



# Postrumatic immediate reattachment of a dehydrated tooth fragment – Case study

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## Abstract

**Introduction:** Among head traumas, dental injuries are highly correlated to sports activities, and their management can be a real challenge for practitioners of any specialty. In the case of trauma directed to dental structures, restorative solutions may not be sufficient to achieve a definitive and long-lasting treatment.

**Aim:** This paper aims to present a case report of a treatment of a tough post-trauma case of a patient after hitting the ball and show the outcomes of the implemented treatment.

**Case study:** We present a case report of a treatment 24-year-old patient who is a semi-professional football player. During the training, he lost 1/3 part of the coronal central incisor.

**Discussion:** The reattachment procedure was performed. The remaining tooth structure was treated with an 'etch and rinse' technique using a 3-step universal dental adhesive system. This procedure is flexible and permits minimally invasive therapy taking advantage of dental adhesion and allowing the restored tooth to obtain a fracture resistance compatible to the functional stress of a sound tooth. This technique compared to the prosthetic techniques, besides being more conservative, can produce immediate results without the need for various laboratory procedures, generating better patient compliance.

**Conclusions:** This therapy is particularly suitable for maxillofacial as it is minimally invasive, quick, and easy to perform.

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## 1. INTRODUCTION

Dental injuries are often associated with facial trauma. In the study by Gassner et al. among all facial injuries, 48% were classified as dental injuries.<sup>1</sup> According to the literature, the average incidence of this type of injury is estimated at 50%.<sup>2,3</sup> The patient's injury was categorized as a crown fracture and it affected upper left molar incisor (tooth number 21), without exposure of the pulp. The upper central incisors are the most commonly injured teeth among all of the teeth trauma cases. Within the upper incisors, 96% of injuries involve the central incisors of the jaw.<sup>1,4,5</sup> These types of injuries lead to the loss of enamel and dentin within the tooth with or without exposure to the pulp. To decrease the frequency of dental injuries preventive measures should be taken.<sup>6</sup>

Recent progress and innovative methods in the treatment of facial and dental injuries have improved functional and aesthetic results among those suffering dental trauma.<sup>1,3</sup>

The study presents the treatment of a 24-year-old, semi-professional football player, who lost 1/3 of the central incisor as a result of hitting the ball during training.

## 2. AIM

The study aims to present the treatment of difficult post-traumatic case and to show the results of the implemented treatment.

## 3. CASE STUDY

A 24-year-old semi-professional soccer player came to the dentist's office after he was injured during soccer practice. He suffered a crown fracture of the upper left central incisor during training. The tooth was delivered in a 0.9% NaCl solution at a temperature of 36.6°C 8 hours after the injury. X-rays and facial photographs were taken before treatment (Figures 1–3).

Vitality tests were made by spray containing etylium chloratum (orbis-dental) directly on an isolated tooth by robber dam and tooth mobility tests were also performed on the traumatic tooth. The periapical X-ray did not reveal any injuries to the tooth root. The fracture was located in the crown area with a well-visible fracture line.

The first stage of tooth repair included the isolation from saliva and blood with a rubber dam and local anesthesia to relieve the pain. Before placing the broken tooth fragment in its correct position the physiological place was verified. The broken part of the incisor was



**Figure 1.** X-ray of left central incisors directly after incident (lost 1/3 part of crown without pulp damage fully vital).



**Figure 2.** The 1/3 part of crown left central incisor fractured.



**Figure 3.** Extraoral photo of teeth and upper lip.

first attached to an adhesive transfer holder (Pic-n-stick, Pulpdent, Watertown, MA, USA).

The surface of the fragment was etched using 37% phosphoric acid gel, for 30 s enamel, 15 s with dentin. The surface was rinsed with distilled water and then covered with a 3-stage adhesive system (All-Bond, BISCO, Schaumburg, IL, USA).



**Figure 4. The X-ray and extraoral photos after treatment.**

At 10x magnification under an operative microscope, the broken fragment was correctly positioned in its physiological place. Subsequently, the adhesive system on the tooth fragment was cured using an LED lamp for 10 s 100 mW/cm<sup>2</sup> and 20 s 500mW/cm<sup>2</sup> on the labial and buccal sides. Finally, the fixed fragment was polished with the use of the iden-flex system with reduced granulometry. Photographs and X-rays of the tooth restoration result are shown in Figure 4. Post-traumatic follow-up examinations at 4 weeks and 6 months showed consistent results: no pain, no tooth discoloration, and a normal response to ethyl chloride.

## 4. DISCUSSION

In this case, the visible fractured surface was easily accessible.<sup>7</sup> The fragments should be stored in a suitable medium to avoid dehydration and possible discoloration. Other authors recommend placing it in a sealed container with the physiological solution at a temperature of 37°C.<sup>8–10</sup>

The technique of fragment reattachment presents numerous advantages compared to conventional restorative methods as it is more conservative and provides the clinician with the opportunity to restore the contour, architecture, and the original brightness of the tooth. The proposed technique for the use of one's fragment of a broken tooth is very predictable, fast, and aesthetic and does not require additional preparations.<sup>11</sup>

The fractures with pulp exposure, are categorized as complicated fractures, and the implementation of the endodontic treatment should be considered be-

fore the process of the direct fragment reattachment technique. This approach is particularly suitable for trauma teeth. In cases of tooth crown fracture with pulp injury, it is essential to start root canal treatment before the final cementation of the broken fragment of the tooth crown.<sup>12,13</sup> In this instance, it is required to conduct a thorough estimation of the biological width and execute minimally invasive endodontic access to ensure prolonged clinical success. The retention of the fragment is closely linked to the specific technique employed and the restorative materials utilized in the reattachment procedure.<sup>14</sup>

Various surgical techniques have been documented in the literature, ranging from minimal or no additional tooth preparation to diverse preparation alternatives, including the application of a circumferential bevel, the incorporation of an internal groove, the introduction of an external chamfer, and the utilization of a superficial over-contour of material along the fracture line.<sup>15–17</sup>

The researchers have assessed the functional and aesthetic results, the adaptability, and the enduring stability of a method involving the reattachment of a tooth fragment without the need for additional tooth preparation. This procedure is employed to restore crown fractures solely utilizing a bonding agent, providing a straightforward and immediate restoration of the tooth based on its structure.<sup>18</sup>

## 5. CONCLUSIONS

This type of treatment is particularly desirable because of its low cost, quickness, minimal invasiveness, and relatively easy conduction, with glued surfaces that are highly visible and easily accessible. The technique of broken fragments direct fixation is effective, and predictable and is an excellent alternative to direct and indirect restorations. In addition to its aesthetic value, the re-fixing technique is quick to perform. We reconstructed a completely broken tooth using a no-destruct part of enamel and dentin. With the single technique, we obtain optimal aesthetic results being able to satisfy most aesthetic and functional demands like before trauma.

## CONFLICT OF INTEREST

None declared.

## FUNDING

None declared.

## ETHICS

Informed consent was obtained from the patient to publish his anonymised medical data.

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