



Case Report

Management of Subluxation in the Esthetic Zone: A Case Report

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Received: 18 December 2023; Revised: 20 January 2024; Accepted: 27 January 2024

Abstract

Dental trauma occurs unexpectedly and without prior notice. Dental practitioners and their offices must be adequately equipped to quickly and properly treat patients who require emergency and urgent intervention to ensure the best possible outcome, and as soon as possible, with proper management protocols that will affect the future prognosis of the affected teeth. This report covers the case of a 13-year-old female patient who suffered partial subluxation of her left maxillary central and lateral incisors, difficulty closing her mouth, and soft tissue laceration. The case was treated immediately following the approved protocol and monitored for three years until the soft tissues were completely healed and the anterior permanent teeth were properly aligned.

Keywords: Dental trauma, Lateral luxation, Papillary regeneration, Pulp canal obliteration, Subluxation.

علاج الخلع الجزئي في المنطقة التجميلية: تقرير حالة

الخلاصة

تحدث صدمة الأسنان بشكل غير متوقع ودون إشعار مسبق. يجب أن يكون أطباء الأسنان وعياداتهم مجهزين بشكل كافٍ لعلاج المرضى الذين يحتاجون إلى تدخل طارئ وعاجل بسرعة وبشكل صحيح لضمان أفضل نتيجة ممكنة، وفي أقرب وقت ممكن، مع بروتوكولات العلاج المناسبة التي ستؤثر على الوضع المستقبلي للأسنان المصابة. يغطي هذا التقرير حالة مريضة تبلغ من العمر 13 عاماً عانت من خلع جزئي في القواطع المركزية والجانبية في الفك العلوي الأيسر، وصعوبة في إغلاق فمها، وتهتك الأنسجة الرخوة. تم علاج الحالة مباشرة وفقاً للبروتوكول المعتمد ومراقبتها لمدة ثلاث سنوات حتى تلتئم الأنسجة الرخوة تماماً ويتم محاذاة الأسنان الدائمة الأمامية بشكل صحيح.

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Article citation: Al-Aaloosi SRA. Management of Subluxation in the Esthetic Zone: A Case Report. *Al-Rafidain J Med Sci.* 2024;6(1):117-120. doi: <https://doi.org/10.54133/ajms.v6i1.511>

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INTRODUCTION

The kind, severity, and number of traumatic dental injuries per patient vary depending on their age and the cause of trauma [1]. Accidents are the leading cause of permanent tooth damage [2, 3], followed by traffic crashes, violence, and sports [4-8]. Trauma to the anterior teeth has a significant and negative impact on the patient's aesthetics, phonetics, and functional abilities [9]. It may also cause psychological trauma for both the parents and the affected children. Dental trauma effects may include pain, infection, changes in physical appearance, speech issues, and mental distress, all of which can have an impact on the child's quality of life [10]. Pedestrian, cycling, car-related, and violent traumas typically result in various tooth injuries, bone injuries, and soft-tissue injuries [11]. A rapid hit to the mouth cavity can cause many forms of injuries to the dentition and supporting tissues. Traumatic dental injuries to permanent teeth can be characterized as fractures, luxations, or avulsions [12]. Lateral luxation

is defined as "a displacement of the tooth in a direction other than axial." The periodontal ligament is ruptured, resulting in a contusion or fracture of the supporting alveolar bone [13]. In contrast, a concussion is an injury to the tooth's supporting components that does not result in mobility or displacement. It is typically distinguished by tenderness to percussion in both vertical and horizontal orientations. It could be accompanied with a crown fracture [14]. Pulp revascularization, reinnervation, rearrangement, and repair of periodontal ligament fibers are all likely to contribute to post-traumatic healing [15]. Immediate and effective therapy of dental damage will influence the long-term prognosis of the injured teeth [16]. Although concussion and subluxation are minor events with a high survival rate, they should be closely watched since they can lead to pulp necrosis or pulp canal obliteration [17,18]. The current case report presents the early management effects of injured maxillary incisors caused by violence in a 13-year-old female patient, with a nearly 3-year follow-up.

