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## CASE REPORT

### Rehabilitating Wide Maxillary Defect with Distraction Osteogenesis and Khoury Technique: Case Report

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#### Abstract

Maxillary and mandibular bone defects can result from injury, congenital defect or accident, or as a consequence of surgical procedures when treating pathology or defects affecting jaw bones. And with conventional bone grafting techniques, it is not possible to close these kind of defects. Distraction osteogenesis has become a very popular technique, as the ability to reconstruct combined deficiencies in bone and soft tissue makes this process unique and invaluable to all types of reconstructive surgeons. The aim of this article is to present the case of a 52-year-old female patient, who, in 2016, was operated at another center for tumour resection. After these, patient referred to our center and we treated the wide anterior maxillary bone and soft tissue defect by using bilateral alveolar cleft distractor. After narrowing the wide defect with distraction osteogenesis, khoury technique was used for rehabilitating the small defect. As a result, using cleft distractor is an effective method for rehabilitation of the large maxillary defects.

**Keywords:** Distraction osteogenesis, Khoury technique, maxillary defect, maxillectomy

#### Introduction

Maxillary and mandibular bone defects can result from injury, congenital defect or accident, or as a consequence of surgical procedures when treating pathology or defects affecting jaw bones<sup>1</sup>. With conventional bone grafting techniques, it is not possible to close these kind of defects. Distraction osteogenesis (DO) is a biological process of generating new bone and soft tissue by gradual traction of the clinical bone segments<sup>2</sup>. This technique, which can provide skeletal advancement and expansion of soft tissue simultaneously, has become an effective surgical technique for patients with jaw deformities<sup>3</sup>. DO technique has been found to be an impressive alternative to conventional reconstruction methods with its recent popularization<sup>3,4</sup>. The aim of this article is to present a wide bone defect repair with combine surgical techniques.

#### Case Report

A 52-year-old female patient was referred to our clinic for functional oral rehabilitation, who, in 2016, was operated at another center for tumor resection. Anterior partial maxillectomy was performed, but post operatively wide anterior maxillary defect was present extending across the midline. She had a 24 mm-wide bony defect extending from the left premolar region to the maxillary anterior region. We planned closing the maxillary bone and soft tissue defect by using bilateral alveolar cleft distractor. Two cleft distractor (Kilsmartin Louis cleft distractor) applied both side of the wide defect under general anesthesia with intranasal intubation. At the right side, segmental osteotomy with three teeth was done, and left side only segmental osteotomy was done without any teeth. After osteotomy, both of these distractors were applied and tested in the same session. Distraction phase started after a 7-day latency period at a rate of 0.5 mm in the morning and 0.5 mm at night for a total of 1.0 mm per day. (Figure 1)

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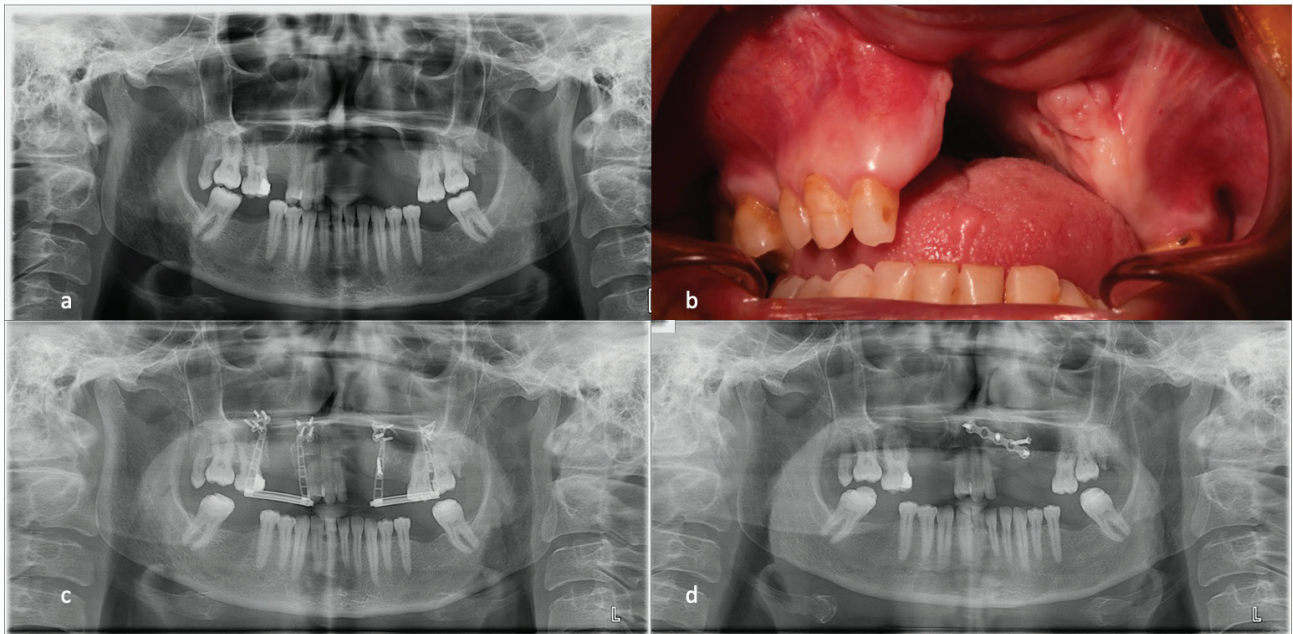


