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## TECHNIQUES OF CORRECTION OF CROOKED NOSE

### ABSTRACT

Nose is aesthetically divided into three parts-upper, middle and lower third. Upper third is bony part, while lower 2/3rd is cartilaginous. Deviation of the external nose from midline is called crooked nose. Crooked nose deformity can be due to deviation of either bony part or cartilaginous or both. Correction of crooked nose poses a great challenge in rhinoplasty. Most of the time it is associated with deviated nasal septum. Therefore, it has to be addressed both functionally and aesthetically.

Depending upon site of deviation whether bony (upper 1/3) or cartilage (lower 2/3) of the nose, there are different techniques of correction of crooked nose. Sites of deviation, techniques of correction of these deviations will be discussed in detail.

**Keywords:** Correction, Crooked Nose, Techniques

### INTRODUCTION

Nose is aesthetically divided into three parts-upper, middle and lower third. Upper third is bony part, while lower 2/3rd is cartilaginous (Fig.1). Deviation of the external nose from midline is called crooked nose. Crooked nose deformity can be due to deviation of either bony part or cartilaginous or both. Correction of crooked nose poses a great challenge in rhinoplasty. Most of the time it is associated with gross septal deviation. In our study out of 89 patients who underwent septorhinoplasty, 41 patients had crooked nose and all these patients had septal deviation.<sup>1</sup> In another study out of 140 patients who underwent septorhinoplasty, 100 (71.43%) patients had crooked nose and out of those 100, 77 (77%) patients had deviated nasal septum.<sup>2</sup>

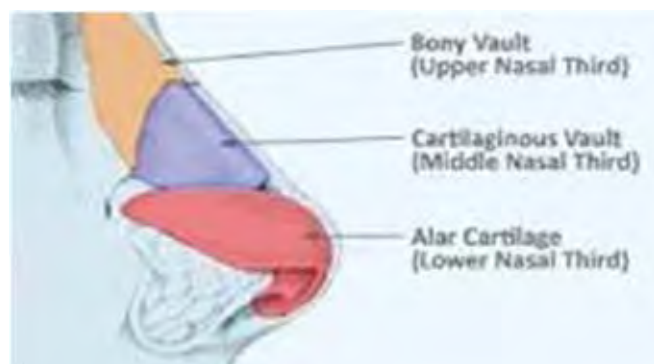


Fig.1: Parts of nasal dorsum

### EVALUATION

Evaluation of the deviated nose begins with a thorough history and physical examination.

#### History

Proper history taking is necessary to determine the aetiology of deviation. In case of trauma, nature and duration of trauma is important. In case of fractured nasal bone of short duration, it can be corrected by simple procedure like digital manipulation or closed reduction. Otherwise surgery should be delayed 6 months for complete resolution of swelling and healing process. In case of open fracture it is better to wait till the wound heals completely or open reduction should be carried out. Also rule out history of previous nasal surgery. Systemic diseases, autoimmune or connective tissue diseases involving nose and nasal septum should be enquired. We should also ask for any substance abuse like cocaine.

Symptoms of nasal obstruction, may indicate septal deviation or nasal valve collapse. Also rule out medical or seasonal allergies.

#### Physical examination

The physical examination encompasses a systematic and thorough evaluation of the nose. Beginning with an external nasal examination, the nose is analyzed in relation to the entire face.

Evaluate symmetry and balance of facial aesthetic units separately and in conjunction with nasal structures. Rule out fracture of other midfacial bones, hemifacial microsomia. Skin type and patient age are also important factors that must be considered.

Determine the nature of the deviation. Decide if it is a true deviation or an illusion secondary to a unilateral collapsed upper lateral cartilage.

As mentioned earlier crooked noses are typically characterized by deviation of the bony upper third and/or the cartilaginous lower two thirds of the nose (Fig.II&II). Deviation is often sinusoidal in nature (Fig.IV), and the tip may or may not be in

the midline (Fig.V). Therefore, assess the part of deviation ie. involvement of the upper bony third of the nose and/or the middle cartilaginous vault and/or tip.

Detailed analysis of the nasal tip determines whether the tip is midline or deviated. The tip can also be bulbous or drooped. Proper evaluation of the tip is a prerequisite to determine the most appropriate surgical approach. Because for correction of tip open approach will be appropriate. Palpate the nose for bony irregularities, location of the anterior septal angle, and evaluate tip support.<sup>3</sup>

During inspiration, watch for a collapsing ala, which impedes air entry. This is a sign of external nasal valve collapse. Evaluate the inferior turbinates for compensatory hypertrophy which can contribute to nasal obstruction. The attachment of the upper lateral cartilage to the septum ideally creates an angle of 9-15°. Any angle less than this suggests internal valve compromise.

Perform Cottle's test, if there is relief from obstruction, suspect obstruction at the level of internal nasal valve. Examine the internal nose, with the aid of a topical decongestant which allows better visualization of the posterior and dorsal septum. Nasal endoscopy also aids better evaluation of internal nose.

## SURGICAL TREATMENT

The goals of the surgery are creation of a rigid and straight cartilaginous L-strut, correction of the deviated bony structures, and improvement of the nasal airway. It depends upon which part of nasal dorsum is deviated, upper third, mid third, lower third or all three components.

