CONCUSSION AND INTRUSIVE LUXATION OF MAXILLARY PRIMARY CENTRAL INCISORS: CASE REPORT

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ABSTRACT

There are several subcategories of luxation injury which include concussion, subluxation, lateral luxation, extrusive luxation and intrusive luxation. Concussion is the case in which the tooth is sensitive to percussion but has not been displaced and is not abnormally mobile while intrusive luxation involves the displacement of the tooth apically into the alveolar socket. The purpose of this article is to present a case of a 3-year-old boy in whom two primary maxillary central incisors were subjected to concussion and intrusive luxation. Clinical and radiographic examinations are described. The outcomes of the two central incisors were not different from each other except in the time of the periapical abscesses formation at 19 and 34 months after injury even though they sustained different injuries from similar trauma.

INTRODUCTION

Traumatic injuries are unexpected and inconvenient. Approximately half of children sustain some type of dental injury and treated for dental emergencies. The classification of luxation injuries by Andreasen and Andreasen describes five categories of injury in increasing order of severity, based on anatomic, therapeutic and prognostic considerations. These subcategories of luxation injury include concussion, subluxation, lateral luxation, extrusive luxation and intrusive luxation. Concussion is the case in which the tooth is sensitive to percussion but has not been displaced and is not abnormally mobile. Intrusive luxation is the case in which the tooth has been displaced and is firmly embedded in bone. Intrusive luxation is a relatively common luxation injury to the primary dentition. A study analyzed traumatic injuries in the primary dentition found that falling was the most common cause of injury (82%), followed by striking against objects (13%). Most injuries in children with primary dentition (68%) occurred at home. Intruded primary teeth should be evaluated clinically and radiographically to detect evidence of fracture of either the root or alveolar bone, the direction of the displacement and damage to the unbone. Developing permanent tooth. Foreshortening of the intruded incisor in andentition. Geographic exposure normally confirms this direction of displacement. Thus, when intrusive displacement occurs, the primary tooth usually remains labial to the developing permanent tooth. In such cases, reeruption of the primary incisor is anticipated and normally occurs within a maximum of 6 months after the injury. If no signs of reeruption appear after 3 to 4 weeks, the primary tooth should be extracted. Several factors may affect intruded primary teeth and their reeruption. The teeth that were intruded more than half their clinical crown more rarely reerupted, or they became necrotic within the first 6 months. Also, in children with digit or tongue habits the pressure from these habits seems to prevent the tooth from reerupting. In addition, many teeth rotate as they are intruded so that when they have reerupted they have been in traumatic occlu-

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sion. If the crown of the intruded primary tooth is dislocated labially, the root apex is displaced lingually and encroaches on the developing permanent tooth bud. If contact with the permanent tooth bud is suspected clinically and verified with a lateral anterior radiograph, the primary incisor should be removed. In cases in which intrusive complications is significant, the primary incisor should be monitored indefinitely, as the risk of late procedure or extraction. The status of intruded teeth pulpal degeneration that necessitate either a pulpectomy that reerupt should be monitored closely for signs of prevention of damage to the succedaneous teeth. In a study of intruded primary teeth, 91% erupted spontaneously and pulp obliteration occurred in 34%. No data were given on pulp necrosis. Most reerupted primary teeth retain their vitality and later undergo normal resorption; they are replaced on schedule by their permanent successor. However, a necrotic pulp may develop in some of these teeth and in such instances, the teeth must be extracted. The most prevalent treatment recommendation is to allow the intruded tooth to reerupt, provided it is positioned facially away from the developing permanent tooth bud. Reeruption should occur within one to six months with incisal movement being evident in four weeks. If incisal movement is not evident within this time or if the intruded primary tooth is displaced in a palatal direction toward the underlying permanent tooth, it should be extracted. Intruded primary teeth that reerupt should be monitored closely for signs of pulp degeneration that necessitate either a pulpectomy procedure or extraction. The status of intruded teeth should be monitored indefinitely, as the risk of late complications is significant.

**CASE REPORT**

A three-year-old Saudi boy presented to the postgraduate pediatric dentistry clinic, College of Dentistry, King Saud University for dental treatment. A thorough assessment and examination included medical history, clinical examination, radiographic examination and photographic documentation. The father reported that the child fell down 13 months earlier while he was playing. No history of pain or discomfort reported by the patient. Patient medical history was uneventful with only one previous visit to a dentist 8 months following the accident. Extraoral examination and a thorough assessment of soft-tissue revealed no abnormalities. Intraoral examination revealed no evidence of caries and intruded maxillary left permanent central incisor. Assessment of the occlusion and temporomandibular joints were within normal limit. The patient's periodontal status of the injured tooth, adjacent and opposing teeth and their supporting structures were examined carefully and were within normal limit. Radiographic examination of the intruded maxillary left primary central incisor revealed no evidence of any abnormality. In addition, the maxillary right primary central incisor and lateral incisors revealed no evidence of any abnormality. At the conclusion of the assessment the child's condition was explained to the father who was informed about the possible complications and prognosis of the maxillary primary central incisors as well as the need for continuous follow-up appointments. Patient was scheduled for recall follow-up after 6 months. Documentation and recording all findings were done.

