

YEAR BOOK[®]

YEAR BOOK OF PLASTIC, RECONSTRUCTIVE, AND AESTHETIC SURGERY

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1991

The Year Book of PLASTIC, RECONSTRUCTIVE, AND AESTHETIC SURGERY

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A Year Book Medical Publishers imprint of Mosby—Year Book, Inc.

Mosby—Year Book, Inc.
11830 Westline Industrial Drive
St. Louis, MO 63146

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Editorial Office:
Mosby—Year Book, Inc.
200 North LaSalle St.
Chicago, IL 60601

International Standard Serial Number: 1040-175X
International Standard Book Number: 0-8151-6038-0

Journals Represented

Mosby—Year Book subscribes to and surveys nearly 850 U.S. and foreign medical and allied health journals. From these journals, the Editors select the articles to be abstracted. Journals represented in this YEAR BOOK are listed below.

Aesthetic Plastic Surgery
American Journal of Ophthalmology
American Journal of Pathology
American Journal of Roentgenology
American Journal of Surgery
American Journal of Surgical Pathology
American Surgeon
Annals de Chirurgie de la Main
Annals de Chirurgie Plastique et Esthetique
Annals of Internal Medicine
Annals of Plastic Surgery
Annals of the Royal College of Surgeons of England
Archives of Dermatology
Archives of Ophthalmology
Archives of Orthopedic and Traumatic Surgery
Archives of Otolaryngology—Head and Neck Surgery
Archives of Surgery
Breast Disease
British Journal of Dermatology
British Journal of Plastic Surgery
British Journal of Surgery
Burns
Cleft Palate Journal
Cutis
European Journal of Plastic Surgery
French Journal of Orthopedic Surgery
Head and Neck
Infections in Surgery
Injury
International Journal of Adult Orthodontic and Orthognathic Surgery
International Journal of Radiation, Oncology, Biology, and Physics
Journal of Applied Behavioral Analysis
Journal of Bone and Joint Surgery (American Volume)
Journal of Burn Care and Rehabilitation
Journal of Computer Assisted Tomography
Journal of Cranio-Maxillo-Facial Surgery
Journal of Dermatologic Surgery and Oncology
Journal of Hand Surgery (American)
Journal of Hand Surgery (British)
Journal of Neurosurgery
Journal of Oral and Maxillofacial Surgery
Journal of Orthopaedic Research
Journal of Pediatric Surgery
Journal of Reconstructive Microsurgery
Journal of Surgical Research
Journal of Trauma
Journal of the American Medical Association
Laboratory Investigation

Laryngoscope
Microsurgery
New England Journal of Medicine
Ophthalmic Plastic and Reconstructive Surgery
Oral Surgery, Oral Medicine, Oral Pathology
Orthopedics
Pediatric Dentistry
Pediatrics
Plastic and Reconstructive Surgery
Quintessence International Dental Digest
Radiology
Scandinavian Journal of Plastic and Reconstructive Surgery
Surgery
Surgery, Gynecology and Obstetrics
Western Journal of Surgery

STANDARD ABBREVIATIONS

The following terms are abbreviated in this edition: acquired immunodeficiency syndrome (AIDS), central nervous system (CNS), cerebrospinal fluid (CSF), computed tomography (CT), electrocardiography (ECG), and human immunodeficiency virus (HIV).

Introduction

Sincere appreciation is extended to our retired Associate Editors, Drs. Dan Bennett, B.W. Haynes Jr., and Robert J. Hoehn for a superb job during their many years of service to the YEAR BOOK OF PLASTIC, RECONSTRUCTIVE, AND AESTHETIC SURGERY. With the 1991 YEAR BOOK we welcome our new Associate Editors, Drs. Kelman Cohen, Martin Robson, and Robert Ruberg, and look forward to their input.

This year we have expanded our point-counterpoint entries to encourage the authors of abstracted articles to respond to comments and or questions raised to the editors. We believe that these dialogues increase the amount of information imparted to our readers.

I'd especially like to thank Carla White, Assistant Managing Editor, for her support and help in completing the 1991 Edition of the YEAR BOOK OF PLASTIC, RECONSTRUCTIVE, AND AESTHETIC SURGERY.

Stephen H. Miller, M.D.

