

Management of intrusion in primary tooth with fixed-mechano therapy- A case report

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Abstract: Trauma to the primary dentition present special problems and the management is often different as compared with permanent teeth. Trauma to the oral region occurs frequently and comprises 5% of all injuries for which people seek treatment. The highest prevalence was found as intrusive injuries of primary teeth. There is perhaps no single disturbance that has greater psychological impact on both the parents and children than the loss or fracture of a child's anterior teeth. Therefore, an appropriate emergency treatment plan is important for a good prognosis. The following case report presents a new, minimal invasive and an innovative technique for the management of intruded primary maxillary central incisor with the fixed-mechano therapy which fully satisfied the demands of the parents for aesthetic and simultaneously maintained the space in the maxillary arch.

Keywords- Trauma, primary tooth, intrusion, case report.

I. Introduction

Dental injuries are common and present an important dental public health problem. Many epidemiological studies during the last three decades have shown the frequency of dental injuries in children and adolescents.[1-8]It is likely that clinicians who provide dental care for children will have to manage traumatic intrusion of primary incisors at some time. Overall trauma to primary incisors is common (seen in around 30% of children by the age of 7 years 1). However, although intrusion injuries are uncommon in adults, it is likely that around one in five of injuries to primary teeth will be intrusive (17% in one hospital based study).[9]Trauma to the primary dentition present special problems and the management is often different as compared with permanent teeth. Trauma to the oral region occurs frequently and comprises 5% of all injuries for which people seek treatment [10–13]. In preschool injuries, head injuries make up as much as 40% of all somatic injuries. Among all facial injuries, dental injuries are the most common. As much as 18% of all somatic injuries are seen in the oral region in children 0–6 years old. [14] Recent investigations into the incidence of dental trauma, especially in the pediatric and adolescent populations, have made it clear that this particular injury is of a significant nature and affects upto one-third of patients in this age group. It has been suggested that the incidence of dental trauma soon will exceed that of dental caries and periodontal disease among children and teenagers. [15] The main objectives of diagnosis and treatment of traumatic injuries affecting children with primary dentition are pain management and prevention of possible damage to the developing tooth germ. In children upto 2years, intrusion and avulsion are the most severe injuries that can affect the developing tooth germ [16, 17]. During this period, calci cation of incisal and medium third of enamel matrix of the permanent tooth germ takes place. The traumatic displacement of the root of the primary tooth may affect the development of the permanent tooth germ, by altering the secretory phase of the ameloblast, leaving a defect known as circular enamel hypoplasia. Hypoplasia, including enamel discoloration and/or enamel defects are the most frequent malformation sequelae of traumatic injuries to the primary dentition [16, 18-19]. In a long-term study of 255 traumatized primary teeth, 23%of the corresponding erupted permanent teeth showed developmental disturbances. The highest prevalence was found after intrusive injuries of primary teeth.[20] An appropriate emergency treatment plan is important for a good prognosis.[14].There is perhaps no single disturbance that has greater psychological impact on both the parents and children than the loss or fracture of a child's anterior teeth.[15] This is especially so if the injury affects the permanent dentition and involves the loss of extensive tooth structure. Traumatic dental injuries (TDI) involving the anterior teeth may not only lead to restriction in biting, phonetics and aesthetics, but may have an impact on a child's personality and quality of life.[21]Techniques that speed and simplify treatment,restore esthetics and improve long term success rates are therefore of potential value and should be considered. [15]

II. Case Report

A 4 year old boy reported with an intruded primary maxillary central incisor. The parents gave the history of trauma related to front region of the jaw and they wanted to restore the involved tooth without getting it extract. After an intra-oral and radiographic examinations, it was observed that apex of intruded primary central incisor was impinging on to the crown portion of the developing succedaneous permanent incisor [Fig 1][Fig 2]. Hence, the option of treatment of intruded primary maxillary central incisor with fixed mechano therapy was discussed and duly signed written consent was obtained from the parents. Arch wire of size 0.018” was selected and adapted to the canine to canine region of the maxillary arch. After positive adaption, arch wire was bonded to canine to canine region in the maxillary arch excluding the intruded primary maxillary central incisor with acid-etch technique [Fig 3][22]. Ligature wire was bonded to intruded primary maxillary central incisor and then attached to arch wire to create an extrusive force on to the involved tooth [Fig 4]. Prior to discharge of the patient, instructions were given regarding oral hygiene maintenance and consumption of soft diet for first few hours and to avoid biting any hard food/object. The patient was recalled after one week to check any impingement of the appliance and the parents were instructed to report to the clinic after one, two, four and six months respectively. After 6 months of follow-up, parents were satisfied with the treatment and the aesthetics [Fig 5].



Fig 1- Intra-oral view of the intruded primary maxillary central incisor.



Fig 2- Initial radiograph revealing the position of intruded primary maxillary central incisor with relation to the succedaneous permanent incisor.



Fig 3- Arch wire was bonded to canine to canine region in the maxillary arch excluding the intruded primary central incisor.



Fig 4- Ligature wire was bonded to intruded primary maxillary central incisor and then attached to arch wire to create an extrusive force on to the involved tooth.



