

Bilaterally Impacted Maxillary Central Incisors: Surgical Exposure and Orthodontic Treatment: A Case Report

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Abstract

Maxillary central incisor impactions occur infrequently. Their origins include various local causes, such as odontoma, supernumerary teeth, and space loss. Supernumerary and ectopically impacted teeth are asymptomatic and found during routine clinical or radiological examinations. The surgical exposure and orthodontic traction of bilaterally impacted central incisors after removal of impacted supernumerary teeth is presented in this report.

Keywords: Impacted teeth, maxillary central incisor, supernumerary teeth, odontoma

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Introduction

The central incisor is the most frequently retained incisor.¹ The frequency of maxillary incisor impaction ranges from 0.06% to 0.2%.² The most common causes of impaction seem to be odontoma, supernumerary teeth, and loss of space. Impactions caused by disturbances in the eruption path related to crowding are somewhat less common.³ Other causes are crown or root malformation of permanent incisors due to trauma transmitted from the primary predecessors and apical follicular cysts that prevent normal eruption.

Although impaction of a permanent tooth is rarely diagnosed during the mixed dentition stage, an impacted central incisor is usually diagnosed accurately when there is a delay in the eruption of the tooth. Many patients with impacted maxillary central incisors are referred to orthodontists by general practitioners or pediatric dentists due to parental concern about the impaction of an incisor in the early mixed dentition even though its occurrence is less frequent.⁴

An anomaly in the eruption of anterior teeth can interfere with facial aesthetics and cause other clinical problems. Several techniques have been developed as a choice of treatment for this scenario. If the impacted tooth is extracted, loss of alveolar bone is anticipated. Following the healing period, the alveolar ridge becomes thinner and deficient. With these disadvantages in mind, orthodontic treatment to facilitate eruption of the natural tooth and maintaining natural appearance are the goals of treatment. As a result, surgical and orthodontic treatment approaches are accepted for such impacted teeth. Careful

planning is required when moving an impacted tooth by orthodontic means. The mechanics of the treatment can be modified according to the individual clinician's preferences.

This report presents the surgical and orthodontic treatment of a case with impacted maxillary central incisors caused by two supernumerary teeth located in the eruption path of the impacted teeth.

Case Report

A girl, age ten years four months, was referred for orthodontic treatment with a chief complaint of delayed eruption of both upper central incisors. The child was in good health and had no history of medical or dental trauma. Her medical history showed no contraindications to orthodontic treatment (Figure 1).

Intraoral examination showed she had an early mixed dentition with poor oral health, an Angle Class II molar relationship, 3 mm of overjet, and 4 mm of overbite. Cephalometric analysis revealed a normodivergent skeletal Class I pattern (Figure 2).

The panoramic radiograph demonstrated both maxillary central incisors were impacted due to the presence of two impacted supernumerary teeth located in their eruption path. The impacted maxillary central incisors were positioned vertically, and the supernumerary teeth were placed between the crowns of the impacted central incisors (Figure 3).



Figure 1. Pre-treatment facial photographs.



Figure 2. Pre-treatment intraoral photographs.