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1 Congenital Anomalies

Cleft Lip and Palate

Autogenous Rib Graft for Reconstruction of Alveolar Bone Defects in Cleft Patients: Long-Term Follow-Up Results

Witsenburg B, Freihofer HPM (Twenteborg Hosp Almelo and Medisch Spectrum Twente, Enschede; Univ Hosp Nijmegen, Nijmegen, The Netherlands)

J Craniomaxillofac Surg 18:55–62, 1990

1–1

Several types of operations are available for the treatment of patients with residual defects of cleft lip, alveolus, and palate, but there is no consensus about the optimal approach. Some have reported that the free autogenous rib graft is not the optimal material for reconstructing residual maxillary bone cleft defects, whereas others have reported favorably on such grafts. The use of tibial bone, trochanteric bone, mandibular symphyseal bone, bone from the skull, homogeneous bone, and alloplastic material has also been reported.

In a retrospective review the long-term results of using a free autogenous rib graft for reconstructing anterior residual bone defects were evaluated in 4 girls and 13 boys (mean age, 10.8 years) at operation. All had a residual bony gap in the alveolar process and palate with insufficient alveolar bone to move teeth orthodontically into the cleft region. Each child had a congenital unilateral cleft of the lip and alveolus, or the lip, alveolus, and palate, but soft and hard palates were closed at the time of residual defect reconstruction. The mean length of the rib graft used for repair was 9.5 cm. The mean follow-up period was 76 months.

None of the children experienced full-thickness necrosis of the flaps, but some superficial necrosis of the edges was seen. Three children had partial dehiscences of the palate. Two children had a recurrence of an anterior palatal oronasal fistula. Six children had acceptable results and 9 had good to excellent results at follow-up. The graft material did not prevent the permanent upper cuspids from erupting into the rib graft after its incorporation because the canine on the cleft side appeared on average before the age of 12 years and 5 months in 10 children. The good long-term results in these children confirm that autogenous rib bone is a good material for secondary bone grafting of residual alveolar and palatal defects in cleft patients.

► This carefully done study further documents what others, including the commentator, have noted—that rib grafts are a useful and reliable source of bone for closing alveolar clefts.—L.A. Whitaker, M.D.

In Utero Cleft Lip Repair in the Mouse Without an Incision

Sullivan WG (Wayne State Univ)

Plast Reconstr Surg 84:723–730, 1989

1–2

Successful in utero repair of a cleft lip in 16 A/J mice without a noticeable scar has been reported. The friable jelly-like nature of the fetal tissue made the procedure difficult, however.

Each mouse had repair by full-thickness approximation of the cleft edges with 11-0 sutures at 17 days' gestation. Dilantin had been given on day 10. At 20 days' gestation a cesarean section was done, the repair was inspected, and the lip was sectioned for histologic study. Nine of the 16 fetuses were ultimately viable for study.

In all cases continuity was noted where the suture had coapted the edges. Despite no incision, there was little or no evidence of the lip repair. On histologic examination there was epithelial and mesenchymal continuity with an occasional notch in the epithelium and soft tissue asymmetry in complete clefts.

► An important study further experimentally confirming the remarkable capacity of fetal tissues to heal with minimal residua from the surgical process. This study raises an interesting question as to whether it is unnecessary to create fresh wounds in repairing fetal defects, or whether manipulation and making things morphologically correct alone is adequate. In any event, the evidence for the advantages of intrauterine repair of facial defects continues to mount.—L.A. Whitaker, M.D.

► See Abstract 17–1, "Fetal Wound Healing: A Biochemical Study of Scarless Healing."—Stephen H. Miller, M.D.

Orthognathic and Maxillofacial

A Photographic Study of the Facial Profiles of Southern Chinese Adolescents

Yuen SWH, Hiranaka DK (Univ of Hong Kong; Harvard Univ)

Quintessence Int 20:665–676, 1989

1–3

There have been many studies of the cephalometric and profilometric norms for Caucasians, but few studies have described the norms for other races. It is important to define facial parameters for patients from all racial and ethnic backgrounds. The frontal and profile soft tissue facial parameters in 84 orthodontically untreated southern Chinese adolescents (mean age, 13.6 years) were studied.

