Research Article

Utilization of Caudal Septal Cartilage in Management of Crooked Nose Deformity

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Abstract

Background: Crooked nose deformity is abnormal deviation in both bony and cartilaginous parts caused by either trauma or congenital defects. It is a cause of psychological concern to the patient as nose is of prime importance in facial appearance. Rhinoplasty is a critical surgical procedure in this regard, often requiring cartilage grafts for structural support.

Objective: The objective of the study is to share our experience of using caudal septal cartilage graft for correction on crooked nose deformity and assess in terms of patient reported outcomes, which are considered gold standard as they are paramenters for one's quality of life.

Methodology: This retrospective study was conducted at Plastic and Reconstructive Surgery Department Mayo Hospital Lahore from year 2015 to 2020. All patients with crooked nose deformity were included. All data regarding their preoperative functional and cosmetics details were collected and recorded. Syndromic patients, patients with emotional instability and patients having multiple comorbidities were excluded. An open tip approach for rhinoplasty was used. Patients were followed for six months and results were measured using Rhinoplasty Outcome Evaluation Tool pre and post operatively.

Results: Out of a total of twenty four patients, nine were males and fifteen were females. The age ranged from 16 to 34 years. The mean pre-operative rhinoplasty outcome evaluation score was 30.9 and mean post-operative score was 85.0 which was statistically significant (p-value <0.05%). There were minor complications in few patients and none of the patients required major revision surgery.

Conclusion: Caudal septum can be effectively utilized as graft for structural support in the management of crooked nose deformity

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Keywords | Crooked nose deformity, Rhinoplasty, Patient reported outcome, Rhinoplasty Outcome evaluation.

Introduction

Abnormal deviation of bony and cartilaginous nasal pyramid is commonly referred to as "crooked nose" deformity and is a very common presentation to rhinoplasty surgeons.[1] Depending upon the appearance, it can be C-shaped, S-shaped or simply deviated to one side. The most common cause of this deformity is trauma to the nose. As nose is the central part of the face, its deformity assumes prime importance in social relations in addition to barring functional consequences of nasal obstruction symptoms.[2] As a result, patients with crooked nose deformity can fall prey to severe psychological issues. While the challenges of surgical correction remain a formidable task for the surgeon, risk of relapse is also a very common problem.[3] The main reasons for these relapses are related to deforming forces of the cartilaginous structures of the nasal pyramid which retain their memory and exert intrinsic and extrinsic deforming forces.[4]

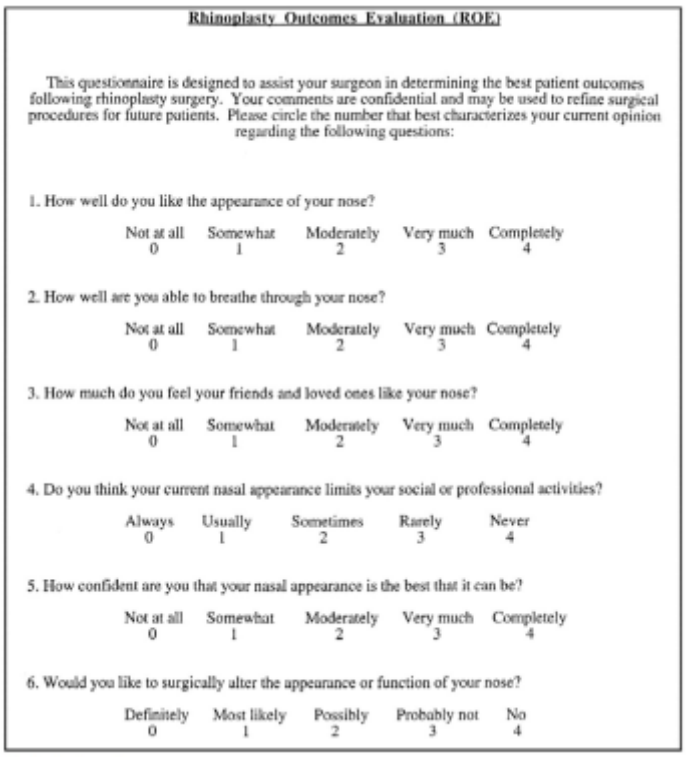
The authors utilize the septal cartilage harvested from

