Multidisciplinary treatment dilacerated central incisor associated with impacted canine and congenital missing lateral incisor: a case report

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SUMMARY
In this case report multidisciplinary treatment of a 16 years old male patient was presented. In the radiographic evaluation, it was determined that maxillary right lateral incisor was congenital missing, canine was impacted at the same side, and left central incisor was dilacerated and impacted. In the intraoral examination, it was observed that space of the left central incisor was closed mildly by the migration of the neighbor teeth, there was a midline deviation, and left lateral incisor had a narrow mesio-distal width. Dilacerated central incisor was extracted and a button was attached on the impacted canine by a surgical approach. Impacted canine was erupted, midline was corrected, and left lateral incisor was moved to the place of the extracted central incisor with orthodontic treatment. After orthodontic treatment, central incisor form was given to the left lateral incisor with a porcelain crown and lateral incisor form was given to the canines by drilling the cusp tips with diamond bur. At the end of treatment, the patient attained a functional occlusion and esthetic appearance.

Key words: Dilacerated maxillary central incisor, congenitally missing lateral incisor, impacted canine

Introduction
A tooth that is not expected to erupt in a reasonable time is termed as an impacted tooth and the prevalence of impacted tooth changes from 1% to 2% in orthodontic patients(1,2). Maxillary canine is the tooth that has been shown to be most frequent impaction(3). Leifert and Jonas(4) reported that occurrence of palatally impacted canines is often closely linked with other dental anomalies. The findings of this study revealed that palatal canine displacement was significantly higher in patients with hypoplasia, peg shape or congenital aplasia of upper lateral incisors, further impacted and congenitally missing teeth and cover-bite. Impaction of the permanent maxillary incisor is observed less frequently, and many serious problems in term of esthetic and occlusal aspects occur in these patients(5).

Bishara6 divided the etiologic factors of the impacted tooth into two groups as generalized and localized factors. Generalized factors include some syndromes like cleidocranial dysplasia while localized factors include lack of space for eruption, retained or early lost deciduous tooth, abnormal position of the tooth bud, the presence of alveolar cleft, ankylosis, cystic or neoplastic formation, alveolar or dental trauma, and dilaceration of root(6-8).

Dilaceration can be defined as a distorted root form and it can occur from any distortion of the crown relative to the root(9). This sort of lesion usually affects the maxillary incisors and in most of the cases the crown is directed labially and superiorly(10). The most common etiological factor is trauma to the corresponding deciduous tooth. Trauma of the former may cause abnormalities in the formation of permanent tooth because of the close relationship be-
between apex of a deciduous tooth and the permanent tooth germ. Either by a direct impact or by periapical inflammation, deciduous tooth may cause dilaceration of the permanent tooth(11). The dilacerated tooth may be either forced to eruption by applying traction force or may be extracted. During the treatment planning, the degree of dilaceration and position of the tooth should be taken into consideration.

In this case report, we describe a clinical situation in which a patient had congenitally missing left lateral incisor and an impacted left canine associated with severely dilacerated central incisor. The patient was treated by removing the dilacerated tooth, moving the right lateral incisor to the place of the central incisor and forcing the impacted canine to the place of the left lateral incisor. The right lateral incisor was transformed to a central incisor with a porcelain crown and both of the maxillary canines were transformed to a lateral incisor by reshaping.

Case Report

Diagnosis

A healthy 16-year-old male patient referred to the orthodontic clinic of GMMA, for treatment. His chief complaint was his unaesthetic appearance due to the absent maxillary left central and right lateral incisors and maxillary left canine were missing. Left lateral incisor was narrow and it was slightly tipped in the mesial direction. Due to the absent teeth, maxillary posterior teeth were mesialized and the patient had a class II molar relation on both of the sides. Overjet was zero and mandibular incisors were slightly crowded (fig. 2a-d).

Panoramic radiograph was taken to detect the missing teeth and it was observed that left lateral incisor was congenitally missing; left canine was palatally impacted, right central incisor was also impacted and its root was severely dilacerated (fig. 3). In the lateral cephalometric analysis, class I skeletal structure with an ANB angle of 1° (SNA, 75° and SNB, 74°) was determined. Vertical facial heights were also in normal limits (GoGn/SN, 27 and y-axis, 62). Dental measurements revealed that maxillary and mandibular incisors were both retroclined (1/NA, 22 and 1/NB, 17, respectively) and lingually inclined (1-NA, 3 and 1-NB, 1, respectively).

