

Open surgical exposure with apically positioning flap technique: A treatment for apically impacted maxillary incisors and canine

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Abstract

Introduction: Impacted teeth are a condition in which the teeth cannot erupt completely. The most effective method for treating labial impacted teeth is the apical flap position technique which maintains attached gingiva. This paper aims to show how the apical flap positioning technique works as a treatment for impacted maxillary incisors and canines.

Case presentation: A 12-year-old girl came with her mother to the pediatric dentistry clinic at Universitas Airlangga with complaints of non-erupting upper front teeth. From the clinical examination, it was found that teeth 21,22,23 were impacted. The examination begins with anamnesis and clinical examination, followed by panoramic, cephalometric, occlusal, and CBCT.

Case Management: Fixed orthodontic treatment is carried out to get a place for impacted teeth 21,22,23. Open surgery with an apically positioned flap technique is performed by making a flap to open the crown, minimizing the bone covering the enamel surface, and then restoring the flap by lifting and joining it with the attached gingiva so that it leaves half to two-thirds of the crown visible. In the H+7 control, removal of sutures, evaluation of treatment measures, and examination of the patient's condition and postoperative recovery were carried out. Fixed orthodontic treatment is still ongoing as of this writing.

Conclusion: Open surgical exposure with the apical flap technique is a good technique to be used in cases of impacted maxillary incisors and canines.

Keywords: Impacted Teeth; Surgical Exposure; Apically Positioning Flap; Case Report

1. Introduction

Missing upper incisors have a major impact on dental and facial esthetics. In addition, it can also cause functional problems associated with missing anterior teeth such as difficulty speaking, especially the “s” sound. This condition can affect overall self-esteem and social interactions, therefore it is important to identify and treat the problem early [1]. The canine tooth is the second rank after the third molar in terms of frequency of impaction tooth. The frequency of canine impaction is 0,8-2,8% [2]. The incidence of canine impaction in the maxilla is more than twice that in the mandible [3]. Labio-palatal position of the canine relative to the erupted tooth—either labial, palatal, or directly above the tooth.

The impacted maxillary canine may be managed by several different techniques. The chosen method would depend on the degree of impaction, age of the patient, stage of root formation, presence of any associated pathology, dental condition

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of the adjacent teeth, the position of the tooth, patient's willingness to undergo orthodontic treatment, available facilities for specialized treatment and patient's general physical condition [5]. Localization and determination of a tooth's exact position is the fundamental step in surgical exposure of an impacted tooth. This can often be done by palpation in labial impactions [4].

Various surgical and orthodontic techniques are used to recover impacted maxillary canines [3]. Surgical exposure and an orthodontically assisted eruption are the most appropriate approaches for an impacted canine. However, in most clinical situations, surgical exposure of the impacted permanent tooth followed by orthodontic traction to guide and align it into the dental arch is indicated [5].

2. Description of case

A 12-year-old girl came with her mother to the Pediatric Dentistry Clinic at Universitas Airlangga, Indonesia with complaints of not growing upper front teeth. From the clinical examination, it was found that teeth 21,22,23 were impacted. The examination begins with anamnesis and clinical examination, followed by supporting examinations in the form of panoramic, cephalometric, occlusal, and CBCT photographs.

On clinical examination, there was a loss of tooth 21, palatal gingiva was visible in region 21, pale and enlarged in region 22, hard palpation of incisal teeth 21 and 22, rotation of tooth 14, tooth exostem 24, impacted teeth 21,22,23, anterior crowding of the lower jaw, a shift of the median line of upper jaw 2mm to the left, and lack of space 2mm in both arch.

