Reminder of important clinical lesson

Management of traumatic intrusive luxation of incisors in a patient with Down's syndrome

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Summary

Special needs individuals are children or adults who are prevented by a physical or mental condition from full participation in the normal range of activities of their age groups. They usually exhibit high treatment needs because of an increased prevalence and severity of trauma. This paper presents a case report and review of treatment strategy of repositioning, splinting of permanent incisors in a 13-year-old boy with Down's syndrome sustaining trauma led to intrusive luxation of maxillary incisors. The intruded incisors were immediately repositioned and splinted with composite within hours.

BACKGROUND

Traumatic injuries to the teeth are among the most serious dental conditions and are particularly important because of the critical sensory, communicative, gustatory and psychosocial functions of the teeth and mouth.¹ Fracture of the anterior teeth is a common result of trauma to the face. It has been shown that traumatic injuries are more prevalent in the disabled than in normal children. This case report consists of a clinical case of trauma to anterior teeth in the patient with Down's syndrome with management and literature review of the special dental considerations unique to these individuals.

A reduced degree of muscle tone (hypotonia) is generally found in Down's syndrome. This affects the musculature of the head and oral cavity as well as the large skeletal muscles. Increased incidence of trauma in these children is due to low muscle tone and ligamentous laxity.²⁻⁴ If a patient has this instability, careful treatment is required.

CASE PRESENTATION

The patient was a 13-year-old male who had suffered a accident 2 h before and after initial examination and soft tissue management, he was referred to the Department of Paediatric Dentistry, Modern Dental College and Research Centre, Indore, India. Clinical and radiographic examination revealed that the injury had resulted in 5–6 mm intrusion of maxillary permanent left central incisors and left lateral incisor (figures 1–3).

On taking history from parents, it revealed that the patient has impairment of cognitive ability and physical growth as well as facial appearance (figure 4). Down's syndrome was identified at birth which was confirmed by cytogenetic analysis of peripheral blood lymphocytes. The couple was non-consanguineous and healthy. The mother's intelligence and development were normal. She had no any physical characteristics associated with Down's syndrome.

The patient had a typical feature of oblique eye fissures with epicanthic skin folds on the inner corner of the eyes,

muscle hypotonia (poor muscle tone), flat nasal bridge (figure 5), a higher number of ulnar loop (figure 6), a protruding tongue (due to small oral cavity and an enlarged tongue near the tonsils) (figure 7), a single flexion furrow of the fifth finger (figure 8) and desiccated tongue as a result of mouth breathing.

INVESTIGATIONS

Intraoral periapical radiograph (figures 2 and 3) were taken with central incisors and lateral incisors.

TREATMENT *if relevant*

Radiographs of the patient showed the 6 mm intrusion of upper incisors with their abnormal relative position with other teeth. Because of the severity of intrusion and completed root development, immediate surgical repositioning of intruded incisors was planned. Prior to surgical operation, the patient was given tetanus toxoid injection and doxycycline. After the administration of local anaesthesia, the intruded tooth was initially luxated.

Figure 1 Intraoral view of intruded central and lateral incisors.

Figure 2 Intraoral periapical radiograph of intruded central and lateral incisors.

Figure 4 Facial view of the patient with Down's syndrome.

Figure 3 Intraoral periapical radiograph after repositioning central and lateral incisors.

Figure 5 Oblique eye fissures with epicanthic skin folds on the inner corner of the eyes and flat nasal bridge.

Figure 6 High number of ulnar loops.

Figure 7 Macroglossic desiccated tongue.

Figure 8 A single flexion furrow of the fifth finger.

There was additional injury to alveolar bone, teeth and surrounding soft tissues with minor lacerations on upper lips.

The tooth was brought into a position by applying careful and very gentle force incisally using extraction forcep (figure 9). The teeth were repositioned to a level such that the cemento enamel junction was in plane with the free gingival margin. Following repositioning of the teeth, space was found to be present between the upper and lower teeth. The patient's history of pre-existing open-bite justified the relative positions. After bringing the upper lateral incisor and central incisors into their respective positions, these teeth were splinted using 22 gauge wire and light cured composite restorative material for 6 weeks (figure 10). Soft tissues were then sutured. Teeth were not responding to pulp vitality test indicating non-vital pulp. Pulp necrosis was diagnosed and endodontic therapy of intruded teeth was instituted with a dressing of calcium hydroxide (figure 11). After 1 month of using the calcium

Figure 9 Extrusion of teeth with the help of extraction forceps.

Figure 10 Intra oral periapical radiograph after splinting of central and lateral incisors.

hydroxide dressing, the filling of the root canals of teeth was performed.

Followed by prescription of fluoridated tooth paste, electronic and figure brush, anticipatory guidance to parents, preventive programs were planned with regular follow-ups.

