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Case Report

Management of Three Different Situation of Dental Intrusion

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Abstract

Intrusive luxation is a traumatic injury characterized by a displacement of the tooth toward the alveolar bone. Its main causes are road traffic accidents, sports activities, and falls. Treatment strategies include waiting for spontaneous re-eruption, immediate surgical repositioning, and repositioning through dental traction by orthodontic devices.

Many factors will guide us to take the right therapeutic decision such as; the degree of root formation, the patient's age, and intrusion severity. This study aimed to report three patients that suffered permanent incisor (PI) traumatic injury who had a different root development and different evolution.

Keywords: *Dental Intrusion; Intrusive Luxation; Traumatic Injury*

Introduction

Intrusive luxation is a rare type of dental injury in which the tooth is displaced further into the alveolar bone by a traumatic force. It comprises 0.3% to 1.9% of all traumatic injuries in the permanent dentition, and peak incidence is in the 6 - 12 years age group [1]. In a retrospective study of the etiology and pathogenesis of traumatic dental injuries, Andreason found that of 2239 injured permanent teeth, only 3% were luxated intrusively [2]. It essentially concerns the upper anterior block following an axial shock.

Dislocation by intrusion is a serious dental injury that damages different structures of the tooth moved in the alveolar process. Thus, the repair process is very complex in case of dental intrusion [3], different type of complication can occurs, even pulpal (pulp necrosis, partial/total pulp canal obliteration, disturbance in continued root development) or periodontal complications (external/internal root resorption, loss of marginal bone support, replacement resorption/ankylosis and gingival recession) [4].

The management of intruded permanent tooth may consist of (i) allowing spontaneous re-eruption, (ii) surgical repositioning and fixation, (iii) orthodontic repositioning, [5,14].

Despite the variety of treatment modalities, rehabilitation of intruded teeth is always a challenge. The present clinical report shows the management and evolution of three patient with dental intrusion.

Clinical Cases

Clinical Case1

A 12 years old female consult our department of dental medicine 24 h after a road traffic accident. The exobuccal examination show bruising of her upper and lower lips (Figure1).

Figure 1: *Bruising of the lips.*

The endobuccal examination reveal a severe intrusion and rotation of tooth 11 and an amelo-dentinal fracture of teeth 11 and 21 (Figure 2).

Figure 2: *Tooth11: severe intrusion, tooth 21: simple amelo-dentinal fracture.*

A panoramic radiograph was made showing an open root apex of the intruded tooth (Figure 3).

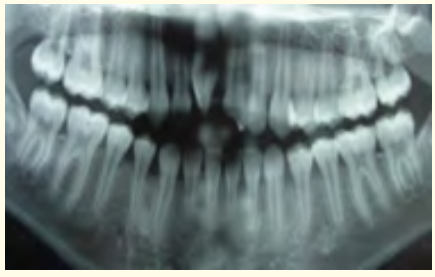

Figure 3: *No root or alveolar fracture 11: Open root apex (stage 9 of Nolla).*

Surgical reduction was made followed by flexible splint with acier wire 0.4 and resin composite on palatal surface and resine composite on vestibular surface (Figure 4).

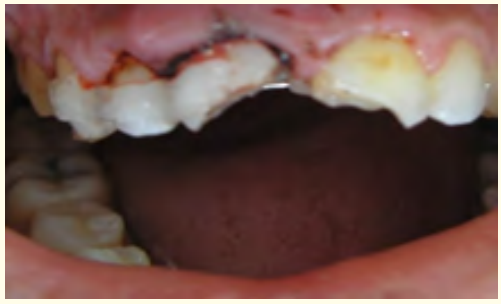

Figure 4: *Flexible. splint: wire 0.4 and resin composite (on palatal), resin composite(on vestibular)fr 4 weeks.*

Endodontic treatment was done 2 weeks later and root canal was filled with hydroxide calcium during 14days followed by gutta percka filling (Figure 5).

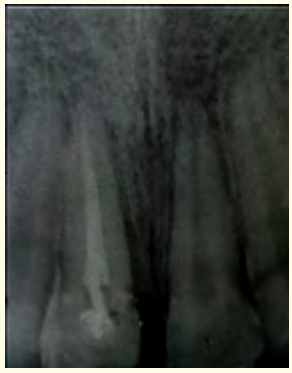

Figure 5: *Endodontic obturation after4 weeks.*

After coronal restoration was made with resine composite a clinical control was made 2 month later showing a good evolution and aesthetic integration of the two intruded teeth (Figure 6).

