

## **Treatment of Simple Anterior Crossbite with a Removable Appliance in the Permanent Dentition: A Case Report**

### **Basit ön Çapraz Kapanışın Daimi Dentisyon Döneminde Müteharrik Aparey ile Tedavisi: Vaka Raporu**

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#### **Abstract**

This case report presents the treatment of a patient with a simple anterior crossbite using a removable appliance in the permanent dentition. The chief complaint of the 12-year-old female patient was the ugly appearance of her front teeth. She had a symmetrical face with competent lips, dental Class I canine and molar relationships, upper and lower anterior crowding, and an anterior dental crossbite because of a lingually positioned upper left central incisor. The lower left central incisor was labially positioned and was prone to occlusal trauma. Gingival recession on the labial surface of the lower left central incisor was considered to be because of a traumatic occlusion. The patient was on the waiting list for fixed orthodontic treatment; therefore, it was decided to perform removable appliance treatment as soon as possible to correct the crossbite, resolve the crowding, and eliminate the occlusal trauma. The treatment plan included a removable orthodontic appliance with a biteplate and finger springs. At the end of the 5-month treatment, the crossbite was successfully corrected, crowding was resolved, occlusal trauma was eliminated, normal overjet and overbite were achieved, and the smile esthetics significantly improved. In properly selected cases (even in adolescents), with cases involving good and satisfactory patient compliance, correction of a simple anterior crossbite can be successfully achieved using a removable appliance.

**Keywords:** Anterior crossbite, permanent dentition, removable appliance

#### **Öz**

Bu vaka raporunda, basit ön çapraz kapanışın müteharrik aparey kullanılarak daimi dentisyon döneminde tedavi edilmesi anlatılmaktadır. Ön dişlerin kötü görünümü şikayeti olan 12 yaşındaki bayan hasta simetrik bir yüze ve yeterli dudak kapanışına sahipti. Ağız içi muayenesinde hastanın Sınıf I dişsel ilişki ile birlikte alt ve üst keser çapraşıklığının olduğu tespit edildi. Üst sol santral keser dişin lingual pozisyonlanmasına bağlı olarak dişsel çapraz kapanışın meydana geldiği görülmüş, alt sol santral keser dişin labiyal pozisyonlanmasına bağlı olarak okluzal travmaya maruz kaldığı belirlenmiştir. Alt sol santral keser dişin labiyal yüzündeki dişeti çekilmesinin travmatik oklüzyondan kaynaklandığı belirlenmiştir. Hastanın sabit tedavi bekleme sırasında olması sebebiyle, çapraz kapanışın düzeltilmesi ve okluzal travmanın bir an önce elimine edilmesi amacıyla müteharrik aparey tedavisinin yapılması kararlaştırılmıştır. Tedavi planı ısırma düzlemi ve labiolingual zemberekleri içeren müteharrik aparey tedavisi olarak belirlenmiştir. Beş aylık tedavi sonunda çapraz kapanış başarılı bir şekilde düzeltilmiş, alt ve üst bölgedeki çapraşıklık giderilmiş, okluzal travma elimine edilmiş, gülüş estetiği anlamlı ölçüde düzeltilmiştir. Doğru seçilmiş vakalarda (ergen hastalar da dahil olmak üzere) yeterli hasta kooperasyonunun olması durumunda, ön çapraz kapanış müteharrik apareyler ile başarılı bir şekilde tedavi edilebilir.

**Anahtar kelimeler:** Ön çapraz kapanış, daimi dentisyon, müteharrik aparey

#### **INTRODUCTION**

Anterior crossbite can be defined as lingual positioning of the upper anterior teeth relative to their lower counterparts. The term "simple" implies that it is solely because of a dental origin resulting from atypical axial inclinations of the maxillary anterior teeth, thus differentiating it from complicated anterior crossbites, which are because of skeletal problems such as maxillary retrognathia or mandibular prognathia (1). The early correction of simple anterior crossbites is recommended to prevent abnormal enamel abrasions, anterior teeth fractures, and periodontal problems and to provide better functional occlusion and esthetics (2-5). The orthodontic treatment of a simple crossbite can be achieved with a removable or fixed appliance, involving lingual movement of the mandibular tooth, labial movement of the maxillary tooth, or

a combination of both simultaneously. Lingual repositioning of a mandibular tooth in a crossbite is defined as favorable to its gingival and alveolar bone heights (6-11).

This case report documents a case in which a simple anterior dental crossbite was successfully corrected in permanent dentition using a removable appliance.

#### **CASE REPORT**

##### **Diagnosis and Treatment Objectives**

The patient was a 12-year-old female whose chief complaint was the ugly appearance of her front teeth. She had a symmetrical face, competent lips, average smile, a nonconsonant smile arc, and a straight profile with normal upper and lower lips (Figure 1).

*This study was presented as poster presentations at the XIV<sup>th</sup> International Congress of the Turkish Orthodontic Society, 25-29 October 2014, Ankara, Turkey. Bu çalışma XIV. Uluslararası Türk Ortodonti Derneği Kongresi'nde poster bildirisi olarak sunulmuştur, 25-29 Ekim 2014, Ankara, Türkiye.*

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**Received/Geliş Tarihi:** 01.09.2015 **Accepted/Kabul Tarihi:** 17.02.2016 **DOI:** 10.5152/clinexphealthsci.2016.055

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Figure 1. Pretreatment extraoral and intraoral photographs.