OUTCOME AND FOLLOW-UP

Teeth were stable and the patient was completely asymptomatic at 3 weeks follow-up (figure 12). Splints were removed after 6 weeks. Both upper and lower central incisors were stable and soft tissue injuries were healed.

Figure 11 Intraoral periapical radiograph after placement of calcium hydroxide dressing in central and lateral incisors.

Figure 12 Composite splint placement and sutured soft tissues.

DISCUSSION

The intrusive luxation of anterior teeth in children creates psychological impact on both the parents and child especially if the injury affects the permanent teeth. These injuries are common in patients with special needs (Down's syndrome).⁵

Down's syndrome is a genetic disorder caused by the presence of all or part of an extra 21st chromosome. It is named after John Langdon Down, the British doctor who described it in 1866. Often Down's syndrome is associated with some impairment of cognitive ability and physical growth as well as facial appearance. It is a chromosomal abnormality characterised by the presence of an extra copy of genetic material on the 21st chromosome, either in whole (trisomy 21) or part (such as due to translocations).

The effects of the extra copy vary greatly among people, depending on the extent of the extra copy, genetic history and pure chance. Recently, researchers have created transgenic mice with most of human chromosome 21 (in addition to the normal mouse chromosomes). The extra chromosomal material can come about in several distinct ways. A typical human karyotype is designated as 46, XX or 46, XY, indicating 46 chromosomes with an XX arrangement typical of females and 46 chromosomes with an XY arrangement typical of males.⁶

Down's syndrome can be identified during pregnancy or at birth. The primary skeletal abnormality affecting the orofacial structures in Down's syndrome is an underdevelopment or hypoplasia of the midfacial region. The bridge of the nose, bones of the midface and maxilla are relatively smaller in size which was present in our case also. In many instances, this causes a prognathic Class III occlusal relationship which contributes to an open bite. Absence or reduction in size of the frontal and maxillary sinuses is common. The angle of the mouth is pulled down with passive elevation of the hypotonic upper lip and thinning of the lateral aspects. The lower lip is also hypotonic and becomes increasingly everted, especially with tongue protrusion. The mouth appears to be open due to the relatively large tongue in a reduced oral cavity. This leads to mouth breathing, drooling, chapped lower lip and angular cheilitis. Macroglossia, results from small oral cavity. Desiccated tongue as a result of mouth breathing.⁴

Individuals with Down's syndrome usually exhibit high treatment needs because of an increased prevalence and severity of trauma. Children who are disabled are a well-established group of children who need greater supervision and are more prone to traumatic injuries. Like other oral health conditions, traumatic dental injuries are preventable, and preventive measures can only be applied when factors that contribute to the injuries have been identified.

Historically, suggested treatment methods of intruded teeth have been spontaneous re-eruption, immediate surgical repositioning and fixation, orthodontic repositioning and a combination of surgical and orthodontic repositioning. Current management strategies include, surgical reduction (immediate repositioning), repositioning with traction (active repositioning) and waiting for the tooth to return to its preinjury position (passive repositioning).⁷ Recently immediate surgical repositioning has been documented as the treatment of choice for completely intruded teeth. In present case, tooth was severely intruded and need to be repositioned with appropriate tissue repair. The aim of the treatment is to restore the tooth in its original position by decompressing the injured tissue and re-establishing normal relationship between tooth and bone. Immediate repositioning was opted as the treatment of choice as it extrudes and saves the tooth in one step procedure.

Andreassen postulated that fully mature intruded teeth must be extruded by orthodontic means over a 2–3 week period. According to them, total repositioning by surgical means in such cases may increase the risk of resorption. However, their study is based on a pooled sample of different injury types, including subluxation, extrusion and intrusion. The unique nature of the intrusion injury distinguishes it from other luxations. In addition, many previous studies, including that of 29 intruded permanent teeth by Kinirons, *et al* showed that repositioning increased the

prevalence of resorption. In our case, immediate repositioning was used for treating intruded incisors with favourable results at 6 weeks follow-up. Still further follow-up is continued to obtain a better interpretation of the result.^{8 9}

Learning points

- ▶ Different treatment methods of intruded teeth have been spontaneous re-eruption, immediate surgical repositioning and fixation, orthodontic repositioning and a combination of surgical and orthodontic repositioning.
- ▶ When tooth displacement occurs, the poorest prognosis is associated with intrusively displaced teeth. Potential complications include pulpal necrosis, pulp obliteration, root resorption, ankylosis and loss of marginal support.
- ▶ For intruded teeth with closed apices, the incidence of pulpal necrosis is 100%, whereas in intruded teeth with open apices, the incidence of pulpal necrosis is 63%.
- ▶ Surgical repositioning methods need at least 3 week for root stabilisation in new position.

Competing interests None.

Patient consent Obtained.

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