


A comparative study on the effects of intranasal silicone splints and silastic sheets on breathing post septal surgeries

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Abstract

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Background: Septoplasty is a surgical procedure to straighten the bone and cartilage dividing the space between your two nostrils (septum). If septoplasty is performed alone or as a part of a rhinoplasty procedure, internal nasal splints are generally used.

Objective: To compare silicone nasal septal splints with integral airways and silastic sheets after septal surgery in terms of patient breathing (with the splint in place).

Patients and Methods: This study involved 50 patients who underwent septal surgery in terms of septoplasty or septo-rhinoplasty due to nasal septal deviation. They were allocated into two groups. Group A comprised 25 patients who underwent septal surgery and were packed with silicone nasal septal splints. Group B comprised 25 patients who underwent septal surgery and were packed with silastic sheets. They were removed on the seventh postoperative day. Clinical efficacy was compared using visual assessment and patients' subjective breathing status.

Results: The patients in both groups A and B had similar mean ages: 27.8 years (range, 18-51 years) and 25.84 years (range, 18-48 years) in Group A and Group B, respectively. The study included 58% males and 42% females. The type of surgery were septoplasty and septorhinoplasty in 38% and 62%, respectively. Breathing status was significantly lower in Group A than in Group B at the 7th postoperative day ($p < 0.004$).

Conclusion: Intranasal septal splints with silastic sheets result in less nasal obstruction while in place; thus, they can be used as an effective alternative to silicone nasal splints with integral airways after septal surgery.

Keywords: Septal surgery, silicone splint, silastic sheet

Introduction

The nose is a complex organ that forms an important part of the face and has multiple functions. The principal physiological function of the nose is to humidify and warm inspired air, as well as to remove noxious particles from the air, thus protecting the

delicate distal lower respiratory tract. The nose also serves as a sense organ, housing the olfactory apparatus that allows individuals to smell substances for pleasure and defense purposes[1]. The nasal septum is a mucosa-covered bony and cartilaginous structure

located in the rough midline of the nose that separates the right nostril from the left nostril[2].

The nasal septum is composed of a small anterior membranous portion, the quadrilateral cartilage, the perpendicular plate of the ethmoid, the vomer, and the nasal crests of the maxilla and palatine bones[3].

The nasal septum serves many functions, including separation of the nasal airway into two nasal cavities, support of the nasal dorsum, maintenance of the nasal tip, and forms part of the nasal valves[4].

Nasal septal deviations can be congenital, developmental, or secondary to trauma. About 50% of the general population is thought to have some deviation in their nasal septum, and most of these are asymptomatic. Symptomatic patients will often present with nasal obstruction, with or without external deformity, and can also present with nasal drainage, a decreased sense of smell, difficulty sleeping, dryness, epistaxis, and pain. If the deviation is severe, it can impinge on the turbinates, lateral nasal wall, and middle meatus, and can predispose patients to recurrent and/or chronic sinusitis. Surgical correction should be considered in appropriate patients with chronic symptoms related to a deviated nasal septum that are significantly affecting their quality of life[5].

Occasionally, epistaxis requires a septoplasty for control, particularly if the bleeding is coming from beneath or posterior to a septal spur or the deflection precludes endoscopic visualization of the bleeding vessel. Epistaxis is more common on the obstructed side of the nose, where the drying

effects of unhumidified air impact more directly upon the septum[6].

The septoplasty operation has evolved from simple cartilage manipulation to the current more complex procedures, which are often combined with surgery on the turbinates and valves. Septoplasty corrects structural deformities of the nasal septum to help relieve nasal obstruction. When combined with rhinoplasty, the procedure may help to straighten the deviated nose and may provide cartilage grafts[7,8].

In general, septal surgery should conserve skeletal support through the strategic restructuring of deviated elements, rather than endanger it through the reckless excision of vital structural components. If septoplasty is performed alone or as part of a rhinoplasty procedure, it is recommended that a septal splint be placed. When positioning the septal splint, a through-and-through suture is placed using an absorbable material such as 4-0 PDS. The purposes of the nasal splint are as follows:

1. To prevent the formation of hematomas by approximating the septal mucosa on both sides.
2. To help the re-epithelialization of the mucosa when it is damaged during surgery.
3. To keep the mucosa moist during healing.
4. To prevent synechia formation between the septum and the turbinate.

