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Correspondence and Communications

Interpositional collagenated cancellous bone blocks for nasal dorsum augmentation: A new technique for nasomaxillary hypoplasia treatment

Dear Sir,

Nasomaxillary hypoplasia is a rare congenital malformation involving the middle third of the face. Depending on its severity, patients present the following clinical features to varying degrees: an arhinoid face, abnormal position of the nasal bones, maxillary hypoplasia with subsequent malocclusion, a reduced or absent anterior nasal spine (ANS), atrophy of the nasal mucosa, and absence of frontal sinuses¹. Orthognathic surgery (OS) and rhinoplasty are suitable and powerful techniques for both the functional and aesthetic management of these patients².

The present paper describes a novel technique for restoring the nasal projection in a patient with nasomaxillary hypoplasia, analyses its advantages and limitations, and discusses its potential applicability in other similar contexts.

A 22-year-old woman was referred to our Department with malocclusion and self-esteem problems related to a severe concave facial profile. The rest of her medical history was unremarkable, with no antecedents of facial trauma.

The physical examination revealed midfacial hypoplasia with both nasal and maxillary related aesthetic and functional problems. In relation to the nasal alterations, the following clinical aspects were noted: absence of nasal projection with a flattened nasal tip and dorsum, a short columella, and acute nasolabial and obtuse frontonasal angles. In relation to the maxillary problems, the sagittal and transversal maxillary deficiency was associated with class III malocclusion, with significant underbite (anterior crossbite) - all resulting in a flat facial profile (Figure 1).

Cone-beam computed tomography (CBCT) revealed decreased anterior cranial base dimensions and a hypoplastic but existent ANS, thereby confirming the diagnostic suspicion of nasomaxillary hypoplasia. Consensus was reached in advising concomitant rhinoplasty and OS after orthodontic treatment. The Declaration of Helsinki guidelines were followed in all the treatment phases, and written informed consent was obtained.

The patient was operated upon under general anaesthesia. OS for occlusal and maxillo-mandibular discrepancy

correction led to nasal tip projection, since the ANS and premaxilla supported it. Then, the nasal dorsum defect was resolved using the following novel technique. Subperiosteal dissection over the lateral aspects of the nasal bones and the medial aspects of the maxillary bones was achieved through the intraoral approach of LeFort I osteotomy. Then, lateral osteotomies of the nasal bones were performed integrally with a piezoelectric device using a long cutting saw tip (Implant Centre 2[®], Satelec-Acteon Group, Tuttlingen), and digital in-fracturing was completed with light pressure (thus being able to avoid paramedian and superior osteotomies). A quadrangular cancellous block of xenogenic bone (OsteoBiol[®] Sp-Block. Tecnos, Italy) (10 × 10 × 20 mm) was divided into two triangular prisms. Finally, the nasal pyramid was projected by interpositioning the two triangular prisms bone blocks (10 mm of height) on each side in the osteotomies between the nasal and the frontal processes of the maxillary bones (Figure 1, 2). The subperiosteal elevation of the paranasal area associated to the Le Fort I technique, which implied nasal septum detachment, allowed not only for direct intraoral visualization of the osteotomies but also for superior displacement of the osteotomized pyramid (with the aid of a periosteal elevator), and for sliding the grafts in the slot pushed up until enough symmetrical elevation had been achieved. Radix acted as a hinge area and its forward displacement was minimal. After wound suture, external splinting with adhesive strip and self-adhesive padded aluminium splint was carried out.

At 12 months of follow-up, no complications had been reported, the patient remained satisfied with the outcome, and surgical stability was evidenced through photographic assessment (Figure 1). The pre- and the two postoperative (at one and 12 months of follow-up) CBCT datasets were superimposed by means of surface matching with a specific software (Dolphin Imaging & Management Solutions, Chatsworth, CA, USA). It revealed a stable increased projection of the nasal dorsum and ANS of 5.18 mm and 5.52 mm, respectively (SupFig. 1).

To date, one-stage surgery in the form of rhinoplasty and OS is considered the best treatment option for nasomaxillary hypoplasia. As illustrated in the present case, maxillary repositioning involves partial or full nasal tip projection correction. Thus, according to Posnik, management of the nasal deformity should first establish a corrected maxillary foundation and only then proceed with construction of the nasal framework².

Several techniques and different kind of grafts have been proposed to reconstruct the nose. Although a one-piece L-shaped strut costochondral graft cantilevered to the frontal

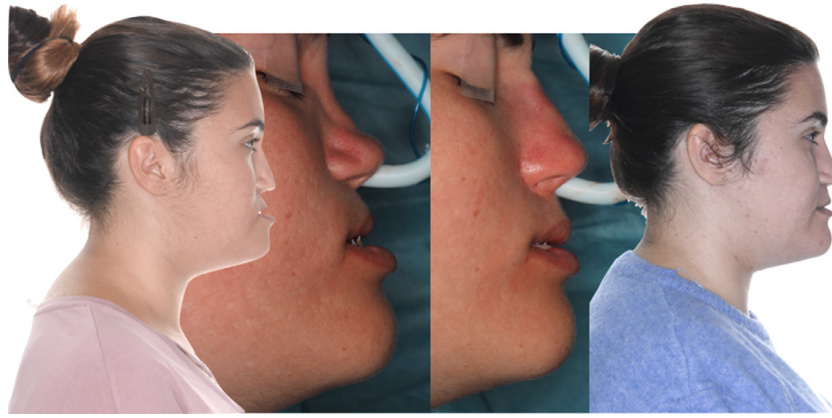


Figure 1 From left to right: female patient with nasomaxillary hypoplasia, facial profile immediately after orthognathic surgery, where nasal tip projection is evidenced, facial profile immediately after rhinoplasty, where straightening of the nasal dorsum is evidenced, and one-year follow-up facial profile.

