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CASE REPORT

# Retraction of the upper maxillary incisors with corticotomy-facilitated orthodontics and mini-implants

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**KEYWORDS**

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**Abstract** This report describes a case of 21-year-old female with severe maxillary protrusion, and class /1 dental relationship. The treatment plan was extraction of upper first premolars and retraction of the anterior teeth. Mini-implants were used to provide maximum anchorage to maintain the extraction space. To shorten the retraction time selective alveolar corticotomy was combined with orthodontic therapy. The treatment time was reduced without any adverse effects on the periodontium and the vitality of the teeth.



## 1. Introduction

Adult patients who seek orthodontic treatment often desire that their treatment be completed in a short period of time.[12] However, adult patients with severe overjet requiring maximum anchorage usually require at least 2 years of active treatment.[22] One possible method for completing treatment in a shorter period is through an orthodontic treatment combined with corticotomy.[17,6,2,19]

Corticotomy is defined as the osteotomy of the cortical bone.[10] In adult patients, this technique reduces the treatment time because the resistance of the dense cortical bone to orthodontic tooth movement is removed.[5] Wilcko et al. have noted that orthodontic tooth movement is accelerated by the increase of bone turnover and decrease of bone density,[20] because osteoclasts and osteoblasts are increased by a regional acceleratory phenomenon [RAP][4] after the corticotomy.

Anchorage loss often produces insufficient treatment results, particularly in patients who require maximum anchorage.

With the introduction of mini-plates[16,1] micro-implants and mini-screws/implants[14,13,15] as anchorage, it has become possible to achieve absolute anchorage.[8]

Therefore, an orthodontic treatment combined with corticotomy and placement of mini-implants may provide the advantage of shortening the orthodontic treatment period in maximum anchorage cases. However, there have been few case reports in which such a therapy was performed.

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## 2. Case report

### 2.1. Case summary

The patient's chief concern was the protruding incisors, and her goal was complete retraction of the anterior teeth. Extra-oral examination revealed a convex profile, right nasolabial angle and a gummy smile. Radiographic evaluation revealed a slightly increased mandibular plane angle, proclined upper incisors and a slight increase in the lower facial height. The panoramic radiograph shows normal anatomical structures.

### 2.2. Diagnosis

A 21-year-old female presented with class  molar and canine relationships, with anterior overjet of 8 mm, severe protrusion of the upper anterior teeth, a moderate deep bite, and a four mm anterior overbite. Radiographic examination showed a skeletal class  relationship with severe underlying Sagittal jaw discrepancy.

Orthognathic surgery was not desired by the patient, because of the general anesthesia and the high-cost of this surgical approach. The selective extraction of two permanent maxillary first premolar teeth was considered acceptable. Because of the patient concern of the treatment period, we suggested a minimal invasive selective alveolar corticotomy under local anesthesia to shorten the treatment time and the patient agreed.

### 2.3. Treatment objectives

Decision was made to start a compromised treatment, so the objectives included the following: (1) align and level teeth in both arches, (2) reduce the upper teeth protrusion, (3) achieve class  canine relationship and ideal overjet and overbite.

### 2.4. Treatment plan

Based on the patient complaint and the clinical and cephalometric findings, the following treatment plan was formulated:

(1) Placement of full maxillary and mandibular fixed appliances, (2) implantation of two mini-implants between the maxillary first molar and second premolar, (3) extraction of the first premolars combined with selective alveolar corticotomy, (4) mini-implants were used for maxillary en masse anterior retraction to obtain maximum anchorage, and (5) finishing with fixed appliance.

### 2.5. Treatment progress

Fixed preadjusted Roth appliance (0.022∗0.028 slot) was used. After leveling and alignment, two orthodontic mini-implants (Svenska Ortho-cut, Sweden) self drilling type, conical shape with 1.6 mm diameter and 8 mm length were implanted into the buccal alveolar bone between first molars and second premolars (Fig. 1).

The upper first premolars were designated for removal at the same appointment of the surgery.

### 2.6. Surgical procedure

The corticotomy was carried out under local anesthesia. A full thickness mucoperiosteal flaps were reflected both labially and lingually around all the upper anterior teeth (canine to canine), except for the lingual aspect of the interdental papilla between the maxillary central incisors (Fig. 2). Vertical bone cuts in the cortical bone were made about 1–2 mm below the alveolar crest and were extended 2–3 mm beyond the apices of the anterior teeth, these cuts were performed both facially and lingually from the distal of the right upper lateral incisor to the distal of the left upper lateral incisor with 1 mm diameter ceramic bur (Komet, Germany). The cuts extended only about

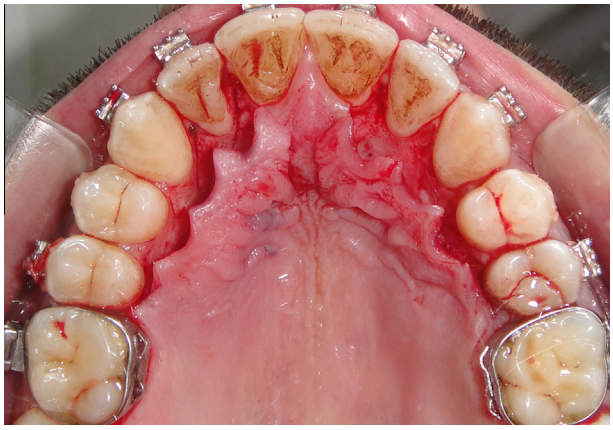

**Figure 2** Extension of the palatal flap.

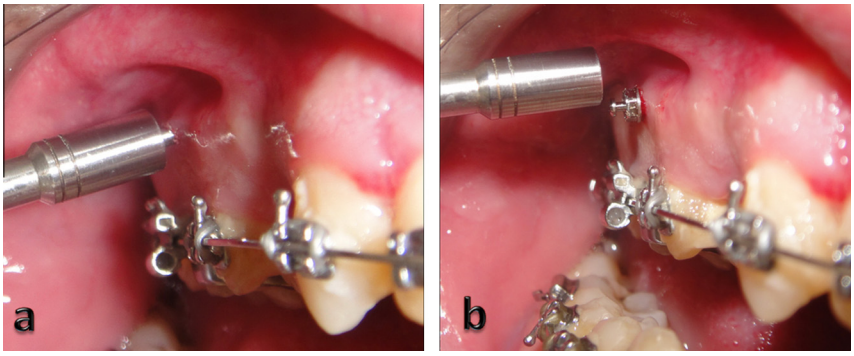


**Figure 1** (a) Placement of mini-implant. (b) Mini-implant after placement.