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Technical Note
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U-shaped osteotomy in management of paranasal deficiency

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Abstract. When paranasal deficiencies are not accompanied by occlusal alterations, mobilization of the maxilla via Le Fort I osteotomy may not be justified. In this preliminary, report for the first time is presented a U-shaped osteotomy (USO) that mobilizes anteriorly and/or superiorly the maxillary bone surrounding the pirifom aperture. Advantages and indications of this new procedure are discussed.

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Management of paranasal deficiency has always been an aesthetic challenge to the maxillofacial surgeon. Too often, profiloplasties achieved through classic maxillomandibular osteotomies yield insufficient projection and definition in the paranasal areas. Maxillary advancement usually provokes forward and upward rotation of the tip of the nose as well as shortening of the collumela and fullness at the nasal base[8]. There are instances where paranasal deficiencies are not accompanied by occlusal alterations. In such cases, mobilization of the maxilla via Le Fort I osteotomy may not be justified. It is also quite common to see skeletal class III patients who have rejected surgery. Some have been treated orthodontically, achieving a stable occlusal result but still having the characteristic facial traits of antero–posterior maxillary deficiency, with pre-eminence of the nose and chin and deficient paranasal areas. Another typical situation involves patients with mandibular deficiency or excess with associated paranasal deficiency. Often, correction of the malocclusion by mandibular advancement or set-back only results in paranasal deficiency that does not justify a Le Fort I osteotomy. Finally, there are patients seeking rhinoplasty in whom nasal hypertrophy only is apparent, caused largely by lack of support at the base[11].

Classic ancillary procedures of onlay paranasal grafting are insufficient to correct all deficient aspects (paranasal, nasal spine, nasal base) in this area [1–3,5–7,9,10,12,13,15]. The materials used are usually expensive when alloplastic, or cause donor site morbidity when autologous. Alloplastic materials are more susceptible to infection than autogenous grafts. Recently, Chow et al.[4] proposed a pyriform rim sandwich osteotomy for correction of para-alar deficiency. This osteotomy does not correct the frequently encountered lack of projection at the nasal spine. Presented here, is a U-shaped osteotomy (USO) that has been designed to mobilize anteriorly and/or superiorly the maxillary bone surrounding the pirifom aperture, thus giving projection to paranasal areas, the nasal spine and the base of the nose. The mobilized bone is pedicled in the anterior part of the septum and alar base muscles, and stabilized with one or two screws.

Surgical technique

When performed as an isolated procedure, the USO was done under local anaesthesia plus sedation. In instances where mandibular surgery and/or rhinoplasty were performed concomitantly, general anaesthesia was used.

After infiltration, a through and through high horizontal incision is made between the upper lateral incisors. Periosteal elevation is done with care to preserve mus-

cular insertions around the nasal spine. Detachment of the nasal mucosa from the floor and lateral walls follows. For this purpose, an angled periosteal elevator is used from a lateral approach. The cartilaginous part of the nasal septum is detached from this same approach with the periosteal elevator, leaving inserted the anterior 2 cm.

The osteotomy is then performed using a 35-mm-long flexible blade in a reciprocating saw. It begins at one side of the piriform aperture approximately 2 cm above the nasal floor and proceeds downward with a curved pattern midway between the nasal floor rim and the apex of the incisors, to symmetrically complete the 'U' at the other side. The cut with the saw is performed in a trough-and-trough oblique fashion, reaching the nasal floor approximately 2 cm behind the piriform rim (Fig. 1). The osteotomized block is then mobilized with the aid of a chisel. To allow adequate mobilization of the segment, it is necessary to dislocate the cartilaginous septum from the vomer. This manoeuvre can easily be achieved through the horizontal part of the osteotomy with the aid of a guarded curved chisel.

Differential projection can be achieved at the lateral paranasal areas and nasal spine, depending on need (Fig. 2). The segment is then secured to the anterior maxilla with two long screws (Fig. 3). Suturing is done in two layers, re-attaching muscle and mucosa with resorbable 4/0 vicryl.