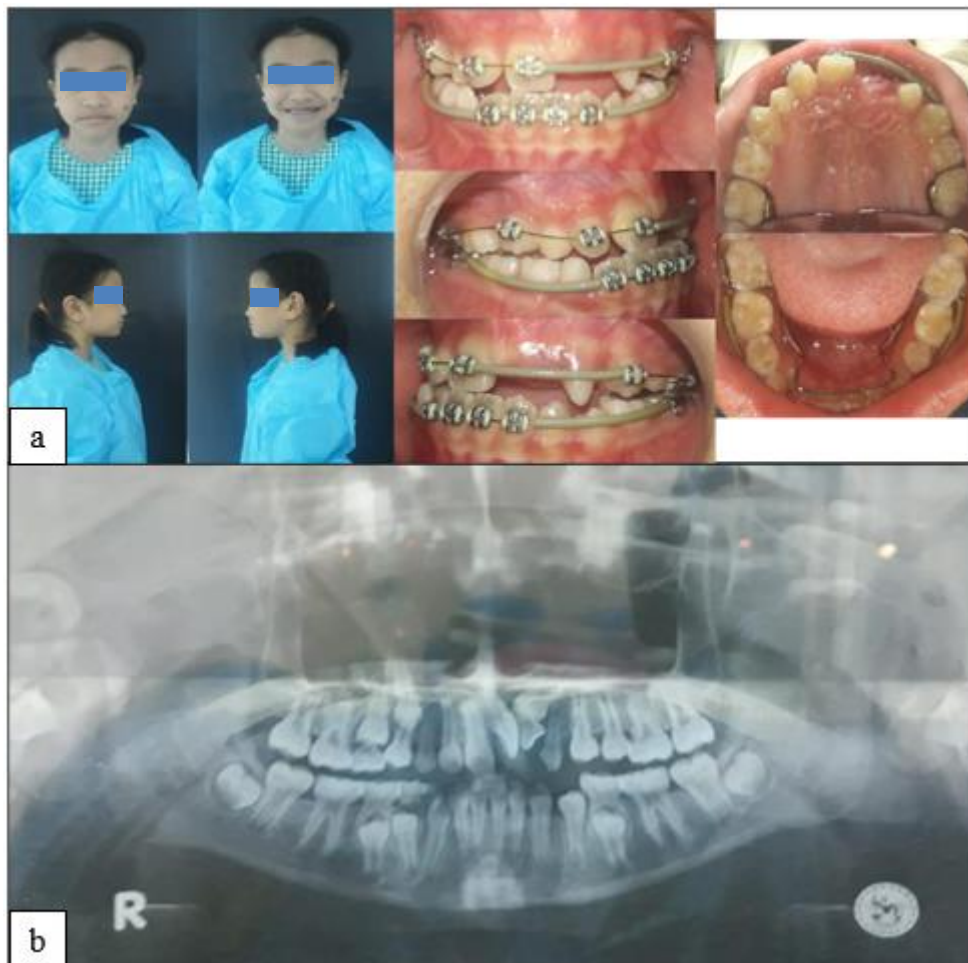


Figure 1 Pre-surgical exposure (a) extraoral and intraoral photos; (b) panoramic photo

Open Surgical exposure begins with marking on the incision area, followed by local infiltration anesthesia in the 21,22,23 region. A trapezoidal incision was made, followed by a full-thickness flap technique using a raspatorium. Excision of the fibrous tissue covering the crown and removal of the alveolar bone at the level of the cemento-enamel junction (CEJ). Then proceed with the installation of buttons on teeth 21, 22, 23, and connecting to the main wire SS

0.016" x 0.022" using a 0.010" ligature wire. The flap was positioned more apically, then the flap was sutured by using silk 3.0.

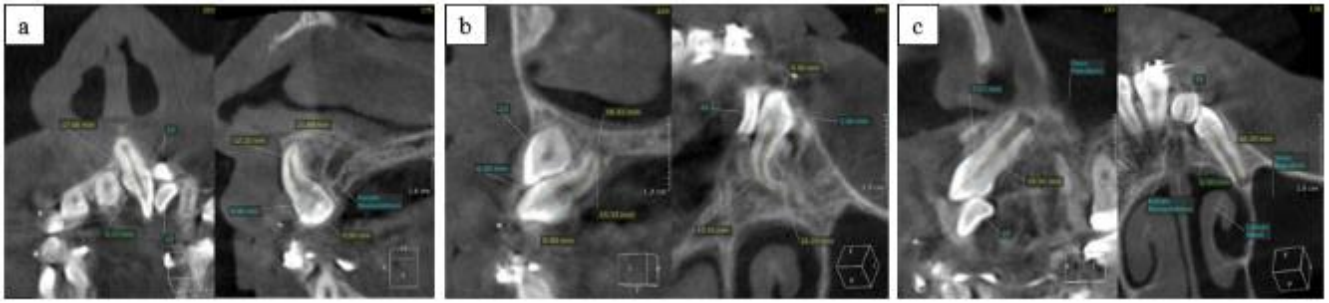


Figure 2 The multiplanar view of CBCT shows images of impacted teeth 21, 22, and 23 as well as deciduous teeth 63 with radiopaque images of orthodontic appliances along the occlusal line and palate