the caudal septum in the form of spreader grafts and septal extension grafts after straightening the septum to achieve a durable solution to deviated nasal septum. In addition, correction of bony dorsal abnormalities with osteotomies and columellar strut graft for tip support are also added. We believe that all those areas of the nose like bony dorsum, cartilaginous septum, columella and nasal tip need to be addressed separately while dealing with crooked nose deformity. In this way, acceptable aesthetic results can be achieved along with improved nasal function. We have been using the rhinoplasty outcome evaluation tool for measuring the outcome of crooked nose surgery in our patients. This study demonstrates the effectiveness of caudal septal resection which can be utilized in the form of spreader grafts, columellar strut grafts and septal extension grafts.

Methodology

Approval from ethical committee was taken prior to start of the study. A retrospective study was performed to assess the outcome of all septorhinoplasty surgeries from the patient's perspective. The study was conducted at Plastic and Reconstructive Department Mayo Hospital Lahore. All patients operated by the senior author from year January 2015 to December 2020 who presented with crooked nose (deviated nasal vault with septal deviation leading to breathing difficulty from the nose) were included in the study. Patients with multiple comorbidities like diabetes, hypertension, Ischemic heart disease and Chronic Obstructive Pulmonary Disease, history of any psychiatric illness, emotional instability, having unrealistic expectations and any intra-nasal pathology like intra-nasal polyp, allergic rhinitis etc. and any syndromic patients were excluded. Also patients with absent or deficient septal cartilage requiring costal cartilage graft reconstructions were also excluded from the study.

All preoperative records of the patients including complete history, psychological background and motivating factors for surgical procedures were recorded. Standardized photographs including frontal, lateral, oblique, and basal views were obtained for every patient. Patients were counseled about pre-operative and post-operative instructions and use of outcome analysis tool i.e Rhinoplasty Outcome Evaluation (ROE) Performa (Figure 1).



Rhinoplasty Outcomes Evaluation (ROE)

This questionnaire is designed to assist your surgeon in determining the best patient outcomes following rhinoplasty surgery. Your comments are confidential and may be used to refine surgical procedures for future patients. Please circle the number that best characterizes your current opinion regarding the following questions:

1. How well do you like the appearance of your nose?

Not at all	Somewhat	Moderately	Very much	Completely
0	1	2	3	4

2. How well are you able to breathe through your nose?

Not at all	Somewhat	Moderately	Very much	Completely
0	1	2	3	4

3. How much do you feel your friends and loved ones like your nose?

Not at all	Somewhat	Moderately	Very much	Completely
0	1	2	3	4

4. Do you think your current nasal appearance limits your social or professional activities?

Always	Usually	Sometimes	Rarely	Never
0	1	2	3	4

5. How confident are you that your nasal appearance is the best that it can be?

Not at all	Somewhat	Moderately	Very much	Completely
0	1	2	3	4

6. Would you like to surgically alter the appearance or function of your nose?

Definitely	Most likely	Possibly	Probably not	No
0	1	2	3	4

Figure 1: *Quality of life instrument.*

All the patients were operated under GA, and open-tip rhinoplasty approach was used in all. After elevation of muco-periosteal flaps, the caudal septum was harvested saving 1cm of dorsal and caudal septum. Straightening of the L-shaped septal cartilage by scoring and addition of spreader or septal extension grafts was carried out. In case the caudal septum was severely deviated, whole of the caudal septum was excised so as to completely straighten the dorsal septum as in extracorporeal reconstruction. Osteotomies for bony dorsum correction and straightening along with columellar strut for tip support were also carried out in all patients. Internal nasal as well as external nasal splintage was applied for 1 week post operatively. Splints and sutures were removed on the 7th post-operative day. Patients were followed up at tenth day, fifteenth day, sixth week and six months post-operatively.

The questionnaire was filled preoperatively and at six months' follow-up in all patients. Each ROE question was graded range from zero to four, where zero is for least satisfaction and four for maximum satisfaction. In order to achieve a range from 0 to 100, the total score of each patient was divided by 24 and multiplied by 100. Thus a range of patients' satisfaction from 0 to 100 can be obtained which is easy to comprehend. All the patients' data were compiled. Outcomes were measured using SPSS version 26.For statistical analysis, paired Student's t test and the Mann-Whitney test were applied.