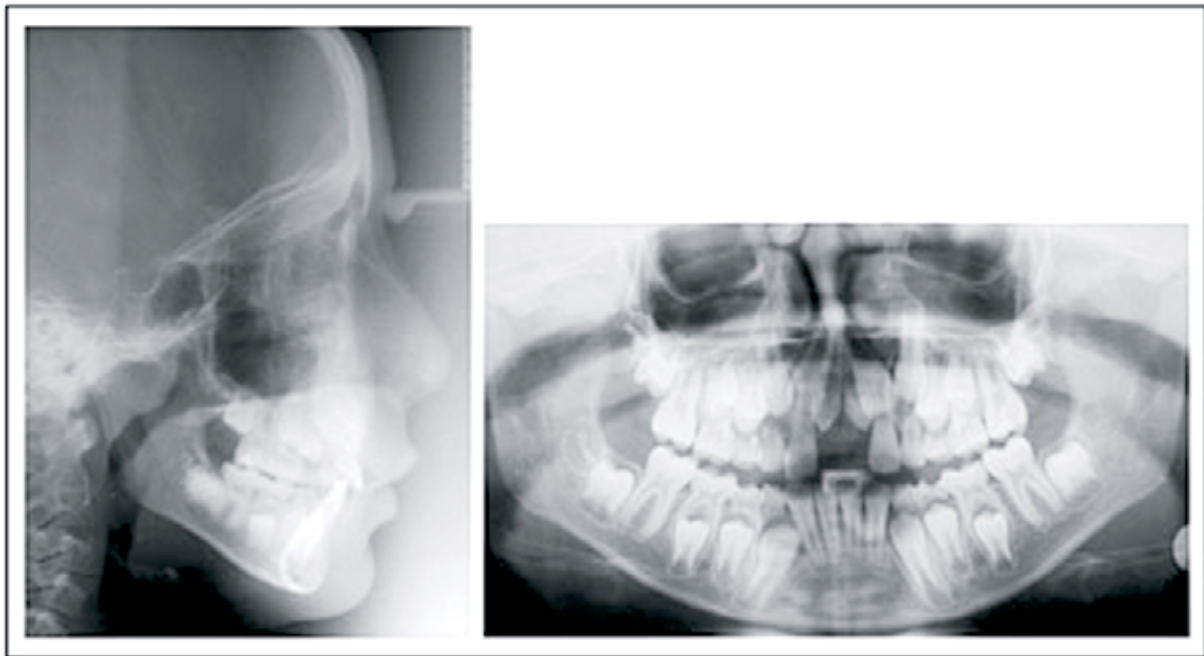


Figure 3. Pre-treatment radiographs.

The treatment plan consisted of surgical exposure, extraction of the supernumerary teeth, traction of the impacted central incisors, and fixed orthodontic treatment.

Treatment

The patient was sent to the Department of Oral and Maxillofacial Surgery (Faculty of Dentistry at Ondokuz Mayıs University in Samsun, Turkey) to remove the supernumerary teeth and expose the impacted incisors. Local anaesthesia was administered using Articaine® with 0.006 mg/ml adrenaline. The surgeon raised a mucoperiosteal flap to remove supernumerary teeth. To expose the impacted incisors, a sufficient amount of bone was removed with a round bur. After removal of the supernumerary teeth, attachments with a 0.010-inch ligature wire were bonded to the labial surface of the impacted incisors during surgical exposure (Figure 4).

Orthodontic traction of the impacted incisors was accomplished with a maxillary removable appliance containing a high labial archwire. A light force of approximately 60 to 90 g was applied by 1/8 inch and 2.5 oz intraoral elastics between ligature wires and the high labial archwire (Figure 5).

When the incisors reached the occlusal plane, the buttons were removed and a 2x2 fixed orthodontic system was applied. Molar bands were placed on the maxillary first permanent molars, and brackets were placed on the maxillary permanent central

incisors. After the completion of initial levelling, cervical headgear was used for distalization of the maxillary first permanent molars to correct an existing Class II molar relationship and to open the space for the maxillary permanent teeth. A Class I molar relationship was established at the end of five months. After this stage, both dental arches were banded and bonded using 0.022" x 0.028" slot straight wire appliances to close spaces, and the final anteroposterior correction was made with Class II elastics. The patient was given maxillary and mandibular Hawley retainers with instructions for initial full-time wear and then long-term night time wear. Total treatment time was 32 months.

Results

The maxillary central incisors were brought into an acceptable position within the arch (Figures 6, 7, and 8).

Adequate overbite, overjet, and intercuspation were achieved. Well-interdigitated Class I canine and molar relationships were attained. The most significant change was a dramatic improvement in the patient's smile, and the final appearance of the teeth was esthetically pleasing with gingival margins at the same level and similar clinical crown sizes. After completed treatment, the repositioned incisors had an acceptable gingival contour and width of attached gingiva. The post-treatment radiograph showed the newly positioned incisors showed no periodontal bone loss, minimal root resorption, acceptable root parallelism, and root form.