(a) Coronal and Sagittal view of CBCT: The root canal is bent with the apical end laced palatally; The facial side of the crown is distal and the cingulum side is mesial; The crown position is in the maxillary labial and has penetrated the labial cortical plate, is in contact with and there is loss of the cortical boundary of the nasopalatine canal on the anterior-lateral side (as seen on slicing), and is in contact with the crown of impacted teeth 22 and 23 without resorption; The root position is more mesial than the crown position, located in the maxillary labial with the apical tip right at the maxillary midline and inferior to the nasal cavity, the rootbody as a whole has penetrated the labial cortical plate, with the apical follicular border in contact with the base wall of the nasal cavity without loss. cortical border (intact); **(b) Sagittal and Axial view of CBCT:** The root canal is bent with the apical end of the root laceration in a superior-buccal direction; The facial side of the crown is superior and the cingulum is inferior; The position of the crown was labial maxilla, some of the sides of the crown had penetrated the labial and palatal cortical plates, located at and tangent to the distal impacted tooth 21 and inferior to the impacted tooth 23 without resorption; The root position is superior-posterior (palatal) to the crown position, ± 2.5 mm inferior to the nasal cavity, with the border of the tooth follicle in the medial side of the root in contact with the wall of the nasopalatine canal without loss of the cortical boundary (intact); **(c) Sagittal and Axial view of CBCT:** The root canal is straight with the apical end of the root not formed/completely closed; The facial side of the crown is buccally and the posterior side of the crown is palatal; The position of the crown was in the maxillary labial, part of the crown side had penetrated the labial and palatal cortical plates, located at and tangent to the distal side of the impacted tooth 21 and the superior side of the impacted tooth 22 without any resorption images, and the border of the tooth follicle on the mesial side was in contact with the wall of the nasopalatine canal without any signs of resorption. accompanied by loss of cortical boundaries (intact); The root position is superior-posterior to the crown position, is in an inverted Y (junction between the nasal cavity and maxillary sinus), in contact with the lateral wall of the nasal cavity and the medial wall of the maxillary sinus without loss of cortical boundaries (intact).

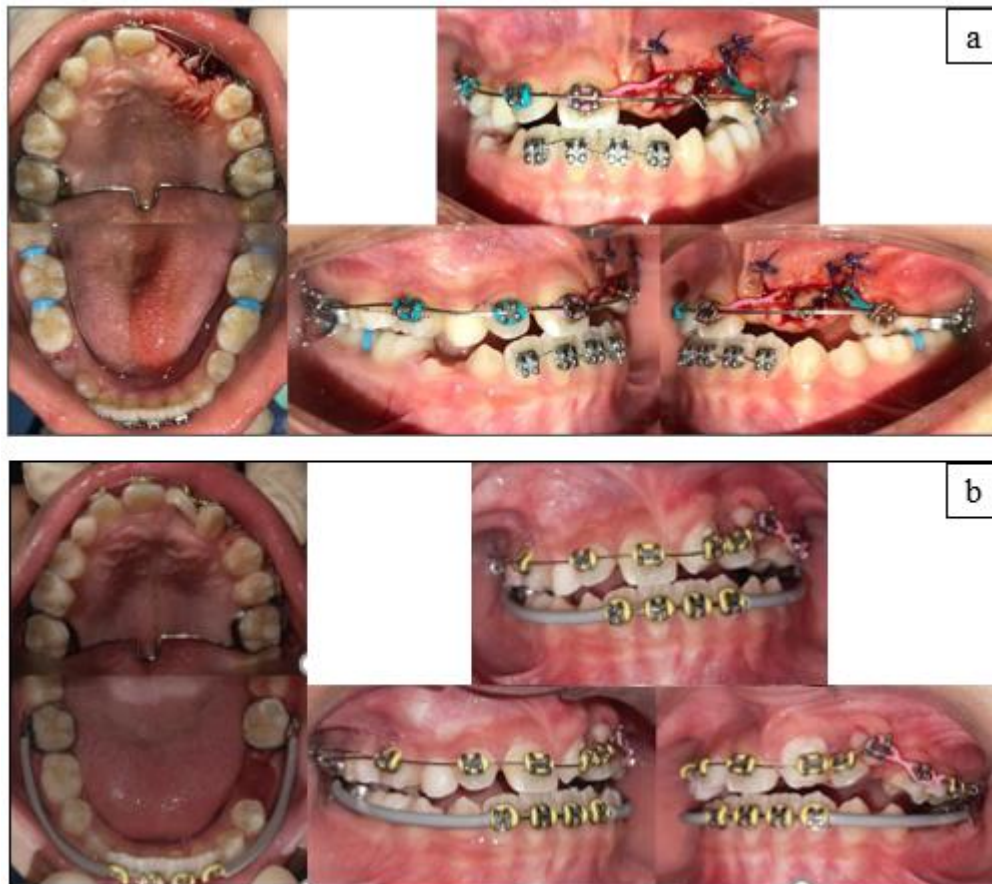


Figure 3 Patient's intraoral photo: (a) right after surgical exposure; (b) 15 weeks after surgical exposure

