

Nasal Dorsum Augmentation with Diced Cartilage Grafts Wrapped in Scarpa's Fascia

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ABSTRACT

Background: Diced cartilage grafts wrapped in fascia are used for nasal dorsal augmentation to restore dorsal volume and improve nasal contour. Scarpa's fascia may provide alternative wrapping material for diced cartilage grafts. This study aimed to evaluate the clinical outcomes and complications of nasal dorsal augmentation using diced cartilage grafts wrapped in Scarpa's fascia. **Patients and Methods:** This prospective case series included 15 patients with saddle nose deformity who underwent nasal dorsal augmentation using diced cartilage grafts wrapped in Scarpa's fascia at Fayoum University Hospitals between November 2022 and May 2024. Patients were followed for 6–12 months. Preoperative and postoperative radix measurements were compared, and postoperative complications, physician-rated satisfaction, and patient-reported satisfaction were assessed. **Results:** The mean patient age was 35.1 ± 7.9 years (range, 22–50 years), and 10 patients (66.7%) were male. The mean radix measurement increased from 8.4 ± 0.83 mm preoperatively to 13.4 ± 0.83 mm postoperatively ($P < 0.001$). A palpable dorsal graft occurred in 1 patient (6.7%), while visible contour deformities were observed in 2 patients (13.3%). Donor-site morbidity occurred in 2 patients (13.3%), comprising 1 case of minimal hematoma and 1 case of minimal seroma. No infection, graft resorption, wrapping-related complications, or step-off deformity was observed. Physician-rated satisfaction was excellent in 10 patients (66.7%) and good in 5 (33.3%). Patient-reported satisfaction was excellent in 9 patients (60.0%) and good in 6 (40.0%). **Conclusion:** Nasal dorsal augmentation using diced cartilage grafts wrapped in Scarpa's fascia was associated with a significant postoperative increase in radix measurements and favorable descriptive satisfaction ratings in this small case series. Although the observed complications were limited, the findings should be interpreted cautiously given the small sample size and follow-up duration. Larger comparative studies with longer follow-up are required to further evaluate the safety, durability, and clinical effectiveness of this technique

Keywords: Nasal dorsal augmentation; diced cartilage grafts; Scarpa's fascia; saddle nose deformity; rhinoplasty.

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1. INTRODUCTION

The aesthetic appearance of the nasal dorsum is an important consideration in rhinoplasty. Although dorsal reduction is commonly performed to address a prominent dorsal hump, dorsal augmentation is required in patients with saddle nose deformity. This deformity may result from excessive resection of the nasal dorsum during previous rhinoplasty, trauma, congenital abnormalities, or other causes of structural nasal support loss [1,2].

The choice of cartilage graft material depends on the required volume, structural support, and availability of donor tissue.

Septal cartilage is frequently preferred because it is relatively straight, provides structural support, and can often be harvested during septoplasty. Conchal cartilage, which is more curved and flexible, may be useful for selected contouring procedures, whereas costal cartilage can provide a larger volume of graft material when required [3].

Diced cartilage grafts are used in dorsal augmentation to address contour irregularities and restore dorsal volume. They may be placed as free diced cartilage or wrapped in a suitable soft-tissue material. Dicing cartilage allows it to be shaped to the desired contour, while wrapping may facilitate graft handling and placement. Various wrapping materials and graft configurations have been described; however, outcomes may vary according to the graft material, surgical technique, and patient characteristics [4,5].

Daniel described the use of autologous deep temporal fascia as a wrapping material for diced cartilage in rhinoplasty [4]. Antohi et al. described chondrofascial grafts incorporating conchal cartilage and retroauricular fascia [6]. Cerkes et al. reported the use of diced cartilage wrapped in rectus abdominis fascia for nasal dorsal augmentation [7].

To our knowledge, the use of Scarpa's fascia harvested from the lower abdomen as a wrapping material for diced cartilage grafts in nasal dorsal augmentation has not been previously described. Therefore, this study aimed to evaluate the clinical outcomes and complications of nasal dorsal augmentation using diced cartilage grafts wrapped in Scarpa's fascia in patients with saddle nose deformity.