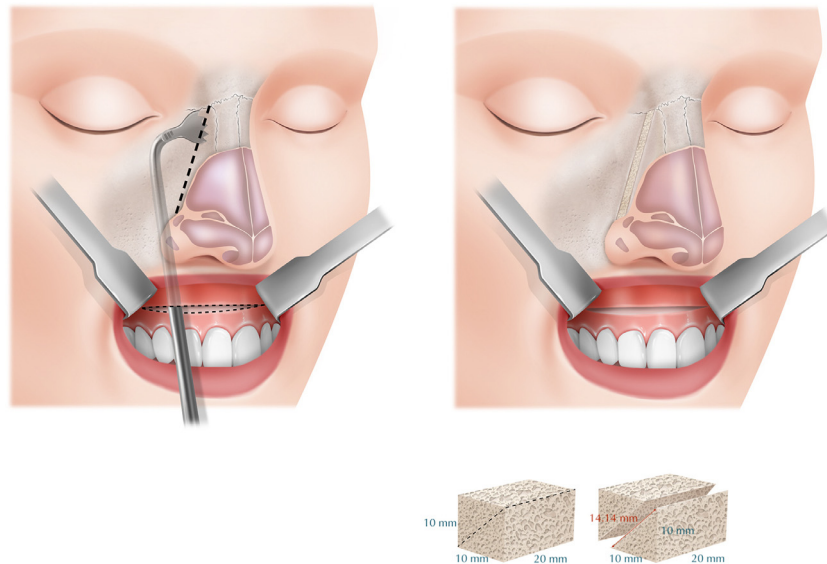


Figure 2 Illustration showing lateral osteotomies of the nasal bones using a piezoelectric device and projection of the nasal pyramid by interpositioning two triangular-shaped blocks of collagenated cancellous bone on each side.

bone is the most widely accepted approach², no unequivocally superior surgical strategy and grafting procedure in terms of stability and nasal contour have been established so far. Different grafts have been used in nasal reconstruction, including autologous tissues (bone, cartilage, fascia, dermis) and alloplastic materials (Silastic, Gore-Tex, Mersilene). Alloplastic implants still pose an increased risk of prolonged infection and rejection, which can result in exacerbation of the deformity. The use of autologous materials is therefore preferred, due to the greater long-term stability afforded. Nonetheless, grafts definitively placed at early ages are subject to great variability in resorption and overgrowth, with less predictable results².

On the other hand, collagenated cancellous bone graft blocks have been widely used in maxillofacial reconstruction, with satisfactory outcomes in terms of stability³. The technique described in this study, involving

interpositional graft blocks, allows us to approach the base of the nasal dorsum while restoring its projection without altering the morphology of the nasal pyramid - avoiding shape irregularities, as well as donor site morbidity. However, the technique is not suitable for cases characterized by a total lack of nasal bones. Conversely, this technique could be extended to patients with Binder-type features.

In the context of OS, the intraoral approach to lateral nasal osteotomy is an excellent option for avoiding visible scars⁴. In addition, the use of piezoelectric instrumentation is more precise and less traumatic⁵.

To sum up, the described technique affords satisfactory nasal dorsum augmentation while avoiding the use of permanent foreign materials, with minimal morbidity, no unsightly scars, great patient satisfaction, and adequate stability.

Ethical approval

The Declaration of Helsinki guidelines were followed in all the treatment phases, and written informed consent was obtained.

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The authors have no financial interests to declare regarding the contents of this article.

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Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:[10.1016/j.bjps.2020.08.137](https://doi.org/10.1016/j.bjps.2020.08.137).

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Federico Hernández-Alfaro
Institute of Maxillofacial Surgery, Quirón-Teknon Medical Centre Barcelona, Carrer de Vilana 12, 08022 Barcelona, Spain
Department of Oral and Maxillofacial Surgery, International University of Catalonia, Sant Cugat del Vallès, Barcelona, Spain

Jesús González-Soto
fellow at Institute of Maxillofacial Surgery, Quirón-Teknon Medical Centre Barcelona, Barcelona, Spain

Maria Giralt-Hernando
Department of Oral and Maxillofacial Surgery, International University of Catalonia, Sant Cugat del Vallès, Barcelona, Spain

Jorge Masià-Gridilla
Institute of Maxillofacial Surgery, Quirón-Teknon Medical Centre Barcelona, Carrer de Vilana 12, 08022 Barcelona, Spain
Department of Oral and Maxillofacial Surgery, International University of Catalonia, Sant Cugat del Vallès, Barcelona, Spain

Mirco Raffaini
Face Surgery Centre, Parma, Italy
Department of Maxillofacial Surgery, University of Firenze, Firenze, Italy

Adaia Valls-Ontañón
Institute of Maxillofacial Surgery, Quirón-Teknon Medical Centre Barcelona, Carrer de Vilana 12, 08022 Barcelona, Spain
Department of Oral and Maxillofacial Surgery, International University of Catalonia, Sant Cugat del Vallès, Barcelona, Spain

E-mail address: avalls@institutomaxilofacial.com

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