Dental Traumatology 2006; doi: 10.1111/j.1600-9657.2006.00351.x

DENTAL TRAUMATOLOGY

Case Report

Surgical repositioning of traumatically intruded permanent incisor: case report with a 10-year follow up

Nelson-Filho P, Faria G, Assed S, Pardini LC. Surgical repositioning of traumatically intruded permanent incisor: case report with a 10-year follow up. © Blackwell Munksgaard, 2006.

Abstract – This report describes the case of a 10-year-old boy that was referred to the pediatric dentistry clinic 15 days after sustaining a severe traumatism that led to complete intrusion of the maxillary left mature permanent central incisor. The intruded tooth was repositioned by using surgical extrusion. Endodontic therapy was performed with calcium hydroxide-based paste as root canal dressing and root canal filling was performed with a calcium hydroxide-based root sealer and gutta-percha points. The post-operative course was uncomplicated, with both clinical and radiographic success up to 10 years of follow up. In this case surgical repositioning combined with endodontic therapy constituted a viable alternative treatment for intrusive luxations in mature permanent teeth.

Paulo Nelson-Filho[1], Gisele Faria[1], Sada Assed[1], Luiz Carlos Pardini[2]

[1]Department of Pediatric Clinics, Preventive and Social Dentistry, Faculty of Dentistry of Ribeirão Preto, University of São Paulo, Ribeirão Preto, São Paulo, Brazil; [2]Department of Morphology, Stomatology and Physiology, Faculty of Dentistry of Ribeirão Preto, University of São Paulo, Ribeirão Preto, São Paulo, Brazil

Key words: intrusion; traumatism; permanent teeth

Prof. Dr Paulo Nelson-Filho, Departamento de Clínica Infantil, Odontologia Preventiva e Social, Faculdade de Odontologia de Ribeirão Preto/USP, Avenida do Café, s/n, Ribeirão Preto, SP 14040-904, Brasil
Tel.: +55-16-6024099
Fax: +55-16-6330999
e-mail: nelson@forp.usp.br

Accepted 15 December, 2004

Intrusive luxation is an uncommon event that corresponds to only 3% of all traumatic injuries in permanent dentition (1). Since intrusion is a complicated and severe luxation injury, the healing process subsequent to trauma is complex (2). Complications include pulp necrosis, inflammatory root resorption, dentoalveolar ankylosis, loss of marginal bone support, calcification of the pulp tissue, paralysis or disturbance of root development and gingival retraction (3, 4). Overall, the management strategies for dental intrusions must be focused on eliminating or reducing the occurrence of these complications (4).

Although the optimal treatment for traumatically intruded permanent incisors has not yet been determined, three treatment approaches have been reported (2, 5–7): wait for the spontaneous re-eruption, which is indicated for immature permanent teeth, and surgical or orthodontic repositioning, for mature teeth.

This paper describes the treatment management of a traumatically intruded mature permanent central incisor by surgical repositioning.

Case report

A 10-year-old male patient was seen at the Pediatric Dentistry Clinic of the Faculty of Dentistry of Ribeirão Preto, University of São Paulo, 15 days after he had fallen down the stairs at home and injured his maxillary central incisors.

Although the time elapsed since the traumatism was remarkably long, the guidelines for management of trauma patients were followed. The patient was first examined for extraoral signs of injury, including swelling, changes in the color of the skin

and asymmetry of the face and head. The facial bones and mandible were palpated to assess the mouth opening. Inspection of the nostrils revealed no perforation. Areas of ecchymosis, crepitus or pain upon palpation were not observed, which removed the suspicion of underlying fractures.

Intraoral examination revealed slight extrusion of the maxillary right permanent central incisor, absence of the maxillary left permanent central incisor and purulent exudate draining from the region corresponding to the left one (Fig. 1). The radiographic examination showed the root of the right permanent central incisor to be completely developed, with the apical foramen closed, and revealed complete intrusion of the maxillary left permanent central incisor, with concomitant crown fracture without pulp involvement (Fig. 2).

Since the orthodontic movement of the intruded tooth was not a viable approach at that moment, surgical repositioning was elected as the treatment of choice. Incision was done, a vestibular flap was elevated, and the intruded incisor was repositioned with dental forceps (Fig. 3). During extrusion, excessive elevation was avoided and care was taken to prevent inadvertent touching of root surface.

Suture was accomplished and the tooth was immobilized in its new position by means of a 0.6 mm stainless steel wire and light-cured resin composite splinting (Z-100, 3M do Brasil Ltda, Sumaré, SP, Brazil). Antibiotic therapy was prescribed for 7 days, with amoxicillin 500 mg, three times per day. The patient was instructed on eating habits and was strongly encouraged to maintain good oral hygiene.

One week after surgery, the endodontic therapy of the right and left permanent central incisors was initiated. Both teeth exhibited external inflammatory root resorption. Root canals were instrumented with step-back technique and copiously irrigated with 2.5% sodium hypochlorite. The canals were filled with a calcium hydroxide-based paste associated to polyethyleneglycol 400 (Calen, S.S. White Artigos Dentários, Rio de Janeiro, RJ, Brazil)[1].

Fig. 1. Clinical appearance 15 days after traumatism with absence of the left permanent central incisor crown.

Fig. 2. Radiograph appearance 15 days after traumatism, showing complete intrusion of the maxillary left permanent central incisor.

Fig. 3. Surgical repositioning of the maxillary left permanent central incisor with dental forceps.

[1]An amount of 2.5 g calcium hydroxide, 1 g zinc oxide p.a., 0.05 g colophony, 2 ml polyethyleneglycol 400, 0.04 g paramonochlorophenol.