Case Presentation

A healthy 13-year-old girl came to our office after receiving a blow to the face during a quarrel with her younger brother, resulting in trauma to the anterior teeth. The accident occurred 30 minutes before her arrival, and she suffered serious psychological stress. Extra-oral examination revealed evident misalignment of the maxillary incisors, no shattered facial bone, and a normal TMJ. The patient couldn't close her mouth in the maximum intercuspal position, and an exam revealed that teeth 11 and 23 were sensitive to percussion. Teeth 21 and 22 were lingually displaced, and the interdental papilla between the maxillary central incisors was lacerated, as illustrated in Figure 1.



Figure 1: Case at presentation, A, frontal view, B, occlusal view.

Periapical radiography excluded root fractures but revealed an alveolar bone fracture (Figure 2A). The affected region experienced spontaneous and acute pain, as well as bleeding. Based on the above-mentioned information, the case was diagnosed with partial subluxation of tooth no. 11; lateral luxation of teeth 21 and 22; and concussion on tooth 23 with laceration of soft tissue and tearing of the interdental papillae between teeth 11 and 21. Local anesthetic was delivered after her parents provided informed consent and with the patient's approval. An attempt was made to force teeth 21 and 22 back into their sockets, but resistance was encountered, thus a decision was made to open a flap and do an open reduction.



Figure 2: X-ray Radiographs of the case; before reduction (A), after reduction (B), and 3 years after the accident showing pulp canal obliteration (C).

According to the International Association of Dental Traumatology (IADT) [12] and the American Academy of Pediatric Dentistry (AAPD) [13], the flap is stitched together with a vertical mattress suture, and the injured teeth are splinted with an orthodontic 0.016-inch stainless steel wire and composite resin (Figure 3).

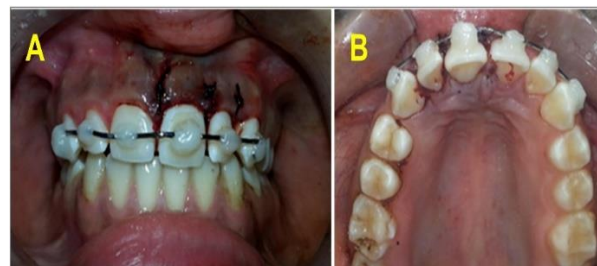


Figure 3: The case after reduction and fixation; frontal view (A) and occlusal view (B).

This should last for up to two weeks. A radiograph was performed following splinting to check adequate reduction (Figure 2B). Systemic antibiotics (amoxicillin 500 mg three times a day for seven days) and analgesic medications were administered as needed. The patient was given instructions on how to eat a soft diet and maintain proper dental hygiene. The suture was removed after 5 days, as indicated in Figure 4, and after two weeks (when the splint should have been removed), the teeth remained painful and movable, therefore the decision was made to keep the splint in place for another week.



Figure 4: Suture removal after 5 days from the accident; A, frontal view (A), and occlusal view (B).

The splint was removed three weeks later, and a fluoride gel with acidulated fluorophosphate (AFP) was administered (Figure 5). The case appeared to be stable, with no sensitivity in any tooth except 11, which was sensitive to percussion, and minor movement in teeth 21 and 22. A follow-up routine was implemented in the first month following the trauma, then after one month, six months, a year, and once a year.



Figure 5: Splint removal after 3 weeks from the accident; frontal view (A), and occlusal view (B).

After one month of removing the splint, the patient was evaluated again, and none of the teeth showed pain to percussion. A vitality test was performed, which

revealed a normal reaction with minimal mobility in teeth 22. The papilla between the central incisors was somewhat deformed but untreated for assessment. No radiograph was taken because the parents refused radiological intervention. They missed their follow-up visit for two years and eight months after the accident. The patient was about 15 years old, and she was quite pleased with the outcome. The patient had been diligent in brushing and flossing their teeth, and the deformed interdental papilla between the two maxillary central incisors had totally healed (Figures 6 and 7). Tooth 21 had a slight gray discoloration, but none of the front teeth pained or were sensitive to percussion.



Figure 6: Frontal view of the case 3 years after the accident, showing complete healing of the interdental papilla.