If the septal splint is fixed too tightly and kept over one week, secondary septal mucosal perforation can occur. Thus, excessive compression and prolonged placement of septal splints should be avoided[9].

Patients and Methods

Study protocol

A prospective, non randomized, observational study was conducted on the patients who had undergone septoplasty or septo-rhinoplasty.

The study was held in the otolaryngology department at Rizgary Teaching Hospital in Erbil, Iraq, from January 2021 to March 2022. The study sample consisted of 50 patients who required septal surgeries in terms of septoplasty or septo-rhinoplasty. The patients were divided into two groups based on the type of nasal splint used postoperatively, with lumenized silicone splints placed in group A and silastic sheets were placed in group B.

Study population

The inclusion criteria were:

- 1-All patients who require septoplasty or septo-rhinoplasty.
- 2-Age group above 18 years.

While the exclusion criteria were:

- 1-Patients with other causes of nasal obstruction, like chronic sinusitis, nasal tumors, and polyposis.
- 2-Patients with previous septal surgeries.

Study Design

A detailed history, anterior rhinoscopy, and endoscopic nasal examination were conducted on each patient prior to surgical intervention to determine the type of septal deviation, condition of the nasal mucosa, and any associated nasal pathologies.

The surgical procedure was carried out by different senior otolaryngologists under general anesthesia. The closed technique of septoplasty involves a hemi-transfixion incision within the nasal mucosa, whereas the

open technique involves a trans-columellar incision.

At the end of surgery, lumenized silicone splints were placed bilaterally in group A, while silastic sheets were inserted bilaterally in group B Figure (1). All patients were prescribed analgesics, antibiotics, and nasal irrigation postoperatively and were followed up for seven to ten days to assess the patency of the nasal airway. On the day of the splints' removal, the patients' airway patency was assessed by recording the patients' subjective breathing status in each nostril together with a visual assessment of the splints' lumen and nasal cavity for any secretions or crusts causing nasal obstruction.

Statistical Analysis

For statistical purposes, specific numerical descriptive scores were allocated for each patient depending on the side of nasal obstruction and subjective breathing status to identify the level of significance between the two studied groups Table (1).

In our study, the SNOT-22, NOSE, and VAS scales were not used, simply because these scores only describe the severity rather than the side of nasal obstruction; however, our study demonstrated unilateral vs. bilateral nasal obstruction correlating with the visual assessment of the splints' lumen and the nasal cavity of the same side in order to compare the clinical effectiveness of each type of nasal splint on patients' nasal airway patency. The data was collected by using a paper questionnaire containing information obtained from the patients' history and clinical examination after receiving written consent from the patients who agreed to participate in the study.

By using the statistical package for social sciences (SPSS) program version 26 on Microsoft Windows 10, data will be entered, coded, and analyzed using Pearson's chi-square to determine the association between

the type of nasal splint and the breathing scores of the patients. Level of significance (P value) ≤ 0.05 considered significant, and ≤ 0.001 considered highly significant.



Figure (1): Silicone and silastic nasal splints

Table (1): Breathing scores for nasal airway patency

Subjective breathing score	Nasal airway patency
0	Bilateral obstruction
1	Unilateral obstruction
2	Bilateral patent airway

Results

Age distribution

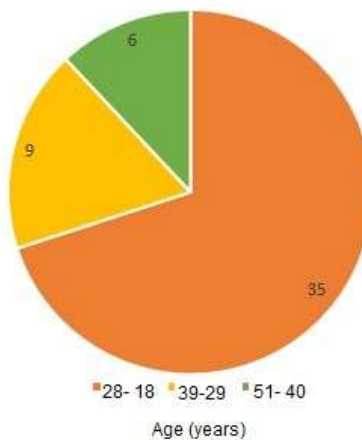


Figure (2): Patients' age groups

The range of age groups was from 18 to 51 years with a majority of distribution between

18-28 years (70%) . The mean age was 26.82 with a standard deviation of 8.55.

