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Orthodontic Treatment with Surgical Intervention of Impacted Upper Central Incisor - A Case Report

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Abstract

Introduction: This case report involves the interdisciplinary treatment of an impacted central incisor. **Case Report:** An 11-year-old patient came to Hasanuddin University Dental and Oral Hospital along with his parents with a chief complaint of non-erupting anterior teeth. Intraoral examination revealed that the right central incisor was not erupted and the left lower central incisor was missing. The panoramic radiograph showed that the right central incisor was impacted and the lower left central incisor was agenized. The patient's parents also complained that the lower front teeth were not neat. Lateral cephalometric analysis showed class I skeletal. Orthodontic treatment was performed with 0.022 inch Roth system brackets. Initial alignment was performed with leveling and alignment of teeth with the aim of creating space for impacted teeth and eliminating crowding on the mandibular anterior teeth. The second stage was surgical intervention by windowing the impacted right upper central incisor. Traction was performed for 5 months of treatment and stabilization for 6 months. The result of the treatment was that the impacted central incisor was restored to its proper position in the normal dental arch so that normal aesthetics and function were achieved. **Conclusion :** Impaction treatment of incisive tooth 11 using fixed orthodontic appliance and open window surgery successfully retracted tooth 11 to the occlusal plateau, tooth 11 remained vital, periodontal tissues were normal, the patient and her parents were very satisfied with the facial aesthetics achieved

Keywords: Maxillary incisor impaction, Interdisciplinary orthodontic treatment.

INTRODUCTION

An impacted tooth is a tooth that has failed to erupt due to several causes, causing the tooth to remain in the alveolar bone and unable to erupt spontaneously. The etiology of tooth impaction includes abnormal tooth seed position, lack of space for eruption, ankylosis of primary teeth, early loss of primary teeth so that the permanent tooth seed is still deep in the alveolar bone, trauma, alveolar fissures, odontomas, tumors and neoplasms.[1]

The maxillary central incisor is the third most commonly impacted tooth after the third molar and maxillary canine. The prevalence of maxillary incisors in children and adolescents varies between 0.04%-2.00%.[2]

At the stage of tooth development, after the tooth root is formed half to three quarters of the teeth will erupt, but if within a certain period of time a tooth that should have erupted but has not erupted, then this situation needs careful attention to determine whether the tooth is experiencing impaction or agenesis.[3]

The purpose of treating impaction of maxillary permanent incisors is to obtain good facial aesthetics, good dental occlusion, periodontal tissue health, and prevent phonetic disorders and increase patient confidence. Radiographic examination is very important as an early detection procedure, to determine the diagnosis, treatment plan and treatment technique to be performed.[1,4]

Treatment of impacted permanent teeth usually requires multidisciplinary care by orthodontists,oral surgeons, periodontists. Periodontal problems can begin to arise after tooth alignment and leveling procedures using fixed orthodontic appliances, therefore the state of periodontal tissue needs careful attention during the treatment process.[5,6]

The purpose of this case report is to describe the treatment of tooth 11 impaction due to the presence of odontoma at the incisal edge of tooth 11 using fixed orthodontic appliances and open window surgery.

DIAGNOSIS AND ETIOLOGY

An 11-year-old girl, escorted by her mother, came to the hasanuddin university dental and oral hospital with a complaint of one right maxillary incisor not growing. The patient felt embarrassed because when smiling it looked toothless.

Extra oral examination, normal and symmetrical face, lirus profile. Intra oral examination showed tooth 11 was absent, right maxillary canine was still in the eruption stage, left lower central incisor was absent, third molar was still in the developmental stage, there was a narrowing of the space for tooth 11,

Panoramic x-ray examination showed that the eruption direction of tooth 11 was on the eruption path, the tooth morphology was normal. Cephalometric analysis showed: SNA 85°, SNB 83° ANB 2° I-Na 28°/3 mm, I-Nb 18°/1 mm; I-I:139° Occlusal-SN: 9°, Mandibular plane-SN: 25°, N-Pog: 4 mm. The diagnosis of this impaction case was grade 1 dentoskeletal malocclusion, with tooth 11 impaction, tooth 31 agenession, maxillary median line shifted to the right by 2 mm and mandibular line shifted to the left by 3 mm, space narrowing of tooth 11, deep bite, crowding of mandibular teeth. The prognosis of the case was good as tooth 11 was in a good eruption direction.