2. PATIENTS AND METHODS

Study Design and Patient Selection

This prospective case series included 15 patients who presented with saddle nose deformity to the Plastic Surgery Outpatient Clinic at Fayoum University Hospitals, Fayoum, Egypt, between November 2022 and May 2024. All patients underwent nasal dorsal augmentation using diced cartilage grafts wrapped in Scarpa's fascia harvested from the lower abdomen.

Inclusion Criteria

- Patients aged 18 years or older.
- Patients with saddle nose deformity of any etiology.
- Patients without extensive scarring of the nose or lower abdomen.

Exclusion Criteria

- Patients younger than 18 years.
- Patients with extensive scarring of the nose or lower abdomen.
- Patients with recent nasal trauma or active nasal infection.
- Patients with uncontrolled diabetes mellitus, a bleeding tendency, or receiving anticoagulant therapy.
- Patients with psychological instability.

Preoperative Assessment

Preoperative evaluation included a detailed history of the onset, course, and duration of the saddle nose deformity, as well as any previous surgical procedures involving the nose or lower abdomen. Clinical examination of the nose and lower abdomen was performed to assess the deformity and the suitability of the donor site. Routine preoperative laboratory investigations included a complete blood count, coagulation profile, liver function tests, and kidney function tests.

Surgical Technique

All procedures were performed under general anesthesia. An inverted V-shaped transcolumellar incision was made, followed by dissection of the nasal skin and soft-tissue envelope using the open rhinoplasty approach. A dorsal nasal pocket was created to accommodate the graft.

Cartilage was harvested from the nasal septum in all patients, with additional conchal cartilage harvested in six patients. Septal deviation, when present, was corrected during the same procedure. The harvested cartilage was diced into approximately 1-mm pieces using a No. 11 scalpel and collected in a 1-mL insulin syringe.

A sheet of Scarpa's fascia was harvested through a small incision in the lower abdominal crease. The fascia was fashioned into a sleeve around the insulin syringe and secured with Vicryl sutures. The diced cartilage was introduced into the fascial sleeve through the syringe, after which the sleeve was closed with Vicryl sutures.

After completion of the planned rhinoplasty steps, the wrapped graft was introduced into the dorsal pocket using two pull-

out Vicryl sutures. These sutures were initially passed through the skin over the upper radix and then attached to the upper end of the wrapped graft to facilitate its positioning within the dorsal pocket. Excess diced cartilage was expressed through the lower end of the fascial sleeve, which was subsequently secured with Vicryl sutures. The lower end of the graft was fixed to the underlying soft tissue or cartilage to minimize displacement.

Multiple Steri-Strips were applied transversely over the nasal dorsum and over the two pull-out sutures at the forehead. Nasal packs were removed after 48 hours, and nasal splints were removed after one week. The two pull-out sutures were cut at skin level.

Postoperative Follow-up and Outcome Assessment

Patients were followed postoperatively for 6–12 months.

Radix Measurement

Radix measurements were recorded in millimeters before and after surgery. The measurement was defined as the distance from the level of the corneal surface at the medial canthus to the nasion. Preoperative and postoperative measurements were compared to evaluate the change in radix height following dorsal augmentation.

Postoperative Complications

Postoperative complications were assessed and documented during follow-up, including palpable dorsal grafts, visible contour deformities, donor-site complications, infection, graft resorption, wrapping-related complications, and step-off deformity.

Satisfaction Assessment

Physician-rated and patient-reported satisfaction with the postoperative nasal appearance was categorized as excellent or good. Physician-rated satisfaction reflected the clinical assessment of the postoperative nasal contour, whereas patient-reported satisfaction reflected the patient's subjective perception of the aesthetic outcome. No validated satisfaction questionnaire was used.

Statistical Analysis

Data were analyzed using the Statistical Package for the Social Sciences (SPSS), version 22 (IBM Corp., Armonk, NY, USA). Categorical variables were summarized as frequencies and percentages, whereas continuous variables were expressed as means and standard deviations. An independent-samples t-test was used to compare continuous variables between two independent groups, and one-way analysis of variance (ANOVA) was used for comparisons among three independent groups. A paired-samples t-test was used to compare preoperative and postoperative radix measurements. A two-sided P value of less than 0.05 was considered statistically significant.