Figure 6: *Clinical control (2 months).*

Clinical Case 2

A 9 years old male who is victim of Scholar accident consult us 3hours after the injury (during an acute phase). The endobuccal examination reveal a total intrusion of tooth 11 and severe intrusion of tooth 21 (Figure 7).

Figure 7a: *Intraoral examination vestibular vue 11: total intrusion, 21: severe Intrusion.*

Figure 7b: *Intraoral examination palatal vue simple amelo-dentinal fracture of teeth 11 and 21.*

A periapical radiograph was taken showing an immature permanent teeth of both intruded incisors (only stage 8 of Nolla) (Figure 8).

Figure 8: *Radiological examination: 11,21: Open root apex (stage 8 of Nolla).*

A surgical repositioning (Figure 9) with forceps was done after local anesthesia followed by radiological control of repositioning (Figure 10).

Figure 9: *Surgical Repositioning tooth 11,21.*

Figure 10: *Radiological control of repositioned tooth.*

A flexible splint was made from tooth 13 to tooth 23 during 4 weeks.

The amelo-dentinal fracture was covered by Caoh2 photopolymerisable and cement glass ionomere to prevent pulp necrosis.

Due to the immaturity of the two intruded teeth (stage 8of Nolla), the low thickness of the root walls and the large apical diameter, we chose to abstain on endodontic treatment, to monitor the patient given the possibility of pulp regeneration.

At the control appointment after 1 month we remove the splint (Figure11), the pulp vitality of the intruded teeth was verified with cold test, we do not have any radiological signs of pulp complication (Figure 12). We decided to give the next appointment of control after 3 months but the patient is lost of sight.

Figure 11: *Clinical control after 4 weeks.*

Figure 12: *Radiological control after 4 weeks: no signs of pulp complications.*

Clinical Case 3

A 25 years old healthy female was referred by the emergency department to our department of dental medicine in the evening, following traumatic injuries to her teeth caused by a fall.

Extra-orally, we note a bruising of the lower lip, and sutured wound on her chin (Figure 13).

Figure 13: *Exobuccal examination Bruising of the lips, sutured wound on the chin.*

Intra-orally, she presented moderate intrusive luxation of 11, 21 (less than 7 mm) associated to an amelo-dentinal fracture of both intruded teeth (Figure 14).

Figure 14: *Endobuccal examination: 11-21: moderate Intrusion: amelo-dentinal fracture.*

Pre-operative radiograph showing intruded #11 and #12, no alveolar fracture was detected (Figure 15).

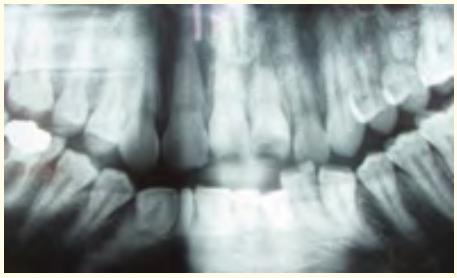

Figure 15: *No root or alveolar fracture 11-21: closed root apex.*

Following IADT protocol, we can choose orthodontic or surgical repositioning we opt the second alternative which is less time consuming treatment suitable for our patient, the emergency treatment consisted, under local anesthesia on repositioning the intruded teeth with forceps (Figure 16) followed by radiological control (Figure 17) and flexible splinting using 0.5 diameter Steel wire with composite resin (Figure 18).

Figure 16: *Repositioning tooth 11-21.*

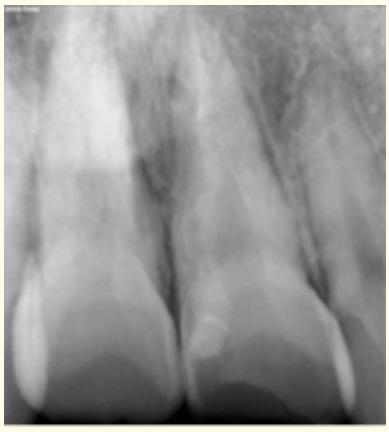

Figure 17: *Radiological control of repositioned tooth.*

Figure 18: *Flexible splint: wire 0.4 and resin composite (4weeks).*

After 2 weeks, the root canal treated was performed in 11, 21 using rotary instruments [ProTaper Universal, Dentsply Maillefer, Ballaigues, Switzerland] and filled with hydroxide calcium. Definitive obturation and splint remove were done after 4 weeks (Figure 19). The teeth were then restored with resin composite. Referring to the IADT reassessment protocol followed with revisions at 6-8 weeks, 6 months with radiological (Figure 20) and clinical control (Figure 21) showing a marginal bone loss.

