



(CASE REPORT)



Surgical and orthodontic management of impacted maxillary central incisor in children: A case report

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Abstract

Impaction of maxillary permanent central incisor is a frequently reported case in dental practice, and its treatment is challenging because maxillary central incisors are of great important for both aesthetic and functional aspects, since they provide support of the lip and facial muscles. Early detection of such teeth is most important if complications are to be avoided. In this article, we report a case of a 12-year-old girl, in the Pediatric Dentistry Specialist, Dental and Oral Hospital, Airlangga University. Combined approach with surgical exposure and the application of an orthodontic force brought the impacted left maxillary central incisor down to its proper position in the dental arch.

Keywords: Impacted teeth; Maxillary central incisor; Surgical exposure; Orthodontic correction; Case report

1. Introduction

Impacted are the permanent teeth which stay within the jaw bone after their normal eruption time and are surrounded by the dental follicle, which has no communication with the oral cavity [1]. Maxillary central incisors are generally expected to erupt into the mouth around the age of 7, following eruption of the mandibular incisors. An impaction must be suspected if the tooth fails to erupt into normal function within a specified time and the contralateral tooth has been present in the mouth for over a period of 6 months [2]. Impaction of maxillary permanent incisors occurs in 0,2 to 1% of the population. It is the third most commonly impacted tooth [3].

Studies have shown that about 1-2% of occlusal problems correlate to impacted anterior teeth. The alignment of the anterior impacted teeth is essential, because otherwise complications occur, such as ankylosis, external root resorption, recession, bone loss and risk for the health of the adjacent teeth [3]. A failure of tooth eruption due to impaction will also influence the psychological development of the affected people. Patients often present to the dental clinic for management due to the high aesthetic and functional concerns [4].

The maxillary incisors are the most prominent teeth in an individual's smile, they are also the teeth that are on maximum display during speech in most individuals and the normal eruption, position and morphology of these teeth are crucial to facial aesthetics and phonetics [4]. The cause of impaction may be related to; presence of supernumerary teeth, cysts, trauma to the deciduous teeth and succedaneous tooth germ during development, unbalanced tooth-arch width relationships leading to loss of space in the arch, odontoma and mucosal barriers in the path of eruption [5].

The management of impacted maxillary incisors usually involves surgical exposure and the tooth left to erupt into alignment where there is enough space available in the arch with a favourable vertical and horizontal position or a combination of surgery and orthodontic traction. Impacted teeth can be exposed by removal or repositioning the soft tissue that envelopes them, leaving them in full view at the end of the surgical procedure. The teeth might then erupt

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spontaneously, or, with a bonded attachment, an extrusive force can be applied to augment the diminished natural eruptive force [6].

2. Case History

A 12-year-old girl, came with her father to the Pediatric Dentistry Specialist, Dental and Oral Hospital, Airlangga University, with a chief complaint that his left maxillary front tooth did not grow while her right front tooth had grown perfectly. From the medical history, the patient had a trauma at age 4, with the premature exfoliation of some deciduous teeth. The report showed good general health, no history of allergies, and no medical history of case management.

Intraoral examination (Fig 1) revealed missing upper left central incisor, and the adjacent teeth had drifted into the unoccupied space. The patient had moderate oral hygiene with good periodontal health and a slightly bulged alveolar ridge. There was significant dental crowding in the mandibular arch with a Class III molar relationship on both sides. Overjet was 1 mm and overbite -1.3 mm. Radiographs showed that the maxillary left central incisor was impacted in a mesioangular position in the region of the nasal floor, and the right canine had an impaction tendency (the incisal tip overlapped the root of the right central incisor) (Fig 2).



Figure 1 Intraoral views

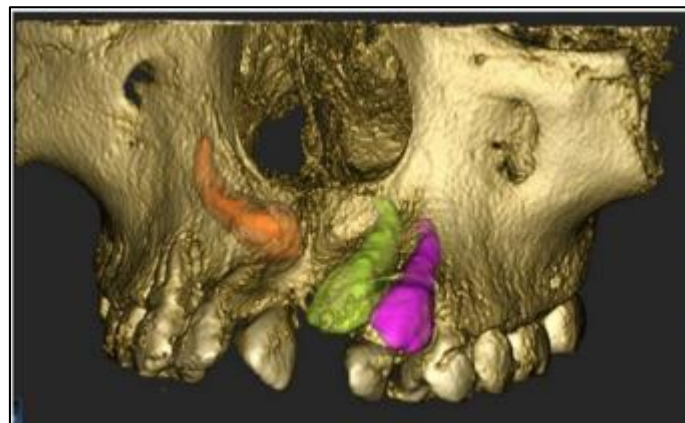


Figure 2 Radiographic examination

It was decided to perform surgical exposure of the impacted tooth, followed by bonding a bracket to the tooth labial surface and guiding it down to its natural position.