Tooth splinting and sutures were removed 15 days after the surgical intervention.

The root canal dressing was changed every 30 days for 4 months (Fig. 4) until control of resorption was confirmed radiographically. Both teeth were then filled with gutta-percha points and a calcium hydroxide-based sealer (Sealapex – Sybron/Kerr, Indústria e Comércio Ltda – Guarulhos, SP) (Fig. 5) and restored with a light-cured resin composite (Z-100, 3M do Brasil Ltda, Sumaré, SP, Brazil).

Fig. 4. Antibacterial dressing with calcium hydroxide paste.

Fig. 5. Obturation of root canals with gutta-percha and sealer following 4 months with calcium hydroxide treatment.

Radiographic and clinical controls of the treatment mode were conducted at 3, 6, and 12 months and then at yearly recalls. At the 10-year recall, the gingival margin of the repositioned left incisor was located more apically than that of the right incisor. In addition, although the intruded tooth had been surgically repositioned to the same incisal level of the right incisor, it appeared in slight infraocclusion in relation to the homologue, which gave rise to suspicion on ankylosis (Figs 6 and 7). Notwithstanding these aspects, the periapical radiolucency and areas of external inflammatory root resorption were resolved and the intruded tooth was clinically asymptomatic, with healthy surrounding periodontal tissues and no loss of marginal bone support.

Fig. 6. Clinical appearance 10-year follow up.

Fig. 7. Radiograph 10-year follow up. Cemental healing appears to have taken place.

Discussion

According to Andreasen and Andreasen (4), in the majority of the cases, the treatment of choice for traumatically intruded permanent teeth with complete root formation should be the orthodontic repositioning rather than the surgical repositioning.

It is mandatory that the tooth be sufficiently repositioned within 2–3 weeks to perform the endodontic therapy (4), since pulpal necrosis has been reported to occur in almost 100% of the cases of intruded teeth with complete root formation (3) and an external inflammatory root resorption may be radiographically evident 2 weeks after the trauma (2). Therefore, in the current case, considering that the intrusive injury had happened 2 weeks before the patient sought for treatment, one decided for the surgical repositioning instead of the orthodontic extrusion.

Authors such as Çaliskan (8), Çaliskan et al. (9) and Ebeleseder et al. (10) have recommended the surgical repositioning as the treatment of choice for intrusive luxations in permanent dentition. Nevertheless, Andreasen and Andreasen (4) deliberate that the additional trauma that may be caused to the periodontal structures during the surgical repositioning procedures could increase the possibility of postoperative complications, such as external root resorption and loss of marginal bone support.

Ebeleseder et al. (10) analyzed 58 traumatically intruded and surgically extruded permanent teeth and observed that the greater the manipulation during the surgical repositioning procedures, the higher the incidence of ankylosis. However, the surgical extrusion was not found to have any influence on the loss of alveolar bone support (10). According to these authors (10), the advantages of the surgical repositioning include being an easily handled treatment approach and replacing the tooth in its original anatomical condition, thereby yielding the healing of the adjacent tissues, as well as the endodontic access at the right moment. Even though, it is accepted that total dislocation of the root from the socket during the surgical repositioning procedures coupled with occasional additional damages to the periodontal ligament may substantially increase the risk for dental ankylosis.

In the case reported in this article, the surgical repositioning of the intruded tooth was performed to obtain root canal access and yield endodontic therapy to be rendered as earlier as possible, with the prospective of arresting the external inflammatory root resorption progress and preventing the tooth to be prematurely lost.

Andreasen (11) advocates that the time interval between the occurrence of an intrusive injury and the surgical repositioning of the intruded tooth is a decisive factor accounting for the development of external root resorption. The author reported that teeth repositioned within 90 min after trauma showed less root resorption than those replanted lately. Kirinos and Sutcliffe (12) observed that the retention rate of traumatically intruded teeth that were surgically repositioned more than 24 h after suffering an intrusive injury was significantly lower than that of teeth whose repositioning was not delayed. The outcomes of this case report show that, although the intruded incisor, was surgically repositioned 15 days after the patient had sustained the traumatic intrusion, the treatment mode was rendered successfully.

Çaliskan (8) and Çaliskan et al. (9) described the management of three cases of maxillary permanent central incisors, one with complete root formation and two with incomplete root development, which sustained intrusive luxation. The teeth were surgically repositioned 7 and 21 days after trauma, respectively, immobilized with interdental sutures and surgical dressing, and endodontically treated. Clinical and radiographic follow up of approximately 24 months after the surgical extrusion revealed satisfactory apical healing and healthy supporting tissues, with no evidence of ankylosis or loss of marginal bone support.

These findings are in agreement with those of the present report, which showed that the treatment approach adopted for the management of an intruded mature permanent central incisor was successful up to 10 years of follow up. The periapical radiolucency and areas of external inflammatory root resorption were resolved and the tooth remained in the oral cavity in general good conditions. Although the repositioned incisor appears in slight infraocclusion in relation to the homologue, which suggests the development of areas of ankylosis, it is worthy to mention that the patient is now 20-year old. Considering that the progression of ankylosis depends on the patient's age, or more specifically on the bone growth and remodeling rate (2), it may be assumed that if ankylosis has developed, it is likely to continue progressing very slowly, thereby allowing the maintenance of the tooth in the oral cavity for an indeterminate time.

Overall, the treatment of traumatic dental intrusions, and every trauma intervention alike, should be guided by application of ultimate scientific evidence and research-based knowledge integrated with the clinician's expertise. The outcomes of this case report showed that surgical repositioning combined with endodontic treatment constitutes a viable and lasting alternative treatment for intrusive luxations in mature permanent teeth.

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