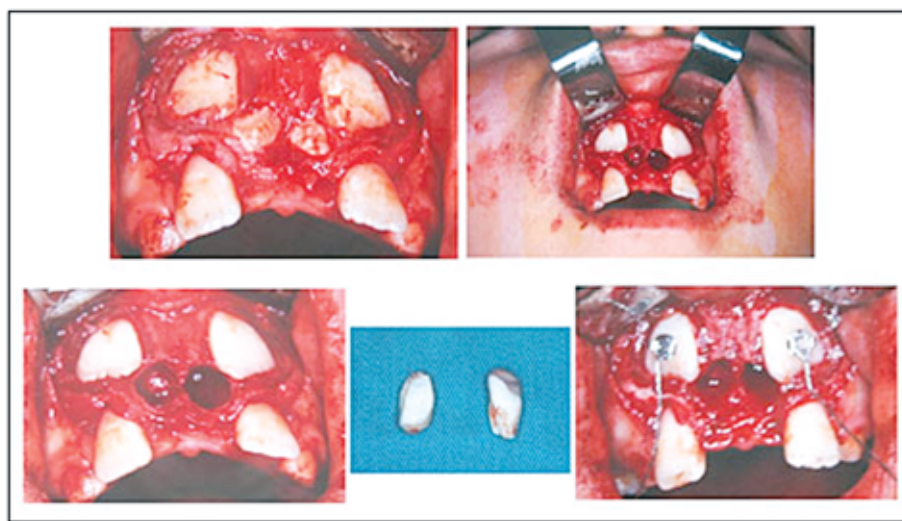


Figure 4. Clinical views at surgical exposure.

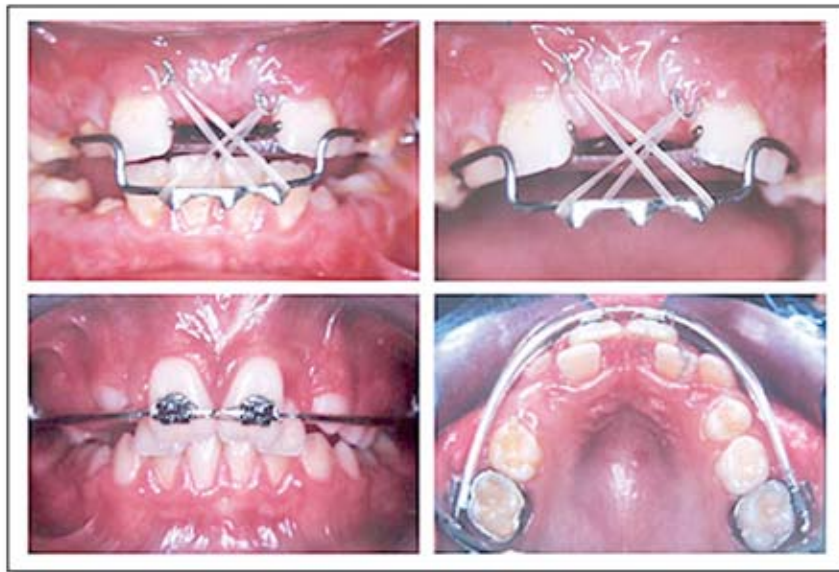


Figure 5. Elastic traction to central incisors and in-progress intraoral photographs.



Figure 6. Post-treatment facial photographs.



Figure 7. Post-treatment intraoral photographs.