Infraorbital soft tissue points were marked on the skin before lateral and frontal photographs of the face were taken of each subject at a fixed distance from a reference ruler. The photographs were enlarged to life size and then digitized. Seven frontal and 17 profile measurements were computed and soft tissue profiles were developed.

In both sexes by far the greatest variability in frontal measurements

was in inclination of the eye fissures. However, there were significant sexual differences in interocular and biocular diameters and nasal and mouth widths, with boys having larger measurements for these indices. The nasolabial and geniolar angles had the most variation within each group with respect to angular measurements from the profile analysis. There were no significant sexual differences in angular measurements from the profile.

Eighty-eight percent of the boys and 91% of the girls had prognathic profiles. Sixty-nine percent of the boys and 50% of the girls had a retrognathic shift of the chin. Data in this study differed from those found in other racial groups. Comparative data for this adolescent population were inconsistent. Future studies on a population that has completed growth are needed to provide objective information in defining facial harmony and proportion in terms of the patient's ethnic and racial background.

► Another article attempting to document anthropologic ideals in Orientals. The conclusions reached are that the sample size was inadequate, although the authors did note, as has been indicated previously, that the geniolar angle has considerable variation.—L.A. Whitaker, M.D.

Golden Proportion for Maxillofacial Surgery in Orientals

Kawakami S, Tsukada S, Hayashi H, Takada Y, Koubayashi S (Kanazawa Med Univ, Ishikawa, Japan)

Ann Plast Surg 23:417–425, 1989

1–4

The golden proportion, an ancient Greek concept, has been used as the best visually balanced sectional ratio in art and architecture in the Western world. The golden proportion is also applicable to the positional relationships of eyes, nose, and mouth to facial length in Caucasians. Thirty female and 30 male Japanese with no anomalies of facial bone or soft tissue were studied to determine whether such relationships also exist in Orientals. Facial moire topography was obtained at the plane crossing of the right angle to the Frankfort horizontal plane in each subject. Each standard line was then determined, and ratios were calculated for each of 7 items.

The Japanese tended to have a longer upper lip and shorter chin length than Caucasians, which is most likely a general facial characteristic of Orientals. This tendency was seen more dramatically in women. Each ratio obtained was used for preoperative and postoperative aesthetic analysis in maxillofacial surgery.

This method has made it possible to understand quantitatively the positional relationship and the balance of eyes, nose, and mouth in the face and to make comparisons with typical subjects.

► Normal and ideal morphological relationships and values need to be better understood in Oriental faces. Virtually all information is on Caucasians, thus this

article presents important data relative to the upper lip and the chin length. The moire topographical determinations, while giving interesting pictures, still haven't proven to be of objective value in assessing soft tissue relationships on the human face.—L.A. Whitaker, M.D.

Three-Dimensional Analysis of Facial Morphology Before and After Orthognathic Surgery

Kobayashi T, Ueda K, Honma K, Sasakura H, Hanada K, Nakajima T (Niigata Univ, Niigata, Japan)

J Craniomaxillofac Surg 18:68–73, 1990

1–5

Objective and quantitative analysis of facial morphology before and after orthognathic surgery is essential to obtaining an harmonious profile and improved occlusal function. Most cephalometric analyses of the facial hard and soft tissues are 2-dimensional studies. There have been several reports of 3-dimensional (3-D) hard tissue analysis, attained by 3-D correction of cephalometric landmarks on frontal and lateral cephalograms, and of 3-D soft tissue analysis, attained by stereophotography, topography, and other complex, expensive techniques. A new method was developed for performing 3-D analysis of hard and soft tissue morphologies of the face.

Technique.—A metal reference frame with standard points of known 3-D values is set around the face. Reference points are marked on the face with a black eyeliner. Soft tissue analysis consists of calculating the 3-D coordinates of the facial reference points by perspective transformation with the use of 2 pairs of photographs taken simultaneously from the right and left sides of the face. To perform 3-D analysis of the mandible, simultaneously obtained frontal and lateral cephalograms are analyzed.

Nine male and 19 female patients aged 16–33 years who underwent surgical correction of class III malocclusion, with or without open bite and lateral deviation of the mandible, were evaluated by this method before and after operation. Twenty-four patients had bilateral sagittal split osteotomies, 2 underwent bilateral mandibular body osteotomy, and 2 with facial asymmetry had a combination of ramus osteotomy and mandibular body osteotomy.

