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Crooked nose correction: an institutional experience

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ABSTRACT

Background: Crooked noses pose a particular challenge in nasal reconstruction, even for the most experienced of surgeons, as there is inevitably a combination of functional and aesthetic abnormalities which need to be addressed. Crooked nose deformity is a common presentation in the ENT clinic due to raise in the road traffic accidents.
Methods: This was a prospective study conducted in the Department of ENT, GMCH. All the cases of crooked noses presenting to our department was included in the study. The patients were subjected to a proper history and thorough physical examination. Preoperative nasal analysis was done using photography and nasal endoscopy. The type of intervention for each patient and their outcome was analyzed.
Results: The majority of the crooked nose was due to blunt force trauma sustained during road traffic accidents (RTA) or during physical violence. In all crooked nose with an external deformity, there is an underlying septal deformity. The aim of the surgery is to achieve an aesthetically pleasing and a physiologically functioning nose.
Conclusions: From the present study, we can conclude that the majority of the crooked nose was due to blunt force trauma sustained during road traffic accidents or due to physical violence. Besides having a considerable external deformity, majority of the cases also had functional problems too and this two aspects could be addressed properly by doing a septorhinoplasty.

Keywords: Crooked nose, RTA, Septorhinoplasty, Osteotomy, Extracorporeal septoplasty

INTRODUCTION

The term "crooked nose" is used for all clinical conditions involving deviation of the nasal pyramid from the median line.[1] The nose is one of the most prominent features of the face and even a slight external deviation is noticeable to a discerning eye. Crooked nose is found in clinical practise today as result of road traffic accidents (RTA), physical violence or sports injury.[2]

The consequences of nasal trauma for the patient are severe, in both functionality and aesthetic term and crooked nose deformity also known as deviated nose or scoliotic nose, is one of the most common problems dealt with in ENT emergency.[2,3] The patients usually present with nasal stuffiness, nasal obstruction, or an obvious deformity like a depressed nasal dorsal profile.[2] Still more important than the social aspect of the crooked nose is its psychological impact on the person concerned.[4]

Correction of the crooked nose is one of the most difficult and challenging aspects of rhinoplasty as the main therapeutic problem is essentially the risk of relapse.[5] This depends entirely on the cartilaginous structures of the nasal pyramid, which retain the "memory" of the deviation and tend to revert to the original position over time like a spring.

The objective of the present study is to evaluate the cases of crooked nose and study their etiological factors, functional as well as external deformity and their outcomes after surgical intervention.

METHODS

The present study includes 18 cases of crooked noses who underwent septorhinoplasty in the Department of ENT, GMCH and MMCH, during the period of June 2016 to July 2018. Patients who underwent closed reduction of nasal bone fractures were not included in the study.

The name, age, sex, etiology of crooked nose, onset of deformity (acute vs. chronic) and the type of surgical intervention have been recorded in every case and a detailed history and clinical findings were documented. During clinical assessment, the nose was divided into the upper bony third, the mid and lower cartilaginous thirds, in order to compartmentalize the planned repair, as the management of each third is different.[6]

A diagnostic nasal endoscopy and functional assessment of respiration was done using Cottle's/modified Cottle's in all the cases.

Any co-existing rhinosinusitis was treated conservatively pre operatively. Necessary preoperative investigations for surgery under general anesthesia were done for all cases. Radiological investigations generally advised were radiographs of the nasal bones in frontal and lateral plane. CT scan was prescribed only in case of coexisting head injury to evaluate the cribiform plate.

A set of preoperative and postoperative photographs were taken for all patients which included frontal, right and left profile, right and left lateral, a basal and a helicopter view with the head in the Frankfurt plane.

Surgical technique

All cases were operated under general anaesthesia. After initial evaluation, if only septoplasty with lateral osteotomy was needed, then cases were selected for closed approach. But if cartilaginous vault correction was anticipated, then an open rhinoplasty approach was adopted.

There is no single surgical technique to handle these difficult problems. The surgical steps were applied according to the individual demands of the cases. But the following basic surgical principles were followed:

Incision: Depending on the type of approach either a complete transfixion incision for a closed approach or a mid columellar stair step/inverted V incision combined with a marginal incision was used for the open approach.

