

The Management of Multiple Traumatized Anterior Teeth with Four-Year Follow-Up

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Abstract

Traumatic dental injuries are recognized as a public dental health problem worldwide and they manifest with a number of different types. They may occur alone or in a variety of combinations where both a fracture and a luxation injury affect the same tooth. A thorough diagnostic procedure plays an essential role in avoiding the risks of overlooking or misinterpreting concomitant injuries and preventing any subsequent healing complications. This case report discussed the management of traumatized anterior teeth. It clearly indicates how the correct diagnosis and appropriate treatment of combined dental injuries associated with multiple teeth, guided by the current evidence-based recommendations, can be successful. The establishment of continuous updates of knowledge among dental practitioners can maximize the chances of success in the management of traumatic dental injuries. The present case report can serve this purpose.

Keywords: Trauma, intrusion, fracture, root canal, follow-up

INTRODUCTION

The tooth and its supporting structures can be affected by different types of traumatic injuries. A thorough diagnostic procedure plays an essential role in avoiding the risks of overlooking or misinterpreting concomitant injuries, and preventing any subsequent healing complications.^{1,2} The management of simple dental traumas can be treated by fillings with/without root canal treatment. However, complicated dental injuries, including fractures and luxation of the tooth, may require endodontic, surgical, orthodontic, and/or prosthodontic combination treatment.³ In addition, complicated trauma requires long-term follow-up (up to 5 years).⁴ The aim of this case report is to present in detail the successful management and outcome of multiple traumatized anterior teeth with a 4-year follow-up.

CASE PRESENTATION

A 21-year-old male was admitted to our clinic 3 hours after he suffered fractures of the upper anterior teeth. The patient presented with lacerated and swollen lips. He stated that he had attended a local hospital where he had received emergency treatment. His medical history was unremarkable for metabolic or neurological disorders.

Intraoral examination revealed the presence of luxation injuries and crown fractures of the maxillary central incisors (#11, #21) and the left lateral incisor (#22) as well as gingival lacerations and bleeding (Figure 1). In addition to enamel fracture, tooth #11 was displaced in the palatal direction. Tooth #21 appeared to be intruded by about 5 mm and had an enamel-dentin fracture without exposing the pulp, while tooth #22 had a complicated crown fracture without any displacement.

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Figure 1. Clinical presentation of the injured teeth, front view and occlusal view.

Clinical examination showed no mobility in teeth #11 and #21 but slightly increased mobility in tooth #22 in response to lateral finger pressure. Teeth #11, #21 and #22 exhibited a positive response to percussion and palpation sensibility tests. Among these teeth, only #22 responded to cold tests and an electric pulp test. The diagnosis was confirmed via radiographic examination (Figure 2). No fractures were found in the jaws, alveolar bones, or teeth roots near the injured area. The periodontal ligament space was enlarged in the apical area of #11. The cement-enamel junction of #21 appeared to be located more apically than #22. A final diagnosis was made as lateral luxation with enamel fracture of tooth #11, intrusion with an uncomplicated crown fracture of tooth #21, and subluxation with a complicated crown fracture of tooth #22.

The patient's confirmation regarding the treatment procedures was obtained and the management was started by cleaning the area with a physiological saline solution in order to obtain better visualization. Local anesthesia was administered and a firm digital pressure was

applied to the laterally luxated tooth #11, aiming to reposition it into its correct location. The immediate surgical repositioning of tooth #21 was performed by gently pulling it down with forceps into its original socket (Figure 3). Following this, a flexible splint was used to fix the traumatic teeth. This splint was applied from tooth #13 to tooth #23 using orthodontic wire and flowable composite resin (Figure 4). In the same session, the endodontic treatment of tooth #22 was started under rubber dam isolation. The process was carried out using the ProTaper Universal rotary system with different irrigation solutions. Then, the root canal of the tooth was dressed with calcium hydroxide. The patient was warned to only ingest soft food for 1 week and oral hygiene instructions were given. An antibiotic was prescribed for 5 days and chlorhexidine rinses for 2 weeks.

The early follow-up intervals were on the third and seventh days to check the healing of the wound surfaces and the stability of the splint. 10 days after the trauma, the root canal of tooth #22 was obturated using AH Plus sealer and gutta-percha. The endodontic treatment



Figure 2. Radiographic images of the injured teeth. OPG X-ray and periapical radiographs.

