Dental Traumatology

Dental Traumatology 2010; **26**: 360–362; doi: 10.1111/j.1600-9657.2010.00885.x

Acute treatment of a concomitant horizontal root fracture and luxation of the coronal fragment of the right upper central incisor: a case report

CASE REPORT

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Accepted 23 January, 2010

Abstract – We report a case of a horizontal intra-alveolar root fracture between the middle and apical third of the upper right central incisor associated with an extrusive luxation of the coronal fragment, in a 24-year-old male patient. Twenty minutes after being accidentally hit by a metallic device, the patient's coronal portion was repositioned and splinted under local anesthesia. After that, we lost sight of the patient. One year later, the patient showed up. The splint was lost, the tooth showed physiological mobility and responded to pulp testing. Radiographs showed healing of the horizontal fracture and normal periodontal ligament.

Trauma to the oral region is common amongst all facial injuries and occurs in 5% of all cases (1). Crown fractures and luxations of the upper anterior region are the most frequently seen (1). In permanent teeth, Majorana et al. (2) reported a prevalence of root fractures of 7.7% of all injuries. The middle-third of the root is more affected than the coronal and the apical thirds. Clinically, the usual appearance is a luxation injury of the coronal fragment, varying in severity. The tooth has increased mobility, with bleeding from the periodontal ligament and injuries to other tissues. The patient reports pain during occlusion. Radiographic examination confirms the diagnosis of root fracture and reveals a horizontal or radiolucent line separating the displaced coronal fragment from the apical one (3).

Pulp vitality preservation is better in horizontal root fractures than in luxation injuries without root fracture (4). Immediate treatment is successful in nearly 80% of the cases (5).

We report a case of an acute treatment of a horizontal fracture between the middle and apical thirds of the root associated with a severe luxation of the coronal fragment of the upper right central incisor.

Case report

A 24-year-old male patient presented at the emergency of the Endodontics Department, at the Dental Clinic of Monastir, Tunisia, with pain upon biting in his maxillary right central incisor. He reported being accidentally hit, 20 min earlier, by a metallic device while being at work.

Clinical examinations revealed a wound of the chin, gingival hemorrhage and a mild injury of the internal side of the lip. The upper right lateral incisor showed an uncomplicated crown fracture. The central incisor was extruded, displaced palatally and was slightly mobile (Fig. 1). Palpation of the buccal mucosa revealed an extrusion of the root through the fractured alveolar bone. Radiographic examination showed a horizontal fracture nearly in the middle third of the root and extrusion of the coronal fragment. The apical fragment was not displaced (Fig. 2).

After disinfection with chlorhexidine 0.12% and local anesthesia with a vasoconstrictor (adrenaline 1 : 100.000), the immediate treatment was repositioning by digital pressure, of the coronal fragment to a close contact with the apical part. Flexible splinting was performed using a nylon fish line bonded to adjacent teeth (lateral incisor–lateral incisor) with composite resin (Fig. 3). The wound in the chin was disinfected and sutured.

Postoperative radiograph showed optimal reposition of the luxated coronal fragment (Fig. 4). Gentle tooth brushing and rinsing with an antiseptic were recommended. The patient was referred to the department of periodontology for periodontal care.

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Fig. 1. Clinical view showing luxation of the coronal fragment of the right upper central incisor. The crown was palatally displaced and the fractured root was extruded through the alveolar bone.

Unfortunately, the patient had been abroad for 1 year, after which, he contacted our department to have remains of the composite resin removed. Clinically, the patient had poor oral hygiene. The splint had disappeared and the composite resin was discolored. The right central incisor was well positioned, with physiological mobility and the crown was not discolored. The occlusion was normal (Fig. 5). Percussion testing revealed no pain. The pulp responded to vitality testing with cold spray. Radiographic examination revealed healing of the horizontal fracture (Fig. 6). The patient was advised to maintain a good oral hygiene.

Fig. 3. Clinical view of a nylon fish line-composite resin splint in place.