Fig 1. Profile and intraoral photographs before treatment

Fig 2. Profile and intraoral photographs after treatment

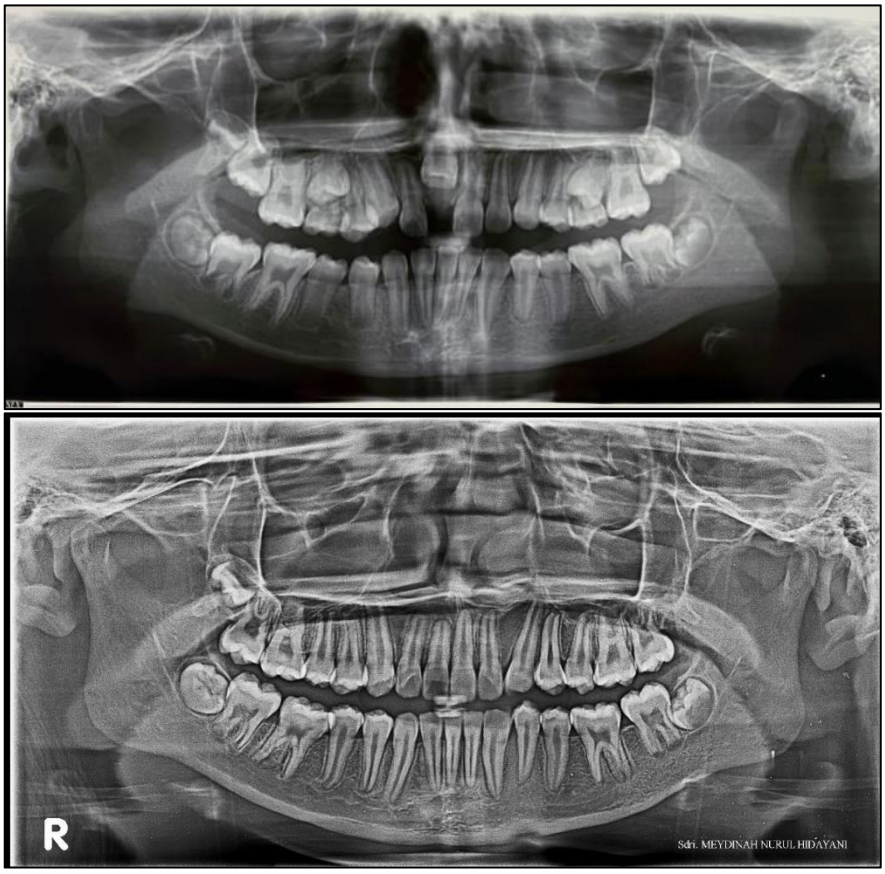

Fig 3. Lateral panoramic before treatment (a) and after treatment (b)