Antero–posterior projection was achieved in all cases, in the paranasal areas. Upward rotation of the tip of the nose as well as variable increases in nasolabial angle were achieved. (Fig. 4a and b) The length of the screws used for fixation ranged between 12 and 18 mm. For patients in whom USO was performed concomitantly with mandibular surgery, little pain or discomfort was experienced at the surgical site compared to that experienced at the mandibular site. Although follow up was short, there appears to be stability both at the skeletal and soft-tissue level. No complications were present in this group of patients (see Figs. 5–7). Mild swelling of the area lasted between 1 and 2 weeks.

Discussion

Contemporary aesthetic management of dentofacial deformities implies seeking an optimal occlusal result with maximization of the aesthetic parameters. Classically, paranasal projection has been achieved either by mobilizing the maxilla anteriorly, or through apposition of different materials in the area [8,11,14,15]. Le Fort I type osteotomies are indicated when treatment of associated malocclusions implies mobilization of the entire maxilla. This movement will provoke variable degrees of projection of the nasal tip and fullness in the paranasal areas.

Apposition of bone grafts and alloplastic materials has been widely used to improve paranasal projection. Harvesting of autologous materials (rib, calvarial, coronoid) provokes morbidity at the donor site and requires additional

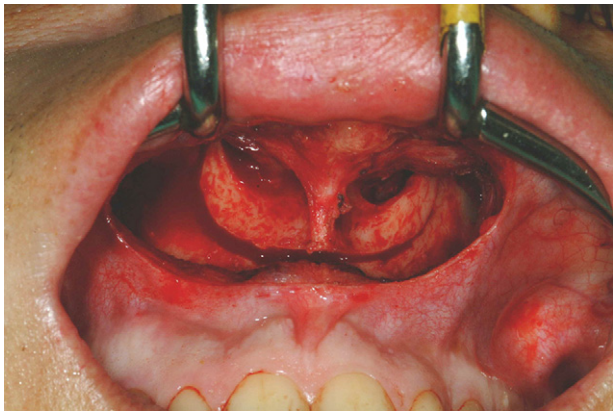

Fig. 1. USO mobilizes the piriform aperture, leaving it pedicled to the anterior septum.

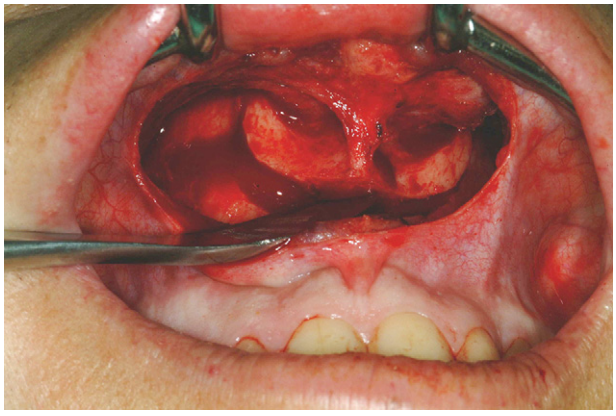

Fig. 2. The fragment is freed by limited periosteal dissection at the anterior nasal floor.

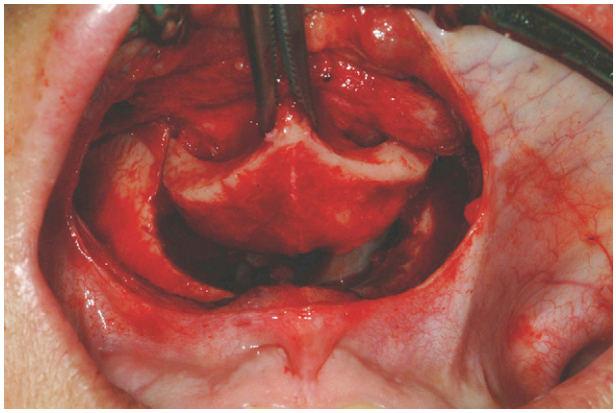

Fig. 3. It is important to preserve septal and muscular insertions at the anterior nasal spine during mobilization to allow adequate blood supply to the bone segment.