Ethical Considerations

The study was approved by the Research Ethics Committee of the Faculty of Medicine, Fayoum University, Egypt (Approval No. R 263). The study was conducted in accordance with the applicable institutional ethical requirements.

3. RESULTS

Demographic and Preoperative Characteristics

The study included 15 patients with saddle nose deformity. The mean age was 35.1 ± 7.9 years (range, 22–50 years). Ten patients (66.7%) were male and five (33.3%) were female. Primary rhinoplasty was performed in 13 patients (86.7%), whereas two patients (13.3%) underwent secondary rhinoplasty. The etiology of saddle nose deformity was congenital in nine patients (60.0%), traumatic in four (26.7%), and related to previous dorsal hump excision in two (13.3%). Cartilage was harvested from the nasal septum alone in nine patients (60.0%) and from both the nasal septum and concha in six patients (40.0%) (Table 1).

Table (1): Description of demographic and preoperative clinical characteristics among study group.

Variables	Number (n=15)	
	Mean ± SD	Median (Range)
Age (years)	35.1±7.9	36 (22-50)
Sex	No.	%
Male	10	66.7%

Female	5	33.3%
Type of rhinoplasty		
Primary	13	86.7%
Secondary	2	13.3%
Etiology of saddle nose		
Congenital	9	60%
Traumatic	4	26.7%
Post hump excision	2	13.3%
Site of cartilage harvesting		
Nasal septum	9	60%
Nasal septum & Concha	6	40%

Graft Dimensions and Radix Measurements

The mean dimensions of the diced cartilage–fascia grafts were 17.5 ± 6.8 mm in length, 6.9 ± 0.8 mm in width, and 5.0 ± 0.76 mm in height. The mean preoperative radix measurement was 8.4 ± 0.83 mm, increasing to 13.4 ± 0.83 mm postoperatively. This increase was statistically significant ($P < 0.001$) (Table 2, Figure 1).

Table 2. Graft dimensions and preoperative and postoperative radix measurements.

Variables	Number (n=15)	
	Mean $\pm$ SD	Median (Range)
Diced cartilage- fascia graft dimensions (mm)		
Length	17.5 ± 6.8	19(2-24)
Width	6.9 ± 0.8	7(5-8)
Height	5 ± 0.76	5(4-6)
Radix measurement (mm)		
Preoperative	8.4 ± 0.83	8(7-10)
Postoperative	13.4 ± 0.83	14(11-14)
p-value	<0.001*	

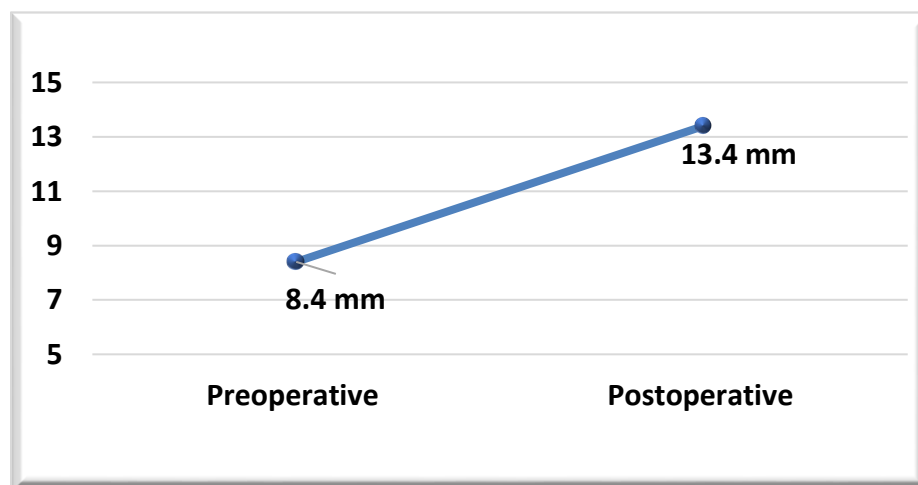


Figure (1): Pre and postoperative mean radix measurement (mm) in the study cases.

Postoperative Complications

During postoperative follow-up, one patient (6.7%) developed a palpable dorsal graft, and two patients (13.3%) exhibited visible contour deformities. Donor-site morbidity related to Scarpa's fascia harvesting occurred in two patients (13.3%), comprising one case of minimal hematoma (6.7%) and one case of minimal seroma (6.7%). No cases of infection, graft resorption, wrapping-related complications, or step-off deformity were observed (Table 3).