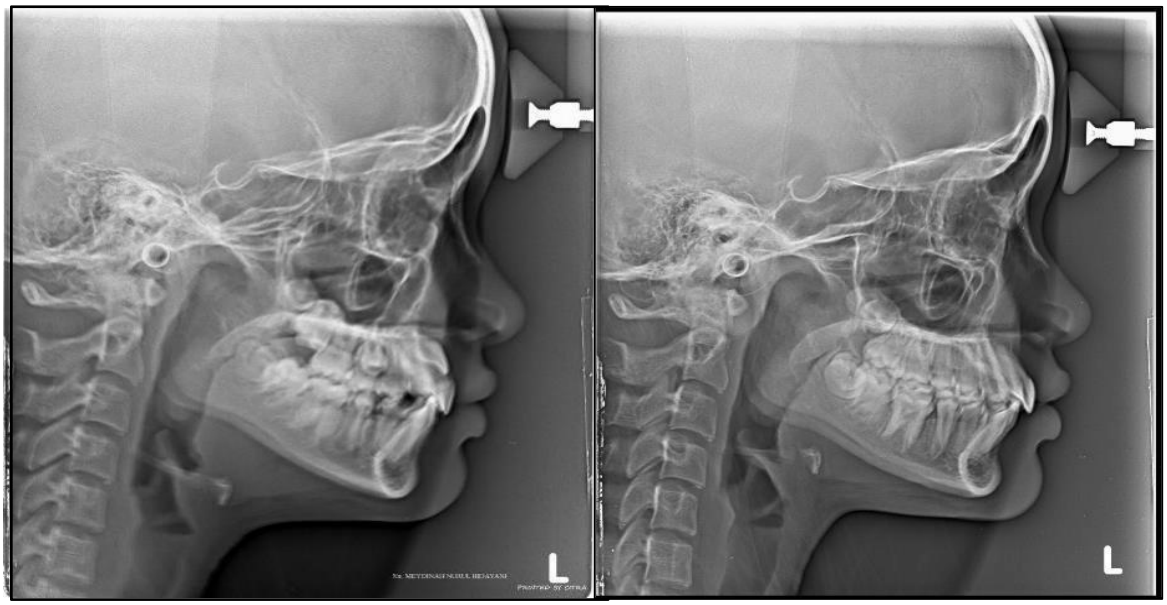

Fig 4. Lateral cephalometry before treatment (a) and after treatment (b)

Table 1. Cephalometric summary

Parameter	*Norm*	*Pre-treatment*	*Post-treatment*
Skeletal Analysis			
SNA (°)	82 ± 2	85	86
SNB (°)	80 ± 2	83	84
ANB (°)	2±2	2	2
Dental Analysis			
UI- NA (mm)	4 ± 2	3	5
UI- NA (°)	22 ± 2	28	30
LI-NB (mm)	4 ± 2	1	3
LI-NB (°)	25 ± 2	18	20
Interincisal (°)	135 ± 10	139	130
Facial Analysis			
E line to upper lip (mm)	1 ± 2	1,5	2
E line to lower lip (mm)	0 ± 2	2,5	3
Nasolabial (°)	102 ± 8	89	88

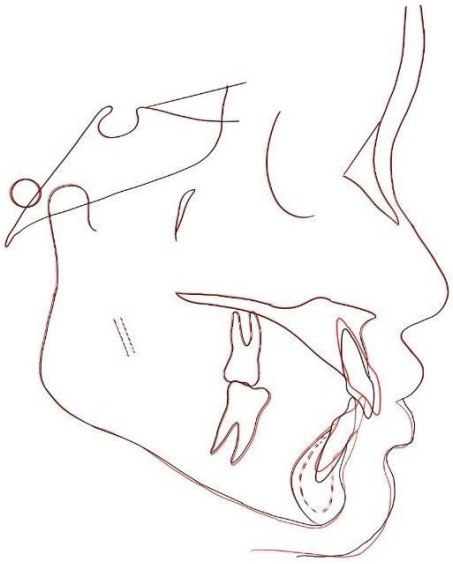

Fig 5. Lateral cephalometry before treatment (black line) and after treatment (red line)

TREATMENT OBJECTIVES

The main objective of orthodontic treatment in the maxilla was to provide space for the eruption of the narrowed tooth 11, while in the mandible it was to correct tooth crowding. After the space for tooth 11 was obtained, open window surgery was performed to open the labial surface of the crown of the impacted tooth 11, and an orthodontic bracket was placed on the crown of tooth 11. With drawal of the impacted tooth 11 was not performed using a gold chain attachment because the crown surface of the impacted tooth 11 was wide enough, so the use of an incisive bracket was chosen, the base of which was wider than the base of the gold chain attachment.

TREATMENT ALTERNATIVES

In the case where the upper right central incisor does not erupted, treatment can be performed by extracting the upper right central incisor and insertion a Maryland bridge prosthesis.

