

Severe intrusion on permanent teeth: what to expect?

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ABSTRACT

Intrusive luxation, although rare, is the most severe form of traumatic dislocation emergencies. Axial shock causes considerable pulpal and periodontal complications. The treatment is complex since the prognosis is often unfavorable with inevitable complications. The therapeutic modalities in mature teeth depends mostly on the impaction's degree but also on the age of the child.

The aim of this paper is to report a case of an intrusive luxation occurring on left upper permanent central incisor which has been repositioning surgically within 15 days with 18 months of follow-up.

Keywords

Intrusive luxation, Mature teeth, Surgical repositioning, Immediate repositioning.

Introduction

Dental intrusion also called impaction or luxative intrusion correspond to the axial displacement of the tooth into the alveolar bone causing usually a perforation of the alveolar bone [1]. Uncommon, it represents between 0.3 to 1.9% of permanent teeth dislocation. It occurs mostly on children between the ages of 6 and 12 and generally affects a single tooth, especially the central or the lateral maxillary incisor [2,3].

It's a "real" emergency, corresponding to the most severe trauma among all dental dislocations causing inevitable pulpal and periodontal healing complications. Therefore, their care is a real challenge since the prognosis is often unfavorable.

The purpose of this article is to report a case of an intrusive luxation on an upper right permanent mature central incisor which have been repositioning surgically within 15 days with an 18 months follow-up.

Clinical Case

M.Z is 13-year-old boy who consulted the pediatric dentistry

department, 15 days following a public road accident. The patient has previously been admitted in hospital for tetanus prophylaxis. General examination didn't reveal any systemic disease neither any known drug allergy. Extraoral examination revealed a wound in the nose and a preexistent suture in the left labial margin [Figure 1a].

Intraoral examination revealed a severe papillary inflammation related to the presence of plaque deposits. The examination of traumatized tooth showed a difference of height between the incisal edge of tooth 11 which is shorter than that of the contralateral. There was also an enamel dentin fracture on tooth 21 [Figure 1b].

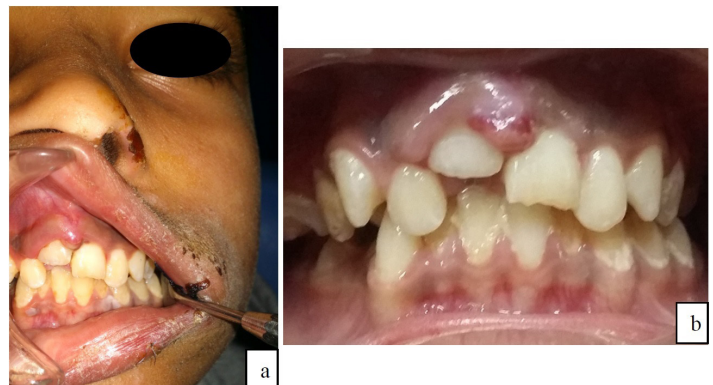


Figure 1: Clinical examination.

a: extraoral examination : wound in the nose and suture in the left labial margin.

b: intraoral examination : tooth 11 is shorter than the controlateral teeth (7mm) and tooth 21 showing an enamel-dentin fracture.

Panoramic X-ray confirmed the integrity of bones structures. It was supplemented by a retroalveolar radiography showing the cemento-enamel junction level located more apically than tooth 21 with no root or alveolar fracture. [Figures 2a,b].



Figure 2: Radiographic examination.

a: panoramic X-Ray: integrity of bones structures.

b: retro alveolar X-ray :cemento-enamel junction of tooth 11is located more apically than tooth 21.

Clinical and radiological features pointed to diagnosis of severe intrusion for the upper right central permanent incisor and to enamel dentin fracture for the upper left central permanent incisor.

The immediate management of our case consisted on an active surgical repositioning of the impacted teeth using forceps. Then a non-rigid splint was immediately bonded with an extension from tooth 25 to 15 that was maintained for a period of 8 weeks. The pulp protection of tooth 21 was performed in the same session (Figure 3).

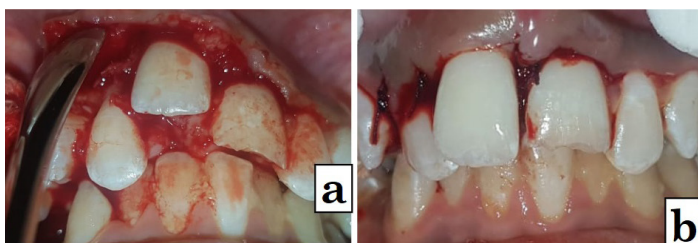


Figure 3: Surgical repositioning step by step. a: intrasulcular incision.

a: flap detachment.

b: immediate result after suturing.

At the end of this first visit, the patient received an antibiotic prescription, an analgesic and an antiseptic were also prescribed. Postoperative instructions were provided to our patient including oral hygiene advice with a soft toothbrush and dietary advice to avoid any additional trauma. One week later, an endodontic therapy on the impacted teeth was performed.

