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Surgical repositioning of a traumatically intruded permanent incisor in a patient with rheumatic fever: case report

CASE REPORT

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Abstract – Intrusive luxation of permanent teeth is a relatively uncommon type of injury to the periodontal ligament. However, it is one of the most severe types of dentoalveolar trauma. By definition, intrusive luxation consists of the axial displacement of the tooth into the alveolar bone, accompanied by comminution or fracture of the alveolar bone. Here we report the treatment management of a traumatically intruded immature permanent central incisor by surgical repositioning undertaken in a 10-year-old child with rheumatic fever 10 days after sustaining a severe dentoalveolar trauma. The intraoral examination showed the complete intrusion of the permanent maxillary right central incisor and the radiographic examination revealed incomplete root formation. Prophylactic antibiotic therapy was prescribed and the intruded tooth was surgically repositioned and endodontically treated thereafter. The postoperative course was uneventful, with both clinically and radiographically sound conditions of the repositioned tooth up to 3 years and 2 months of follow-up. These outcomes suggest that surgical repositioning combined with proper antibiotic prophylaxis and adequate root canal therapy may be an effective treatment option in cases of severe intrusive luxations of permanent teeth with systemic involvement.

Intrusive luxation consists of the axial displacement of the tooth into the alveolar bone (1–4), usually accompanied by comminution or fracture of the alveolar bone (5). The maxillary central incisors are the most commonly affected teeth, followed by the maxillary lateral incisors, rarely occurring in the mandibular arch (5). Intrusive luxation is an uncommon event in the permanent dentition and corresponds to only 1.9% of all traumatic injuries (2). It is considered one of the most severe types of injury to the periodontal tissues because it causes great damages to soft (gingival, periodontal and pulpal tissues) and hard (alveolar bone) tissues (1, 5). Most cases belong to the 6–12 year-old-age groups and there is a slight predominance of male over female patients (2). The main etiologic factors are falls, bicycle accidents, traffic accidents and sporting activities. Children with accentuated overjet and inadequate labial sealing are at higher risk of sustaining traumatic injuries (5).

Different diagnostic approaches may be used in cases of intrusion, namely, clinical examination, including pulp vitality tests, degree of mobility, reduced crown size of the traumatized tooth, and radiographic examination, which are important to determine injury extension, stage of root development, periodontal ligament space obliteration and possible damage to the adjacent teeth (1, 2, 5). The potential consequences of a traumatic injury include pulp necrosis, root canal obliteration, inflammatory root resorption, ankylosis, gingival recession and loss of supporting marginal bone (2, 6). These events may range according to the stage of root development, extension of intrusion and case management (1, 6).

According to the literature, the treatment options include spontaneous re-eruption, surgical repositioning and orthodontic repositioning (2–4, 6–12). The treatment approach should be based on the patient's general health status, age, type of dentition, stage of root formation and time and severity of the traumatic injury (4, 12).

Here we report the treatment management of a traumatically intruded immature permanent central incisor by surgical repositioning undertaken in a child with rheumatic fever 10 days after sustaining a severe dentoalveolar trauma.

Case report

A 10-year-old male patient was referred to the Pediatric Dentistry Clinic of the Federal University of Ceará, Brazil, 10 days after sustaining a traumatic injury to the maxillary anterior region.

During the clinical interview, the patient's parent reported that the child had been diagnosed with rheumatic fever and was under medical treatment with administration of intramuscular injections of G penicillin at 20-day intervals.

The intraoral clinical examination revealed the complete intrusion of the permanent maxillary right central incisor as well as presence of gingival inflammation and edema in the traumatized area (Fig. 1). Preoperative

Fig. 1. Intraoral clinical view 10 days after trauma.

Fig. 2. Periapical radiograph taken 10 days after trauma.

radiographs confirmed the intrusive luxation of the tooth, which presented open root apex (Fig. 2). There was no damage to the adjacent teeth or to the surrounding anatomic structures.

