

# Comparison of Closed versus Open Rhinoplasty in Management of Traumatic Nasal Deformities in Terms of Mean Correction of Nasal Deviation

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## ABSTRACT

**Objective:** To contrast the mean correction of nasal deviation between closed and open rhinoplasty in treating traumatic nasal abnormalities. **Techniques:** An RCT was used. The OPD of ENT Unit-I Allied Hospital, Faisalabad Pakistan enrolled 60 patients matching the inclusion criteria. Both open (Group A) and closed (Group B) rhinoplasties were done at random using the lottery technique. Under GA, the same consultant carried out the surgeries. Patients were monitored for a month in order to address nasal deviations (at post-operative, second and fourth week). Final evaluation was conducted on 28th day. **Results:** In Group A 33.33 percent and in Group B 40 percent patients were between the ages of 41 and 60. In Group A (open approach) 66.67 percent (n=20) and in Group B (closed approach) 60 percent (n=18) were between the ages of 18 and 40. The mean and standard deviation were 35.4+11.02 and 37.53+10.91 years, respectively. Males in group A made up 70 percent (n=21) and of Group B 63.33 percent (n=19), whilst females in group A made up 30 percent (n=9) and in group B 36.67 percent (n=11). The bony component was corrected as 16.00+3.59 in A Group and 10.40+2.59 in B Group, with a p-value of .001, while the cartilage component was corrected as 11.63+1.92 in A Group and 7.40+4.45 in B Group, with a p-value of .0001, indicating a significant difference. **Conclusion:** open rhinoplasty improves mean nasal deviation better than closed rhinoplasty.

**Keywords:** Mean nasal deviation Correction, Open versus closed rhinoplasty, Nasal deformities.

## INTRODUCTION

Fracture nose is the most common facial fracture<sup>1,2</sup> among all age groups<sup>3</sup> due to its prominent location. In literature, the ratio of male to female nasal fractures has been published as 3.1:1.3. The main reasons are Traffic accidents (26.6 percent) and falls (25.5 percent).<sup>4</sup>

In one study, fractures of both nasal bones were the commonest (69.24 percent), followed by fractures of the maxillary frontal process and bony septum 66.89% and 42.25 percent, in that order.<sup>2</sup> Nose trauma treatment depends upon several factors, including the age of the patient, duration since the injury, need for recent versus late manipulation, type of sedation, and method (open vs.

closed manipulation). Septorhinoplasty is a less complicated operative management strategy for an affected nose in days after trauma.<sup>5,6</sup> The combined nasal bone fracture reduction and cosmetic rhinoplasty can be challenging due to the severity of the fracture and skeletal instability.<sup>7</sup>

This study compared closed and open rhinoplasty in managing traumatic nasal deformities regarding mean correction of nasal deviation. Literature has shown that open and closed reduction provide good outcomes in cosmesis and breathing.<sup>8</sup>

## METHODS

It was a Randomized controlled trial. 60 patients fulfilling inclusion criteria were admitted through OPD of ENT Unit-1 Allied Hospital Faisalabad and were enrolled in this study. Study duration was from 1<sup>st</sup> July 2021 to 31<sup>st</sup> August 2023.

Patients with post-traumatic deviated nose aged 18 to 60 years of either gender and moderate to severe traumatic nasal deviation patients were included in this study.

Patients with revision surgery of post-traumatic nasal deformity, pregnant ladies, immunocompromised patients and patients with any malignancy or mental disorder were excluded from the study.

Rhinoplasty was performed randomly using the lottery method in either the open (group A) or closed method (Group B). The same consultant operated on all patients in GA. Additionally, osteotomies had been done in all patients under the skin flap, and the pack was not placed. Their nasal splints were kept till the 21<sup>st</sup> day, but tapings remained for a month. Patients were examined for nasal deviation correction until 4 weeks (post-operative, 2<sup>nd</sup>, and 4<sup>th</sup> week). The outcome was measured on the 28<sup>th</sup> day. The sample size was calculated using pooled variance 12.7 %, 80% power of the study, and 95% confidence level at 5 percent type-I error. p-value of  $\leq 0.05$  was opted significant statistically.<sup>9</sup>

SPSS version 20 was used for data gathering and analysis. For quantitative variables like age, defects of nasal bony and cartilage components (pre and post-operative), and mean corrections Mean  $\pm$  S.D was used. Qualitative data such as gender and severity of deformity (per operational definition) were presented in frequency and percentage. A comparison of corrections of the nasal bony component and cartilage component was done using a non-dependent sample t-test in both study groups to compare the mean correction of nasal deformities between them.

## RESULTS

60 cases in total (in either group 30) were enrolled after fulfilling the criteria of the study for making a comparison of closed versus open rhinoplasty in the treatment of traumatic nasal deformities in terms of mean correction of nasal deviation.