The magnitude of the surgically produced soft tissue volumetric changes in the anterior mandibular region was proportional to the posterior movement of the mandible. Both patients with facial asymmetry were improved after operation, and close correlation between the directional indices of asymmetry of the hard and soft tissues was observed. This type of 3-D analysis is useful for analyzing the facial morphology in orthognathic surgery. The technique requires no elaborate equipment or complex training and provides reproducible data.

► Although the authors are correct in attempting to assess soft tissue changes as the final determinant of success in craniomaxillofacial surgery, the technol-

ogy described doesn't give those answers. What is described as volumes does not take into account thickness of tissue, even though that's implied by the terminology, and the surface area changes are too coarsely measured to give meaningful information. We are still looking for an accurate way of measuring soft tissue changes.—L.A. Whitaker, M.D.

A Lateral Cephalometric Analysis of Nasal Morphology Following Le Fort I Osteotomy Applying Photometric Analysis Techniques

Gassmann CJ, Nishioka GJ, Van Sickels JE, Thrash WJ (Univ of Texas, San Antonio)

J Oral Maxillofac Surg 47:926–930, 1989

1–6

Previous studies have reported on soft tissue changes of the face that result from Le Fort I osteotomy, but there has been little information about changes in nasal morphology. Changes in nasal morphology after Le Fort I osteotomy were evaluated by using a photometric analysis applied to a lateral cephalogram.

Presurgical and 6-month follow-up cephalograms obtained from 50 patients were examined. The nasal tip projection angle, columellar angle, and supratip break angle were used to measure the soft tissue profile of the nose. Two other variables were analyzed for correlation with soft tissue measurements: closure technique and whether or not the anterior spine was removed.

There was a weak correlation between A-point movement both horizontally and vertically and the nasal tip projection angle. When the A-point was moved in an anterior and superior direction, the nasal tip was rotated up. With movement in a posterior and inferior direction, the nasal tip was rotated down. The only A-point movement that had a significant relationship with the columellar angle was in the horizontal plane. The columellar angle increased when the A-point was moved in an anterior direction. The presence or absence of the anterior nasal spine had no significant relationship with changes in nasal morphology, nor did closure technique.

Predicting specific nasal morphology after Le Fort I osteotomy is difficult. The complexity of the nasal anatomy contributes to the difficulty as does large interpatient variation in nasal infrastructure. Movements at A-point can account for only 10% and 20% of the influence of the nasal tip projection angle and the columellar angle, respectively. Nevertheless, certain persistent patterns may assist the surgeon in predicting outcome.

► The authors accurately conclude that predicting changes in the nasal tip correlated with maxillary osteotomies is difficult. As all plastic surgeons know, soft tissue changes, especially with the multitude of planes and angles involved in the projecting nasal tip, have such a complexity of variables that it is unlikely they can be broken into tidy categories related to infrastructure alterations.—L.A. Whitaker, M.D.

The Skeletal Stability of Le Fort I Downfracture Osteotomies With Rigid Fixation

Carpenter CW, Nanda RS, Currier GF (Univ of Oklahoma)

J Oral Maxillofac Surg 47:922–925, 1989

1–7

The Le Fort I downfracture osteotomy is often used to correct dento-facial anomalies. However, postsurgical movement of the tooth-bearing segment of the maxilla has occurred with this procedure. To overcome this problem, a technique for rigid fixation was developed.

Twenty adults received Le Fort I osteotomies stabilized with rigid fixation. Sixteen patients had maxillary impaction and advancement, 1 had impaction only, and 3 had maxillary advancement only. Eight patients had transverse expansion from 3 to 8 mm of the maxilla at surgery. Patients were evaluated by longitudinal cephalometric radiographs obtained within 2 weeks before surgery, 1 week after surgery, and at least 6 months after surgery. Investigators evaluated vertical and sagittal changes in the maxilla in relation to the Frankfort horizontal plane.

Regardless of the procedure performed, no significant changes occurred in maxillary positioning at follow-up. The mean postsurgical relapse was smaller than that reported in patients who underwent stabilization of the maxilla with intraosseous and maxillomandibular wiring. The Le Fort I downfracture osteotomy with rigid fixation is a dependable procedure for correcting a number of maxillary deficiencies.