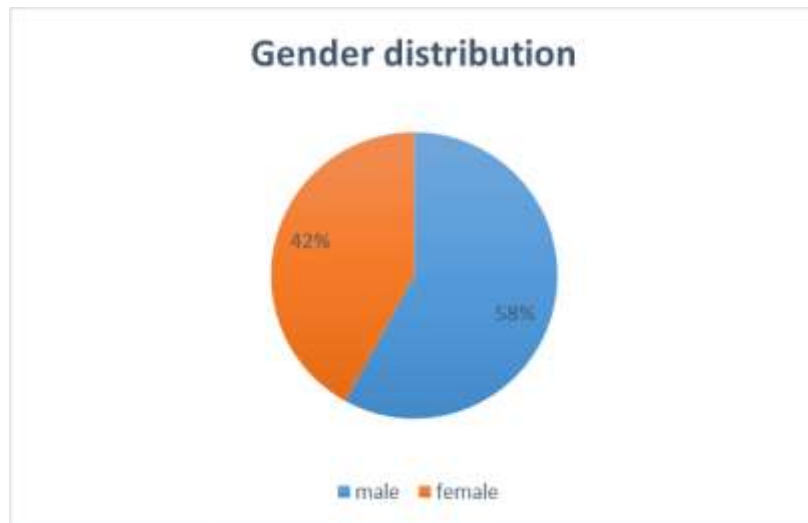


Figure (3): Patients' gender distribution

There was a male gender preponderance with a total percentage of 58% as compared to

42% of female gender.

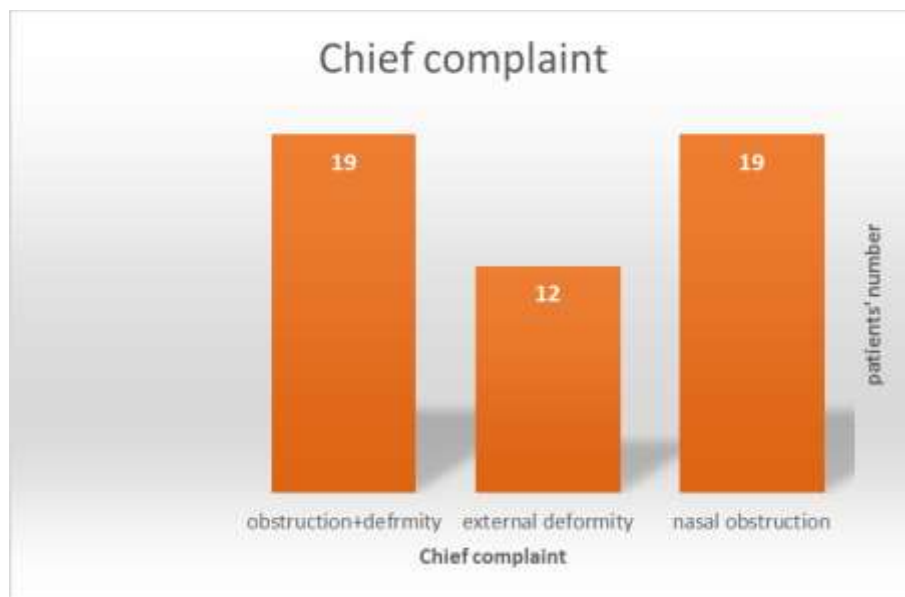


Figure (4): Patients' preoperative chief complaint

The main complaint of the patients was nasal obstruction with a total number of 38 patients

(76%) with only 12 patients complaining of solely external nasal deformity .

