

# Surgical Treatment of the Nasal-Maxillary Complex in Adolescents With Cleft Lip and Palate

Fernando D. Burstein MD, FACS, FAAP

Atlanta, Georgia, USA

Rather than treating nasal, maxillary, and soft tissue deformities as separate problems, the author has approached the deformities as a single aesthetic and functional unit, the nasal-maxillary complex. This complex includes the maxilla, nose, and overlying soft tissues, including the upper lip. Successful reconstruction is based on a thorough knowledge of the underlying anatomy and physiology of these structures. Treatment of nasal-maxillary complex deformities in adolescents represents the final stages in a lifetime of reconstructive procedures. A team approach is preferred that includes a craniofacial surgeon, orthodontist, dentist, prosthodontist, and speech and language pathologist. The author's personal philosophy is based on sequential reconstruction of the underlying nasal-maxillary bony base. This is followed by reconstruction of the internal/external nasal complex and final soft tissue reconstruction. These principles are presented along with case examples.

*Key Words:* Cleft lip and palate, maxillary deformity, cleft nasal deformity

**M**axillary and nasal deformities associated with unilateral and cleft lip and palate have been well described by others.<sup>1-3</sup> The unilateral deformity presents as an asymmetric deformity of the maxilla and nose (Figs 1 and 2). Ipsilateral flattening of the nasal tip, septal deviation, as well as different locations of the alar rims, both in terms of height and depth, are some of the key nasal findings. The maxilla is also asymmetric, with the lesser segment often rotated,

constricted, and many times truly hypoplastic, resulting in class III malocclusion (Fig 1). Alveolar clefts of varying sizes are the norm. The bilateral deformity is a more of a symmetric deformity that involves a relatively flattened, bifid nasal tip, somewhat less septal deviation, splayed ala, and often a functionally short columella (Fig 4). The bony deformity also tends to be more symmetric, with the central prolabial segment separated from the two lateral maxillary segments to varying degrees. With unilateral and bilateral deformities, maxillary hypoplasia may occur to such a degree that combined orthodontic and surgical treatment becomes a necessity. Externally, both maxillary deformities may present with a relatively concave midfacial pattern. This can be accentuated by hypoplasia of the perinasal tissues. These patients will present with a functional class III malocclusion and, in some cases, true prognathia in addition to the relative maxillary hypoplasia. Secondary lip deformities are variable and require an individualized approach.

Definitive treatment of the nasal-maxillary complex is deferred until adolescence. Preparation for the final treatment includes orthodontia and surgery. Between the ages of 9 and 12 years, the orthodontist will begin normalizing the maxillary arch, which usually involves palatal expansion to establish a normal arch width. During the period of mixed dentition, the orthodontist usually recommends alveolar bone grafting. This can be performed on an 23 hour stay basis and involves using a small bone mill to harvest cancellous bone.<sup>4</sup> Ideally, the palatal expansion device is removed after 3 to 4 months, once the bone has calcified. Successful closure of the alveolar soft tissues and bone grafting will result in a one-piece maxilla in both the unilateral and bilateral conditions. This allows the orthodontist to proceed with arch normalization, leveling of the occlusal plane, and tooth movements in preparation for maxillary advancement later in adolescence.<sup>5</sup> I prefer to wait at least 1 year after bone grafting the alveolar cleft before considering maxillary advancement.

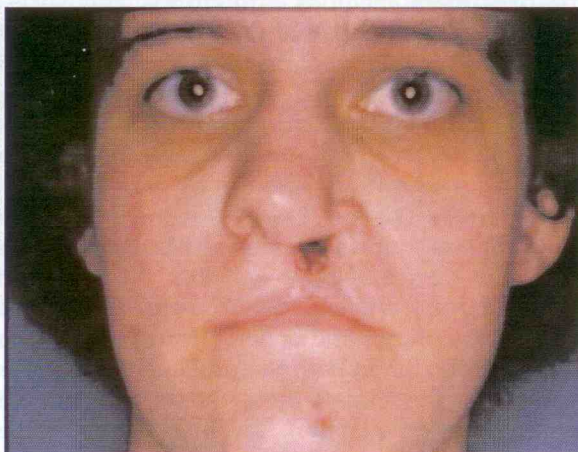
From the Division of Plastic and Reconstructive Surgery, Emory University; and the Center for Craniofacial Disorders, Children's Healthcare of Atlanta at Scottish Rite, Atlanta, Georgia.

Address correspondence and reprint requests to Dr. Fernando D. Burstein, Suite 500, 975 Johnson Ferry Road, Atlanta, GA 30342; E-mail: fburstein@aol.com

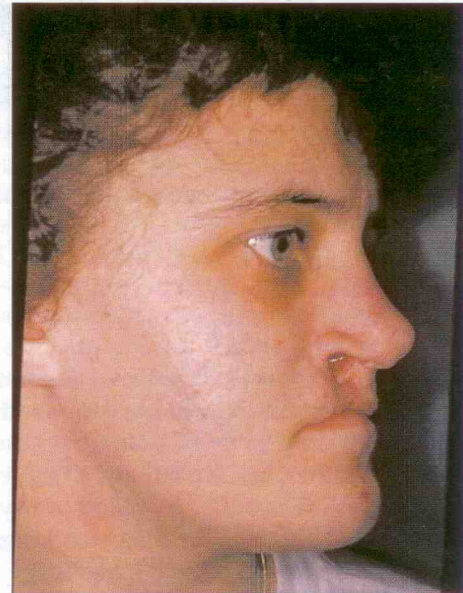


**Fig 1** Occlusal view of patient with unilateral cleft lip and palate. Note anterior crossbite, alveolar cleft, and missing dental units.

The key to an ultimately successful aesthetic and functional result is normalization of the bony base.<sup>6</sup> The first steps covered include closure of the alveolar cleft and bone grafting. The next step involves normalization of the occlusal relationship between the maxilla and mandible. To achieve this, maxillary advancement is performed (Fig 5). This procedure has been well explained by various authors.<sup>7-9</sup> Key technical points include maintenance of vascularization of the maxilla and retention of the advancement. The maxilla can be quite scarred from previous palatal surgery, and great care must be taken to preserve an adequate blood supply. This can be accomplished by leaving a wide buccal mucosal pedicle attached to the maxilla. Many times, it is possible to preserve the greater palatine blood



**Fig 2** Anterior view of adolescent female shown in Figure 1 with unilateral cleft. Note cleft nasal and lip deformities with asymmetric nasal tip.



**Fig 3** Oblique view of patient shown in Figures 1 and 2 with unilateral cleft.

supply. Avoiding unnecessary traction after the maxilla has been mobilized can also preserve soft tissue attachments that contribute to the blood supply. Once the maxilla has been down-fractured, the internal nasal cavity can be visualized. If there is turbinate hypertrophy, the turbinates are trimmed to improve postoperative airflow. If there is gross



**Fig 4** Adolescent female with bilateral cleft lip and palate. Note short nasal pyramid and splayed tip.

