



## Stability Evaluation of Orthodontic Treatment of a Severe Open Bite Problem for an Adult by Maxillary Molar Intrusion Using Zygomatic Mini-Plates and Premolar Extractions: A 5 Year Follow Up Results

### *Zygoma Mini Plak Kullanılarak Maksiller Molar İntrüzyonu ve Küçük Azı Çekimi Yoluyla Şiddetli Açık Kapanışın Ortodontik Tedavisinin Stabilite Değerlendirmesi: 5 Yıllık Takip Sonuçları*

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#### ABSTRACT

Relapse of the open bite following the orthodontic treatment may occur within various periods after finishing active treatment. This study evaluates the stability of a severe open bite treatment using records taken 5 years after the treatment. Clinical Presentation: A 16- year old female patient with severe anterior open bite of (-6 mm) and skeletal Cl II relation owing to mandibular retrognathia and dental Cl I occlusion and moderate crowding in both arches. The patient was treated with maxillary molar intrusion with the help of zygomatic miniplates and NiTi coil springs tied to maxillary bite blocks to reduce the lower face height and to close the negative overbite and premolar extractions were also performed to relieve the crowding followed by conventional fixed orthodontic treatment. Conclusion: the patient showed stable vertical correction and a relapse only in the form of diastema at the extraction site. This type of treatment is recommended for similar cases since it has good stability in the long term, and it is less invasive than the orthognathic surgery with less postoperative complications expected.

**Keywords:** Orthodontics, intrusion, zygoma, stability, open bite

#### ÖZ

Ortodontik tedaviyi takiben açık kapanışta görülen nüks, aktif tedavi bittikten sonra çeşitli dönemlerde ortaya çıkabilir. Bu çalışma, tedaviden 5 yıl sonra alınan kayıtları kullanarak şiddetli bir açık kapanış tedavisinin stabilitesini değerlendirmektedir. Klinik Bulgular: Mandibuler retrognati ve dental Cl I oklüzyonuna sahip şiddetli ön açık kapanış (-6 mm) , iskeletsel Cl II ilişkisi ve her iki arkta orta derecede çapraşıklık gösteren 16 yaşında kadın hastaya ait. Alt yüz yüksekliğini ve açık kapanışı azaltmak için Zigomatik miniplaklara bağlanan NiTi yaylar yardımıyla üst çene molar intrüzyonu yapıldı. çapraşıklığı gidermek için premolar çekimleri ve geleneksel sabit ortodontik tedavi uygulandı. Sonuç: dik yöndeki ortodontik düzelmelerin stabil olduğu görüldü. Çekim yerinde minimal aralık şeklinde bir nüks bulundu. Bu tür bir tedavi, uzun vadede iyi stabilite göstermektedir ve ortognatik cerrahiye göre daha az invaziv olduğu ve postoperatif komplikasyon yaratmadığı için benzer vakalar için önerilebilir. **Anahtar Kelimeler:** Ortodonti, intrüzyon, zygoma, stabilite, açık kapanış



## INTRODUCTION

Open bite cases in adults is one of the most difficult and the most susceptible cases to relapse after orthodontic treatment (1,6). Tooth extractions may become necessary in open bite corrections and the treatment stability of both extraction and non-extraction treatment has been studied extensively (7,8). Increased lower facial height due to elongated maxillary posterior segment necessitates the help of surgical interventions since it cannot be reduced by fixed orthodontic treatment alone which can lead to unfavourable elongation of upper incisors and a gummy smile (4,9). Surgical interventions such as single or double jaw surgery for posterior maxillary impaction and jaw repositioning is often needed (6, 10). Recently a less invasive method has been shown to be effective by intruding the maxillary molars with the anchorage derived from zygomatic mini plates tied to posterior bite blocks covering the upper molars and premolars (1,3,6,10,11). The long term stability following this method of treatment has been studied in a number of studies 1 and 4 years posttreatment (3,6). This case report evaluates the treatment outcomes and stability 5 years posttreatment.

## CLINICAL PRESENTATION

### Diagnosis

A 16-year-old female patient seeking treatment with a chief complaint of anterior open bite. In the extra oral examination, the patient showed increased lower face height and retrognathic mandible together with incompetent lips. Intraorally the patient had moderate crowding in both the upper arch and the lower arch. The main discrepancies were in the vertical relations with a negative overbite of 6mm anteriorly and a lateral open bite extending to the first premolars (Figure 1).

