VIDEO+

Orthognathic Surgery and Rhinoplasty to Address Nasomaxillary Hypoplasia

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Summary: The treatment of nasomaxillary hypoplasia is challenging. The phenotype of Binder "syndrome" includes the following: midfacial hypoplasia, class III malocclusion, small or absent anterior nasal spine, flattened nose, horizontal nostrils, short columella, acute nasolabial angle, and a flat frontonasal angle. A staged approach is used, with orthognathic surgery to achieve vertical maxillary length and sagittal advancement, followed by rhinoplasty aimed to increase nasal tip projection, rotation, and columellar length. This article details the diagnosis and treatment of nasomaxillary hypoplasia, demonstrating the senior author's (D.M.S.) preferred approach and technical steps. (*Plast. Reconstr. Surg.* 140: 930, 2017.)
CLINICAL QUESTION/LEVEL OF EVIDENCE: Therapeutic, V.

Nasomaxillary hypoplasia was originally described by Zuckerkandl in 1882[1] and reported in greater detail by Binder in 1962.[2] The cause of this "syndrome" is unknown, with both environmental and genetic factors in play.[3] Recent consensus is that this is not a syndrome, but rather a nonspecific abnormality with hypoplasia of the nasomaxillary region.[4] Regardless of the cause, the phenotype is conserved and treatment of the underlying skeletal and nasofacial deformities is challenging.

Patients with nasomaxillary hypoplasia are characterized by a concave lateral profile with poor support of the upper lip, perialar region, and nasal tip. A class III malocclusion with significant underbite (anterior crossbite) is observed. The mandible is protrusive in either absolute or relative terms, and the chin may be malpositioned. The nasal tip and midvault are dramatically underprojected, often with a relative dorsal hump. The tip is underrotated, with an acute nasolabial angle, a short columella, and flat nostrils.

Orthognathic surgery and rhinoplasty are powerful techniques with broad indications and applicability for both functional and aesthetic improvement. These facial, nasal, and occlusal discrepancies are corrected using a combination of orthognathic surgery (e.g., Le Fort I, bilateral sagittal split osteotomies, genioplasty) and rhinoplasty.

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INDICATIONS AND MANAGEMENT

An 18-year old woman presented with an underbite, lack of upper lip support, and nasal deformity, consistent with nasomaxillary hypoplasia following a period of orthodontic decompensation; workup for orthognathic surgery was performed. The surgery was planned three-dimensionally and addressed the sagittal and vertical maxillary deficiency, mandibular asymmetry, and chin position. The goal was to equilibrate the facial skeletal position, and optimally support the nasolabial region. It was recognized that Le Fort I advancement and lengthening alone would not improve the nasal deformity. Rather, this would worsen the nasal appearance.[5,6] In a staged fashion, 4 months after jaw surgery, rhinoplasty was performed. This centered on increasing tip projection and rotation, dorsal hump reduction, columellar lengthening, and narrowing of the alar base. This combination of targeted orthognathic surgery and rhinoplasty effectively created nasolabial support, with projection of the maxillary

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incisors, piriform, nasal tip, and lip. (**See Video, Supplemental Digital Content 1,** which demonstrates an 18-year-woman with nasomaxillary hypoplasia. Initial assessment before orthognathic surgery is shown, followed by the technical details of orthognathic surgery. The preoperative rhinoplasty evaluation and intraoperative rhinoplasty steps are shown. Lastly, her final result, after both orthognathic surgery and rhinoplasty, is shown, available in the "Related Videos" section of the full-text article on PRSJournal.com or, for Ovid users, available at ***http://links.lww.com/PRS/C415***. Copyright maintained by the senior author.)

OPERATIVE TECHNIQUE

Orthognathic Surgery

Orthognathic osteotomies with fixation are performed in standard fashion. The bilateral sagittal split osteotomy is performed first, followed by Le Fort I, with interpositional bone grafting, and lastly, genioplasty. Intermediate and final splints are used, and removed at the end of the case. Rigid internal fixation is used at all osteotomy sites. No external incisions are required.

Rhinoplasty

Open rhinoplasty is completed. Initially, a judicious cephalic trim and a dorsal reduction at the keystone (to address the relative hump) are performed. A septoplasty is undertaken, maintaining an L-strut, and a left spreader graft is placed. Lateral osteotomies are initiated with infracturing. A caudal septal extension graft is used to enable tip projection and rotation. Domal sutures and an infralobular tip graft create additional tip projection. Alar batten grafts and crushed dorsal and radix onlays are placed. Finally, alar base and sill excisions are performed to control the basilar width and nostril appearance.

Postoperative Care

After orthognathic surgery, the patient is discharged after 23 hours and maintained on a blenderized diet for 3 weeks. The rhinoplasty postoperative course entails keeping an external nasal splint and Doyle splints in place for approximately 7 days. Activity is limited during the initial postoperative periods and gradually resumed as normal. The images in the video are from greater than 6 months postoperatively, and the three-dimensional images are from 12 months postoperatively (Fig. 1).

CONCLUSIONS

Nasomaxillary hypoplasia is effectively managed using orthognathic surgery and rhinoplasty. Maxillary advancement with vertical lengthening

Video. Supplemental Digital Content 1 demonstrates an 18-year-woman with nasomaxillary hypoplasia. Initial assessment before orthognathic surgery is shown, followed by the technical details of orthognathic surgery. The preoperative rhinoplasty evaluation and intraoperative rhinoplasty steps are shown. Lastly, her final result, after both orthognathic surgery and rhinoplasty, is shown, available in the "Related Videos" section of the full-text article on PRSJournal.com or, for Ovid users, available at ***http://links.lww.com/PRS/C415***. Copyright maintained by the senior author.

Fig. 1. Sequence of three-dimensional images (in two-dimensional lateral perspective) showing right lateral views (*above*) and left lateral views (*below*) of the patient preoperatively (*left*) versus after jaw surgery and rhinoplasty (*right*).

and nasal alteration to achieve tip projection and rotation are the critical technical aspects to success.

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PATIENT CONSENT

Patient provided written consent for the use of patient's images.

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