3. Discussion

Missing upper teeth has a major impact on dental and facial esthetics which can affect overall self-esteem and social interactions [1]. The impacted maxillary canine may be managed by several different techniques. The chosen method would depend on the degree of impaction, age of the patient, stage of root formation, presence of any associated pathology, dental condition of the adjacent teeth, position of the tooth, patient's willingness to undergo orthodontic treatment, available facilities for specialized treatment and patient's general physical condition [7]. There are four aspects of the canine position that should be assessed along with carefully taking into account the age of the patient. The use of these prognostic factors in an index has been suggested to estimate treatment difficulty. These factors are (1) overlap of incisor, (2) vertical height, (3) angulation, and (4) position of the apex. These criteria may aid decision-making regarding the management of cases [7]. Treatment Options for Impacted Canines are 1. Observation, 2. Surgical exposure, 3. Surgical exposure and orthodontic traction, 4. Surgical removal [5].

There are many and varied reasons for the impaction of the maxillary canine. The causes maybe classified into four distinct groupings. Some are due to local hard tissue obstruction, those due to local pathology, those due to a departure from or disturbance of the normal development of the incisor teeth, and those directly due to hereditary/genetic factors [8]. Medical history and patient history found that the patient had trauma when she was 5 years old. Trauma to the face may cause laceration of the soft tissues of the lips and cheek and its force may be transmitted to the upper jaw, to cause displacement of the unerupted canine tooth or a dilaceration of its developing root, particularly in the younger child. According to incidents of this kind, the tooth may become impacted [8].

The examination began with anamnesis and clinical examination and continued with supporting examinations in the form of panoramic photos, cephalometry, occlusal, and CBCT. CBCT view of patients showing radiographic features impacted on 21, 22, 23 teeth undisclosed by alveolar bone. Panoramic view of the patient showing radiographic feature impacted on 21, 22, 23 tooth and radiopaque across occlusal line and palate (wire orthodontics).

Surgical exposure is indicated when the tooth doesn't erupt spontaneously after creating space in the arch and it is attempted after root formation [3]. This technique may be used in cases where there is enough space for the canine to erupt, and where the root formation is incomplete. Surgically exposing the crown of the canine may allow it to come into position by normal eruptive forces [5]. The present study investigated the long-term results of the successful orthodontic resolution of the impaction of maxillary canines in which an open-surgical exposure technique had been used. The main clinical advantage of this technique, other than its simplicity, is that the crown remains in full view at the end of surgery [6].

In this case, we choose surgical exposure with trapezoid incision and orthodontically assisted eruption technique, because an impacted tooth involves a broad area, and the patient is very cooperative. To attempt this technique, the case must fulfill the following criteria:

The impacted canine must be favorably positioned. (b) The patient must be compliant with both surgery and long-term orthodontics. (c) The patient must not have associated medical problems [5].

The apically positioned flap is indicated in cases where the cervical portion of the crown does not lie within the attached gingiva, removal of the soft tissue may cause the attached gingiva to be lost [5]. The apically positioned flap is suitable only for labially-impacted canines in their normal locations in the arch. The flap should be designed to preserve a band of attached gingiva to guide the eruption of the tooth through its natural path of eruption [3].

The combined effects of surgical exposure and light orthodontic movement forces are beneficial for the periodontal health of the tooth because they minimize the loss of alveolar bone support than heavy movements. Vermette et al. addressed that the close exposure method has been recognized as one of the best methods for uncovering labially impacted teeth, especially when the tooth is located high above the mucogingival junction or deep in the alveolus where the apically positioning flap may be unviable.

4. Conclusion

Open surgical exposure with an apically positioned flap technique is a great technique to use in impacted maxillary incisors and canine cases.

Compliance with ethical standards

Acknowledgments

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Disclosure of conflict of interest

The authors declare that there is no conflict of interest regarding the publication of this document.

Statement of informed consent

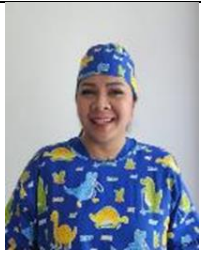
Informed consent was obtained from patient included in the study.

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Author's short biography



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