Figure 19: *Endodontic obturation (4weeks).*

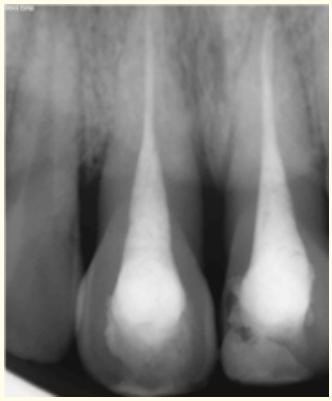

Figure 20: *Radiological control after 6 months (no signs of resorption or ankylosis).*

Figure 21: *a: Clinical control after 6 months, b: marginal bone loss on tooth 11.*

Discussion

Therapeutic decision

Management of intrusion is influenced by the extent of injury and the stage of root development (immature or mature root) [7]. The treatment modalities include passive repositioning that allow the immature tooth to re-erupt and active repositioning for permanent tooth that include orthodontic repositioning or immediate surgical reduction [8].

The therapeutic decision largely influences the evolution and the type of healing, spontaneous re- eruption being most favourable.

Spontaneous re-eruption of immature teeth has been recommended for moderate intrusion (less than 7 mm) and little intrusion (less than 3 mm) for mature permanent tooth.

In mature permanent teeth with severe intrusion (> 7 mm), surgical repositioning must be followed by root canal treatment. This treatment was, performed in severely intruded teeth with completed or almost completed root development like the first case presented in this paper. This will allow to reduce the tension on the periodontal fibers and consequently less replacement resorption may occur [9]. It is less time-consuming and requires fewer patient visits [10]. Surgical repositioning had the least favorable outcome, it might also have induced additional trauma [15]. This is in contrast to the finding of Al-Badri., *et al*. [11] thinking that the occurrence of root development was related to the severity of the original injury and the stage of root development rather than the repositioning procedure.

In surgical reduction, more risk of marginal bone loss was noted, this finding can be explained by the severity of the injury rather than the technique.

Orthodontic traction is suited for the management of moderately (3 - 7 mm) intruded mature permanent teeth or severe intruded immature permanent tooth (Table 1) [11].

Situation	Immature permanent teeth	Mature permanent teeth
	• Intrusion < to 7 mm wait for spontaneous re-eruption	• Intrusion < to 3 mm wait for spontaneous re-eruption
	• Intrusion > to7 mm: orthodontic or surgical repositioning	• Intrusion from 3 to 7 mm Orthodontic or surgical repositioning
		• Intrusion > to7 mm: Surgical repositioning

Table 1: *Treatment indication referring to clinical situation.*

Splint

Intruded teeth were stabilized with the non-rigid (flexible) splint. It allowed the physiologic mobility that helped in the repair of the periodontal ligament. Endodontic treatment was started after at least two weeks to facilitate the healing of periodontal ligament tissue. Calcium hydroxide was used as an intracanal medicament to reduce the likelihood of root resorption that is associated with traumatic dental injuries and particularly in the case of dental intrusions [12].

Therapeutic decision and prognosis depend on the maturity of the tooth, severity of the injury.

Pulp survival

In intrusive luxations, there is always damage both to the pulp and the PDL.

It is well known that pulp survival more likely occurs in immature than in mature teeth after luxation injuries and that revascularization might occur in dental intrusion even in replanted immature teeth, this explain our attitude in the second case to wait for possibility of

revascularisation. In teeth with almost closed or closed apices, the outcome was less successful and earlier pulp depulpation was recommended; this is our decision in the first and third case reported in this paper. On the other hand, the long-term prognosis after endodontic treatment is good in mature teeth [15].

Complications and Parameters influencing prognosis

Intrusive injury in permanent tooth is one of the most severe luxation injuries. Various complications like pulp necrosis, marginal bone loss [6]; observed in our third case (in which we proposed the treatment by a bone and gingival graft but the patient refused and she is satisfied with the result especially she does not have a gingival smile) and all types of external root resorptions (surface, infection-related, ankylosis-related and invasive cervical resorption) have been pooled.

Many parameters influence prognosis :first the time elapsed between trauma and consultation it should not exceed 24 hours to release the contact between bone and root in order to limit the risk of ankylosis, second we must cover exposed dentin in cases of enamel-dentine fracture to avoid pulp necrosis, third the type and duration of splint it is recommended to don't exceed six to eight weeks and to use flexible splint, finally the monitoring of the traumatised teeth is very important at different appointment: after 2 weeks, 4 weeks,6 or 8 weeks, 6 months, 1 year and every year up to 5 years to detect and intercept certain complications [13].

Conclusion

Rehabilitation of traumatically intruded teeth is a challenge since the repair process is complex after intrusion. The present clinical report shows a successful multidisciplinary treatment of moderate, severe intrusive luxation.

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