► The title is confusing (downfracture actually means impaction as well as advancement, as used by the authors) and the number of patients small. Nevertheless, in this series, LeFort I osteotomy with rigid fixation was shown to be slightly more stable than with wire fixation.—L.A. Whitaker, M.D.

Definitive Surgical Correction of Vertical Maxillary Deficiency

Rosen HM (Pennsylvania Hosp, Philadelphia)

Plast Reconstr Surg 85:215–221, 1990

1–8

Vertical maxillary deficiency is commonly corrected with a simultaneous Le Fort I osteotomy and interpositional autogenous bone grafting to lengthen the maxilla vertically. However, the operation is associated with an unacceptable degree of skeletal relapse, ranging from 31% to 78%. The use of rigid plate and screw fixation has improved stability somewhat, but relapse rates of 25% are still reported. Resorption of the bone graft material has been implicated as the primary cause of the post-operative instability.

In 9 patients rigid plate and screw fixation was combined with interpositional implantation of porous block hydroxyapatite for correction of vertical maxillary deficiency. The 7 female and 2 male patients were aged 15–44 years (mean age, 21 years). Four patients had class II division I occlusions and underwent simultaneous sagittal split ramus osteotomies to advance the mandible. The other 5 patients had class III occlusions.

Four patients also underwent simultaneous vertical augmentation genioplasty to further increase the vertical height of the chin and lower face.

Only patients in whom there would be no residual bone contact between the maxilla and the remainder of the midfacial skeleton after repositioning were included in this study. All osteotomy gaps were implanted with porous block hydroxyapatite and all maxillae were rigidly fixed in position with miniplates. Postoperative intermaxillary fixation was not used.

After a mean follow-up of 19.6 months, cephalometric analysis showed excellent stability of the repositioned maxillae. The mean vertical relapse was 4.3%, which is considered well within the error of cephalometric tracing techniques. The mean increase in lower face height was 9.1 mm and ranged from 4 to 14 mm. There have been no complications, but long-term resistance of the maxillary sinus to trauma with the use of porous hydroxyapatite remains to be determined. However, the early results obtained in these patients are encouraging.

► An excellent study demonstrating the advantages of porous hydroxyapatite and rigid fixation in correcting vertical maxillary deficiency. This method should be seriously considered for all patients having maxillary lengthening procedures.—L.A. Whitaker, M.D.

Predictability of Upper Lip Soft Tissue Changes With Maxillary Advancement

Stella JP, Streater MR, Epker BN, Sinn DP (John Peter Smith Hosp, Fort Worth, Tex; Univ of Texas, Dallas)

J Oral Maxillofac Surg 47:697–703, 1989

1–9

To predict aesthetic soft tissue results after maxillary advancement surgery, a soft-to-hard tissue ratio must be developed that considers vertical and horizontal changes and interpatient variables. An attempt was made to develop a reliable soft-to-hard tissue ratio, noting changes in subnasale (Sn) and upper lip vermilion that can be used with maxillary advancement surgery performed with Le Fort I osteotomy.

Pre- and postsurgical tracings were drawn on lateral cephalometric radiographs made with a soft tissue screen for 21 adults undergoing Le Fort I maxillary advancement surgery. All patients had a vertical change of less than 2 mm. Researchers calculated the mean maxillary advancement and mean change in Sn. Patients were subdivided into 2 groups according to lip thickness: group 1 had lips between 10 and 17 mm thick; group 2 had lips more than 17 mm thick. Mean data and linear regression analyses were performed for each group.

A soft tissue change was unpredictable when based solely on a given amount of maxillary advancement. In group 1 there was an excellent correlation between the magnitude of maxillary advancement and change in Sn; however, in group 2 there was almost no relationship at all. Overall, 14 of 21 patients had a reduction in lip thickness of at least 2 mm after

surgery. The other 7 patients had postoperative lip thinning of less than 1 mm. No lips thickened. In several patients lip thinning was more than 25%. The mean preoperative lip thickness was 17 mm, which decreased to 15 mm after surgery. Lip thickness stabilized within approximately 6 months after surgery.

In patients undergoing maxillary advancement with Le Fort I osteotomy, no correlation exists between change in soft tissue position and bony advancement. However, the correlation is much better in individuals with thin lips. Some lip thinning occurs in all patients.

