Correction of Symptomatic Chronic Nasal Airway Obstruction in Conjunction With Bimaxillary Orthognathic Surgery: Does It Complicate Recovery and Is It Effective?

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Purpose: The purpose of this study was to assess the safety and efficacy of intranasal procedures carried out simultaneously with bimaxillary orthognathic surgery.

Materials and Methods: The authors executed a retrospective cohort study derived from patients treated by a single surgeon at 1 institution from 2004 through 2013 with a minimum follow-up of 1 year (range, 1 to 10 yr). An index study group consisting of a consecutive series of patients with symptomatic chronic obstructive nasal breathing (CONB) and a bimaxillary developmental dentofacial deformity (DFD) also involving the chin were identified. They underwent a minimum of: Le Fort I osteotomy, bilateral sagittal ramus osteotomies, septoplasty, inferior turbinate reduction (ITR), and osseous genioplasty. Study variables included age at operation, gender, pattern of presenting DFD, presence of obstructive sleep apnea, segmentation of the maxilla, and airway management. The primary outcome variable studied was residual CONB.

Results: During the study period, 262 patients met the inclusion criteria. Their age at operation averaged 25 years (range, 13 to 63 yr) and 134 were female (51%). The major patterns of presenting DFD included long face (29%) and maxillary deficiency (25%). No patients required nasal packing, reintubation, tracheostomy, or blood transfusion. In 6 of the 262 patients (2%), the intranasal procedures did not resolve nasal breathing difficulties. In these patients, procedures recommended included synechiae release (n = 3), revision septoplasty (n = 3), and further ITR (n = 4). An association between age at time of surgery and non-segmental Le Fort I osteotomy with the occurrence of residual nasal obstruction was confirmed.

Conclusions: When completing septoplasty and ITR through a Le Fort I, airway management need not be altered from standard protocol. The management of CONB in conjunction with orthognathic surgery is highly effective, with few complications. Non-segmental Le Fort I in patients at least 40 years of age is more likely to be associated with residual CONB, but the incidence remains low.

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Comprehensive care of the patient with a dentofacial deformity (DFD) requires consideration of the presenting malocclusion and achieving long-term dental health, the presenting skeletal dysmorphology and maximizing facial esthetics, and assessment of the upper airway and managing sites of obstruction. Since the late 1800s,

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prominent clinicians, including Dr Edward Angle and Dr Vilary Blair, recognized that an intimate relation among malocclusion, maxillary deformity, and chronic obstructive nasal breathing (CONB).[1-6] Since the 1960s, experimental and clinical studies have confirmed the common occurrence of symptomatic nasal airway obstruction in association with developmental jaw deformities involving the maxilla.[7-39] In affected individuals, examination can identify anatomic causes, including a deviated septum, hypertrophic inferior turbinates, an elevated or irregular nasal floor, and narrow pyriform rims (Figs 1-4).

Because of the known occurrence of CONB in some patients with a DFD, the authors previously recommended a thorough preoperative baseline airway assessment in all patients.[40-45] Others have advocated nasal airway evaluation only if complaints are voiced by the patient. Williams et al[46] completed a prospective study in a subgroup of patients undergoing a Le Fort I osteotomy with limited advancement (2 to 5 mm) and limited vertical change (−2 to +1 mm). The patients also underwent recontouring of the nasal floor and crest and many underwent maxillary segmentation with arch expansion. In general, these surgical procedures were not expected to increase nasal airway resistance and were judged favorable for the nasal airway. No specific nasal cavity examination was reported to have been carried out in the patients before surgery. Although most had some improvement or at least no worsening in breathing, 20% developed persistent difficulty breathing through the nose after surgery. In another study, Martin et al[47] completed a nasoendoscopic examination of a consecutive series of patients who had undergone Le Fort I osteotomy without a presurgical assessment of the nasal airway. The study data led to the conclusion that "all patients undergoing impaction and advancement of the maxilla" should be informed of the possible decrease in nasal airflow after surgery.

The authors previously completed a prospective cohort study in a subgroup of patients with DFD, maxillary deformity, and confirmed symptomatic CONB.[43] All were documented to have major deviations or buckling of the septum and hypertrophic inferior turbinates as a cause of the presenting airway obstruction. All patients underwent simultaneous correction of the confirmed maxillary and intranasal deformities. The Le Fort I osteotomy accomplished a spectrum of movements that often included considerable vertical shortening (eg, to correct a long-face growth pattern). Evaluation at 3 and 6 months after surgery confirmed that all patients achieved substantial improvement in nasal breathing. Success of the surgery meant that none of the patients had residual chronic nasal airway obstruction. A similar clinical approach, but with a larger sample should provide an opportunity to study the causes of residual nasal obstruction after attempted correction.

The purpose of this retrospective cohort study was to evaluate for residual nasal airway obstruction in a consecutive series of patients undergoing septoplasty and reduction of hypertrophic inferior turbinates to manage chronic nasal airway obstruction in conjunction with bimaxillary orthognathic surgery. The intranasal

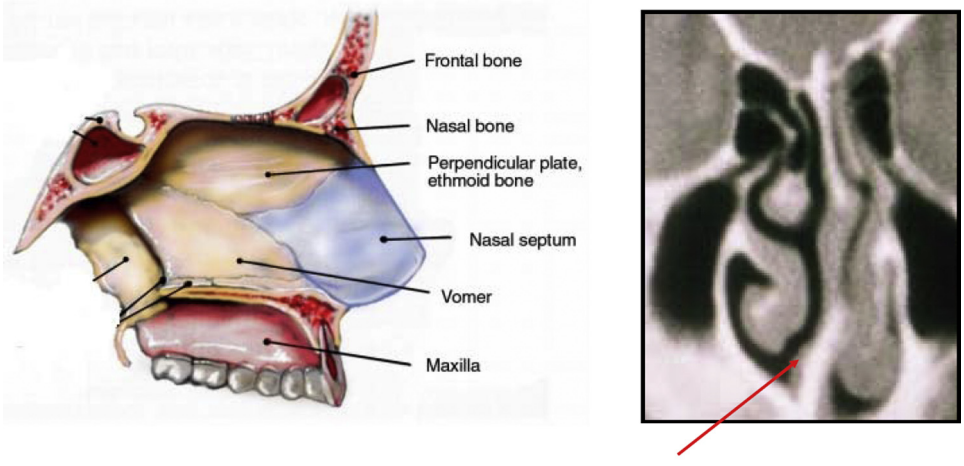

FIGURE 1. Sagittal midfacial illustration and coronal section computed tomographic views of the skeletal (vomer and perpendicular plate of ethmoid) and cartilage (quadrangular) components of the septum of the nose. Computed tomographic view indicates deviation and buckling of the septum, which obstructs the left side of the nose. From Posnick JC: Nasal airway considerations in the evaluation and treatment of dentofacial deformities, *in* Posnick JC (ed): Orthognathic Surgery: Principles and Practice. St Louis, MO, Elsevier, 2014, Fig 10-2, p 289; modified from an original illustration by Bill Winn.