



Orthodontic management of a horizontal impacted maxillary permanent incisor

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ABSTRACT

Missing/impacted central incisors causes' severe esthetic concern for patients & parents and require sound diagnosis and treatment planning for its correction. The aim of this case report is to describe the correction of a horizontally impacted maxillary central incisor high in the alveolar bone through surgical exposure and guidance by orthodontic treatment. The impacted tooth was successfully guided in to occlusion without jeopardizing its vitality or morphology.

INTRODUCTION

Missing or unerupted maxillary incisor is unattractive and has an effect on self-esteem & general social interaction of young adolescent [1]. The condition may result in functional problems such as speech difficulties [2, 3]. The presence of impacted maxillary incisor is rarely diagnosed in early mixed dentition, as the incidence of impaction of maxillary incisor is less frequent [4]. The treatment options for management of impacted incisor ranges from passive observation, orthodontic guidance to extraction of tooth and the prognosis depends on several factors. The present article describes a case with horizontally impacted maxillary right central incisor that was guided into proper position in occlusion without jeopardizing its vitality or morphology.

CASE REPORT

A 08 year old girl reported with chief complaint of non-erupting right upper front tooth. The child was in a good health and had no medical or dental history contributing to the chief complaint.

Diagnosis & Treatment planning:

The patient had a well-balanced face with skeletal Class I features. Patient was in mixed dentition, all teeth corresponding to her age were present except tooth no. 11. The space for tooth no. 11 was reduced resulting from drifting of adjoining teeth (Figure 1). Radiographic examination included OPG (Figure 2) and IOPA

(Figure 3) to locate the impacted tooth. Radiographs confirmed the presence of impacted tooth placed high in the bone, erupting horizontally close to anterior nasal spine (ANS) (Figure 4), although the root morphology was not clear on these radiographs. Various treatment options were discussed with parents including extraction of impacted tooth & prosthodontic rehabilitation, extraction of impacted tooth followed by orthodontic space closure and surgical exposure of impacted tooth & orthodontic guidance of impacted tooth into occlusion. Treatment plan selected was to surgically expose the impacted tooth to place an attachment to facilitate the guided eruption of the impacted tooth. Pre treatment Periodontal Index score was found to be 4/23= 0.17 (Table 1).

Treatment progress:

Before surgical exposure of the tooth, preparation of the arch to accommodate impacted tooth was planned. 018" Roth PEA was placed on upper anterior and open coil spring was used to regain the lost space. After initial leveling with heat activated NiTi wire, the wire size was gradually increased to 016"X022" SS. Surgical exposure of impacted tooth was done with full thickness muco-periosteal flap under local anesthesia. Closed eruption technique was planned because of the obvious advantages offered. Lingual fossa of maxillary right central incisor was exposed and a lingual button was bonded using moisture insensitive primer (Transbond MIP, 3M Unitek) and a ligature wire was attached. Flap was sutured back and a light traction force (15 gm) was applied using square elastic thread to



Figure 1 : Pre treatment intraoral photograph

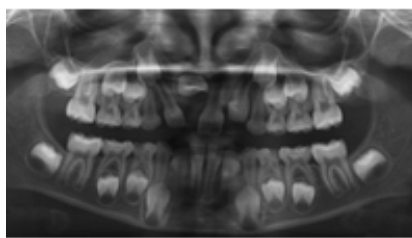


Figure 2 : Pre treatment OPG

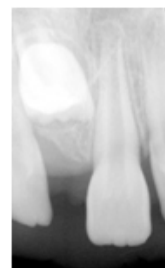


Figure 3 : Pre treatment IOPA



Figure 4 : Pre treatment Lateral Cephalogram

Table 1: Pre-treatment Periodontal Index

Maxillary Arch												
Tooth No.	16	55	54	53	12	-	21	22	23	64	65	26
PI Score	0	0	0	0	0	-	4	0	0	0	0	0
Mandibular Arch												
Tooth No.	46	85	84	83	42	41	31	32	73	74	75	36
PI Score	0	0	0	0	0	0	0	0	0	0	0	0

Total No. of teeth = 23
 Periodontal Index score : $4/23 = 0.17$
 (Clinical Condition: Clinically normal supportive tissue)

guide the tooth to occlusion (Figure-5A). The patient was monitored periodically and traction was activated every 3 weeks. Tooth erupted into oral cavity after 5 months with good labio-lingual orientation (Figure 5B). Lingual button was now replaced with a labial bracket and pigback 012” NiTi arch wire was used to guide the tooth in position (Figure 5C, D). Post treatment Periodontal Index score of the dentition was repeated and was found to be $2/23 = 0.08$ (Table 2).

