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Airway Obstruction After Rhinoplasty: Prevention and Correction

Aesthetic and reconstructive rhinoplasty may result in an inadvertent decrease in nasal airway patency leading to patient dissatisfaction. Recognition of patients who are at risk for airway compromise, coupled by knowledge of surgical measures that can be incorporated into the surgeon's armamentarium can enhance both the functional and aesthetic results of rhinoplasty. Thorough, systematic initial evaluation of the nasal airway and familiarity with surgical techniques that can be used in primary and revisional rhinoplasty to preserve or enhance the nasal airway maximizes the chances for a favorable outcome. Preoperative evaluation can reveal patients with preexisting weakness in cartilaginous airway support which may result in airway collapse with negative inspiratory pressures. In addition, patients may have significant fixed obstructions at the nasal inlet, septal or mid-vault levels. Proper diagnosis and treatment planning allows the surgeon to incorporate septoplasty, turbinectomy, pyriform aperture enlargement, alar spreader grafts, batten grafts and collumelar grafts as needed into their rhinoplasty technique. Properly

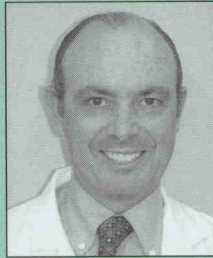
applied these techniques can enhance the overall aesthetic results while preserving or improving nasal airway patency.

Initial evaluation includes external and internal nasal evaluation and a thorough history. When necessary rhinometry and flexible nasal endoscopy and CAT scanning can yield additional physiologic and anatomic information. Septal deviation and turbinate hypertrophy are noted. If significant, submucous septal resection and partial inferior turbinectomy are incorporated into the rhinoplasty operative plan. This is important in reductive rhinoplasty since decreasing dorsal height, narrowing of the nares, lateral osteotomies, and tip reduction can all contribute to increased nasal airway resistance. Alar valve collapse can be easily diagnosed by occluding one nares during inspiration and observing for lateral alar collapse. The maneuver is repeated with cotton tipped applicator supporting the nasal valve. If airflow is improved with this maneuver alar spreader or batten grafts may be indicated, figures 1, 2. In older patients

with a nasal labial angle of ninety degrees or less, pushing the tip up can significantly improve airflow, figure 3. These patients may benefit from a strut graft placed in the collumella. Patients with uncorrected vertical midface hyperplasia may be found to have a very tight nasal inlet during examination. These patients can benefit from enlargement of the piriform aperture, figure 4. Spreader grafts, batten grafts, strut grafts, and piriform enlargement can all be incorporated in primary or secondary rhinoplasty.

There are several technical points that can minimize potential airway problems in primary rhinoplasty. Mucosa must be preserved and if inadvertently lacerated it should be repaired. This is particularly critical at the nasal valve. The area of ligamentous attachments between the caudal end of the upper lateral cartilages and the cephalic part of the lower lateral cartilages must be respected. Overresection of the domes and lateral crura can weaken this area and result in airway collapse. Likewise at least 4mm of lower lateral cartilage should be preserved to insure that the nasal inlet is supported. If a submucous resection of the septum is a part of the surgical plan, both the cartilaginous and bony septum must be treated. Care should be taken to preserve at least 10mm of caudal and 10mm of dorsal septum to prevent collapse of the middle vault.

Secondary correction of rhinoplasty deformities often incorporates techniques for airway correction including spreadergrafts, batten grafts, and grafts



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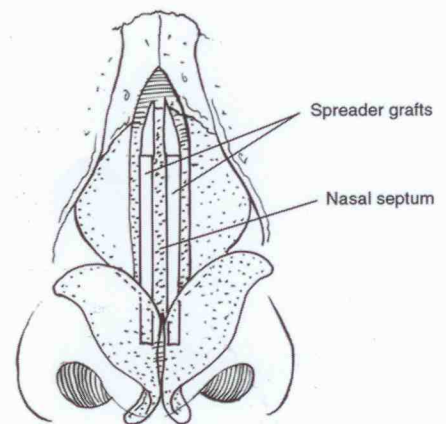
for alar reconstruction. Often the type, size and number of grafts are determined once the anatomic problems have been exposed at surgery. Materials for correction may be in short supply. Conchal or costal cartilage graft harvesting may be necessary if septal cartilage is not available. The external approach is recommended for secondary rhinoplasty.

Extended spreader grafts used to support alar valve and reconstruct mid nasal vault

The surgeon who performs rhinoplasty procedures should be familiar with diagnosis and treatment of airway problems. Knowledge of nasal anatomy and physiology along with careful operative treatment can maximize patient satisfaction.

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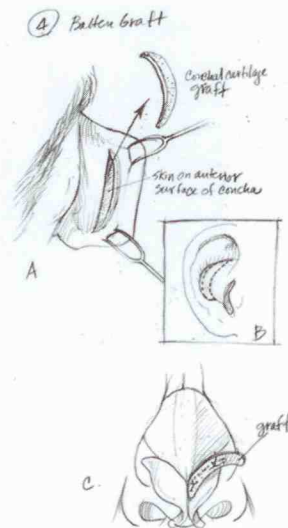
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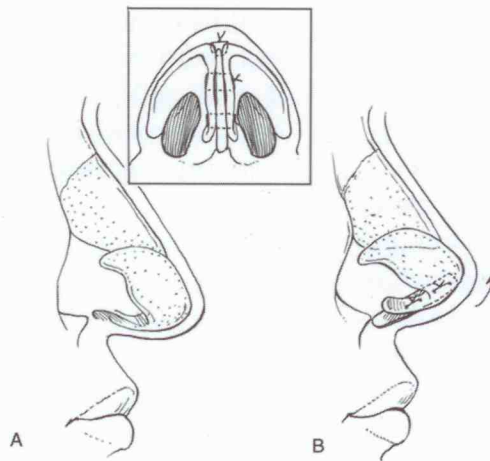
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Conchal batten graft used to support structurally deficient juncture of upper and lower lateral cartilages.



Strut graft placed between footplates of lower lateral cartilages to raise tip and open nasal inlet.



③ Pyriform aperture stenosis

Pyriform stenosis narrowing nasal airway. Small rongeurs used via intranasal approach to increase aperture.