Discussion

We think that it is noticeable that the patient was treated only on the day he presented at the emergency, without being controlled and monitored for pulp and periodontal healing according to the International Association of Dental Traumatology (IADT) (3, 6). Although spontaneous healing of horizontal fractures have been reported in the literature (7), we do believe, in the present case, that the dentist's intervention was important because the coronal fragment was extruded, displaced and blocked into the fractured alveolar bone and needed to be repositioned into its original location. After 1 year, the pulp remained vital and the test was positive.

Fig. 2. Initial radiograph revealed horizontal root fracture between the middle and apical thirds.

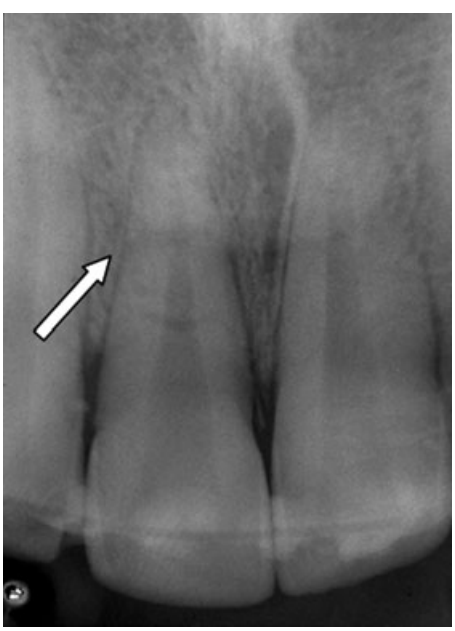

Fig. 4. Immediate radiograph after the tooth repositioning. Note the close contact between the coronal and the apical fragments.

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Fig. 5. Clinical view 1 year after. The tooth is well-positioned. Splinting material is still present but the previously splinted tooth is no longer splinted.

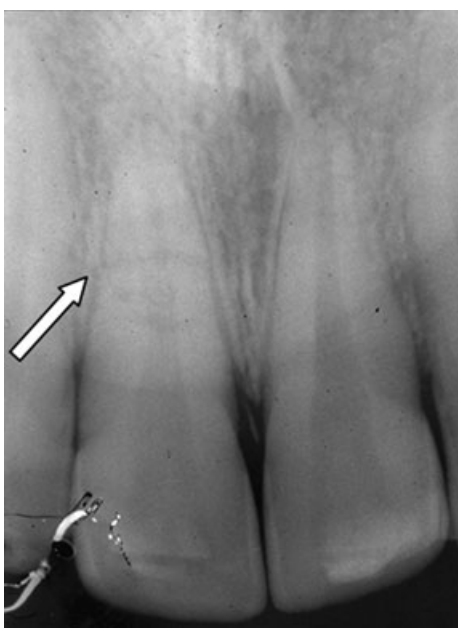

Fig. 6. Postoperative radiograph confirming healing of the horizontal fracture.

Postoperative radiograph confirms root fracture healing process after appropriate treatment, by deposition of calcified tissue between the fractured fragments. Andreasen et al. (8) and Cvek et al. (9) reported, in large series of intra-alveolar root fractures, a healing rate by hard tissue fusion of the fragments of 30% and 33%, respectively. Odontoblasts and cells from the cementum are involved in this process (10). As the patient could not remember the circumstances of the loss of the splint, we suppose, according to the IADT (3), that 4 weeks were sufficient to favor cicatrization. Repositioning seems to favor pulp healing and hard tissue repair (8, 11).

It was demonstrated that root fractures have good prognosis. The overall healing is of 78% according to Andreasen et al. and Cvek et al., respectively (8, 12).

In conclusion, we believe that the immediate treatment of the intra alveolar root fracture with the severely displaced coronal fragment was important for the good prognosis. Moreover, this case shows that an intra alveolar root fracture has a good prognosis also in adults.

Acknowledgements

The authors thank Miss Neziha Berrezouga for revision of the manuscript.

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