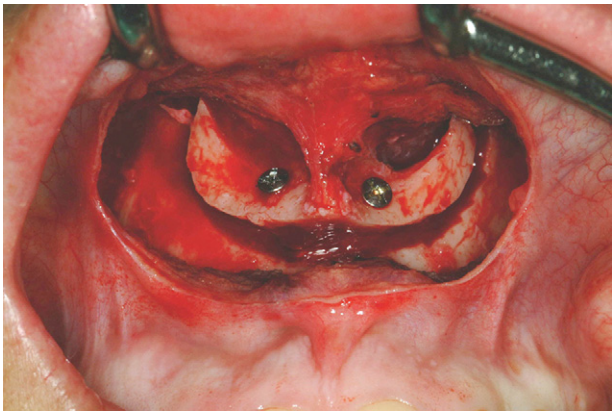

Fig. 4. Fixation of the segment in the new position is done with two screws placed in an oblique fashion.

time for modelling. It is still often difficult to achieve symmetry [4]. Alloplastic materials are expensive and more prone to infection and rejection than autologous ones [1,5,12,13]. Both types tend to project the paranasal areas laterally but not inferiorly unless massive dis-insertion of the muscles is performed. When they are placed laterally, nasal tip projection is not sufficiently modified.

As mentioned previously, Chow et al.[4] have proposed a pyriform rim sandwich osteotomy for correction of paranasal deficiency. This osteotomy does not correct the frequently encountered lack of projection at the nasal spine. It also necessitates harvesting of bone blocks to hold the lifted paranasal bone in place. USO allows simultaneous projection at the tip of the nose and paranasal areas without using foreign materials other than the stabilizing titanium screw, and avoiding associated morbidity in donor areas. The same principles and advantages of performing chin osteotomies rather than chin implants can be applied in this case.

Fig. 5. In patient no. 6, USO was performed concomitantly with a genioplasty. Note that long screws are holding both mobilized segments in place.

Fig. 6. (a and b) This patient presented paranasal and upper lip deficiency plus lack of nasal tip projection. USO together with cheiloplasty yielded an improved profile.

Although the follow-up time of the patients discussed here has been relatively short, no significant skeletal relapse has been observed clinically or radiographically. Prospective long-term follow up is required to evaluate the degree of skeletal stability and range of applications of this technique.

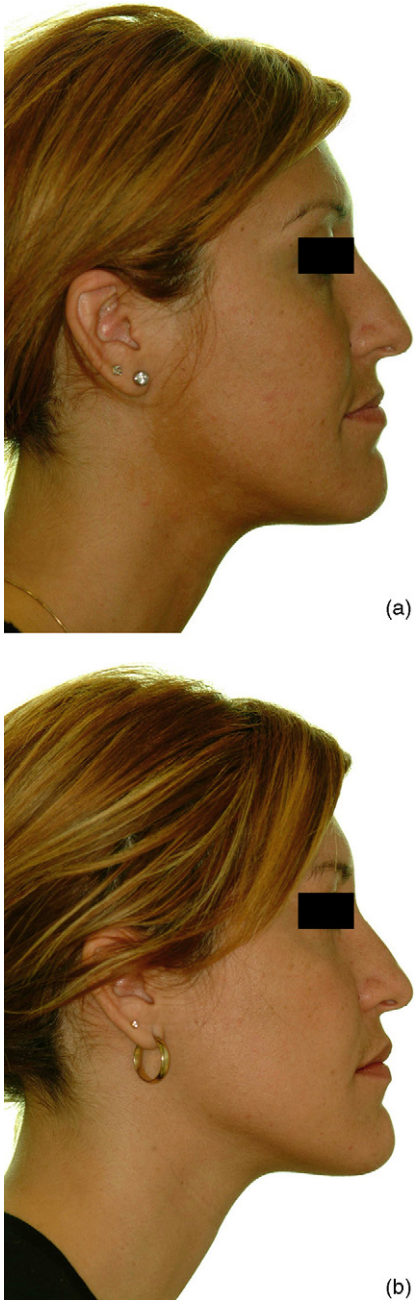

Fig. 7. (a and b) Paranasal deficiency and mandibular asymmetry in a class III patient. Bimaxillary surgery was an option. Instead, mandibular set-back and centering plus USO were performed. Note changes in paranasal and nasal tip areas.

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