Mobilization: Of the skin, periosteum and mucoperi-chondrium/mucoperiosteum.

Septoplasty: the majority of the crooked nose requires extensive septal correction. Deviations and spurs are resected and the septum is brought to the midline and stabilized by using a variety of graft materials and sutures. The septum if mobilized from the anterior nasal spine in case of caudal deviations should always be fixed back to the spine at the end of surgery to prevent post-operative saddling.

Bony deviation: The bony pyramid is mobilized by lateral, intermediate and medial osteotomies (if required). Sometimes multiple osteotomies are done on the convex side at different levels for adequate mobilization of the bony pyramid.

Correction of the profile after straightening the nose: If a hump persists, it can be dissected out. The irregular projecting cartilaginous parts are excised and the bony areas smoothed with the help of a rasp. If any depressed areas are noticed then it is augmented using a suitable graft material, for e.g. septal cartilage, conchal cartilage or rib cartilage.

Tip work: This is tackled at the end to achieve an overall pleasant and harmonious appearance of the entire nose.

Camouflage: This is an invaluable technique and small depressions or irregularities can be easily masked by cartilage grafts, but care should be taken that the existing support structure of the nasal pyramid is preserved.

Extra corporeal septoplasty: In case of grossly deviated cartilaginous septum with multiple angulations and folds, this technique is applied. The whole of the cartilaginous and bony septum is removed as a single piece and taken out. The septum is straightened on the table and an "L" shaped frame is created which is fixed back in a dorso - caudal fashion to the nasal bones and the maxillary spine. The fixation is done after the bony osteotomies (if required) are performed.

Postoperatively all the cases were packed with merocel and a plaster of Paris cast was applied. The merocel was removed on the 3rd to 5th post -operative day and the cast was kept for a minimum of 10 days in the postoperative period.

RESULTS

A total of 18 patients were included in the study during the 2 year period. Majority of the cases were due to extrinsic trauma sustained during RTA (7 cases), physical violence (5 cases), sports injury (3 cases). Only 3 out of the 18 cases did not give any history of extrinsic trauma, out of which 2 cases were developmental and one was a postoperative septoplasty case.

All the patients belonged to the age group between 12 to 45 years with a majority of the cases being male (17 cases).

All cases presented with external deviation of the nose, involving either the bony third (8 cases), the mid cartilaginous portion (5 cases) or both the mid and lower

third (2 cases) or the bony and mid third (3 cases) along with nasal obstruction. Another associated symptom was epistaxis (in c/o acute injury). 3 of the cases who had sustained their injuries a couple of years back also complained of recurrent epistaxis. On doing a diagnostic nasal endoscopy, it was seen that these bleeding generally occurred from the nasal spurs present in these patients. In 2 of these cases, nasal synaechiae involving unilateral or both nostrils were also present. Only 4 patients were treated using the endonasal approach while the rest underwent open rhinoplasty procedures. Out of the 14 cases of open rhinoplasty, 4 cases underwent extracorporeal septoplasty. The most common post-operative complications were peri orbital oedema and ecchymosis and this was seen with both the open and closed approach. It was observed that the post-operative oedema persisted for a longer duration in the open approach than that of the closed approach. One patient developed post-operative pleural effusion after a rib cartilage harvest. The patients were usually discharged on the 7th to 10th postoperative day.

Table 1: Level of deviation in crooked nose.

Level of deviation	No. of cases	%
Upper	8	44.44
Middle	5	27.77
Upper and middle	3	16.66
Middle and lower	2	11.11
Total	18	100

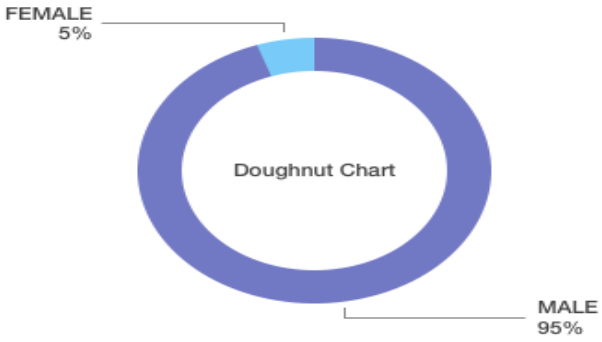

Figure 1: Sex ratio of cases under study.

