CASE REPORT

Alveoler process fracture in mandibular immature permanent incisors region

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Abstract

The presented case evaluates the treatment of an alveolar fracture associated with mandibular immature lower permanent incisors. An 8-year-old girl was referred to our clinic 3 hours after the trauma. The clinical and radiographic examination of the alveoler bone showed a fracture, along with the mandibular fracture and significant segment mobility and dislocation of several immature mandibular permanent incisors. These were moving together to the lingual side because of the direct trauma associated with falling from the school wall. After the application of the buccal and lingual infiltration of local anaesthesia, the dislodged bone including the lower permanent incisors, were carefully repositioned. The teeth were splinted using semi-rigid arch bars with orthodontic brackets keeping the teeth between primary molars.The splints were removed one month later and no abnormality was observed in the immature permanent incisors. After 24 months follow up, the mandibular permanent incisors were observed to have the apical closure. Treatment of alveolar fractures in growing children with immature teeth may provide beneficial healing pattern with careful semi-rigid splinting and follow up procedures.

Keywords: Direct trauma, Alveolar Process Bone Fracture, Immature Teeth.

Introduction

Dental trauma is a significant problem that may have serious outcomes on children and their parents.[1] Traumatic injuries in permanent dentition can appear rather severe, particularly when dental tissue injuries are associated with trauma to the supporting tissues.[2] It was reported in a study that bone, facial lamella and alveolar process fractures constitute 50%, 23.9% and 4.4% of the total with various levels, respectively.[3] A common location of the alveoler process fracture is the anterior region. The fracture line may be positioned beyond the apices, but in the most cases involves the alveolar socket.[1,4] Approximately one half of all jaw fractures involve teeth in the fracture and most of these are found in the mandible. The location of jaw fractures is significantly related to the state of the dentition involved.[5] The presence of a marginal periodontal bone defect also seems to be related to the location of a fracture line. In children, developing permanent teeth located in the line of the fracture, are usually seen in the mandibular canine and incisor regions.[6] Treatment of fractures of the alveolar process includes reduction and immobilization. Generally, laterally luxated incisors need repositioning and splinting if alveolar fracture occurred, although in some cases they may return to their original position.[3,7] After administration of local anaesthesia, the alveolar fragment can commonly be repositioned and splinted. Splinting of alveolar fractures can be achieved by means of an acid-etch/resin splint or arch bars. A fixation period of 4 weeks has been adviced.[4] Treatment of trauamatized immature permanent teeth is especially complicated due to the potential harm to the permanent tooth collaterally.[3,7] Whereas mandibular incisors and canines are less prone to trauma compared with their maxillary peers, mandibular and maxillary fractures are more frequently observed compared with other maxillofacial constituents.[8] The healing patterns of alveoler bone fractures are not much more evident according to the limited previous findings hence the pulp necrosis,infection related resorption ankylosis resorption and tooth loss are potential complications which highlight the importance in alveolar fractures.[8,9]

This case report contributes to the treatment procedure and follow up data of alveolar fracture associated with mandibular immature lower permanent incisors for 24 months.

Case Report

An 8-year-old girl was referred to Karadeniz Technical University, Faculty of Dentistry, Department of Paediatric Dentistry, 3 hours after trauma on 18 August 2011. A paediatrician in a local hospital had examined the patient and found no neurological injuries. General physical examination was normal. The child was referred the patient for treatment and evaluation of the trauma to our specialized centre. The patient had no records of her past medical history. The extraoral examination revealede that the symphis region had been damaged due to the trauma which was evident due to presence of bruises. Moreover,intraoral examination revealed the segment mobility was affected with displacement of several immature mandibular permanent incisors moving

