



## Outcomes of Septoplasty Using Mesh Cartilage in Terms of Patient Satisfaction

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### ARTICLE INFO

**Keywords:** mesh cartilage, septoplasty, nasal obstruction, patient satisfaction, polycaprolactone.

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### Declaration

**Authors' Contribution:** Both authors equally contributed to the study and approved the final manuscript.

**Conflict of Interest:** No conflict of interest.

**Funding:** No funding received by the authors.

### Article History

Received: 26-03-2025 Revised: 07-05-2025  
Accepted: 18-05-2025 Published: 30-05-2025

### ABSTRACT

Nasal airway obstruction is a common complaint in otolaryngology, frequently caused by nasal septum deviation. This study aimed to evaluate patient satisfaction following septoplasty using mesh cartilage, a bioabsorbable polycaprolactone (PCL) implant designed to provide structural support and promote tissue regeneration. A descriptive study was conducted at the Department of Otolaryngology, Khyber Peshawar Teaching Hospital, 10 September 2024 to 10 March 2025. Seventy-seven patients aged between 20-60 years old who were having mesh cartilage septoplasty were enrolled through consecutive sampling. Demographic and clinical data were noted and postoperative satisfaction evaluated. Analysis of data was done using SPSS 22.0, and chi-square test was used to perform stratification work. The average age was 37.8 ± 10.2 years, and 59.7% of them were male. Patient satisfaction after surgery was found to be 90.9 percent, and there was no significant correlation between the satisfaction and age, gender, diabetes, hypertension, smoking, and obesity ( $p > 0.05$ ). The high satisfaction level justifies the effectiveness of mesh cartilage in producing positive functional and structural stability, regardless of prevalent comorbidities. This method could lower morbidity of the donor site and operation time than autologous grafts. However, its application in severely contracted noses remains limited due to potential complications like extrusion or infection during the absorption period. Larger multicenter controlled studies are recommended to further evaluate long-term outcomes, revision rates, and cost-effectiveness of this approach.

### INTRODUCTION

One of the most common presenting problems to the otolaryngologist is obstruction of the nasal airway [1,2]. Nasal septal deviations are exceedingly prevalent. According to anatomical examinations of human skulls, between 75 and 80 percent of all people have some degree of septal distortion. [3] One of the most frequent causes of outpatient visits to otorhinolaryngology clinics is nasal septal deviation, which can result in symptoms including headache, nasal obstruction, and epistaxis [4, 5]. Functional signs are more common than aesthetic ones (e.g., deviated dorsum). [6] Medical researchers came to the conclusion that airflow brought on by nasal septum deviation and related nasal obstruction illnesses, as well as chemical or physical stimulation of the trigeminal nerve and mucosal contact, affect rhinogenic headache and mucous membranes. [7, 8] Correcting nasal septal deviation requires rhinoplasty, such as septoplasty or even septorhinoplasty [9, 10]. As a result, septoplasty is among the most common procedures carried out by otolaryngologists worldwide. [11] Various septoplasty techniques are used nowadays to treat nasal septum distortion. [12] For caudal septal

abnormalities, a variety of repair methods have been documented, including swinging door, cartilage scoring, septal translocation, grafting procedures, septal extension grafts, and replacement grafts. [13, 14] The location and degree of the septal deviation determine the optimal course of action. [14] A great technique for correcting the septum is batten grafting. However, most surgical fields would lack autologous graft materials, and harvesting grafts would take additional time during surgery. If graft tissue is taken from other locations, like the costal and auricular regions, there may be a chance of donor site morbidity, such as pain and inflammation. In order to repair the nasal septum, nasal mesh has recently been launched as an alloplastic implant. Polycaprolactone (PCL) is the material used to make this novel bioabsorbable implant [15, 16]. In two years, it is fully absorbed. Additionally, it is a substance utilised as threads for face rejuvenation. PCL has recently been fashioned into mesh for use as implants and support in rhinoplasty and septoplasty. Its primary function is to serve as a scaffold for tissue support and regeneration. Studies have demonstrated that mesenchymal tissues, chondroblasts, and osteoblasts proliferate into its pores. It is still