Treatment plan

Treatment plan for this patient was to; (a) extract the impacted and dilacerated central incisor, (b) force the impacted canine to erupt into the place of the congenitally missing lateral incisor, (c) move the left lateral incisor to the place of the extracted central incisor, (d) re-contour the right and left canines with a diamond bur, (d) re-shape the left lateral incisor by a porcelain crown application.

Figure 1. Panoramic radiograph of the patient revealing the impacted left canine, congenitally missing lateral incisor, and impacted and, dilacerated maxillary incisor of the patient before treatment.
Treatment progress

Initially, 0.18 slot Roth brackets were attached on the maxillary and mandibular teeth. Following the leveling phase with 0.12 inch nitinol arch wires, 0.16 inch nitinol arch wires were inserted and a flap was raised to extract the dilacerated central incisor and to attach a button on the impacted canine. Traction force was applied to the canine until eruption. After it positioned into the place of the congenitally missing lateral incisor, 0.16x0.16 stainless steel arch wire was inserted and force was applied to the left lateral incisor in the mesial direction by using an elastic chain. 0.16x0.22 stainless steel arch wires were used during the finishing phase.

At the end of orthodontic treatment that lasted for 22 months, left lateral incisor was prepared and porcelain crown was applied so as to shape it like a central incisor. Additionally, the right and left canines were re-contoured by abrading the cusp tip with a diamond bur and lateral shape was given to these teeth.

Discussion

Impaction of permanent teeth causes serious consequences such as esthetic, phonetic and occlusal problems for the young patients. Clinical signs of an impacted tooth include retention of the primary tooth, space closure, and elevation of the soft tissue of the palatal or labial mucosa(12). Radiographic evaluation usually reveals the causes of impaction such as a supernumerary tooth, an odontoma or a dilaceration. The treatment of the impaction has to be planned according to the reason of the obstacle for eruption(13-15). In the presented case, left canine and right central incisor were impacted. Panoramic radiograph showed that the reason of the canine impaction was ectopic eruption of the related tooth caused by the congenitally missing left lateral incisor. The reason of the impacted central incisor was the severely dilaceration of the root.

Figure 2 a,b. Intraoral photographs of the patient before treatment.

Figure 3 a,b. Intraoral photographs of the patient after treatment.

Figure 4a,b and figure 5a-d shows the extra oral and intraoral photographs of the patient after treatment.
Dilaceration is characterized by an angulation between the crown and the root and it is often related to a traumatized primary incisor (16-18). However, Steward (19) who studied 41 cases of dilaceration determined that only 22% of the patients had a history of trauma and reported that root dilacerations were more likely caused by ectopic development of the tooth germ. In the presented patient there was no apparent history concerning dental and alveolar trauma. Therefore, ectopic development and abnormal position of the tooth bud was the possible etiologic factor of the dilacerated tooth.

Treatment of the dilacerated incisor depends on the degree of dilaceration, the position of the tooth and patient’s motivation (20). The treatment options reported in the literature are traction and alignment with fixed or removable orthodontic appliances, extraction of the dilacerated tooth and replacement by prosthesis, and extraction of the central tooth and transposition of the lateral incisor (14,21,22). Transposition of a canine to the extraction site of a dilacerated maxillary central incisor is another treatment alternative reported by several researchers (23,24). In the presented case, since the central incisor was at a higher level in the alveolar bone, we decided to remove it.

The impacted and dilacerated central incisor was not the unique problem of the patient. Additional to this challenge, left lateral incisor was congenitally missing, left canine was impacted, and right lateral incisor was atypical with narrow crown width. To achieve appropriate esthetic and symmetrical appearance we decided to position the impacted canine to the place of the missing lateral and mesialize the atypical left lateral incisor to the place of the dilacerated central incisor. By this treatment protocol, both of the maxillary canines were re-contoured like a lateral incisor and a symmetrical appearance was provided. If the left lateral incisor was kept in its place, the right canine that was placed into the space of the lateral incisor would be very prominent since the symmetric lateral incisor is an atypical narrow tooth. This would create a serious esthetic problem for the young patient. Moving the lateral incisor to the place of the extracted dilacerated central incisor was essential not only improving the esthetic but also to achieve and maintain an acceptable bone height (25). Additionally, if the left lateral incisor was not mesialized to the place of the central incisor, the patient would have to use a bridge or an implant supported crown restoration and both of these treatment choices were more traumatic than using a porcelain crown.

References