-old female patient came to the Dental Conservative clinic with the chief complaint of a broken tooth on the upper front tooth. The patient has a history of trauma in the past 2 months which caused a fractured front tooth, tooth #22 was painful 1 month ago.

Case management: Tooth of the patient diagnosed as necrotic pulp with asymptomatic apical periodontitis with complicated crown fracture underwent single visit endodontic treatment. Discussion: The treatment consisted of cleaning and shaping with a Reciproc Blue VDW file, irrigation using 5.25% NaOCl and 17% EDTA, activation using ultrasonic devices, obturation with a single cone technique and optimal magnification. With the latest dental equipment, proper instrumentation and good irrigation techniques, as well as good knowledge, one visit treatment could be done.

Conclusion: Single visit endodontic treatment gives good outcome in complicated crown anterior teeth fracture.

Key Word: Single Visit; Complicated Crown Fracture

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I. Introduction

Single visit endodontic treatment is defined as the conservative non-surgical treatment of an endodontically involved tooth consisting of complete biomechanical cleansing, shaping and obturation of the root canal system during one visit.¹ Some of indication for single visit are: fractured teeth where esthetics is the most important concern, teeth with accidental/mechanical pulp exposure, and patient who cannot frequently visit dental clinic.²

Crown fractures are a common type of traumatic dental injury (TDI). According to the AAE (American Association of Endodontists), a complicated crown fracture is an enamel and dentin fracture with pulp exposure (AAE).^{3,4} Many TDIs are complex, and their treatment requires a profound knowledge of the physiological and pathological responses of the affected tissues. With the development of science and technology, single visit treatment can be an alternative for endodontic cases, including trauma cases.

II. Case Report

A 26-year-old female patient came to the Dental Clinic, Department of Conservative Dentistry, Universitas Sumatera with the chief complaint of a broken tooth in the upper front tooth. The patient has a history of falling 2 months ago and causing a broken front tooth, tooth #22 had pain 1 month ago. The patient has no dental treatment history.

Based on clinical examination, On physical examination, a complete fracture of the crown of tooth #22. was seen. On the vitality test, the tooth gave negative response to thermal test. Meanwhile, on examination of supporting tissues, the results of percussion, palpation, mobility, and swelling were negative. The radiographic examination revealed a fracture line in the crown (enamel-dentin) involving the pulp. In addition, lamina dura discontinuity was seen and thickened. Periodontal space widened in the apical region. There was a radiolucent lesion in the periapical area.



Figure 1. Pre Operative Clinical View



Figure 2. Pre Operative Radiograph

The examination was carried out using a Carl-Zeiss Eyemag Pro S dental loupe with a magnification of 4.5x. First, pre-endodontic build-up was performed. Access opening was done using Endo Z bur and Endoaccess bur. During examination by using a Carl-Zeiss Eyemag Pro S dental loupe with a magnification of 4.5x, the anatomy of the second left incisor maxillar was determined as one canal. Under the magnification, it was possible to insert a size #8, #10, #15, #20 and #25 K-file for glidepath. Irrigation using 5,25% NaOCl solution.



Figure 3. Clinical View of Access Preparation

Working length was determined with electronic apex locator (VDW-gold) and confirmed using periapical radiograph (Figure 4).

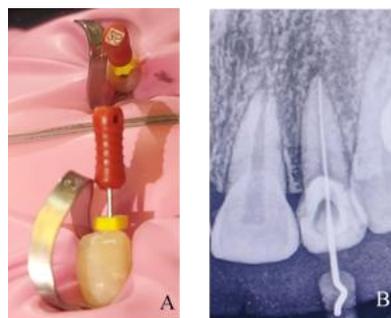


Figure 4. Working Length Confirmation. A: Clinical View. B: Radiographic View

The canal were completely instrumented and cleaned thoroughly in one visit using reciproc blue #25 file. Irrigation was used 5.25% NaOCl, activation using ultrasonic devices in 30 seconds, irrigation was using saline. And then changed to 17% EDTA, activation using Ultrasonic activation 30 s, followed using saline after that, dried the canal using paper point. Fitting master cone was done and the radiography was taken (Figure 5).



Figure 5. Fitting of Master Cone

Obturation was done using single cone with sealer AH-Plus. After that, cutting guttaperch using Fast-Pack® (Eighthent), then put RMGIC (Ionoseal) as an orifice barrier. After that, application of PTFE as temporary orifice spacer and Temporary restoration using Cavit (Cavit™ - 3M).