Table (3): Frequency of postoperative complications among study group.

Variables	Number (n=15)	
	No.	%
Infection	0	0%
Resorption	0	0%
Visible contour deformity	2	13.3%
Palpable dorsal graft	1	6.7%
Wrapping-related complications	0	0%
Step- off deformity	0	0%
Scarpa's fascia donor site morbidity	2	13.3%
Types of Scarpa's fascia donor site morbidity		
Minimal hematoma	1	6.7%
Minimal seroma	1	6.7%

Physician-Rated and Patient-Reported Satisfaction

Physician-rated satisfaction was classified as excellent in 10 patients (66.7%) and good in five (33.3%). Patient-reported satisfaction was classified as excellent in nine patients (60.0%) and good in six (40.0%) (Table 4, Figure 2).

Table 4. Physician-rated and patient-reported satisfaction.

Variables	Number (n=15)	
	No.	%
Physicians' satisfaction		
Excellent	10	66.7%
Good	5	33.3%
Patients' satisfaction		
Excellent	9	60%
Good	6	40%

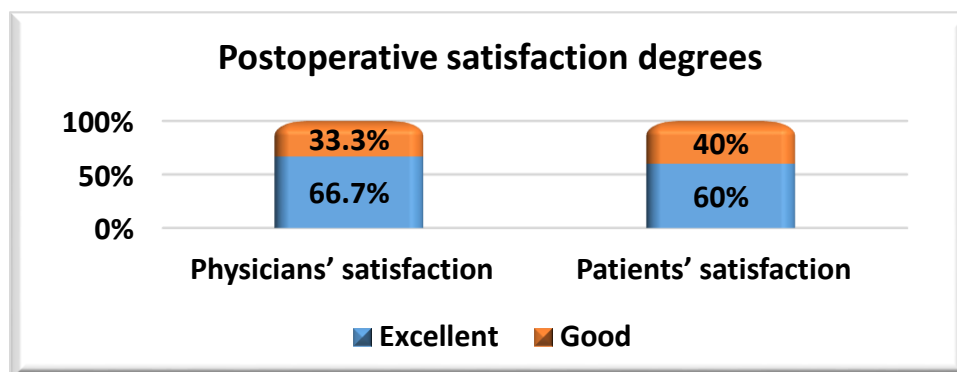


Figure (2): Postoperative satisfaction degrees.

Comparison of Postoperative Radix Measurements

No statistically significant differences in mean postoperative radix measurements were detected according to sex ($P = 0.19$), type of rhinoplasty ($P = 0.28$), etiology of saddle nose deformity ($P = 0.14$), or cartilage harvesting site ($P = 0.32$) (Table 5).

Table (5): Comparison of postoperative Radix measurement in different demographic and clinical characters among study group.

Variables	Postoperative Radix measurement Mean ±SD	p-value
Sex		
Male	13.2±0.92	0.19
Female	13.8±0.45	
Type of rhinoplasty		
Primary	13.3±0.85	0.28
Secondary	14±0	
Etiology of saddle nose		
Congenital	13.6±0.53	0.14
Traumatic	12.8±1.3	
Post hump excision	14±0	
Site of cartilage harvesting		
Nasal septum	13.2±0.97	0.32
Nasal septum & Concha	13.7±0.52	

Figure 3. Preoperative, intraoperative, and six-month postoperative photographs of nasal dorsal augmentation using diced cartilage grafts wrapped in Scarpa's fascia.