Curvatures of the mid and lower third of the dorsal septum can be corrected with several techniques. Spreader grafts can be utilized for internal stenting to straighten the dorsal deviations. These grafts are placed between the upper and lower lateral cartilage and septum (Fig.VI). They are sutured together.<sup>4,5</sup>

A deviated caudal septum can be corrected by resection and replacement with a straight septal cartilage graft or use of columellar strut (Fig.VII).<sup>6</sup>

In severe deviations of septal cartilage involving both dorsal and caudal portions of the septum, extracorporeal septoplasty, modified

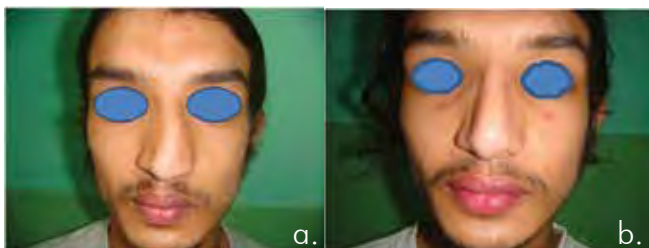


Fig.II: a. Crooked nose involving all three parts of the nasal dorsum before correction b. After correction



Fig.III: a. Deviation of upper 3rd of the nasal dorsum before correction b. After correction



Fig. IV: a. Sinusoidal deviation of nasal dorsum before correction b. After correction



Fig.V: a. Deviated tip to the left before correction b. After correction

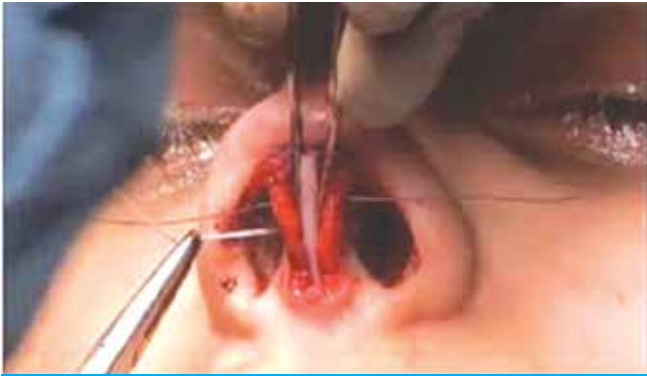


Fig. VI: Correction of deviated tip with columellar strut

extracorporeal septoplasty or use of septal crossbar grafts may be the appropriate method.<sup>7,8,9,10</sup>

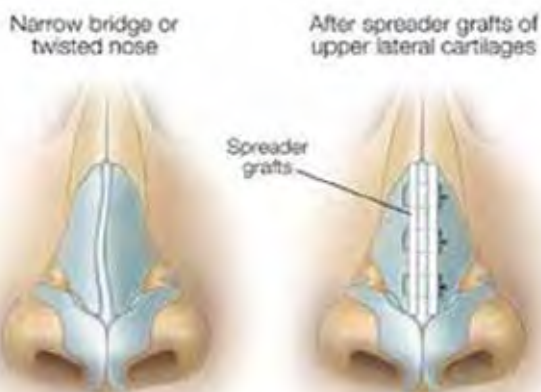


Fig. VII: Correction of mid 3rd with spreader grafts (Courtesy: Dr. Raymond Goh)

For correction of the deviated bony pyramid, several osteotomies can be performed. Medial osteotomy, lateral osteotomy, double-level lateral osteotomies, sometimes intermediate osteotomies may be needed if there is gross bony deformity.<sup>11,12</sup> The goal of osteotomies is to create mobile bony segments that can be returned to a favorable anatomic position and orientation. Lateral osteotomy can be done internally by giving a small incision just proximal to the inferior turbinate and sliding osteotomies intra nasally at the pyriform aperture (Fig.VIII). It can also be performed by a percutaneous osteotomy through a single stab skin incision on the sidewall of the nasal dorsum. The osteotome is marched up the sidewall in a postage stamp manner (Fig.IX). Dorsal onlay grafts can provide camouflage for any residual asymmetries after septal reconstruction or can be applied for dorsal augmentation.<sup>7</sup>

Silastic or radiographic film splints can be used and fixed with the mattress suture to stabilize the septum. Nasal packing should be minimized to a



Fig.VIII: Lateral osteotomy internal approach

thin piece of ribbon gauze or PVA pack.

External stabilization of the nose is done with a layer of either steri-strips or micropore tape, cut to match the length of the dorsum, ending just at the supratip region. Starting on one dorsal sidewall, a longitudinal piece of micropore tape is wrapped around the tip and then back up the other dorsal sidewall. This dressing keeps the tip in the desired position.

A cast or external nasal splint is applied which



Fig. IX: Lateral osteotomy percutaneous approach

keeps the mobile nasal bones in place, protects the nose from external force and prevents excessive swelling. External nasal splint and tape remain in place for 7-14 days.

Following removal of the dressing, the dorsum may tend to migrate back to its deviated position. Gentle nasal massage with correct placement of digital pressure, should be done until nasal bones have achieved greater stability.

### OUTCOME AND PROGNOSIS

Surgical management of the crooked nose is complex. The degree of septal deviation, site of external deformity, nasal valve collapse and tip status will help guide the surgeon to choose the appropriate approach. Properly diagnosing deviating forces and treating them accordingly is imperative.<sup>13</sup>

## CONCLUSION

Correction of the deviated nose is one of the most challenging tasks in rhinoplasty and should be approached in a systematic manner to ensure satisfaction to the patient and surgeon. It should be addressed both aesthetically and functionally. Depending upon site of deviation various techniques can be applied. Preoperative, intraoperative, and postoperative assessment of the patient is equally important to ensure a favorable outcome.

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