Patients' age distribution was made, and it reveals that in the A Group, 66.67 percent (n=20) and in the B Group 60 percent (n=18) fell in the ages of 18 to 40, while in A Group 33.33 percent (n=10) and in B Group 40 percent (n=12) fell in 41 to 60 years age group, calculation of Mean  $\pm$  SD done as  $35.4 \pm 11.02$  and  $37.53 \pm 10.91$  years respectively. (Table 1)

**Table 1: Age division (n=60)**

Range of Age (years)	A Group (30 =n)		B Group (30=n)	
	Patient count	%	Patient count	%
18-40	20	66.67	18	60
41-60	10	33.33	12	40
Total	(30)	(100)	(30)	(100)
Mean $\pm$ SD	$35.4 \pm 11.02$		$37.53 \pm 10.91$	

Sex division reveals that 70 percent(n=21) in group A and 63.33%(n=19) in group B had been males. 30%(n=9) in group A and 36.67%(n=11) in group B had been females. (Table 2)

**Table 2: Distribution of sex (n=60)**

Sex / Gender	A Group (30=n)		B Group (30=n)	
	Patient count	%	Patient count	%
Males	21	70	19	63.33
Females	9	30	11	36.67

The severity of deformity in both groups was ruled out; it clarifies that 3.33%(n=1) in Group A and 10%(n=3) in Group B were mild, 60%(n=18) in Group A and 60%(n=18) in Group B were intermediate. 36.67%(n=11) in group A and 30%(n=9) in group B had severe deformity. (Table 3)

**Table 3: Severity of deformity in groups (n=60)**

Severity	A-Group (30 = n)		B-Group (30 = n)	
	Patient count	%	Patient count	%
Mild	1	3.33	3	10
Intermediate	18	60	18	60
Severe	11	36.67	9	30

Comparison of closed versus open rhinoplasty in the management of traumatic nasal deformities in terms of mean correction of nasal deviation shows that the nasal bony component was corrected as  $16.00 \pm 3.59$  in group A and  $10.40 \pm 2.59$  in group B, the p-value was .001. In contrast, the cartilage component shows correction as  $11.63 \pm 1.92$  in Group A and  $7.40 \pm 4.45$  in Group B, the p-value came out as 0.0001 demarcating a clear difference. (Table 4).

**Table 4: Comparison of closed versus open rhinoplasty in management of traumatic nasal deformities in terms of mean correction of nasal deviation (n=60)**

Nasal bony component	A-Group (n=30)		B-Group (n=30)		P-value
	Mean	SD	Mean	SD	
Pre-op	18.47	4.75	17.00	5.06	0.256
Post-op	2.47	1.76	6.60	3.16	0.0001
Mean change	16.00	3.59	10.40	2.59	0.0001

Cartilage Component	A-Group (n=30)		B-Group (n=30)		P-value
	Mean	SD	Mean	SD	
Pre-op	18.20	3.97	16.03	5.67	0.09
Post-op	6.57	3.70	8.63	5.20	0.08
Mean change	11.63	1.92	7.40	4.45	0.0001

## DISCUSSION

Nose is the most prominent and fragile structure of the face. It most commonly gets fractured because of its protrusion on face. It depends on multiple risk factors. The nose common causes are traffic accidents and falls from height. Males are more commonly affected with Nasal bone fractures due to high-risk behaviors.<sup>8</sup> Coexistent fractures of the maxilla's frontal process and bony part of septum can also occur. The fracture should be clearly classified and proper diagnosis made before its treatment. Therefore post-traumatic nasal deformity can be treated with rhinoplasty surgery and getting excellent results in rhinoplasty is a real challenge.<sup>10</sup>

According to one study late management (>12 weeks) by open rhinoplasty has more benefits than immediate closed procedure with less risk of revision surgery, better nasal response to external splintage, better chances of correction of nasal dorsum and septal L-strut deviations, blockade at internal nasal valve, and marked bony deviations or deformities.<sup>11</sup>

Another study reported that closed reduction of fractured nasal bones fails without recognizing septal fracture. Complicated fractures of nasoethmoid area are managed via open approach using rigid splintage.<sup>12</sup> Visualization is comparatively far better with open rhinoplasty than closed approach.<sup>13</sup> Another important benefit of open rhinoplasty over closed one is its ability to be used for teaching and education of team members.<sup>14</sup>

However, open rhinoplasty has also its drawbacks. There is more tissue edema. Surgical time consumption is more with open approach and stability of the cartilaginous framework is affected more with open rhinoplasty.<sup>15</sup> Aaron states that closed rhinoplasty should be employed for less complicated deformities while for complex caudal septal and S-shaped dorsal bone deformities open rhinoplasty should be used. The closed approach is favored in patients with thin skin of the nose and markedly projected noses.<sup>16</sup>

## CONCLUSION

Open rhinoplasty is a significantly better technique for managing traumatic nasal deformities than closed rhinoplasty in terms of mean nasal deviation correction. It gives better exposure and opportunity for teaching.

## LIMITATIONS

The study's sample size was relatively small, which may limit the generalizability of the findings.

## SUGGESTIONS / RECOMMENDATIONS

In this study, patients were operated upon at Govt. hospital and no extra funds were required. Open

rhinoplasty is, thus, recommended for the correction of traumatic nasal deformities.

## CONFLICT OF INTEREST / DISCLOSURE

None.

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