Figure 1. a) preoperative view of the patient with wide defect, b) intraoral view of the defect, c) after the activation phase of the distraction, d) final radiographic view after the khoury technique

The distractor was left in place for 3 months to allow consolidation and removed then under local anesthesia. After this phase of the surgery a 6 mm-wide bony defect remained at the anterior maxillary region. Following one-month recovery period, the patient was operated again. In this second operation, khoury technique was used for rehabilitating the small defect in the anterior maxilla region by using autogenous bone block graft material. In our operation we used the symphyseal donor area for the restoration of lost horizontal alveolar bone volume in the anterior maxilla. After exposing the donor area, we used the piezo electric surgery and rotational instruments. The obtained block was mobilized manually via surgical chisels. Then it was immediately immersed into sterile saline solution to prevent dehydration. The hemorrhage in the donor bed was controlled by firm gauze pressure, and the flaps were repositioned. Subsequently, the flap was sutured using 3.0 vicryl sutures. The block was slightly trimmed for better adaptation and four osteosynthesis screws were used to fix the block bone to the recipient area. The flap was repositioned by monofilament 3.0 sutures (Vicryl, Ethicon, USA). For the initial control of hemorrhage, sterile saline-soaked gauze was applied over both wound areas. Antibiotics (Amoxicillin & clavulanic acid 1000 mg x2 daily for five days; Klamoks BID, Bilim ilaç, İstanbul, Turkey) and a 0.2 % chlorhexidine mouthwash (Klorheks, Dorgsan Pharma, İstanbul, Turkey) was prescribed to prevent the risk of infection in the post-op period. The patient was instructed to follow meticulous plaque control and a soft diet for one week. After operations mentioned above, 18 mm bone gain was obtained only by distraction osteogenesis and 6 mm bone gain with autogenous grafting.

### Discussion

First introduced by orthopedists for lengthening long bones, DO in the maxillofacial complex was initially used to correct mandibular deficiencies and advancement of maxilla and midface<sup>1</sup>. In the dentoalveolar area, it was used to reconstruct vertical alveolar defects and, later, in other situations (ie, advancing the anterior maxilla, accelerating orthodontic treatment, resolving dental crowding)<sup>5</sup>. Although the technique is used to reconstruct a myriad of clinical situations and appears to be well tolerated, DO is not without its drawbacks<sup>6</sup>. Complications associated with this procedure include fractures of basal bone, fracture of transport segment, breakage of distractor, mechanical problems, and infection<sup>7</sup>. However, as shown here, the distraction osteogenesis technique by using bilateral alveolar cleft distractor is useful for orodental/alveolar rehabilitation in patients with partial maxillary defects<sup>8</sup>.

The absence of sufficient bone volume is one of the most relevant problem in our case. Grafting from exogenous sources may provide a limited gain but exhibits poor performance in large bone defects<sup>9</sup>. But, autogenous bone block transfer (ABBT) from the mandibular symphysis, for example, has been used with varying rates of success<sup>4</sup>. The symphyseal ABBT procedure was successful for the restoration of the horizontal bone defect in the anterior maxilla<sup>4</sup>.

In conclusion, the findings of this study show that distraction osteogenesis and the treatment with using the khoury technique, can produce significant bone and soft tissue improvement of the maxilla. Using cleft distractor is an effective method for rehabilitation of the large maxillary defects. Also, symphyseal ABBT procedure was successful for the restoration of a horizontal bone defect in the anterior maxilla.

**Source of Finance:**

There were no additional costs.

**Conflict of Interest:**

There are not any.

**Authorship Contributions:**

I think using cleft distractor is an effective method for rehabilitation of the large maxillary defects and symphyseal ABBT procedure was successful for the restoration of a horizontal bone defect in the anterior maxilla.

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