OPG: orthopantomogram



Figure 3. Clinical image of the teeth #21 during surgical pulling down with forceps.

for teeth #11 and #21 was initiated and calcium hydroxide dressing was applied for 4 weeks. The splint was removed during the following visit (4 weeks after injury) and the teeth were examined clinically and radiographically. No abnormal mobility and no pain on percussion or palpation were detected in the teeth. Thirty-three days post-injury, the endodontic treatment of teeth #11 and #21 was completed (Figure 5). Then, the fractured teeth were restored with composite resin to satisfy the esthetic and functional demands of the patient (Figure 6).

The patient was advised to attend follow-up visits at 4-, 6- and 12-month intervals. However, the patient visited another dental clinic 4 years after

the trauma and a cone-beam computed tomography with periapical radiographs was taken. The clinical and radiographic examinations revealed good healing with the absence of any abnormalities (Figure 7). Informed consent was obtained from the patient who participated in this study.

DISCUSSION

The outcome of traumatic dental injuries is related to the time of treatment after trauma, the injury type, and the quality of treatment. It is important to consider that dental trauma complications such as root resorption and tooth necrosis can occur several months or even years after the injury.⁵ Lacerations of the lips caused by trauma lead to an increased risk of becoming infected with microorganisms.⁶ Thus, the lacerated lip was disinfected and the wound was sutured with a prophylactic broad-spectrum antibiotic treatment.

An intrusion injury, in which the periodontal ligament, root surface, and surrounding bone are severely damaged, is different compared to other luxation traumas. The survival of this type of trauma may be doubtful and there is a high probability of external root resorption.⁷ In our case, tooth #21 was repositioned surgically and fixed with a flexible splint for 4 weeks.

One of the major complications after dental trauma is root resorption. Due to the slow progress of resorptions, traumatic teeth should be followed up after treatment for a long period (up to 5 years).⁷ Factors such as necrosis of the pulp caused by trauma or the presence of bacteria inside the root canal may result from inflammatory resorption which can be controlled or prevented by effective root canal treatment.⁸ Replacement resorption (ankylosis) occurs due to prolonged or inappropriate management of traumatic injury.⁹ Previous studies have shown that the prevalence of the root resorption in avulsed or replanted teeth varied between 57% and 80% and, in intrusion trauma,



Figure 4. Flexible splint was used to fix the traumatic teeth with a control radiograph after fixing.



Figure 5. Post-obturation radiograph of teeth #11, #21 and #22.



Figure 6. Clinical image immediately after endodontic treatment and restoration procedures.



Figure 7. Four-year follow-up with clinical images, periapical radiograph, and CBCT images of teeth #11, #21, #22, respectively, showed complete healing of periapical bone without evidence of periradicular pathology or cervical resorption.

CBCT: cone-beam computed tomography

it was between 38%–66%.^{10,11} External root resorption is a pathologic process which occurs due to several factors including trauma, infection, orthodontic tooth movement or pressure, and it leads to inflammatory reaction and destruction of the protective barrier on the root surface. External root resorption after dental trauma is a high-risk complication and its treatment is unpredictable and often ineffective.¹²

In addition to surgical and orthodontic treatments, endodontic treatment is highly effective in the management of traumatic dental injuries. Endodontic treatment plays no role in treating teeth where external or replacement resorptions are seen, but it is effective in preventing the inflammatory resorption and maintaining the tooth for a longer time. Calcium hydroxide is considered the treatment of choice in the prevention of inflammatory root resorption due to its antibacterial effects and alkaline pH properties.¹³

MAIN POINTS

- Traumatic dental injuries are recognized as a public dental health problem worldwide.
- An appropriate clinical and radiological diagnosis plays a significant role in the management of dental trauma.
- Regular updates regarding knowledge in dental traumatology is required.

ETHICS

Informed Consent: Informed consent was obtained from the patient who participated in this study.

Peer-review: Externally peer-reviewed.

Authorship Contributions

Concept: M.A., U.A., A.A., K.O., Design: M.A., U.A., A.A., K.O., Data Collection and/or Processing: M.A., U.A., A.A., K.O., Analysis and/or Interpretation: M.A., U.A., A.A., K.O., Literature Search: M.A., U.A., A.A., K.O., Writing: M.A., U.A., A.A., K.O., Critical Review: M.A., U.A., A.A., K.O.

DISCLOSURES

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