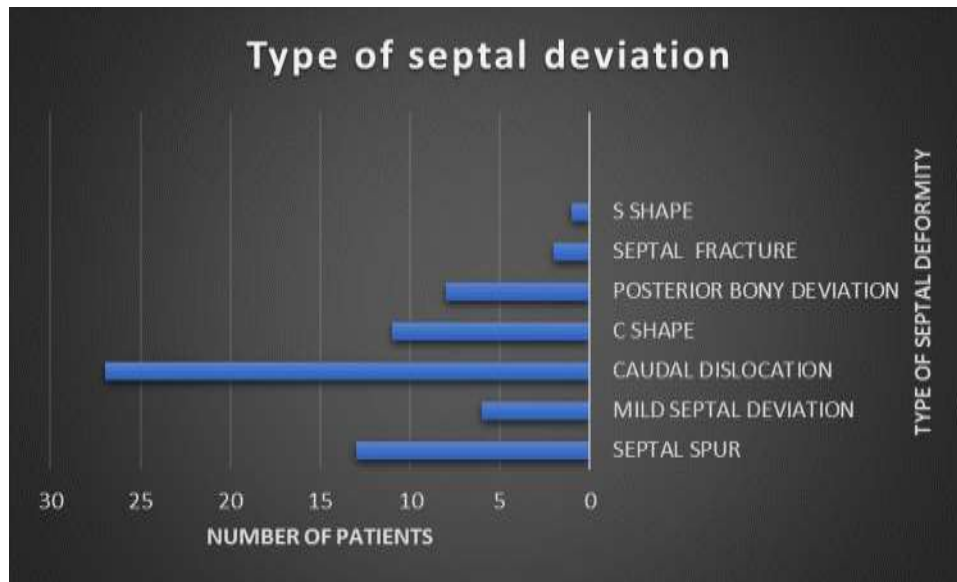


Figure (5): Preoperative type of nasal septal deviation

The main type of septal deviation was caudal dislocation, either alone or combined with another deviation type, with a total of 27 patients. Septal spurs were the second most

common type, accounting for 13 patients. The least common types were an S shape in one case and septal fractures in two cases.

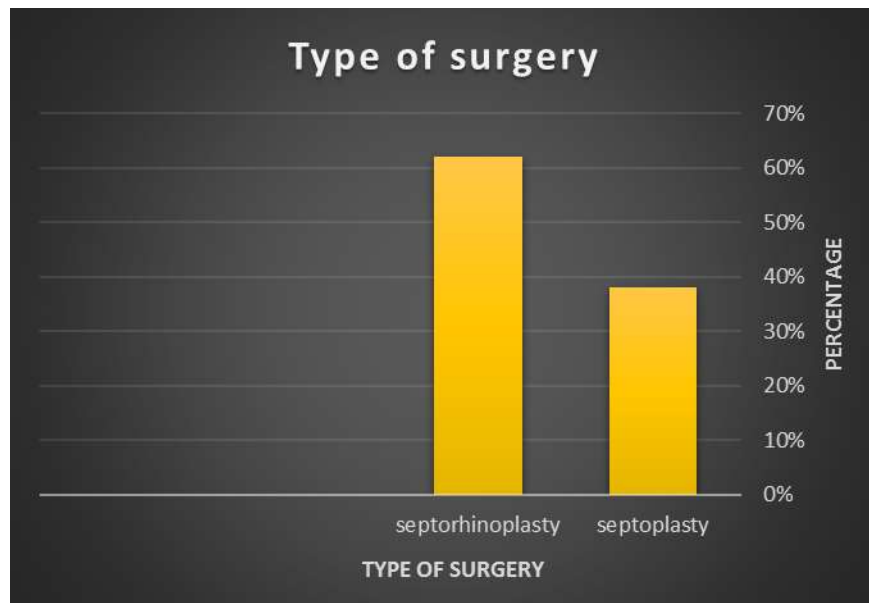


Figure (6): Type of septal surgery

Septo-rhinoplasty was performed in 62% of cases while 38% of cases had undergone septoplasty alone

Table (2): Postoperative breathing scores according to the type of splint

Postoperative Brathing Score	Silicone Splint Group	Silastic Sheet Group	P value
0	18 (72%)	7 (28%)	
1	2 (8%)	10 (40%)	0.004
2	5 (20%)	8 (32%)	
Total	25 (100%)	25 (100%)	

The table above shows that 18 patients in the silicone group were unsatisfied and complaining from bilateral nasal obstruction as compared to 7 patients only in the silastic group. On the other hand, 8 patients were highly satisfied by having bilateral patent airway in the silastic group in contrast to only 5 patients in the silicone group. The P value was 0.004, so there was a highly significant difference between the two groups.