As part of the treatment plan, the patient was submitted to preoperative adequacy of his systemic condition. The intruded incisor was surgically repositioned 7 days after the first visit. Root canal therapy started 1 week after repositioning with bimonthly changes of a calcium

Fig. 3. Periapical radiograph taken after crown opening and placement of a calcium hydroxide-based intracanal dressing 20 days after trauma.

hydroxide-based paste used as an intracanal dressing (Calen®, S.S. White Artigos Dentários Ltda, Rio de Janeiro, RJ, Brazil) (Fig. 3) and use of saline as an irrigant, during a period of 1 year until compete root formation was confirmed (Fig. 4a). Thereafter, root canal filling was performed with zinc-oxide-and-eugenol-based sealer (Endofill, Dentsply Ind. e Com. Ltda., Petrópolis, RJ, Brazil) and lateral condensation of gutta-percha cones (Fig. 4b). The endodontically treated tooth was restored with composite resin (Z-100, 3M/ESPE, St Paul, MN, USA). The patient attended clinical and radiographic controls on a three-monthly basis after completion of the treatment. The postoperative course was uneventful and uncomplicated, with both clinically and radiographically sound conditions of the repositioned maxillary central incisor up to 3 years and 2 months of follow-up (Fig. 5).

Discussion

There are several divergences regarding the management of permanent teeth that had sustained intrusive luxation (1, 2, 4). The currently accepted recommendations are based on the findings of longitudinal clinical studies (4, 7, 12) and comprehend three treatment modalities: (1) watchful waiting for spontaneous re-eruption, which is a manner of avoiding additional injury to the periapical and marginal periodontal tissues, is indicated for

Fig. 4. Radiographic control 1 year after trauma.

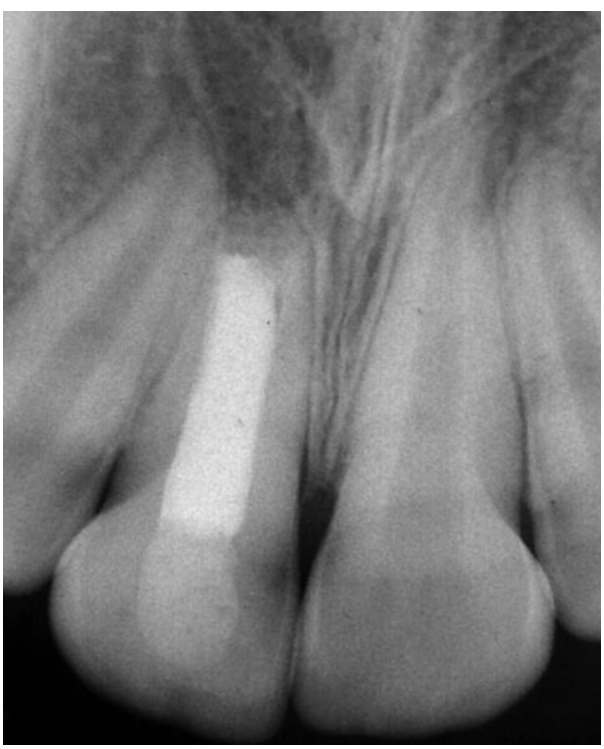

Fig. 5. Radiographic control 3 years and 2 months after trauma.

immature teeth but not for permanent teeth with complete apexification (3–5); (2) surgical repositioning, which is indicated for cases of completely intruded teeth (2–4), as a manner of eliminating bacterial contamination from the coronal surface, alleviating areas of periradicular compression and reducing the osteoclastic activity around the traumatized tooth (4); (3) orthodontic repositioning (2–4, 6, 8), which allows remodeling of the supporting bone and adequate repositioning of the tooth within 2–3 weeks, thus reducing the occurrence of inflammatory root resorption (3).

In the present case, specifically, surgical repositioning was the treatment of choice for the following reasons: first, to manage the patient's systemic condition (rheumatic fever), avoiding any intervention that could possibly expose the child to an infection and hence increase the risk of bacterial endocarditis; second, because the traumatized tooth was completely intruded and preventive root canal therapy could not be undertaken in that way.

The early complications observed in traumatically intruded permanent teeth are, mainly, pulp necrosis and external root resorption. Other consequences secondary to intrusive luxation are ankylosis, loss of supporting marginal bone, gingival recession and root canal obliteration (1–3, 7).

In the case reported here, after 3 years and 2 months of treatment, no adverse events were observed either clinically or radiographically. These outcomes suggest that surgical repositioning combined with proper antibiotic prophylaxis and adequate root canal therapy may be an effective treatment option in cases of severe intrusive luxations of permanent teeth with systemic involvement.

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