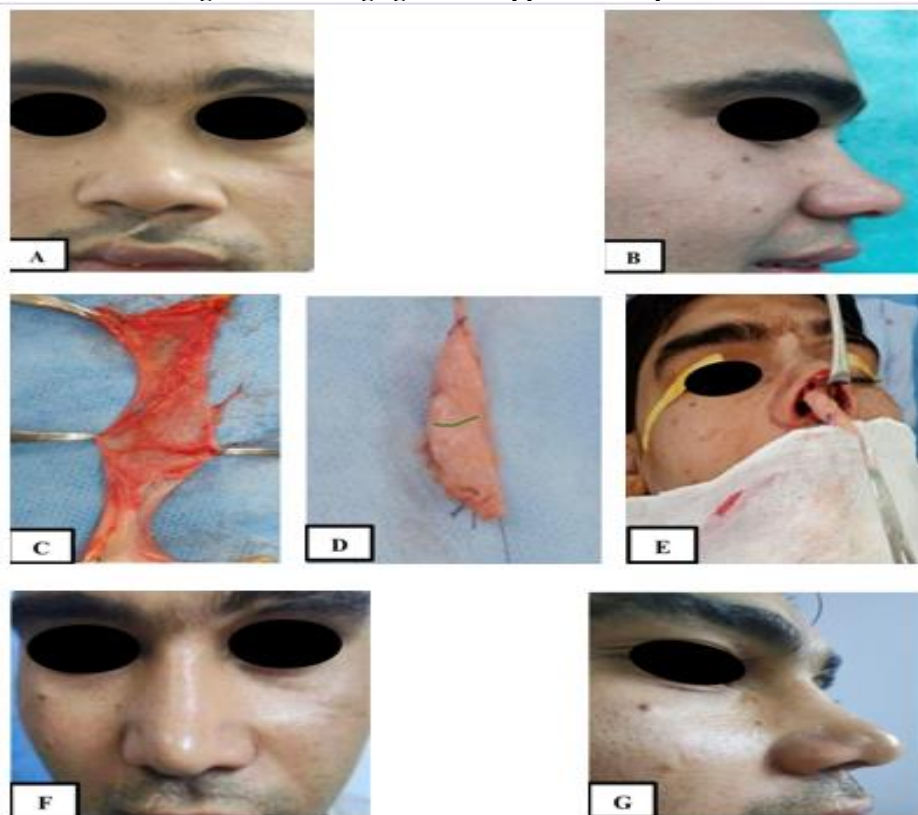


Figure 3. Preoperative, intraoperative, and six-month postoperative photographs of nasal dorsal augmentation using diced cartilage grafts wrapped in Scarpa's fascia. (A) Preoperative frontal view; (B) preoperative lateral view; (C) harvested Scarpa's fascia; (D) diced cartilage grafts wrapped in Scarpa's fascia; (E) insertion of the wrapped graft into the dorsal pocket using two pull-out sutures; (F) six-month postoperative frontal view; (G) six-month postoperative lateral view.

Figure 4. Preoperative and postoperative clinical photographs demonstrating the aesthetic outcome following nasal dorsal augmentation using diced cartilage grafts wrapped in Scarpa's fascia.