TREATMENT PROGRESS

The treatment plan was a combination of fixed orthodontic treatment with open window surgery to open the gingiva over the labial surface of the crown of tooth 11. Orthodontic treatment was performed using a Roth prescription fixed orthodontic appliance with a 0.022 bracket slot, starting with alignment, leveling, correction of the maxillary median line, restoring space for tooth 11 eruption, open window surgery of tooth 11, traction of tooth 11 to the occlusal plain, debonding and retention.

Two weeks after open window surgery, and soft tissue healing had occurred, tooth 11 was pulled occlusally using a double wire (nickel titanium wire 0.012), with a force of 60-90 grams. After tooth 11 reached the occlusal plateau, orthodontic treatment continued until the debonding and retainer installation stage, and post-orthodontic treatment control.

The relation of the left and right canines and molars was class I with normal interdigitation of the maxillary and mandibular teeth. After orthodontic treatment and open window the patient's facial aesthetics changed, the line of smile looked very good, the upper jaw teeth touched the curvature of the lower jaw lip. Panoramic photos showed that the impacted tooth 11 had reached the occlusal plate, The results of cephalometric analysis showed that the skeletal relations of the upper and lower jaws were class 1. The inclination of the maxillary (I-Na) and mandibular (I-Nb) incisive teeth increased slightly so that they looked more protrusive. Despite the protrusive addition of the maxillary and mandibular incisive teeth, the patient's facial profile was still quite good.

DISCUSSION

Successful management of impacted central incisor teeth is a difficult task. The orthodontist and oral surgeon jointly prepare a treatment plan. The maxillary incisors are also very instrumental for phonetics. One of the problems associated with non-eruption of maxillary permanent incisors is tooth impaction. A sign of a maxillary permanent incisor eruption problem is if the tooth does not erupt with a 6-month gap with the next tooth that has erupted. [5]

Early diagnosis of incisor tooth impaction is important so that interceptive orthodontic treatment can be performed to prevent the onset of a more complex malocclusion. Early prevention can be done by knowing the etiology of tooth impaction, whether there is an odontoma, supernumerary tooth or tumor. If the problem is detected early and resolved quickly, it is hoped that it will reduce the risk of tooth root derangement which will increase the difficulty of treatment. [7]

Treatment of impacted teeth requires multidisciplinary care involving orthodontists, oral surgeons and in certain cases periodontists. Open window surgical treatment can be done by open surgical exposure (open window) or closed surgical exposure (closed window). Closed window is a surgical procedure where an orthodontic attachment (gold chain or orthodontic bracket) is attached to the crown surface of the impacted tooth then the flap is closed and sutured so that the attachment is embedded in the mucosal tissue, and the chain is still used to pull the impacted tooth. Open window treatment of impacted teeth is performed by removing hard and soft tissue around the crown surface of the impacted tooth, then on the exposed crown surface of the tooth an orthodontic attachment of gold chain or orthodontic bracket is placed and the tooth is pulled into the occlusal plane. [8,9,10]

The results of the treatment of this case showed that the impaction of tooth 11 was successfully retracted to the occlusal plain with the same crown width as tooth 21. Although the height of the crown of tooth 11 and 21 was different, the patient's line of smile was very good because the curvature of the maxillary anterior teeth touched the curvature of the mandibular lip. The treatment results also showed that tooth 11 remained vital, the gum pocket was also normal at 2 mm. Periodontal health problems that often occur due to the withdrawal of impacted teeth include the formation of deep pockets, in this case the periodontal tissue health of tooth 11 is in good condition with a post-debonding gum pocket depth of 2 mm. Successful treatment of impacted tooth 11 depends on the direction of tooth eruption, available space, treatment plan, mechanotherapy, and patient cooperation. [8,10,11]

CONCLUSION

Impaction treatment of incisive tooth 11 using fixed orthodontic appliance and open window surgery successfully retracted tooth 11 to the occlusal plateau, tooth 11 remained vital, periodontal tissues were normal, the patient and her parents were very satisfied with the facial aesthetics achieved.

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