RESULTS

The impacted right maxillary central incisor was guided successfully to proper position in occlusion (Figure-6). The post treatment radiographs showed good root morphology of the guided tooth with no periodontal bone loss. Noticeable amount of root resorption was noticed on erupted tooth (Figure-7). Presently the guided tooth has good gingival contour and adequate attached



Figure 5 : Mid treatment intraoral photograph

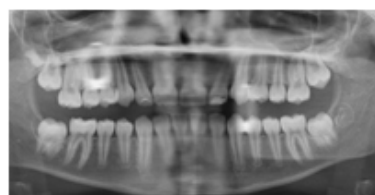


Figure 6 : Post treatment OPG



Figure 7 : Post treatment IOPA



Figure 8 : Post treatment intraoral photograph

Table 2: Post-treatment Periodontal Index

Maxillary Arch													
Tooth No.	16	55	14	53	12	11	21	22	23	24	65	26	
PI Score	0	0	0	0	0	1	0	0	0	0	0	0	0
Mandibular Arch													
Tooth No.	46	85	84	83	42	41	31	32	-	34	75	36	
PI Score	0	0	0	0	0	0	0	0	-	0	0	0	0

Total No. of teeth = 23

Periodontal Index score : $1/23 = 0.04$

(Clinical Condition: Clinically normal supportive tissue)

gingival width (Figure-8). Periodontal indexing reveals post operative clinically healthy supportive structures.

DISCUSSION

A maxillary incisor will be considered impacted and will require intervention if the delay in eruption is more than 6 months compared to contra lateral tooth or if there is deviation from normal sequence of eruption, e.g. lateral incisor has erupted and central incisor is missing/unerupted. The incidence of unerupted maxillary central incisor has been reported as 0.13% in 5-12 year-old age group [5]. The impaction of a tooth can be because of various causes, Bishara in his extensive review has listed a number of etiological factors [6]. The delay in eruption or impaction of maxillary incisor can be because of hereditary factors or environmental factors [7]. Hereditary factors include supernumerary teeth, odontomes, cleidocranial dysostosis, and gingival fibromatosis. Environmental causes include trauma, bone disorders, premature exfoliation of primary tooth, retained primary tooth or cleft lip and palate (surgical scarring). However, the importance of these factors is not established to the impaction.

The timing of intervention is important; any known cause for impaction should be removed first to facilitate spontaneous eruption, if failed orthodontic guided eruption should be planned. Studies have shown that younger the patients quicker the eruption of impacted tooth [8].

The planning for guiding an impacted tooth into occlusion requires a careful thought process and a multidisciplinary approach [9]. The various treatment alternatives available for a patient with impacted incisor includes: (a) extraction of impacted tooth and prosthodontic rehabilitation of missing tooth after growth cessation (b) extraction of impacted tooth and closure of space with lateral incisor and followed by prosthetic rehabilitation (c) extraction of impacted tooth and auto-transplantation with the incisor or premolar (d) surgical exposure and orthodontic guidance of the impacted tooth. Among all the options orthodontic guidance following surgical exposure should be the choice because of known benefits. Closed surgical technique is preferred over other techniques for surgical exposure and guidance of impacted incisor because of favorable results [10, 11]. The technique is advocated even in patients with abnormal root angulation or dilacerations of the impacted tooth [12,13]. The amount of bone removal during surgical exposure and to gain access to the impacted tooth should be kept to minimal, to

replicated natural tooth eruption.

CONCLUSION

Surgical exposure and orthodontic guidance of an impacted maxillary tooth offers a simplified treatment. In the present case the impacted tooth was successfully guided in to occlusion without jeopardizing its vitality or morphology. Closed surgical technique is preferred technique for surgical exposure and a multidisciplinary approach is needed for the successful guidance of impacted tooth.

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