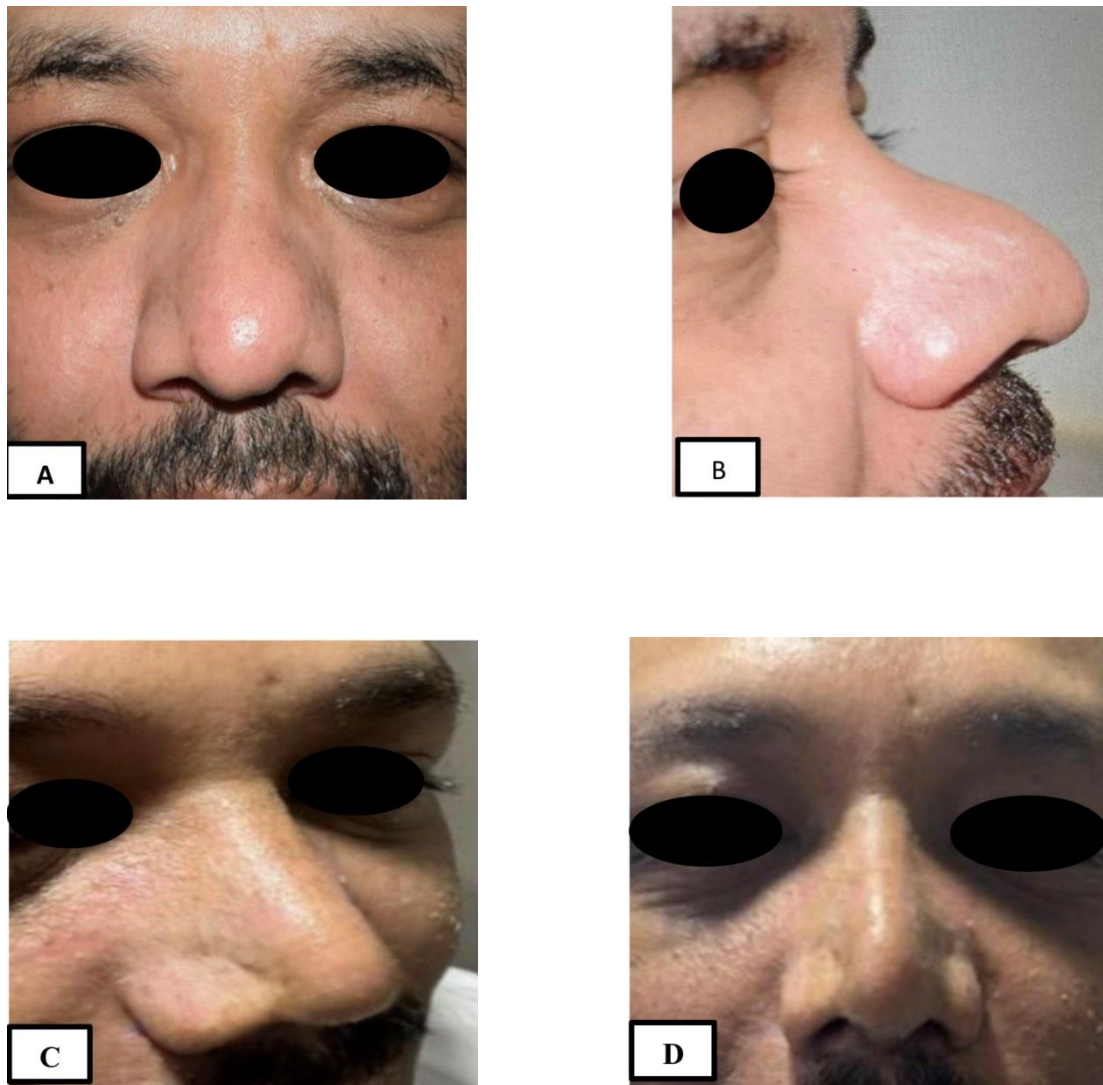


Figure 4. Preoperative and postoperative clinical photographs demonstrating the aesthetic outcome following nasal dorsal augmentation using diced cartilage grafts wrapped in Scarpa's fascia. (A) Preoperative frontal view; (B) preoperative lateral view; (C) one-month postoperative oblique view; (D) six-month postoperative frontal view.

4. DISCUSSION

Peer described the use of diced cartilage grafts in 1943, introducing an approach that subsequently became an established option in rhinoplasty [8]. Diced cartilage grafts offer flexibility in shaping and adapting the graft to the recipient site; however, potential limitations include postoperative palpability, visibility, and contour irregularities. Various wrapping materials have therefore been investigated to facilitate graft handling and improve dorsal contour.

In 2000, Erol popularized the use of diced cartilage wrapped in Surgicel, a technique known as the Turkish delight [9]. Subsequent experimental and histological investigations examined the survival and tissue characteristics of diced cartilage grafts [10,11]. These studies contributed to the broader understanding of graft behavior, although their findings should not be interpreted as direct comparative evidence establishing the superiority of one wrapping material over another.

Several alternative wrapping techniques have been described. Cerkes and Basaran reported nasal dorsal augmentation using diced cartilage wrapped in rectus abdominis fascia [7]. Campiglio et al. described dorsal augmentation using diced conchal cartilage wrapped in retroauricular fascia [12]. Kim and Kim reported nasal reconstruction using diced rib cartilage wrapped in double-layer tensor fascia lata in a patient with severe dorsal collapse [13]. These techniques illustrate the range

of autologous tissues that may be used to wrap diced cartilage grafts. The choice of material may depend on the required graft volume, tissue availability, surgical considerations, and potential donor-site morbidity.

In 2021, Keyhan et al. published a systematic review and meta-analysis evaluating complications associated with autogenous diced cartilage wrapped in fascia for nasal dorsal augmentation [14]. This review provides broader context for evaluating the clinical application of fascial wrapping techniques. Nevertheless, the results of the present study should be interpreted as observations from a small prospective case series rather than evidence of superiority over alternative techniques.

