CASE REPORT

A SURGICAL AND ORTHODONTIC APPROACH IN MANAGEMENT OF IMPACTED CENTRAL INCISORS

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ABSTRACT

This care report describes the treatment of a 10-year-old boy who had two extra teeth that caused his maxillary central incisors to become impacted. Correct incisor relocation was achieved using a sequential procedure that included surgical removal of the supernumerary teeth, and surgical exposure followed by orthodontic traction of the impacted teeth. Throughout treatment, close observation and interdisciplinary collaboration produced a successful aesthetic result, with ideal periodontal health and functional occlusion

KEY WORDS

Impacted tooth, supernumerary, orthodontic force, incisors.

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INTRODUCTION

The impaction of central incisors is rare and the third most common impaction (with an incidence of approximately 0.03–2.1%) after the third molars (approx. 24.4%) and upper permanent canines (approx. 2%)[1,2]. Impacted central incisor has multiple causes, the most common being the presence of supernumerary teeth, odontome or traumatic dilaceration. 56-60% of supernumerary teeth cause impaction due to a direct obstruction to eruption.[3,4] Due to anterior location of central incisor their impaction poses major aesthetic, psychological and functional issues.[5,6,7]

Diagnosis of impacted teeth is mostly done by clinical and radiographical means. Radiographic evaluation is important for determination of the cause, teeth position, rot angulation, depth of impaction etc and helps in diagnosis and treatment planning. According to Lin et al, a tooth that is lower in relation to the alveolar crest, has a dilacerated root with an oblique inclination angle, and has inadequate root development has a better prognosis for orthodontic traction.[8] An image is often covered by superimposition on other structures, and conventional radiography is not always able to show structures in all three planes. When evaluating impacted teeth, Bodner et al examined the image accuracy of computerised tomography (CT) and traditional radiography. Crown shape, root shape, crown/root relationship, and tooth inclination were significantly better assessed on CT than they were on two-dimensional radiography.[9] Lately, cone-beam computed tomography (CBCT) is widely used as a diagnostic tool for impacted teeth.[10]

Missing central incisors significantly hampers the aesthetic of a patient and lowers self esteem. Hence its important to manage the condition in a multidisciplinary approach.

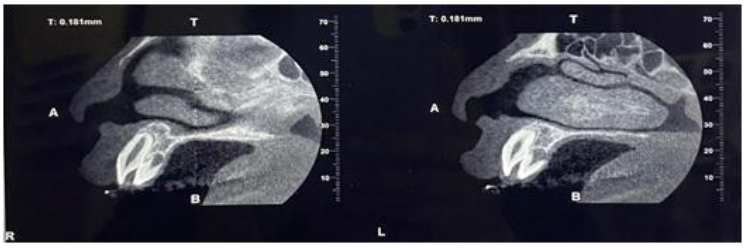
This case report aims to document one such case of impacted permanent central incisors, treated by surgical-orthodontic approach.

CASE REPORT

A ten-year-old male patient reported to the

Fig 1

Fig 2



(Fig 3)

Department of Pediatric and Preventive Dentistry with the chief complaint of missing upper front teeth for the last three years. He was worried about his aesthetic appearance. He revealed no significant medical history or drug allergies. The parents rejected any history of trauma and were unaware of any family history of impaction.

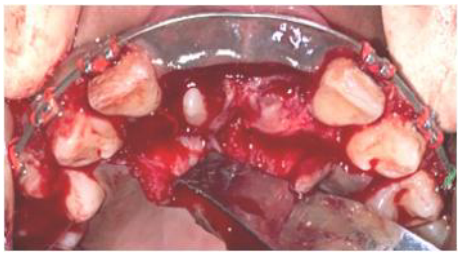
Extraoral examination reveals a mesoprosopic symmetrical face with a mild convex profile and competent lips.

The intraoral clinical examination indicates mixed dentition in the mandibular arch and permanent dentition in the maxillary arch, with delayed eruption of the two maxillary permanent central incisors (Fig1). There was slight mesial tipping of both lateral incisors, and a space loss of 3mm was calculated compared to the available space and the mesiodistal width of the impacted central incisor in the radiograph. The molars exhibited a Class 1 molar relation. Overjet and overbite were found to be normal. A bulge was palpated on both the labial and palatal gingiva.

Panoramic radiographs revealed two impacted supernumerary teeth situated directly above the impacted permanent central incisors (Fig 2) . A cone beam computed tomography(CBCT) was recommended to evaluate the teeth's position, angulation, and depth of impaction. The CBCT revealed two palatally impacted, vertically oriented supernumerary teeth, along with two vertically impacted permanent central incisors (Fig 3). Lateral cephalometry indicated a Class I skeletal pattern (ANB: 2 degrees), a normal growth pattern, and mandibular plane angle (FMA: 26 degrees). The etiology of the impaction of the two permanent central incisors was identified as the physical obstruction caused by the presence of two supernumerary teeth in the anterior maxilla.

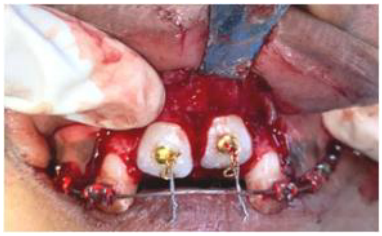
The treatment objective was firstto surgically remove the palatally impacted supernumerary teeth that would clear the path of eruption of the permanent central incisor. Considering the age of the patient and the presence of no eruptive force, spontaneous eruption was not an option. Surgical exposure of the impacted permanent maxillary central incisors, followed by orthodontic traction with light forces was the treatment plan. The final objective was achieving optimal levelling and alignment, facial aesthetics.

