Management of Subluxation in the Esthetic Zone: A Case Report

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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.
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.

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

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 cementoenamel 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

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REFERENCES