Previously mentioned as Kincaid's technique, after local anaesthesia a flap is raised from the edentulous area or from the area of the impacted tooth, protecting as much as possible the attached gingiva (Fig 3). In special cases, impacted tooth which have a more vertical direction and lie above their normal anatomical position, the surgery is performed both labially and palatally, to free the tooth from its bony crypt [7]. The bone covering the crown is removed. The two thirds of the crown are exposed and the dental follicle is removed from the margins of the exposed crown.



Figure 3 The result of open exposure and traction of the central incisor

Seehra *et al* [8] stress that surgical manipulation must avoid areas apically to the cemento-enamel junction (CEJ) because in this area new attachment formation is anticipated. The flap is sutured with the periosteum and one half to two thirds of the crown are left exposed. After surgery, a bracket is bonded on the exposed tooth. The more horizontal is the position of the tooth the more incisally the bracket is placed, in order to achieve orthodontic traction with the desirable tooth inclination.

Every technique for the rehabilitation of an impacted tooth aims at creating the needed conditions, so as the impacted tooth can be uneventfully aligned in the dental arch and surrounded by healthy periodontal tissues. For this, the attached gingiva is required around the tooth, both during its displacement and after its alignment, to avoid the post-surgical risk of epithelial elements covering the tooth. So, the impacted tooth will be relocated faster and without being blocked by soft tissues and, also, the proper dento-gingival contact will prevent bone loss and recession [8,9].

3. Discussion

An impacted maxillary central incisor in a child poses a disturbing aesthetic dilemma because of its prominent location. Neither pediatric dentists nor parents want to wait for complete eruption of the permanent dentition before starting comprehensive orthodontic treatment, especially when the problem can be treated in the early mixed dentition stage [2]. In this case, the clinical as well as radiographic examinations clearly showed that there was enough space available for the traction of the impacted maxillary left central incisor.

We first determined whether the impacted tooth could be successfully aligned in its proper position based on its position and orientation, the amount of root formation, and the degree of root displacements [2,6]. It is important to plan when and how the impacted tooth will be moved to its proper position, as well as the positions of adjacent teeth and the intermaxillary relationships.

The following factors are used to determine whether successful alignment of an impacted tooth can take place: (1) the position and direction of the impacted tooth, (2) the degree of root completion, (3) the degree of dilacerations, and (4) the presence of space for the impacted tooth [10].

The horizontal position of the impacted maxillary central incisor meant that direct removal of the oral mucosa was the only way to expose the tooth and attach the wire [11]. The open technique involves an elliptical incision in soft tissue overlying the impacted tooth. This technique is useful only if the impacted tooth occupies a very superficial position beneath the mucosa or if you can retain adequate width of attached gingiva after exposure. Open exposure allows a dry field for bonding, planning the direction of traction. However, the technique is known to result in increased crown length and poor aesthetics [12]. Surgical exposure and moving the impacted tooth into normal occlusion with light force orthodontic traction is well accepted and reported as a current treatment modality [5,6]. The present case illustrates the management of impacted maxillary central incisor in permanent dentition. The crown of the tooth was palpable in the vestibular sulcus and the covering mucosa was thick and fibrous. A small window was opened surgically to expose the crown and facilitate the placement of the bracket on labial surface. The bracket was cemented and the orthodontic traction was carried out, which resulted in successful positioning of the tooth in the arch.

The slow orthodontic traction resulted in good periodontal and periapical health of the tooth. The present case showed successful results after multidisciplinary approach maintaining the natural tooth in desired position.

This patient was managed through open surgical exposure. Due to the horizontal orientation of the impacted maxillary central incisor, the only method to expose the tooth and attach the wire was by direct excision of the oral mucosa. Open surgical exposure appears to be preferable to closed techniques in terms of treatment duration and ankylosis risk, according to the available evidence. In terms of the main outcome of treatment length, current research suggests that the open surgical method is related to a shorter period of initial impacted teeth alignment to the dental arch than the closed procedure. This might be because of the absence of a relocated flap over the exposed impacted teeth, which could prevent the tooth from erupting [6,13].

4. Conclusion

Impaction of maxillary anterior teeth can be a challenging orthodontic problem. The treatment of an unerupted tooth will depend on its state, position, and presence of enough space in the dental arch to accommodate. The coordinated multidisciplinary approach toward the management of impacted maxillary central incisor resulted in favourable aesthetic and functional outcome. The creation of surgical window, use of the orthodontic traction, and an availability of sufficient space were the important parameters for the positive outcome.

Compliance with ethical standards

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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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