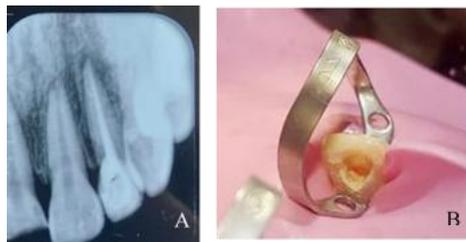


Figure 6. Obturation. A: Radiographic View. B: Clinical View

After 1 week the patient came back for obturation control and got good results. The patient underwent fiber post installation, preparation and restoration with direct resin composite (Figure 7).

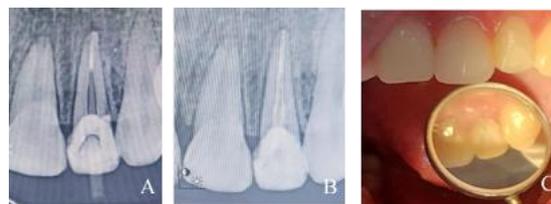


Figure 7. A. Post Insertion. B. Restoration using Direct Resin Composite in Radiographic View. C. Clinical View

III. Discussion

In the patient, a single visit was performed according to the indications: fractured teeth where esthetics is the most important concern, teeth with accidental/mechanical pulp exposure, and patient who cannot frequently visit dental clinic. With the availability of advanced dental materials and equipment, appropriate instrumentation and irrigation, single visit treatment is possible. Working with aid of magnification of dental loupe and ultrasonic devices helps increase the effectiveness. The use of copious irrigation with sodium hypochlorite gave better effectiveness than inter-appointment calcium hydroxide dressing, in disinfecting the root canal system and treatment outcome.¹ Biomechanical preparation done using various advanced NiTi systems which prepares root canal in crown down manner with minimal extrusion of debris and irrigant. And NiTi systems are safe with a minimal incidence of instrument failure.² The single- and multiple-visit approaches showed similar healing or success rates regardless of the precondition of the pulp and periapex.^{5,6}

A single visit is a viable option for both single-rooted and multi-rooted teeth. Sufficient time to complete the procedure is an important part of a visit. In Odionwe's study (2013), the time required to complete one visit ranged from 77 minutes for single canal teeth to 132 minutes for fourth canals. The time it takes to treat a tooth with four root canals, therefore, is not four times as it takes to treat a tooth with one root canal. This is because there are several aspects of treatment that are commonly performed on root canals such as local anesthetic administration, rubber dam placement, access cavity creation, removal of pulp tissue in the pulp chamber, and final coronal restoration. One visit will not only help save patients and doctor's time; but it will also save costs, improve patient compliance, and improve practice management.⁷

This patient was diagnosed with necrotic pulp with asymptomatic apical periodontitis. Management of single visit in this disease has been done. Paredes-Vieyra in 2007 conducted a study of apical periodontitis,

including some case of periapical lesions, which were then carried out single or multiple visits. There was no significant difference in healing in single or multiple visits.⁸ Meanwhile, Molander examined the case of Asymptomatic Necrotic Teeth with Apical Periodontitis which was treated with single or multiple treatments, and found that there was no significant difference in healing.⁹

This patient had a large periapical lesion. In the case of large periapical lesions, a single visit may be performed. Asgary performed a single visit nonsurgical treatment on a chronic periapical lesion measuring 25 mm. At that time, a single visit was carried out until obturation and then came back in 2 weeks for the restoration. Evaluation of the results obtained both clinically and radiologically. So that a single visit can be an alternative treatment for cases of apical periodontitis both with periapical lesions and with necrotic teeth.¹⁰

In the case of a complicated crown fracture of the incisors, a single visit may also be considered. Kilik (2006) reported a case series of trauma complicated crown fractures which underwent single visit endodontic aesthetic treatment. In this case series, a fiber post was given. In case of a loss in coronal structure more than 50%, a post-core system is recommended. In order to distribute the incoming forces equally to the root surface and prevent root fractures, the fiber-post with advanced retentive properties and elastic were chosen in presented cases for additional fracture resistance. The length of the post is most important than its diameter for retention.¹¹ In this case, fiber post was given and gave good results.

IV. Conclusion

Single visit endodontic treatment gives good outcome in complicated crown anterior teeth fracture.

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