Discussion

In our study, the mean age of the patients was 26.82. This could be explained by the fact that the majority of septorhinoplasty patients are in their twenties. In a study conducted by Dal (10), the mean age was 35.1; this unmatched result may be due to the fact that Dal used a larger sample size along with the inclusion of endoscopic sinus surgery in his study. Most (11) reported a mean patient age of 41.5 years, which differed from our study results, most likely due to his study's inclusion of revision cases. Regarding the gender distribution, the results of our study showed a male preponderance of 58%. This could be explained by the fact that males are more liable to trauma than females, which results in more cases of nasal obstruction and external deformities requiring surgical intervention. These findings were similar to the findings in Most [11] in which 66% of the participants were

males. This gender distribution was also the same in the study by Bakshi *et al* [12] with a 69% male predominance.

The chief complaint in our study was nasal obstruction, whether as the only complaint or combined with external nasal deformity. This could be attributed to that most patients with external deformity also complain of some degree of nasal obstruction. These findings were similar to those in Ersozlu *et al.* [13], in which the main complaint was nasal obstruction, although septorhinoplasty cases were not included in their study.

Concerning the type of septal deviation, in our study the most common observed type was caudal dislocation, either alone or combined with another type of deviation, and this may be explained by the fact that a caudally dislocated septum is the most visible type of deviation externally. In a study conducted by Abu El Wafa *et al.* [14], C-shaped septal deviation was the most common type. This could be related to racial factors together with the fact that they included only cases of septo-rhinoplasty due to external nasal deformity, which is more visible in C-shaped septal deviations.

Mild septal deviation cases were included in our study with a total number of six; all of these cases underwent septorhinoplasty, and the nasal septum was used to harvest cartilaginous grafts for cosmetic reshaping.

This number was higher in the study by Abu El Wafa *et al.* [14] with a total of 20 cases, which can be related to a larger sample size as compared to our results.

In terms of surgical intervention, whether septoplasty or combined septorhinoplasty, the majority of cases in our study (62% were operated on with septorhinoplasty versus 38% who had septoplasty alone) were operated on with septorhinoplasty.

One of the reasons is that many patients with nasal obstruction also have external nasal deformity, and undergoing a one-stage septorhinoplasty to correct both problems would be the best choice for such patients due to revision difficulties and increased financial burdens, together with the increasing general trend for septorhinoplasty nowadays. Despite that, we still have 38% of the patients who underwent septoplasty alone, and this is either due to the financial cost of the septo-rhinoplasty or simply because these patients were just seeking for their nasal obstruction to be relieved and they were satisfied by their own external nasal shape, especially in the older age groups. In a study done by Seghers *et al.* [15], the main surgical intervention was also septorhinoplasty, with a total percentage of 72.8% compared to 28.2% with septoplasty alone. These findings were similar to those in our study, despite the larger sample size of 534 patients and the larger range of age groups between 16 and 74 years in the mentioned study.

In our study, the breathing scores were calculated in the first postoperative week by using the patient's own subjective breathing status description and visual assessment of the nasal cavity and splints' lumen after their

removal. In the silastic sheet group, the score was 26 as compared to 12 in the silicone group, and there was a highly significant difference between the two groups in terms of postoperative breathing. Kridel *et al.* [16] reported that hard, thick, commercially available nasal splints with airway tunnels hurt patients going in and coming out; in addition, they often get clogged, and there have been no scientific studies validating their efficacy. They advocate the use of hand-cut, soft, transparent, 0.02-inch-thick splints hand-sized from Silastic sheets, as these splints are more readily available in hospitals, can be easily made intraoperatively, and avoid adding an extra financial burden to the patients by buying the lumenized silicone splints. These findings were the same as the results of our study, which showed that there was a significant improvement in postoperative patients' breathing in the silastic group. This could be related to clogging of the splint airway by the patients' blood, mucus secretions, and dry crusts postoperatively, together with the bulkiness of the splint in relation to the size of the nasal cavity.