After 18 months of regular clinical and radiological follow-up, the teeth is fully functional and there was no problem found (Figure 4).



Figure 4: Clinical result.

a: immediate after splinting.

b: at 18 month.

Discussion

Intrusive luxation occurring on permanent teeth is one of the most severe form of tooth movement [1]. The neurovascular tooth's system and the periodontal ligament suffer from considerable damage. The pulp will likely be necrotic and the periodontal fibers are dilated and / or crushed, resulting in root resorption and marginal bone loss. Indeed, the treatment strategies for dental intrusions must be focused on eliminating or reducing the extent of these healing complications [4,5].

The clinical diagnosis is based on a difference of height in the incisal edges positions between the affected and unaffected teeth and on a high metallic note on percussion. This metallic sound allows the differential diagnosis with a delay of eruption, especially in mixed dentition [6,7]. Radiographic examination allows to determine the impaction's degree, the stage of root edification, the presence of alveolar or radicular fracture as well as a possible damage of the contralateral teeth. On retro-alveolar radiographs, the cemento-enamel junction comparison between the impacted tooth and the erupted teeth, is a good indicator of impaction degree [6,7].

The treatment option for intruded teeth are observation for spontaneous eruption, orthodontic repositioning or surgical repositioning [7,8]. Both the American Academy of Pediatric Dentistry (AAPD) and the Royal College of Surgeons of England (RCSE) guidelines propose the same management options. The only difference is the classification of the intrusion's severity (chart 1).

| Intrusion's degree (mm) | Management options in mature teeth |
|-------------------------|--|
| Mild<3mm | Observation for spontaneous eruption After 2-weeks : orthodontic repositionning |
| Moderate 3-7mm | Surgical repositioning ++ Orthodontic repositionning |
| Severe > 7 mm | Surgical repositioning |

Chart 1: Treatment indication referring to clinical situation [8].

The degree of intrusion can be difficult to assess in some clinical situation, especially for patient with crowded teeth or when the contralateral tooth is absent or had a loss of tooth structure like in our case.

The most significant decision factors reported for the treatment outcome in mature teeth are the degree of intrusion and the age of the patient [9]. Moreover, the International Association of Dental Traumatology (IADT) recommends considering the type

of treatment for intrusions on an individual basis, with taking into consideration the time elapsed since the trauma, patient cooperation and motivation.

There is, however, no consensus about the optimal treatment to minimize the occurrence of complications. The ideal treatment option for a traumatically intruded immature incisor remains indeed controversial [10-12].

In our case as the intrusion was severe, and delay of consultation was long we oriented our treatment to immediate surgical repositioning. This option permits a rapid recovery of the original tooth position that promotes periodontal healing and early endodontic access which may also minimize the risk of root resorption. Another important aspect that should be taken into consideration is the major psychological impact of the dental injury on both the parents and the young child. However, as risk of periodontal lesions can be raised because of surgical manipulation [6], excessive elevation was avoided and care was taken to prevent inadvertent touching of root surface.

A regular follow up that can predict any healing complications was scheduled. Each follow-up session consisted on a percussion test and radiological examination and showed that the repositioned tooth is asymptomatic.

Clinical and radiological control at 8 weeks to deposit the splint revealed that tooth 11 was asymptomatic unlike the tooth 21 which has a sign of pulp necrosis for which we immediately initiate an endodontic therapy. At, 6, 9 months then at one year the follow-up was satisfying with no signs of complications.

The patient was seen again at 18 months, where the first signs of ankylosis was clinically detected by a metallic sound at percussion and a disappearance of lamina dura was detected on the radiography (Figure 5). Root resorption occurs on 2 out of 3 times on permanent teeth and replacement resorption (ankylosis) represent one of the most favorable outcome because it allows the alveolar bone to continue to develop, thus preserving bone dimensions for a subsequent prosthetic rehabilitation [5,6].



Figure 5: Radiographic result.

a: at 8 weeks.

b: at 18 months.

The other major healing complications is marginal bone loss which occurs approximatively in half of the time [6]. Immediate cervical bone loss at repositioning was detected in our case. It is inevitable because of the thickness of the inter dental bone and the bone destruction due to the severity of the trauma. We noted that marginal bone situation at 18 months was corresponding approximatively to the same situation to that seen radiographically at the day of repositioning.

However Andreasen and al. stated that severe healing complications could be seen as late as 5 to 10 years after trauma [5]. Our presented case is still under observation in order to make early diagnosis if any additional sign of complications occurs.

Conclusion

Intrusive luxation, although rare, is the most severe form of traumatic emergencies. Successful treatment requires rigorous clinical and radiographic examination that allows reasoned decision-making. A regular follow up is essential to intercept the inevitable healing complications for the success of treatment in the short, medium and long term.

Dentists must Be aware of the importance of treatment of intrusive tooth even if the prognosis seems to be compromised. The conservation of the tooth even for a short period of time, can significantly improve the life quality of the child and his parent.

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