Figure 3. Posttreatment extraoral and intraoral photographs.



Figure 2. a-d. (a) removable acrylic appliance (b) labial button (c) clinical view of the appliance and the button (d) application of elastic.

The upper dental midline was 1 mm to the left. Intraoral examination showed that the patient had dental Class I canine and molar relationships on both sides, together with upper and lower incisor crowding. She had an anterior dental crossbite because of the lingually positioned upper left central incisor and labially positioned lower left central incisor. In addition, the lower left central incisor had gingival recession, a very narrow band of keratinized mucosa, and periodontal inflammation. The gingival recession on the labial surface of the lower left central incisor was considered to be because of a traumatic occlusion. The treatment objectives were to correct the anterior crossbite, resolve the crowding, eliminate the occlusal trauma, establish a normal overbite and overjet, and improve the patient's facial and dental esthetics. The patient was on the waiting list for fixed orthodontic treatment; thus, it was decided to perform removable appliance treatment as soon as possible to correct the crossbite, resolve the crowding, and eliminate the traumatic occlusion. The treatment plan included a removable orthodontic appliance with biteplate and finger springs. Informed consent was obtained from the patient's family.

**Treatment Progress**

A removable acrylic appliance with a posterior biteplate was designed (Figure 2 a). The posterior biteplate was fabricated so as to reduce the overbite while the crossbite was being corrected. In order to tip the right central incisor, correct the midline, and open up space for the left side palatally positioned central incisor, a button was bonded on the labial surface of the same incisor, and the right side U loop of labial bow of the appliance was modified to include

a helix (Figure 2 b-c). The treatment was initiated with elastic application between the helix and the button (Figure 2 d). The patient was informed to change the elastics two times a day. When space opening was achieved, the finger springs were activated to procline the lingually positioned left central incisor and align the anterior teeth. After 3 months of treatment, the crossbite was corrected and the biteplate was removed. Final adjustments were performed and the appliance was used as a retention plate for an additional one month. During the treatment, significant lower incisor alignment was noted, which occurred spontaneously, secondary to tongue and lip pressure.

At the end of 5-month treatment, the crossbite was successfully corrected, upper and lower anterior incisor crowding was resolved, occlusal trauma was eliminated, normal overjet and overbite were achieved, and the smile esthetics improved significantly. The patient was satisfied with the overall treatment results.

**DISCUSSION**

Several etiological factors can contribute to ectopic eruption and the development of a simple anterior crossbite. These factors can be defined as: a retained primary tooth leading to deflection of the normal eruption, a delayed eruption of permanent dentition, direct trauma to the deciduous dentition leading to the displacement of the permanent tooth bud, anterior crowding, congenitally caused abnormal eruption pattern, and a supernumerary tooth or odontoma (2-27).

Removable orthodontic appliances have many advantages such as: reduced chair time activation, ease in removal, re-fabrication, and cleaning, and finally are cheaper relative to the fixed appliances. On the other hand, their main disadvantage is the need for patient cooperation, which actually plays a very important role in the success of the treatment.

For the treatment of our patient who was in the permanent dentition, we designed a removable appliance to correct the crossbite and resolve the crowding. When the crossbite was corrected and the upper incisors were aligned, the concomitant application of forward force from the tongue proclined the lower left lateral incisor and the lower crowding was resolved spontaneously.

It was reported that orthodontic correction of dental crossbite may lead to the spontaneous improvement of periodontal tissue, as repositioning of a tooth into its proper alveolar foundation allows better distribution of forces on the long axis, as well as bone remodeling (28). At the end of treatment, we noticed an improvement in periodontal health and in the esthetics of the lower left central incisor as the tooth was reattached at its base bone.

The active treatment time was 5 months. The main problems were corrected and treatment resulted in a successful improvement of the malocclusion and esthetics.

## CONCLUSION

In properly selected cases (even in adolescents), with cases involving good and satisfactory patient compliance, correction of a simple anterior crossbite can be achieved successfully using a removable appliance.

**Informed Consent:** Written informed consent was obtained from patients' parents who participated in this study.

**Peer-review:** Externally peer-reviewed.

**Author contributions:** Concept - K.B.; Design - K.B.; Supervision - K.B., Ş.N.; Resource - K.B.; Materials - K.B.; Data Collection&/or Processing - K.B., Ş.N.; Analysis&/or Interpretation - K.B., Ş.N.; Literature Search - K.B.; Writing - K.B.; Critical Reviews - K.B., Ş.N.

**Conflict of Interest:** No conflict of interest was declared by the authors.

**Financial Disclosure:** The authors declared that this study has received no financial support.

**Hasta Onamı:** Yazılı hasta onamı bu çalışmaya katılan hastanın ailesinden alınmıştır.

**Hakem Değerlendirmesi:** Dış Bağımsız.

**Yazar Katkıları:** Fikir - K.B.; Tasarım - K.B.; Denetleme - K.B., Ş.N.; Kaynaklar - K.B.; Malzemeler - K.B.; Veri Toplanması ve/veya işlemesi - K.B., Ş.N.; Analiz ve/veya Yorum - K.B., Ş.N.; Literatür taraması - K.B.; Yazıyı Yazan - K.B.; Eleştirel İnceleme - K.B., Ş.N.

**Çıkar Çatışması:** Yazarlar çıkar çatışması bildirmemişlerdir.

**Finansal Destek:** Yazarlar bu çalışma için finansal destek almadıklarını beyan etmişlerdir.

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