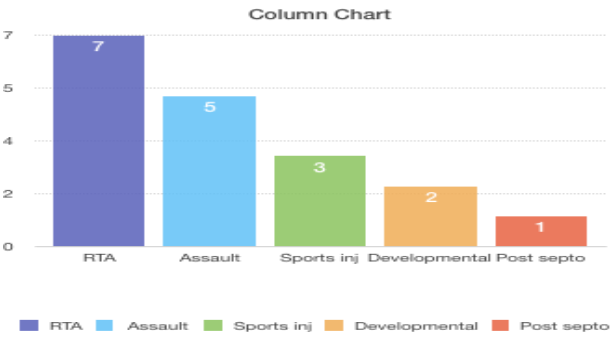

Figure 2: Illustrating the etiological factors.
Sprt inj: sport injury, Post septo: post septoplasty.

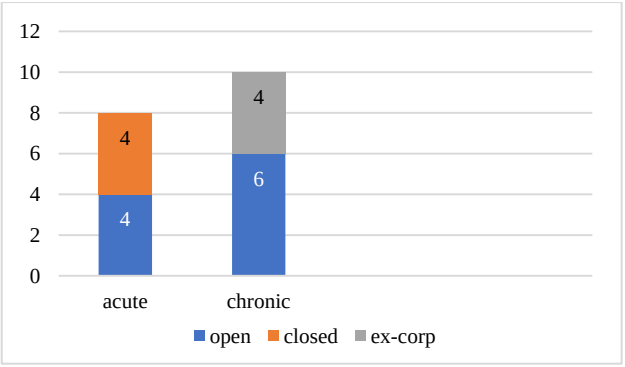

Figure 3: Stacked bar diagram illustrating the type of approach according to the time of presentation of injury.
Ex-corp: extra corporeal septoplasty.

Figure 4 (A and B): Preoperative and postoperative (after 6 months).

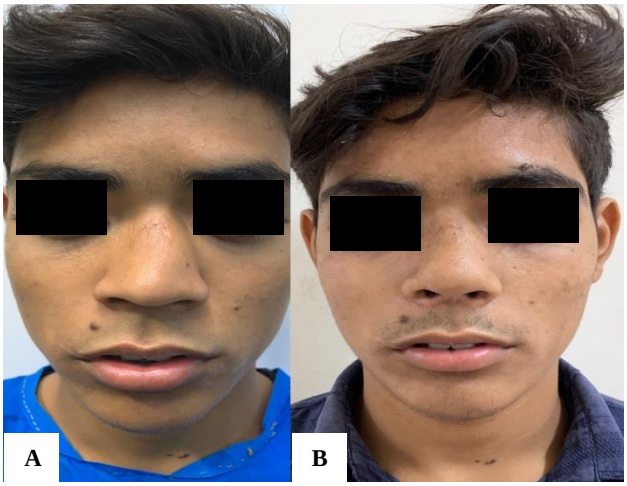

Figure 5 (A and B): Preoperative and postoperative (after 3 weeks).

DISCUSSION

Ellis and Gilbert defined a crooked nose as one that is displaced from the midline plane of the face without any loss of the supporting skeletal framework.[7] A twisted nose frequently leads to a functional impairment.[8]

Majority of the cases were male, due to trauma sustained during RTA, physical violence or as a result of sport related injury.[9] This data is consistent with results of the previous demographic and epidemiologic study conducted on the Asian nose.[10]

The crooked nose may be secondary to a recent event or to years of scarring and contraction following previous trauma. Nasal bones are the most commonly fractured bones in the face and the underlying factor for crooked nose.[11] Neglected or partially reduced nasal fracture usually result in a crooked nose with surface irregularities and depressions requiring reoperations in as high as 50% cases.[12-15] A trauma in childhood, may influence the later development of the nose causing deviation due to misdirection of growth centre.[16] Birth trauma during normal labour or forceps assisted delivery may cause deviated nose and septum. A genetic element also cannot be ruled out as in many families, it is seen that the child/children share similar nasal appearance with the parent.