Patient was seen 6 months following his first visit (19 months following the accident). Clinical examination revealed periapical abscess with labial fistula of the maxillary right primary central incisor. Radiographic examination revealed a periapical radiolucency and evidence of root resorption. (Figure 1). Local anesthesia was administered and the maxillary right primary central incisor was extracted. Patient was scheduled for recall follow-up after 6 months.

The patient did not keep his follow-up appointment and came 21 months following his first visit (34 months following the accident) for emergency visit. Clinical examination revealed mobility and evidence of periapical abscess of the intruded maxillary left primary central incisor (Figure 2). Radiographic examination revealed a periapical radiolucency and evidence of root resorption. (Figure 3). Local anesthesia was administered and the maxillary left primary central incisor was extracted (Figure 4). Patient was scheduled for recall follow-up after 6 months.

**DISCUSSION**

The purpose of this article is to present a case of a 3-year-old boy in whom two primary maxillary central incisors were subjected to concussion and intrusive luxation. Regardless of whether a patient has an isolated injury or a combination of traumatic injuries a thorough examination should be performed and the general considerations apply. However, management of injuries to the anterior teeth of preschool children should be directed toward minimizing potential dam-
age to the developing permanent teeth; therefore, heroic measures to save primary teeth are not indicated. In the present case no attempt was made to keep the maxillary central incisors after showing signs of infection.

The outcome of dental injuries is influenced by patient age, severity, treatment and timely followup. Concussion injuries often go unreported. This may be due to their minor nature resulting in little or no bleedings. In the present case clinical examination revealed no signs of mobility and radiographic evaluation revealed normal periodontal membrane space. As no abnormalities were found, no treatment was required. It is known that treatment of a concussion injury generally requires no treatment or little relieving of the occlusion. Little chance exists for any negative sequelae to a primary tooth as a result of an isolated concussion injury. However, this was not the case in the present condition in which periapical abscess with labial fistula of the maxillary right primary central incisor was seen 6 months following his first visit to the dentist (19 months following the accident). Most reerupted primary teeth retain their vitality and later undergo normal resorption; they are replaced on schedule by their permanent successor. However, a necrotic pulp may develop in some of these teeth and in such instances, the teeth must be extracted.

Because of the severity of injury to the periodontal membrane space, pulp and alveolar bone, the management of intrusive luxation is more challenging and is fraught with a higher incidence of complications. The treatment of intruded primary teeth is debatable but the main concern is the prevention of damage to the succedaneous teeth. Most reerupted primary teeth retain their vitality and later undergo normal resorption; they are replaced on schedule by their permanent successor. However, a necrotic pulp may develop in some of these teeth and in such instances, the teeth must be extracted. In the present case clinical examination revealed no signs of mobility and

Fig 1. A radiograph showing a periapical radiolucency and evidence of root resorption of the maxillary right primary central incisor.

Fig 2. Intraoral photograph showing the intruded maxillary left primary central incisor.

Fig 3. A radiograph showing a periapical radiolucency and evidence of root resorption of the maxillary left primary central incisor.

Fig 4. A radiograph showing the maxillary left primary central incisor after extraction. Note root resorption.
radiographic evaluation revealed normal periodontal membrane space. As no abnormalities were found, no treatment was required as the tooth may reerupt or remain without any signs or symptoms. No history of pain or discomfort reported by the patient up to 34 months following the accident at which clinical and radiographic examinations revealed evidence of periapical abscess and root resorption of the maxillary left primary central incisor. Therefore the tooth was extracted. The most prevalent treatment recommendation is to allow the intruded tooth to re-erupt, provided it is positioned facially away from the developing permanent tooth bud.'

Reports on sequelae from intrusions of the primary dentition have varied. The pulp's response to luxation injuries includes pulp survival, pulp necrosis, pulp canal obliteration and, in rare instances, internal resorption.\textsuperscript{14,15} The occurrence of such sequelae is related to the type of luxation injury (severity) and the stage of root development (capacity for repair).\textsuperscript{16} Intruded primary teeth were found to have the highest correlation with hypoplastic defects in underlying permanent tooth successors (17.4 percent) when compared with lateral luxation (7.1 percent) and avulsion (5.7 percent).\textsuperscript{17} Repositioning intruded primary teeth resulted in less pulp necrosis than repositioning laterally luxated teeth.\textsuperscript{17} During the reeruption phase of intruded primary teeth, the risk exists of acute inflammation around the displaced tooth with clinical presentation of swelling of the gingiva - sometimes with abscess formation and complaint of pain from the site of trauma.\textsuperscript{6,9} In these cases, immediate extraction and antibiotic therapy is essential to prevent the spread of inflammation to the permanent tooth germ. Clinical studies in humans have demonstrated small and insignificant differences in the extent and frequency of developmental disturbances in the permanent dentition when preservation and extraction were compared.\textsuperscript{18} A link between the pathogenesis of enamel lesions in permanent teeth and a history of trauma in the primary predecessor has occasionally been postulated.\textsuperscript{19,20} Many studies have concentrated on the relationship between the histological changes of the permanent tooth germ and experimentally induced periapical inflammation of the primary tooth.\textsuperscript{21-25}

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