Student's t test was used to compare preoperative and postoperative scores.

Results

A total of twenty four patients with crooked nasal deformity who satisfied the inclusion and exclusion criteria were assessed. There were nine males and fifteen females. Their age ranged from 16 years to 34 years (mean age 22.6 years). Among these patients, childhood trauma was the most common cause of nasal deformity (15 patients), while five patients believed that the nose was congenitally deformed and four had history of road traffic accident. The mean pre-operative Rhinoplasty outcome evaluation score was 30.9 and mean post-operative score was 85.0 which was statistically significant (p-value <0.05%). Pre and post-operative pictures of a few cases have been shown in Figures 2-4.

Regarding the complications, one patient developed septal hematoma which was drained without any further collection. Two patients complained of increased alar flare post-operatively which was corrected with alar resection under local anesthesia. One patient complained of mild nasal deviation post operatively but he was not willing for revision surgery. None of the patients required major revision.

Pictures of Representative Cases

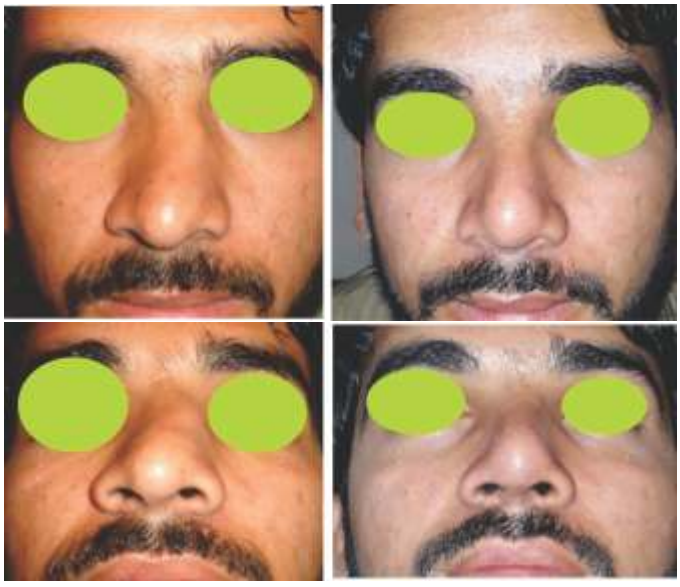


Figure 2: Pre & Post-operative views of patients with severe deviation of bony nasal pyramid. After collection of bony deviation and straightening of septum cartilage was utilized for dorsal cartilage augmentation.

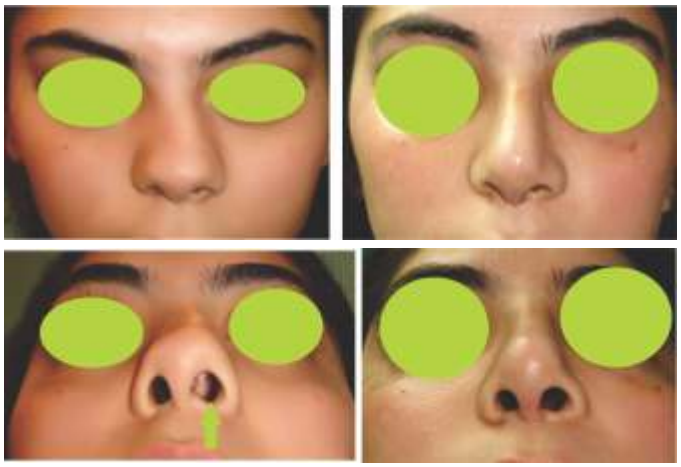


Figure 3: Patient with severe reverse c-shaped deviation pre and post op pictures after correction of deviation.