### Treatment Progress

First the infra zygomatic plates were surgically placed followed by the bonding of the maxillary appliance and application of the intrusive force (Figure 2). The total intrusion time was 9 months with periodic activations of the NiTi coils. After



Figure 1. Extra and Intra oral records before treatment.



Figure 2. Extra and Intra oral photos at the day of bonding of the appliance.

removing the bite block, the open bite was reduced to an edge to edge relation as seen in the photographs and cephalometric radiograph and cephalometric and then premolar extractions were performed followed by fixed orthodontic treatment with bonded brackets (0.018-inch, Roth edgewise appliances) (Figure 3). Intrusion followed by ex-



**Figure 3.** Extraoral and intraoral records after completion of intrusion and debonding of the appliance.

tractions were carried out in this patient to resolve the crowding and to allow correction of the class II relationship. The total treatment time is 3 years and 9 months. Fixed bonded retainers from canine to canine were applied to both arches. The patient then deferred the removal of the zygomatic implants.

## RESULTS

The ideal overbite and overjet was achieved and the anterior open bite was eliminated and the facial and dental aesthetics showed pleasing improvements (Figure 4).

### 5 year follow up results

The correction of the overbite and overjet was stable, and the patient showed no complaints. The occlusion was stable with mild reopening of the extraction site between the lower left canine and premolar and a broken fixed lingual retainer (Figure 5).



**Figure 4.** Extraoral and Intraoral records at the finishing of the fixed orthodontic treatment.



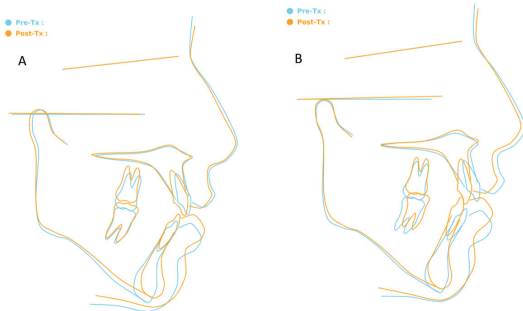
**Figure 5.** Extraoral and Intraoral records after five years of finishing the orthodontic treatment.

## DISCUSSION

Open bite treatment protocols show great versatility because of its variable clinical presentations owing to its multifactorial aetiology.

Decision on the treatment choice depends on a number of factors including the patient's medical history, severity of the open bite and dental and gingival show. Treatments that include extrusion of incisors should be avoided in patients with good incisors, which

would leave limited choices to decide from in order to correct the overbite. Using infrazygomatic miniplates or orthodontic mini-screws to intrude the upper posterior teeth have been introduced as an alternative to surgical correction (4, 11). During intrusion an appliance in the form of an acrylic bite block is bonded on the maxillary molars and premolars connected by two transpalatal bars. This approach gives three benefits: first, it prevents buccal flaring of the intruded teeth, secondly, by its bite raising part, it aids in the intrusions by stretching the masticatory muscles and lastly, the transpalatal bars are bent to be around 4mm away from the palatal mucosa to aid in the intrusion by the muscular activity of the tongue pressing against the palatal bars. The amount of intrusion and its effects on the facial heights can be seen in the radiographic superimpositions of the intrusion phase and in the superimposition of the whole treatment and in the photographic follow up photos (Figure 6, 7). During the following fixed orthodontic treatment, care should be taken to



**Figure 6.** Radiographic superimpositions for radiographs taken A) before bonding and after removal of acrylic splint. B) before treatment and after debonding of the fixed brackets.



**Figure 7.** Follow up photographs taken A) before bonding B) during intrusion C) after removal of acrylic splint showing the amount of intrusion.

avoid re-extrusion of the posterior teeth by keeping the arch wire tied passively to the miniplate arm. The follow up results after 5 years showed stable outcomes regarding the vertical correction with minor reopening of the extraction site due to retainer compliance.

## CONCLUSION

After careful patient selection, the zygomatic mini plate assisted intrusion of the posterior teeth is an effective treatment option to reduce the posterior vertical maxillary excess in moderate anterior open bite patients with stable outcomes in the long term.

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