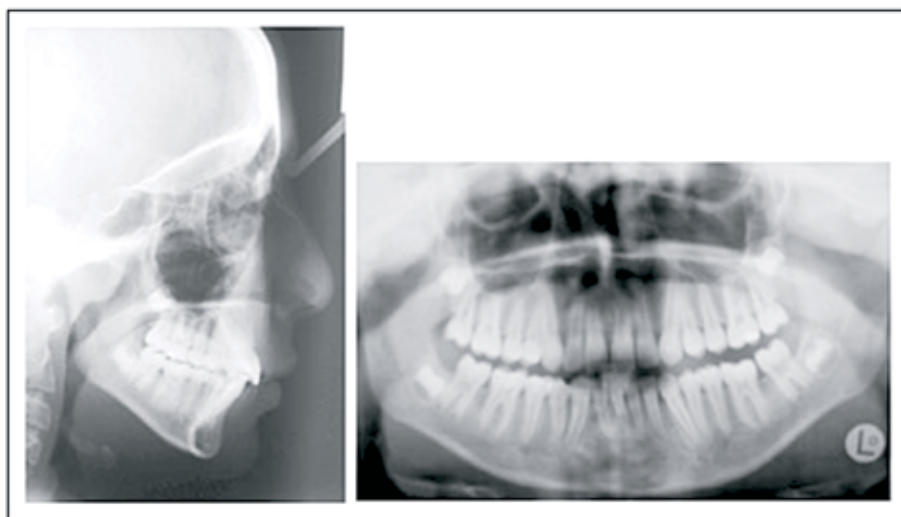


Figure 8. Post-treatment radiographs.

Discussion

Impacted teeth can cause serious dental and aesthetic difficulties as well as psychological problems especially in anterior regions. Although the impacted maxillary incisor occurs less frequently than the maxillary canine, it is of concern to parents during the early mixed dentition stage because of noneruption of the tooth.⁵

Maxillary central incisor impactions occur infrequently; their origins include various local causes, such as odontoma, supernumerary teeth, space loss, and disturbances in the eruption path, also trauma and apical follicular cysts.^{3,6} In the patient treated here both of the upper permanent incisors were disrupted by two supernumerary teeth.

Impaction of maxillary anterior teeth can be a challenging orthodontic problem. Several reports have indicated an impacted tooth can be brought into proper alignment in the dental arch.⁷⁻¹⁰ 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.¹¹ Holland has recommended the movement axis of the impacted tooth must be considered together with these factors.¹²

The treatment approach of impacted maxillary teeth requires the cooperation of dental specialties such as orthodontics, oral surgery, and prosthodontics. Several reports have demonstrated successfully treated impacted maxillary anterior teeth by proper crown exposure surgery and orthodontic traction.^{8,13} Many attempts at treatment have been made; special springs, removable, or fixed appliances have been designed orthodontically for eruption of impacted teeth.^{7,13-15}

Several techniques are commonly used to uncover maxillary labial impactions. One technique, the apically positioned flap, consists of apically repositioning a raised flap that incorporates attached gingiva overlying the impacted tooth. Another technique, the closed-eruption technique, involves raising a flap that incorporates attached gingiva over the impacted tooth, attaching an orthodontic bracket to the tooth, and then fully replacing the tissue over the tooth and bracket. Each technique offers certain advantages during forced eruption of impacted teeth. The apically positioned flap technique permits ready reattachment of a bracket if unintended debonding occurs. However, the closed-eruption technique is believed to provide the most aesthetically pleasing result.^{16,17} In the present case, the closed eruption surgical technique was used. This

technique is more reliable when aesthetic and periodontal health is considered. Vermette et al. recommended the usage of the closed eruption technique when the tooth is in the middle of the alveolus or high near the nasal spine.¹⁶ In this case the periodontal status of the exposed incisor after orthodontic treatment revealed an acceptable gingival contour and attached gingiva. No further mucogingival surgery was recommended.

Conclusions

Forced eruption of impacted teeth must always be considered in young patients because this technique can lead to suitable results from a periodontal, occlusal, and esthetic perspective at an earlier stage better than with other treatment options. Long-term monitoring of the stability and periodontal health of the impacted incisor should be evaluated following orthodontic traction.

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