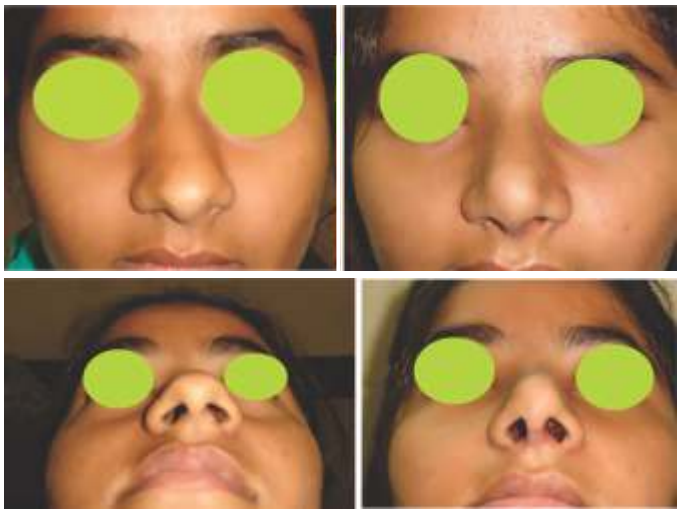


Figure 4: Another patient with severe deviation of cartilagenous and bony structures. Whole pyramid was shifted & stablized using the candle cartilage.

Discussion

Rhinoplasty is perceived as one of the most technically demanding of all cosmetic procedures. Key points for successful rhinoplasty include orientation of goal and comprehensive clinical knowledge, preoperative preparation, precise operative technique, postoperative follow-up, and critical analysis of results. Crooked nose presents a significant challenge to the rhinoplasty surgeons as relapse and reduced patient satisfaction are the most common complaints after surgery. A variety of surgical techniques have been described ranging from septal cartilage straightening, resections, morselization, weakening of the cartilage and extracorporeal reshaping of the nasal septum with varying degrees of success.[5-7]

Another landmark success in treatment of crooked

nose was use of spreader graft originally described by Sheen in 1984 which involved positioning a rectangular shaped cartilage on either side of the dorsal septum.[8] In addition to straightening the septum and preventing relapse, it also proved useful in widening of the internal nasal valve thus improving breathing. Rohrich and many others advocate unilateral spreader graft[9-12] while Guyuron tends to utilize bilateral spreader grafts.[13] The author utilizes septal cartilage harvested from the caudal portion to augment the straightened dorsal septum. In our experience, it gives strength to the septum and prevents any future deviation. As no further cartilage is required, potential donor site morbidity can be avoided in addition to reducing the overall surgical time. In our experience, it causes less post-operative pain decreased complications rate. Only one patient in the study had post-operative hematoma which was managed with simple evacuation.

Using this technique assessment of outcome was our primary objective of study. Patient satisfaction is the new standard of measurement of outcome evaluation post operatively. Outcomes research is a fast-growing field of study that focuses on patient-related aspects of medical or surgical outcomes such as satisfaction and quality of life. In cosmetic plastic surgery, there is deficiency of literature in the field of outcomes based on patient's satisfaction by quantifying the qualitative parameters despite the fact, that patient satisfaction is main target of most facial plastic surgery procedures.[14] Compared to other aesthetic procedures, rhinoplasty patients are less satisfied after surgery. [15]

Rhinoplasty Outcome Evaluation(ROE) questionnaire devised by Alsarraf is an efficient tool for measuring rhinoplasty results.[16] It consists of six questions for physical, emotional and social satisfaction of patients undergoing rhinoplasty.

In our study, mean pre-operative score was 30.9 with mean post-operative score of 85.0 with a difference of 54.1. In contrast Alsaraf et al.,[17] showed mean preoperative score of 38.8 and the mean postoperative score of 83.3, with a mean difference of 44.5 in rhinoplasty patients. Our study results can be compared favorably with the above mentioned studies on crooked nose correction patients. The better results in terms of mean difference may be because of the severe nasal obstruction of the patients pre-operatively in our study group. Arimaet al.[18] conducted a study using endonasal approach and showed mean difference (mean increase in patient satisfaction) of 50.5 between the pre- and postoperative satisfaction scores, with a statistically significant difference ($P<0.01$).

Okur et al.[19] utilized Scion Image program for pre and post-operative frontal view analysis and found that 66.7% of their patient population had good results and claimed significant correction ($p<0.05$) for crooked nasal deformity. The current literature lacks the outcome assessment using Rhinoplasty Outome Evluation (ROE) criteria for crooked nose deformity. The present study is a step towards contribution to literature regarding the said deformity.

Conflict of Interest *None*

Funding Source *None*

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