Fig 5- After 6 months of treatment, intruded primary maxillary central incisor was in occlusal harmony.

III. Discussion

Tooth intrusion consists of the displacement of the tooth into its alveolus and is the most common trauma during early infancy.[23] The prevalence of incisor injury has been reported to range from 6% to 34%. [24-26] Falls, collisions, sporting activities, and traffic accidents have been reported to be the main cause of most dental injuries. Variables such as age, gender, socioeconomic status, and behavioral problems may also influence the frequency of dental trauma. Bauss et al [27] and Caliskan et al [28] both found that patients aged 8—11 years exhibited the highest prevalence of dental trauma. It has been shown that incisor injuries occur more frequently in males.[29,30] Socio-economic influences can also have a significant effect on a child's experience with dental injuries.[31,32] The anatomic factors consistently reported to increase the risk of occurrence of anterior teeth injuries are substantial maxillary incisor overjet and inadequate lip coverage of the

anterior teeth. The socio-behavioral factors reported to increase the predisposition towards traumatic injuries to anterior teeth include gender (males>females), adverse psychosocial environment, behavior problem, increased participation in sports and recreational activities and accident proneness.[33]

In an another study, a material of 207 permanent teeth (including 90 cases collected from the literature), traumatized during development by injuries to primary teeth has been analyzed in a clinical, radiographic, histologic, microradiographic, and electron microscopic study. It appears from this examination that such developmental disturbances may be classified into distinct clinico-pathologic entities, i.e. (1) white or yellow-brown discoloration of enamel, (2) white or yellow-brown discoloration of enamel and horizontal enamel hypoplasia, (3) crown dilaceration, (4) odontome-like malformation, (5) root duplication, (6) vestibular root angulation, (7) lateral root angulation or dilaceration, (8) partial or complete arrest of root formation, (9) sequestration of entire tooth germ, and (10) ectopic, premature, or delayed eruption or impaction.[34] The frequency and type of developmental disturbances in the permanent teeth in relation to the child's age at the time of injury were examined in 78 patients with 100 intruded primary incisors. The central incisors were found to be the most frequently affected teeth. Only maxillary teeth were involved. The dominating age group was 1–3 years and intrusion was seldom seen after the age of 4 years. The frequency of disturbed normal development of the permanent teeth was 54%. In eight cases the intruded teeth were removed immediately, 86 teeth reerupted, and six teeth did not reerupt. Internal white enamel hypoplasia was seen frequently; external hypoplasia, seldom.[35]

During the 7-year clinical follow up of such injuries presents information on the consequences for the intruded primary teeth, and also on what is recognized as one of the more distressing sequelae of this injury; the effect on the permanent successors, whose follicles lie slightly above and palatal to the root apex of the primary incisors. Seventy eight children with 138 traumatised primary incisors fulfilled the inclusion criteria. Thirty six of these teeth, in 23 children, were extracted at the first visit, due to extensive lateral luxation as well as intrusion. In keeping with other reports, this study found that the majority of intruded primary incisors, where immediate extraction was not indicated, re-erupted when simply observed (78% of the remaining 102). However, 54% developed post traumatic consequences, with the most common being pulpal necrosis in 31% of the 102 teeth (managed either with pulpectomy or extraction). Over half of the permanent successors (74 out of the initial sample of 138 traumatised primary incisors) were found to have one or more developmental disturbances: enamel hypoplasia (28.3% of all incisors); dilacerations (16.7% of all incisors); ectopic eruption (16.7% of all incisors).

But does this actually help to inform as to how best to manage the intruded primary incisor? Can they always be left and observed, unless excessively laterally luxated? Recent guidance

states that if radiographic examination indicates (by way of the intruded tooth appearing lengthened relative to its antimere) that the apex of the intruded incisor has been pushed palatally into the follicle of the succedaneous permanent incisor, then the primary incisor should be extracted, to minimize further damage to the tooth germ. However, there is little evidence to support this and there are the associated risks of causing further distress to the child through the extraction and iatrogenic damage to the underlying permanent tooth [9]. Therefore it has been controversial in the Pediatric Dental field whether repositioning and fixation for the intrusion of primary tooth should be done or not. Although the intrusion of primary anterior tooth is often happened, the treatment procedure for it has not been established yet [36]. The consequences of treatment delay on pulpal and periodontal healing following traumatic dental injuries have been highlighted in a comprehensive review. It is also important to consider the economic and resource implications of delayed or inappropriate treatment. Furthermore, there is a growing body of evidence to suggest that dental trauma in children may adversely affect their quality of life with far reaching psychosocial effects.[37]

IV. Conclusion

Early loss of primary teeth continues to be highly prevalent in an early childhood leading to malocclusion and developmental anomalies in developing permanent dentition. A continuous and meticulous treatment planning is essential to monitor developing dental anomalies, space loss and eruption of permanent teeth to prevent malocclusion. It was thus demonstrated in this case report that management of intruded primary central incisor can be successfully achieved with fixed mechano therapy instead of surgical treatment modalities.

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