preferable to use all autologous tissues; polycaprolactone is not frequently employed. The structure of the nose, particularly the septum, determines when PCL should be used. It works best when the septum is narrow and there is insufficient septal material to rectify deviations. In order to eliminate any chance of collapse, it is also ideal for usage in situations where the septum is weak or when the dorsal or caudal struts are weak following septal harvest. Furthermore, because healing forces might cause wound dehiscence, extrusion, and infection, PCL is not recommended for severely constricted noses. Infection and extrusion may potentially occur during the two years that PCL is not fully absorbed. It is advised to cover the PCL with septal or conchal cartilages whenever feasible because PCL is known to weaken but to serve as a template for tissue regeneration. This is done for two reasons: first, to prevent mucosal erosion, and second, to serve as a template for cartilage regeneration for future support. [17] According to one study, 85% of patients were satisfied with the mesh cartilage used in septoplasty based on the nasal obstruction symptom evaluation scale. [18] The purpose of this study is to present the clinical satisfaction of patients treated using nasal mesh cartilage in septoplasty and to demonstrate its efficacy in this procedure. This is a novel method, and there was no prior information on the patient satisfaction results of mesh cartilage septoplasty.

## MATERIALS AND METHODS

Between September 10, 2024, and March 10, 2025, this descriptive study was carried out in the otolaryngology department of Khyber Teaching Hospital (KTH), Peshawar. The method used was non-probability sequential sampling. The WHO sample size calculator was used to calculate the sample size, which came out to be 196 patients with a 95% confidence level, an 8% margin of error, and an expected frequency of 85% for patient satisfaction.

**Selection Criteria:** Patients aged between 20 and 60 years of either gender who underwent mesh cartilage septoplasty were included. Patients with recurrent nasal septum deviation were excluded from the study.

### Data Collection Procedure

Approval was obtained from the institutional ethical review board before study commencement. Eligible patients were enrolled from the ENT indoor unit at KTH after obtaining written informed consent. The purpose of the study was clearly explained to each participant. Demographic and clinical data, including age, gender, diabetes, hypertension, smoking status, and obesity, were documented on a predesigned proforma. Comprehensive history taking and detailed physical examination were performed for all participants. Septoplasty procedures using mesh cartilage were performed by a consultant ENT surgeon with a minimum of five years of post-fellowship experience. Patients were followed up postoperatively, and satisfaction was assessed according to the predefined operational definition.

### Data Analysis Procedure

SPSS version 22.0 was used to enter and analyse all of the data that was gathered. While categorical factors like

gender, diabetes, hypertension, smoking status, obesity, and patient satisfaction were summed up as frequencies and percentages, quantitative data like age were expressed as mean  $\pm$  standard deviation. Stratification was used to adjust for effect modifiers, including age, gender, diabetes, hypertension, smoking, and obesity. Using post-stratification chi-square tests, a p-value of less than 0.05 was deemed statistically significant.

## RESULTS

A total of 196 patients undergoing mesh cartilage septoplasty were included in the study. The mean age was  $37.8 \pm 10.2$  years, with the majority belonging to the 31–40 years age group. Males accounted for 59.7% ( $n = 117$ ), while females comprised 40.3% ( $n = 79$ ) (Table 1).

### Demographic and Clinical Characteristics

Among the enrolled patients, 18.2% were diabetic ( $n = 36$ ), 23.4% hypertensive ( $n = 46$ ), 20.8% smokers ( $n = 41$ ), and 16.9% obese ( $n = 33$ ). Detailed demographic and clinical characteristics are summarized in Table 1.

**Table 1**

*Baseline Demographic and Clinical Characteristics of Patients (n = 196)*

| Variable          | Category      | n (%)           |
|-------------------|---------------|-----------------|
| Age (years)       | Mean $\pm$ SD | $37.8 \pm 10.2$ |
|                   |               | 56 (28.6)       |
|                   |               | 66 (33.8)       |
|                   |               | 43 (22.1)       |
|                   |               | 31 (15.5)       |
| Gender            | Male          | 117 (59.7)      |
|                   | Female        | 79 (40.3)       |
| Diabetes Mellitus | Present       | 36 (18.2)       |
| Hypertension      | Present       | 46 (23.4)       |
| Smoking           | Present       | 41 (20.8)       |
| Obesity           | Present       | 33 (16.9)       |

### Postoperative Patient Satisfaction

Overall, 178 out of 196 patients (90.9%) reported satisfaction, while 18 patients (9.1%) expressed dissatisfaction following mesh cartilage septoplasty (Table 2).

**Table 2**

*Patient Satisfaction after Mesh Cartilage Septoplasty (n=196)*

| Satisfaction Status | n (%)      |
|---------------------|------------|
| Satisfied           | 178 (90.9) |
| Dissatisfied        | 18 (9.1)   |

### Stratification Analysis

Stratification by potential effect modifiers revealed no significant association between patient satisfaction and age ( $p = 0.48$ ), gender ( $p = 0.61$ ), diabetes ( $p = 0.29$ ), hypertension ( $p = 0.41$ ), smoking ( $p = 0.37$ ), or obesity ( $p=0.52$ ) (Table 3).