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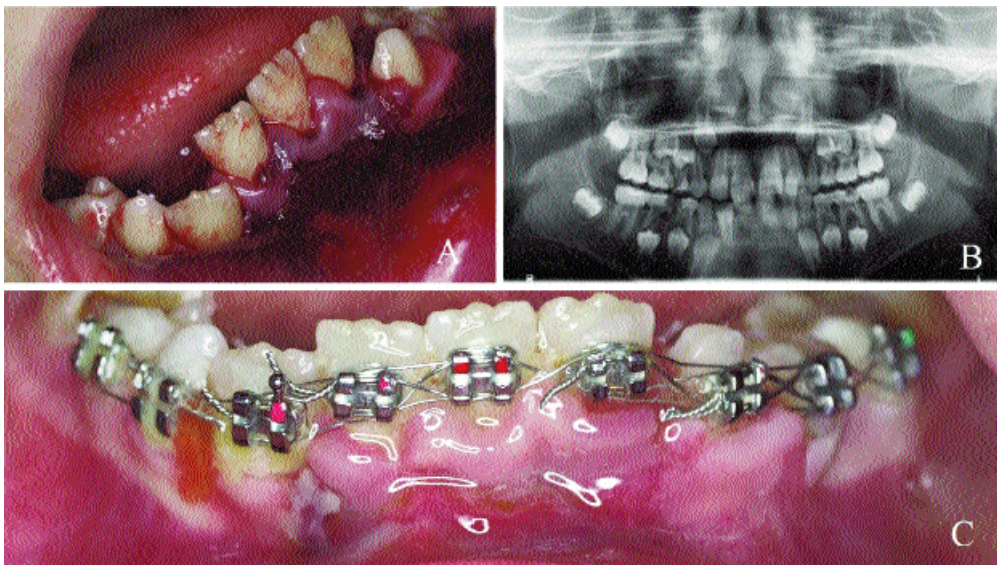

Figure-1: A) Intraoral view of the patient with mandibular fracture. B) Initial orthopantomograph of the teeth associated with mandibular fracture. C) Intraoral view of the splint.

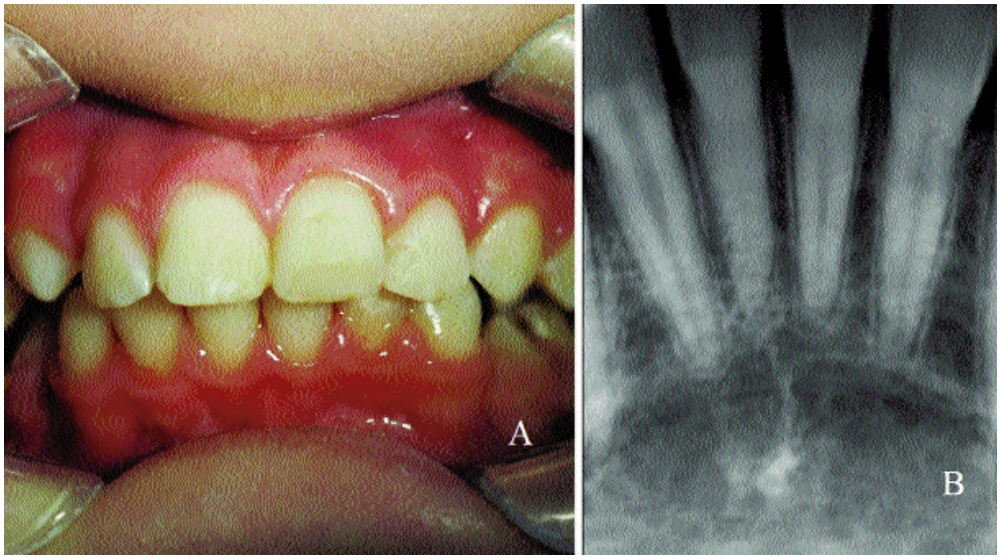

Figure-2: A) Intraoral view of the vital permanent incisors 24 months follow up. B) Radiograph of the vital permanent incisors with the apical closures 24 months follow up.

together to the lingual side with excessive bleeding around the affected region of gingiva (Figure-1A). (The radiographic examination showed that the vertical line of the fracture ran along to the PDL septum and the horizontal line was located from the marginal to the basal bone. Also, the enamel dentin fracture of upper permanent central teeth was observed (Figure-1B). The parents accepted the treatment plan which was designed as manual repositioning of the mobile segment with splinting for four weeks. The written informed consent was provided and local anaesthesia was applied and soft tissue injuries were irrigated with serum physiologic and examined for the presence of foreign inclusions.