Conclusions

This study demonstrates that patients' breathing was significantly better after septal surgeries when silastic sheet splints were used postoperatively as compared to silicone splints, although the latter have an airway lumen for breathing.

Recommendations

Silastic sheet nasal splints are recommended after septal surgeries as an effective alternative for lumenized silicone nasal splints.

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Ethical clearance: This study was approved by the Ethics Committee of Hawler Medical University, College of Medicine. Both verbal and written informed consents were obtained from all participating patients. The patients were informed about the study's objectives, and they could withdraw from it if they wished to do so.

Conflict of interest: Nil

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دراسة مقارنة على تأثير القوالب السيليكونية داخل الأنف و صفائح السيلاستيك على التنفس بعد العمليات الجراحية للحاجز الأنفي

أسامة صبيح جاسم^١ ، د. أرسلان عولا مصطفى^٢

الملخص

خلفية الدراسة: جراحة الحاجز الأنفي هو إجراء جراحي لتقويم العظام والغضاريف وتقسيم المسافة بين فتحتي الأنف (الحاجز). إذا يتم إجراء جراحة الحاجز الأنفي بمفرده أو كجزء من عملية تجميل الأنف ، وتستخدم الجائز الأنفية الداخلية بشكل عام.

اهداف الدراسة: لمقارنة قوالب الحاجز الأنفي المصنوعة من السيليكون مع مجرى الهواء المتكامل و صفائح السيلاستيك بعد جراحة الحاجز الأنفي من حيث تنفس المريض (مع وجود القالب في مكانه).

المرضى والطرائق: تضمنت هذه الدراسة ٥٠ مريضاً خضعوا لجراحة الحاجز الأنفي من حيث رأب الحاجز الأنفي أو تجميل الأنف بسبب انحراف الحاجز الأنفي. تم تقسيمهم إلى مجموعتين. تتألف المجموعة "أ" من ٢٥ مريضاً خضعوا لجراحة الحاجز الأنفي مع تثبيت القوالب المصنوعة من السيليكون داخل الأنف. تتألف المجموعة ب من ٢٥ مريضاً خضعوا لعملية جراحية في الحاجز مع استعمال صفائح السيلاستيك داخل الأنف. تمت إزالتها في اليوم السابع بعد الجراحة. تمت مقارنة الفعالية السريرية باستخدام التقييم البصري وحالة التنفس الذاتية.

النتائج: كان لدى المرضى في كلا المجموعتين أ و ب متوسط أعمار متشابهة: ٢٧,٨ سنة (المدى ، ١٨-٥١ سنة) و ٢٥,٨٤ سنة (المدى ، ١٨-٤٨ سنة) في المجموعة A والمجموعة B ، على التوالي. شملت الدراسة ٥٨٪ ذكور و ٤٢٪ إناث. كان نوع الجراحة رأب الحاجز الأنفي وتجميل الأنف في ٣٨٪ و ٦٢٪ على التوالي. كانت حالة التنفس أقل بشكل ملحوظ في المجموعة أ عنها في المجموعة ب في اليوم السابع بعد الجراحة ($p < 0.004$).

الاستنتاجات: إن قوالب الحواجز الأنفية ذات الصفائح السيلاستيك تؤدي إلى انسداد أقل للأنف أثناء وجودها في مكانها ؛ وبالتالي ، يمكن استخدامها كبديل فعال لقوالب الأنف المصنوعة من السيليكون مع مجرى هوائي متكامل بعد جراحة الحاجز الأنفي.

الكلمات المفتاحية: جراحة الحاجز الأنفي ، قالب سيليكون ، صفيحة سيلاستيك

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