Scarpa's fascia has also been investigated in nasal surgery. Oh et al. reported its use in secondary rhinoplasty [15]. In addition, Valença-Filipe et al. investigated the physical properties of Scarpa's fascia, providing information relevant to its potential use as a fascial graft material [16]. These publications provide a rationale for considering Scarpa's fascia in reconstructive applications. To our knowledge, the present study evaluates its specific use as a wrapping material for diced cartilage grafts in nasal dorsal augmentation.

In the present prospective case series, 15 patients with saddle nose deformity underwent nasal dorsal augmentation using diced cartilage grafts wrapped in Scarpa's fascia. Congenital deformity was the most common etiology, accounting for nine patients (60.0%), followed by traumatic deformity in four patients (26.7%) and deformity following dorsal hump excision in two patients (13.3%). Cartilage was harvested from the nasal septum alone in nine patients (60.0%), whereas six patients (40.0%) required additional conchal cartilage. These findings describe the clinical characteristics of the study population and the cartilage sources used in this series.

The mean radix measurement increased from 8.4 ± 0.83 mm preoperatively to 13.4 ± 0.83 mm postoperatively, with a statistically significant difference ($P < 0.001$). This finding indicates that the procedure was associated with an increase in the measured radix height during the follow-up period. However, the absence of a control group prevents direct comparison with other graft-wrapping techniques or conclusions regarding comparative effectiveness. Furthermore, the sample size and follow-up period of 6–12 months limit conclusions about long-term graft stability and resorption.

Regarding postoperative complications, one patient (6.7%) developed a palpable dorsal graft, and two patients (13.3%) developed visible contour deformities. Donor-site morbidity occurred in two patients (13.3%), comprising one case of minimal hematoma and one case of minimal seroma. No infections, graft resorption, wrapping-related complications, or step-off deformities were observed during follow-up. Although these findings are encouraging, the small sample size limits the precision of the estimated complication rates and does not exclude the possibility of uncommon adverse events.

Physician-rated satisfaction was classified as excellent in 10 patients (66.7%) and good in five (33.3%). Patient-reported satisfaction was classified as excellent in nine patients (60.0%) and good in six (40.0%). These findings indicate that satisfaction ratings were generally favorable in this series. However, satisfaction was categorized as excellent or good without a validated outcome questionnaire; accordingly, these results should be interpreted descriptively.

An additional consideration is the suitability of Scarpa's fascia as a donor tissue. In this study, the fascia was harvested from the lower abdominal crease. Donor-site complications consisted of one minimal hematoma and one minimal seroma. Patients with extensive lower abdominal scarring may not be suitable candidates if reliable fascial harvesting is compromised. Extensive nasal scarring may also affect the feasibility of dorsal pocket preparation and graft placement.

This study has several limitations. First, the sample size was small and the study was conducted at a single institution. Second, the absence of a control group precludes direct comparison with alternative graft-wrapping techniques. Third, follow-up was limited to 6–12 months, which may be insufficient to evaluate late graft resorption, long-term contour stability, and revision surgery. Finally, satisfaction was not assessed using a validated patient-reported outcome measure. Larger comparative studies with standardized outcome assessments and longer follow-up are required to evaluate the reproducibility and long-term performance of this technique.

5. CONCLUSION

Diced cartilage grafts wrapped in Scarpa's fascia may represent an alternative option for nasal dorsal augmentation in selected patients with saddle nose deformity. In this prospective case series, the technique was associated with a significant increase in radix measurement, favorable descriptive satisfaction ratings, and limited observed donor-site morbidity. Harvesting Scarpa's fascia from the lower abdominal crease may offer an alternative donor site for fascial wrapping; however, the present study does not establish superiority over other wrapping materials.

The technique may be unsuitable for patients with extensive scarring of the nose or lower abdomen that compromises graft placement or reliable fascial harvesting. The potential use of diced costal cartilage wrapped in Scarpa's fascia in patients

with severe saddle nose deformity warrants further investigation. Larger comparative studies with longer follow-up and standardized outcome measures are needed to assess long-term graft stability, resorption, complications, aesthetic outcomes, and revision rates.

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