Subsequently, the dislodged bone including the lower permanent incisors was carefully repositioned. The teeth were splinted using semi-rigid arch bars with orthodontic brackets by etching the teeth between primary molars (Figure-1C). Additionally, the fractures of upper central teeth were restored with composite. The patient agreed to obtain radiographs for the validation of true reduction of dislocated teeth. The paediatric dentist prescribed amoxicillin and ibuprofen (2x per day for 7 days at appropriate dose according to the patient's weight) and 0.1% chlorhexidine mouth rinse (twice a day for one week). Follow-up visits were arranged for the patient. Soft-tissue healing was obtained on the second-week visit. The splints were removed 1 month later and no symptoms were observed in the immature permanent incisors. The mandibular permanent incisors were observed as vital with the apical closure by providing the regular careful follow-up procedures as for giving a spontaneous vital healing chance to the open apices teeth instead of application of any invasive endodontic or surgical treatment (Figure-2A,2B).

Discussion

It has been reported that dislocated alveolar fractures could be seen as a mobile unit segment with related teeth in alveoler process bone fracture cases.[1,2,9] As for the treatment options, the fractured alveolar segment can be repositioned and dislocated teeth are brought back to an

appropriate position manually or by using forceps.[1,9] In this case report, the repositioning of the mobile segment was provided by manual technique.

Following repositioning, the teeth should be splinted in a semi-rigid fashion by using suture splint, arch bar splint, flexible wire-composite, rigid wire-composite, composite splint, orthodontic splint[1,6,9] and also the soft tissue injuries should be sutured.[9] The short time periods have much more importance in terms of the interval of injury and splinting procedure. If the splinting procedure could be completed within one hour, the pulp necrosis can be less frequent compared to the longer periods.[6,9] Moreover, two-three weeks of immobilization is generally necessary even for complex mandibular fractures.[9] The splints are held in place 3-4 weeks according to the instructions of International Academy of Dental Traumatology (IADT).[9] Following the above mentioned rules,[1,6,9] the fixation was provided within 3 hours with the proper arch bar splints for four weeks period in the presented case. Thus, the treatment modality which was used in this case could be considered as much as acceptable according to the common protocols.

However, it should be kept in mind that careful regular follow-up is obligatory because of the possible complications such as pulp necrosis, pulp canal obliteration, ankylosis, inflammatory root resorption, surface resorption and bone loss in alveoler process bone fracture.[1,2,9] Pulp necrosis and periapical inflammation are important becuase of the unfavourable consequence of supporting bone injuries and their development depends on the type of injury and the stage of root maturation of mobile teeth.[1,9] According to limited previous data, the most frequent complications in immature teeth could be obtained as pulp canal obliteration or surface resorption.[9] In the present case report, probably owing to the open apices and proper manual splinting in a reasonable period interval between the injury and treatment, the incisors did not lose their vitality at 24 months period. Even the 24 months follow-up period is acceptable, the prolonged (e.g. up to 10 years) observation period should not be overlooked for supporting bone tissue fractures particularly those occuring in immature teeth region because of the lack of knowledge in similar cases.[1,2,9]

The splint was removed after one month since alveolar bone and the teeth demonstrated stability. Epidemologic data did not give a consensus on the long term prognosis of primary and permanent teeth involved in alveolar fractures with immature teeth. Additionally, limited recently published outcomes of IADT[2,9] indicated pulp necrosis, canal obliteration, surface resorption and bone loss in closed apices teeth seems to be more frequent compared to the open apices for three years follow up period. Therefore, the need for publishing more cases regarding the results of alveolar process bone fracture healing with mature and immature teeth should be carefully evaluated for proper future treatment planning. The outcomes of IADT guidelines[9] may also be beneficial for a conservative treatment approach with favourable clinical healing patterns by ensuring a chance to the open apices teeth.

Conclusion

Treatment of alveolar process bone mobile unit fractures in growing children with immature teeth, may provide beneficial conservative healing pattern with immediate careful splinting and long term follow up procedures.

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Conflict of Interest: No.

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