The vitality test revealed a normal reaction in all impacted teeth except tooth 21, which showed a minimal response to cold and electric pulp testing. A radiograph of tooth number 21 indicated pulp canal obliteration or calcification (PCO) (Figure 2C). The patient and her family declined any type of intervention.



Figure 7: Occlusal view of the case 3 years after the accident, showing proper alignment of anterior teeth.

DISCUSSION

Dental traumatic injuries account for 10-35% of the permanent teeth in the general population worldwide [19]. It is critical to treat luxated teeth straight away and ensure that they are properly aligned so that the patient does not have any issues and the periodontal ligament and neurovascular supply heal as rapidly as possible [13]. In this case, the patient experienced a hit to the face [8], resulting in lateral luxation of the left maxillary central and lateral incisors. The luxated teeth were lingually displaced, preventing the patient from closing her mouth in the maximal inter-cuspal position, despite

the fact that she was 13 years old at the time of the incident, indicating developed roots and closed apical foramina. Damage to the pulp and periodontal ligament occurs when teeth are luxated or displaced. Nonetheless, a youthful patient typically has a high rate of posttraumatic recovery [21]. Immature permanent teeth have a higher healing capacity than teeth with a closed apical foramen, and the prognosis is good even after late repositioning [22]. However, delayed treatment might make repositioning difficult due to the development of organized blood clots inside the socket, which makes repositioning of luxated teeth challenging. Thus, rapid repositioning leads to a safer and faster resolution of the issue, as well as improved healing and a better prognosis [16]. Our patient underwent immediate therapy within an hour of the incident, as documented by Anderson *et al.* (2002) [21], which improved the outcome. Laterally luxated teeth frequently develop post-trauma sequelae, such as pulp canal obliteration (PCO) or pulp necrosis. The survival percentage of appropriately treated lateral luxated teeth is 100% [23]. PCO, also known as calcified transformation of the dental pulp, is one of the most prevalent issues that can arise after permanent teeth go loose on the side with completely formed roots (closed apical foramen) [18]. It was observed in 24.3% of instances with laterally luxated teeth analyzed by Pozzi and von Arx [15], about 40% of cases by Nikoui *et al.* [23], and 5.7% of cases with completely grown roots (8 teeth out of 141 cases studied by the author). PCO is a natural mechanism in which odontoblasts deposit reparative dentine in a tooth that has previously been injured but not controlled [25]. It is more likely to be seen in young permanent teeth, especially those with open apices, during trauma [26]. It also appears to occur more commonly following certain traumatic dental traumas, such as extrusive and lateral luxation, as well as in avulsed teeth that were immediately replanted [27,28]. Histological alterations in the PCO indicating the onset of this problem are a significant finding, however they are not well understood in clinical settings [18]. Clinical signs of PCO include yellowish to grayish staining of the crown, a complete absence of sensitivity to heat stimuli, and complete or partial obliteration of the pulp canal system on conventional radiography [20,29]. The preservation of the interdental papilla is essential for the functional and aesthetic rehabilitation of dental treatment [30]. The interdental attachment is composed of a supracrestal attachment that extends from the cemento-enamel junction to the bottom of the pocket in the interproximal area [31]. Tarnow *et al.* found that the papilla was present 98% of the time when the contact point was less than 5 mm away from the bone crest. However, it was only present 56% of the time when the distance was 6 to 7 mm [32]. Based on the evidence presented above and the fact that the patient in this report had no periodontal disease, it is possible to conclude that the interdental papilla between the maxillary central incisors healed fully after two and a half years of follow-up. However, no specialized periodontal surgery was used to repair the damaged papilla discovered 7 weeks after the incident.

Conclusion

Injuries to the permanent maxillary incisors can have a significant impact on the patient's appearance and can affect their social and psychological well-being. According to the clinical case presented, prompt and evidence-based intervention for the soft tissue injury and affected teeth significantly influences the healing process of both soft and hard tissues, as well as the overall health of the affected teeth.

Conflict of interests

No conflict of interests was declared by the author.

Funding source

The author did not receive any source of fund.

Data sharing statement

Supplementary data can be shared with the corresponding author upon reasonable request.

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