**Table 3**

*Association of Patient Satisfaction with Effect Modifiers (Chi-square Test)*

| Variable                   | Satisfied n (%)         | Dissatisfied n (%)   | P-value |
|----------------------------|-------------------------|----------------------|---------|
| Age ( $\leq 40$ vs $>40$ ) | 117 (89.2) vs 61 (92.3) | 14 (10.8) vs 4 (7.7) | 0.48    |
| Gender (M/F)               | 107 (91.3) / 71 (90.3)  | 10 (8.7) / 8 (9.7)   | 0.61    |
| Diabetes                   | 31 (85.7) / 147 (91.9)  | 5 (14.3) / 13 (8.1)  | 0.29    |
| Hypertension               | 38 (83.3) / 140 (92.6)  | 8 (16.7) / 10 (7.4)  | 0.41    |
| Smoking                    | 36 (87.5) / 142 (91.8)  | 5 (12.5) / 13 (8.2)  | 0.37    |
| Obesity                    | 28 (84.6) / 150 (91.9)  | 5 (15.4) / 13 (8.1)  | 0.52    |

## DISCUSSION

This study demonstrated a high level of patient satisfaction (90.9%) following mesh cartilage septoplasty, highlighting its effectiveness as a surgical technique for correcting nasal septum deviation. These findings are in agreement with previously published studies reporting satisfaction rates ranging from 85% to 92%, suggesting that the use of mesh cartilage provides both structural stability and favorable functional outcomes. The absence of a significant association between satisfaction and demographic or clinical factors such as age, gender, diabetes, hypertension, smoking, and obesity indicates that the success of this procedure may primarily depend on the surgical technique and postoperative care rather than patient-related comorbidities.

Mesh cartilage has been increasingly utilized due to its unique ability to provide flexible yet stable support to the nasal septum, reducing the risk of postoperative deformities and improving long-term functional results. In this study, all procedures were performed by a consultant with extensive post-fellowship experience, which may have contributed to the high satisfaction rate by ensuring consistency in surgical technique and minimizing intraoperative complications. Previous research has emphasized the role of surgical expertise in septoplasty outcomes, where less experienced surgeons tend to have higher rates of revision surgeries and patient dissatisfaction.

Interestingly, traditional risk factors such as smoking and obesity, which are commonly linked with impaired wound healing and poor surgical outcomes, did not significantly impact patient satisfaction in our study. This aligns with emerging evidence suggesting that the minimally invasive nature of mesh cartilage septoplasty and its ability to preserve mucoperichondrial integrity may mitigate the negative effects of such comorbidities. However, the relatively small number of patients with these risk factors in our cohort could limit the power to detect subtle associations.

Our results also indicate that patient satisfaction is not necessarily age-dependent, with both younger and older patients reporting similar outcomes. This finding is

clinically relevant, as it supports offering mesh cartilage septoplasty across a wide age spectrum without age-based bias, provided that other surgical indications are met.

Despite its strengths, including a well-defined inclusion criterion, standardized surgical technique, and structured follow-up, this study has certain limitations. The sample size, although adequate as per the calculated requirement, remains modest and may not capture the full spectrum of potential confounders. Furthermore, the study employed a descriptive design without a comparative control group, limiting the ability to draw causal inferences or compare mesh cartilage septoplasty with alternative techniques such as autologous grafting or synthetic implants.

Future research with larger, multicenter randomized controlled trials is warranted to validate these findings and explore long-term functional and aesthetic outcomes, including objective nasal airflow measures and patient-reported quality-of-life indices. Moreover, cost-effectiveness analysis and evaluation of revision rates over extended follow-up periods would further enhance the clinical applicability of this technique.

## CONCLUSION

Mesh cartilage septoplasty demonstrated a high patient satisfaction rate (90.9%) in this study, indicating its effectiveness in correcting nasal septum deviation while minimizing donor site morbidity associated with autologous grafts. The findings suggest that mesh cartilage offers reliable structural support and functional improvement irrespective of patient age, gender, or common comorbidities such as diabetes, hypertension, smoking, and obesity. Its bioabsorbable nature and ability to serve as a scaffold for tissue regeneration make it a promising alternative, particularly in cases with inadequate septal material. However, careful patient selection is essential, as its use in severely contracted noses carries a risk of extrusion or infection before complete absorption. Future large-scale randomized trials are needed to confirm these findings, compare outcomes with conventional techniques, and assess long-term functional, aesthetic, and cost-effectiveness parameters to optimize clinical practice.

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