The maxillary teeth were bonded with MBT brackets and the upper molars were banded. After three months of initial levelling and alignment with the sequential use of 0.12", 0.14", 0.16" Niti wires, 17-25" SS wire was secured to brackets with an open coil spring to gain space of 3 mm. After one month adequate space was gained for the proper alignmet of the two impacted central incisors. Next, A single surgical procedure was planned. In the first step, a full thickness incision was given from distal margin of right canine to the distal margin of the left canine. A full thickness mucoperiosteal flap was raised on the palatal aspect to expose the supernumerary teeth (Fig 4a). After bone guttering the supernumerary teeth were exposed and extracted out with an elevator (Fig 4b). The palatal flap was repositioned back to its place. In the next step, closed eruption technique was used to expose the impacted teeth; two full thickness releasing incision was made from the ditalline angle of right canine and distal line angle of left canine well avoiding the canine prominence. A full thickness envelope flap was raised to expose the Impacted 11,21. The labial surfaces of the teeth were cleaned and properly isolated, etched with 37% phosphoric acid gel for 20 seconds and rinsed and dried with oil- and water-free air spray. Dentin bonding agent (Single Bond, 3M, USA) was then applied with a clean microbrush, its solvent was evaporated with oil- and water- free air spray, and cured for 10 seconds using a cordless LED light cure. Then, 2 lingual buttons with chain were bonded to the labial surface of central incisors and light-cured for a total of 40 seconds from the mesial, distal, occlusal, and gingival directions (10 seconds from each direction) using the same curing unit (Fig 5). Twisted pigtail ligature wire

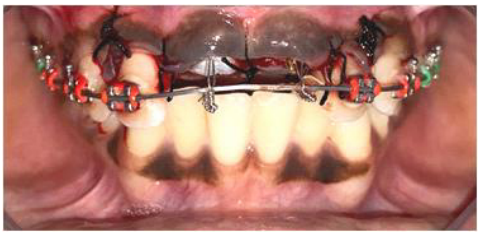


(Fig 4a)

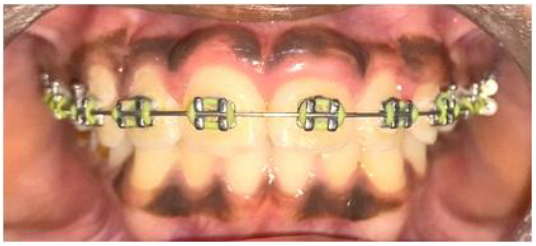
(Fig 4b)



(Fig 5)



(Fig 6)



(Fig 7)

was drawn down from the chain to engage the archwire. Immediate active extrusive traction was applied there after (Fig 6). The mucoperiosteal flap was replaced back and sutured along with the palatal falp. The active ligature tie was replaced every one month upto 4 months. Once the two central incisors were considerably moved towards occlusion, lingual buttons were removed and MBT brackets were bonded to the labial surface. Sequential use of 0.12" , 0.14", 0.16" Niti wires and 17-25" , 19-25" SS wires to brackets resulted adequate alignment and levelling (Fig 7). Fixed canine bonded retainer was provided for retention. Hawley retainer was also placed for the upper arch with full-time wear for the first year, and follow-up visits ware scheduled every three months.

DISCUSSION

The successful treatment of impacted central incisor depends on its position, developmental stage of root formation, root angulation, age of the patient, cause of impaction and the possibility of implementation of a successful periodontal-orthodontic-surgical approach.[11] There are two methods to bring the impacted teeth into occlusion: surgical relocation and surgical exposure followed by orthodontic traction. Although surgical repositioning is a quick fix, there is a chance that the periodontal ligaments will be damaged. To protect the affected tooth, orthodontic traction is frequently advised after surgical exposure.[12]

Proper radiographic evaluation is indispensable to determine the root formation, angulation, position of impacted teeth and presence of any physical obstruction. In our case, two supernumerary teeth obstruct the path of eruption of central incisors. Surgical extraction of supernumerary teeth is ideally indicated in early mixed dentition period to prevent space loss and allow spontaneous eruption of the impacted teeth.[13] Hence, surgical removal of the supernumerary teeth was planned. However, Spontaneous eruption of the impacted teeth can be expected when the apex is still forming. The patient had fully formed apex of central incisors. Spontaneous eruption is not recommended as the success rate for achieving adequate eruption and alignment is only 10%. In one third to half of the cases (36%) there is a total failure of eruption, or requires 1.5- 3 years of wait for eruption and 41% requires orthodontic assistance for adequate alignment after spontaneous eruption[14]. Hence, surgical exposure followed by orthodontic repositioning of the impacted teeth was planned. Closed eruption technique was undertaken, as adequate attached gingiva (>1mm) was available for future aesthetic gingival appearance. As reported by Kokich and Mathews, immediate esthetic result is obtained after performing the closed eruption tecqnique were similar to normal tooth eruption[15]. Also, this technique allows immediate orthodontic traction. Light continuos forces were applied for gradual eruption of the impacted teeth to prevent ankyosis, gingival recession and bracket debonding.

CONCLUSION

Impacted central incisor teeth are a quite uncommon condition that can arise from a number of factors and usually affect both the appearance and functionality. As a result, it requires thorough diagnostic approach and accurate management techniques. In order to move these impacted teeth into their proper positions within a normal occlusion, surgical- orthodontic procedures may be quite helpful.

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