

Postorthodontic Retention With Bone Grafting Procedures, A Case Report

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The premaxilla housing the central incisors is sometimes unstable before and after orthodontic treatment in bilateral cleft lip and palate patients, because it is separated from the larger lateral segments of the maxillary arch. Mobility of the premaxilla and bony defects of the alveoli are associated with mastication, speech and esthetic disorders. Removable dentures and fixed bridges have often been used as practical solutions of these problems.⁸

Use of secondary bone grafts has been recently reported with satisfactory results to fill the bony defect and fix the unstable premaxilla.⁵ In the present case postorthodontic stability, better function of mastication and speech, and esthetic harmony were obtained following autogenous bone graft and flap operations.

The patient was a male, age 16 years, at the time of the orthodontic examination. The records taken then revealed that he had an operated bilateral cleft lip and palate, reversed anterior relation malocclusion, narrow arches, crowding in the upper and lower lateral segments and lingually-placed upper central incisors with high mobility of the premaxilla (Fig. 1). Measurements made from lateral cephalometric films showed no severe abnormalities in the skeletal pattern except the premaxillary area.

The treatment planning was 1) ex-

traction of the upper lateral incisors and four premolars, and 2) correction of the anterior-posterior crossbite by using multibanded appliances. The total period of active orthodontic treatment was two years and four months. After retainers were used for eleven months, bone grafting to stabilize the premaxilla was done in both sides. Two pieces of autogenous iliac bone were grafted as a material for bridging the cleft between the premaxilla and maxilla. A direct bonding appliance in the upper dental arch with an $.018 \times .022$ wire was employed for two months. Then a new Hawley-type retainer was placed. After approximately one year the bony bridge was set and a metal-framed denture inserted. Figure 2 shows radiographically the stabilization of the grafted bone. The profile appearance is observed in Figure 3.

Since first attempts of bone grafts in growing cleft patients were made in the beginning of this century, numerous papers on osteoplasty of cleft palate have been reported and definitions of primary, early secondary, late secondary, tertiary, early and late osteoplasties described.⁴ According to these, *early* osteoplasty in cleft alveolus may lead to severe impairment of maxillary growth, so that *late* secondary osteoplasty remains as the only justifiable form of bone transplantation in cleft surgery. The reason for the indication for osteoplasty extended from elimination of bone deficiency through bony restitution to

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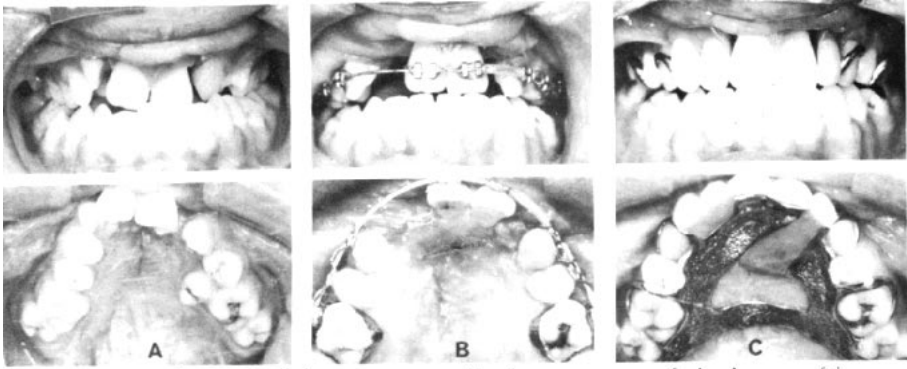


Fig. 1 Oral photos, A) before treatment, B) after two years of the bone grafting, C) with the prosthesis

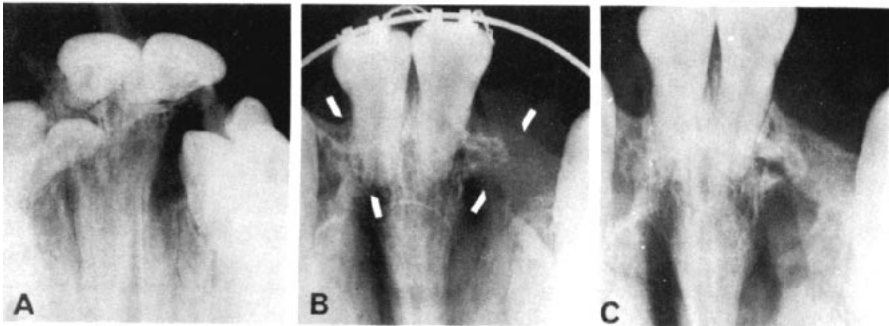


Fig. 2 Occlusal films, A) before treatment, B) one month after the bone grafting (arrows show grafted bones), C) two years after the graft.

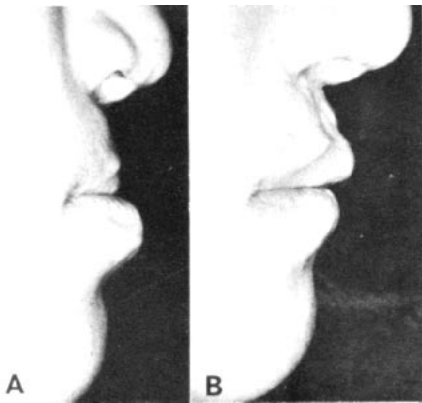


Fig. 3 Facial photos, A) before treatment, B) after treatment.

stabilization of the premaxilla, creation of new bone matrix for the eruption of teeth in the cleft area and

many other assumed advantages up to the stabilization of the lateral segment and obstruction of maxillary compression. Pruzansky⁷ and others published their opposition to maxillary orthopedics and bone grafting in infants. Hanada and Krogman⁸ also concluded that early "dentofacial orthopedics" is not a necessary precursor to lip and palate closure in bilateral cleft lip and palate for achievement of normal incremental facial growth and balanced, proportional growth as well.

Nylen⁶ concluded that when bone grafting was performed in the late teens, it satisfied functional needs and did not further compromise development. Stenstrom and Thilander¹⁰ reported successful maxillary

stabilization in 17 of 19 patients bone-grafted at the age of 14 to 31 years. Epstein² et al. stressed that early bone grafting, although theoretically desirable, has been proven not practicable. It is impossible to determine in infancy which patients will require maxillary orthopedics and subsequent grafting for arch stabilization. Further, it is desirable to simulate an alveolar ridge in bone grafting; however, proliferation of the alveolar process does not occur until eruption of the secondary dentition. The above authors believe grafting should be delayed until the late secondary dentition is completed, when the functional requirements may best be satisfied and the esthetic needs may be judged adequately. Rehrmann et al.⁹ also feel that secondary bone grafting is of great value for definitive stabilization in adult patients after orthodontic extension of the maxilla.

Chierici's experiments on the influence of oriented stress on bone formation suggested that the distribution of functional forces to the grafted environment was conditioned in some way by the tension which stretched the intervening tissue, and that bone-producing stimuli were dominant.¹ Vargervik¹¹ recently reported that after obtaining orthodontically the adequate size and form of the maxilla, an expansion appliance was employed to produce oriented stress and to secure new bone formation following the bone grafting procedures (autogenous rib).

In the present case only *passive* fixation was employed because the active orthodontic treatment was already finished and the considerable mobility of the premaxilla was reduced by the stabilization of the seg-

ments. As a result of delayed secondary bone grafting, after orthodontic correction of malposed teeth, collapsed maxillary arch and crossbite, postoperative stabilization of the premaxilla and satisfactory recovery of masticatory and speech functions were obtained.

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