► The findings again demonstrate the difficulty in measuring soft tissue changes. The observation of lip thinning occurring in all patients after Le Fort I osteotomy, and the correlation of no predictable changes noted with thinner lips, are of interest. However, the multitude of other variables in soft tissue would preclude more definitive statements, and the authors have avoided these.—L.A. Whitaker, M.D.

Maxillomandibular Advancement Surgery in 23 Patients With Obstructive Sleep Apnea Syndrome

Waite PD, Wooten V, Lachner J, Guyette RF (Univ of Alabama, Birmingham)
J Oral Maxillofac Surg 47:1256–1261, 1989

1–10

Obstructive sleep apnea syndrome (OSAS) results in sleep fragmentation and excessive daytime sleepiness that can affect normal activities. If untreated, OSAS can result in early death. A number of surgical treatments have been described. Whether orthognathic surgery can increase airway space and improve OSAS was investigated in 23 patients with documented OSAS who underwent maxillary advancement with Le Fort I and sagittal split osteotomies.

Technique.—An advancement splint was used to advance the mandible into a prognathic relationship while the previous plane of occlusion was maintained. The mandible was rigidly fixed with screws while the patient was in maxillomandibular fixation with arch bars. After the splint was discarded, the maxilla was advanced into the proper occlusal relationship and rigidly fixed with 4 titanium plates.

Patients with macroglossia, microgenia, and redundant pharyngeal tissue underwent adjunctive procedures such as partial turbinectomies and septal reconstruction. Preoperative and postoperative cephalometric radiographs were analyzed by computer. Maxillomandibular advancement surgery benefited 96% of patients. The mean decrease in symptoms such as daytime fatigue, snoring, and respiratory disturbance was significant. A surgical cure, defined as reduction in the respiratory disturbance index to less than 10, was achieved in 65% of patients. When patients without

adjunctive surgery were excluded, the success rate rose to 78%. However, hyoid position and posterior airway space changes were not correlated with clinical success.

Orthognathic surgery increased posterior airway space, but this increase did not always insure surgical success or cure of OSAS. Decreased posterior airway space is an important factor in OSAS, but the posterior airway is not the only area of obstruction or the only anatomical area involved. A combination of maxillomandibular advancement and adjunctive procedures appears to be the most successful treatment for OSAS.

► Maxillary and mandibular advancement surgery with the adjunctive airway clearing procedures described, while radical, may be important for individuals with significant manifestations of obstructive sleep apnea. The results achieved seem to clearly indicate the value of considering these procedures.—L.A. Whitaker, M.D.

Diagnosis and Treatment Planning for Mandibular Subapical Osteotomies With New Surgical Modifications

Wolford LM, Moenning JE (Baylor College of Dentistry, Dallas)

Oral Surg Oral Med Oral Pathol 68:541–550, 1989

1–11

Numerous procedures have been described for the correction of mandibular deformities. In patients with conditions that cannot be treated successfully by orthodontics and ramus osteotomies, a mandibular anterior subapical osteotomy (MASO) may be indicated. The surgical technique originally described by Hofer (1942) was modified to make possible the use of rigid fixation with bone screws and maximum bony interface.

Clinical assessment in patients who require subapical osteotomies should include periodontal evaluation. Adequate attached gingiva must be present around the lower anterior teeth when the lower arch is being leveled orthodontically or surgically. Cephalometric analysis should include the following relationships: maxillary depth, mandibular depth, N-B line to lower incisors and pogonion, lower incisor angulation, upper lip length, anterior mandibular height, and vertical menton soft tissue height. Dental models must be analyzed for curve of occlusion, crowding or spacing, lower incisor angulation, and arch asymmetry.

Three modifications of the subapical osteotomy or osteotomy make it possible to apply rigid fixation with bone screws and maximum bony interface. The first is applicable when the anterior segment must be depressed and moved posteriorly. The second, the superiorly based tenon-and-mortise technique, can be used to elevate the segment or when the anterior segment is to be repositioned inferiorly or posteriorly, or both. The third, the inferiorly based tenon-and-mortise technique, is desirable when the anterior dentoalveolar segment is to be moved inferiorly as well as superiorly or anteriorly, or both.