Ironically, septorhinopasty or SMR operations may also unintentionally produce crooked nose.[17] We had one such case who had undergone a previous septoplasty operation 6 years back who presented with nasal blockage and crooked nose. Granulomatous disorders of the nose, atrophic rhinitis, some benign and malignant intranasal lesions, autoimmune disorders or cocaine abuse may also contribute to crooked nose.[18,19] Before proceeding for any cosmetic corrections in such cases, the underlying condition should be diagnosed properly and treated accordingly.

A detailed history is followed by a precise nasal analysis using photographs, clinical examination and diagnostic nasal endoscopy.

The symmetry and balance of the facial aesthetic units should be evaluated. It is very important to balance the nose against any asymmetry of the face. Another important factor to be considered is the skin type. Indians typically have Fitzpatrick type IV/V skin. In a thin skinned patient, nasal tip surgery results are more prominent, although there is always a risk of graft show. In thick skinned persons although graft works are well camouflaged, results of tip work cannot be well appreciated by the patient.

The external examination of the nose should include examination of the nasal pyramid for its size, shape and length of the nasal bones. The examination should then be directed towards the nasal tip to determine the thickness of the lower lateral cartilages and also the tip support mechanism by careful palpation. The columella is then palpated to assess the resistance of the caudal segment and if cephalic trimming can be safely carried out. The nasal base should be evaluated for caudal septal deviation, prominent or displaced anterior nasal spine and to study the nasal tip support.

External examination determines the deviation– bony, cartilaginous or both. Other associated features like dorsal hump, dorsal saddle or collapsing nasal ala should also be noted. External deviation of the nose is invariably associated with an underlying septal deviation. The septum can be deviated to varying degrees and in extreme cases, it can be impacted against the lateral nasal wall pushing the cartilaginous vault laterally. An anterior rhinoscopy examination is carried out to determine the type of deviation and to assess the nasal mucosa and any underlying nasal pathology. A Cottle's/modified Cottle's test should be performed to evaluate functions of the internal nasal valve and to assess nasal valve collapse.

The internal nose should also be inspected by a 0^{o} nasal endoscope. A thorough preoperative endoscopic examination is helpful in management and prevention of future embarrassment when a nasal obstruction is present even after an apparently successful septorhinoplasty operation.

Preoperative photographs are an important diagnostic tool and prove extremely valuable in case of litigations.

The approach for septorhinoplasty must be chosen after careful considerations of the external nasal deformity that must be addressed. Although there is still an ongoing debate about open vs. closed rhinoplasty, the rhinoplasty surgeon must be adept in both approaches.[20] Endonasal rhinoplasty has a steeper learning curve and GMCH being a teaching hospital, the majority of our cases employed an open approach.[21] The open approach allows the surgeon to better diagnose the deformity through inspection, to better execute certain manoeuvres, and to teach and learn the operation with greater ease.[21] It may also be that revision rates for primary open approach are less than those for closed rhinoplasty.[22] Extra corporeal septoplasty technique first described by Galloway and Fomon and popularised by Prof Wolfgang Gubisch is an excellent way for correcting severely deviated or angulated cartilaginous septum. This has a steep learning curve, as the whole of the bony and cartilaginous septum is mobilised and removed in one piece. It is straightened out on the table and then the straightened septum is reinserted into the nose. The two point fixation of the septum to the nasal bones and the maxillary spine has to be maintained, otherwise it will give rise to a supra tip depression, which is a common complication of this technique.[23]

CONCLUSION

Crooked nose correction is one of the challenges faced by the Rhinoplasty surgeons due to the rise in RTA's in the modern world. Septorhinoplasty as a treatment for crooked nose addresses both the functional as well as the aesthetic component. Only correction of the external deviation does not afford functional relief to the patient. As ENT surgeons are routinely performing septoplasty operations, combining it with rhinoplasty gives a better

overall result. Though the basic surgical steps remain the same, modifications are required according to individual need and surgical expertise. We should always look to make incremental improvements while addressing the external deformity. A proper preoperative counseling and a realistic level of expectation in both the surgeon and the patient can give a satisfactory result in most of the cases. Experience and maturity of the surgeon goes a long way in fashioning a desirable outcome.

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