The Effect of Septocolumellar Suture on Tip Plasty in Primary Open Septorhinoplasty

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ABSTRACT

Background: Septocolumellar suture is a key technique in open septorhinoplasty (SRP), serving as a functional replacement for the Pitanguy ligament and superficial muscle aponeurosis system SMAS to maintain nasal tip projection, rotation, and stability. The study intends to test the change caused by septocolumellar sutures on the rotation and projection of the nasal tip by objective examination of the facial measurements.

Methods: This is a prospective study done on 50 patients (34 females, 16 males) aged between 18 and 44 years who have been operated upon primary open SRP with tip modification. Goode's ratio was used to measure the pre and postoperative projection of the nasal tip but nasolabial angle was used to measure the rotation. A baseline, 3 and 6 months postoperative standardized photographs were taken. Paired t-tests were used to analyse the statistics.

Results: Postoperative analysis revealed a statistically significant improvement in both nasal tip projection and rotation ($P < 0.001$). The mean Goode's ratio slightly decreased from 0.63 to 0.61, yet remained within the aesthetically acceptable range. The mean nasolabial angle increased by an average of 9.8°, indicating enhanced tip rotation. These changes were observed in both male and female subgroups.

Conclusion: The septocolumellar suture is an effective method for controlling and stabilizing nasal tip dynamics in SRP. It significantly improves nasal tip rotation and allows for controlled adjustments in projection, leading to better aesthetic and functional outcomes.

Keywords: septocolumellar suture, tip plasty, septothinoplasty, Godde's ratio, tip rotation.

تأثير غرزة الحاجز العمودي على تجميل طرف الأنف في جراحة تجميل الأنف المفتوحة الأولية

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الخلاصة

الخلفية: تُعد غرزة الحاجز والعمود الأنفي (السبتوكولوميلار) تقنية أساسية في عملية رأب الأنف المفتوحة، حيث تعمل كبديل وظيفي لرباط بيتانغي ونظام السمحاق العضلي السطحي (SMAS) للمحافظة على بروز ودوران واستقرار قمة الأنف. تهدف هذه الدراسة إلى تقييم تأثير هذه الغرزة على دوران وبروز قمة الأنف باستخدام قياسات وجهية موضوعية.

الطريقة: أُجريت دراسة مستقبلية على ٥٠ مريضًا (٣٤ أنثى، ١٦ ذكرًا) تتراوح أعمارهم بين ١٨ و٤٤ عامًا خضعوا لعملية رأب الأنف المفتوحة مع تعديل في قمة الأنف. تم تقييم بروز القمة باستخدام نسبة غود (Goode's ratio)، بينما تم قياس الدوران من خلال الزاوية الأنفية الشفوية. تم التقاط صور موحدة للمرضى قبل العملية، وبعد ٣ و٦ أشهر. أُجري التحليل الإحصائي باستخدام اختبار T للعينات المرتبطة.

النتائج: أظهرت التحليلات بعد العملية تحسنًا ملحوظًا من الناحية الإحصائية في بروز ودوران قمة الأنف ($P < ٠.٠٠١$). انخفض متوسط نسبة غود بشكل طفيف من ٠.٦٣ إلى ٠.٦١، لكنه بقي ضمن النطاق الجمالي المقبول. كما ارتفع متوسط الزاوية الأنفية الشفوية بمقدار ٩.٨ درجات، مما يشير إلى تحسن واضح في دوران القمة، وشمل التحسن كلا الجنسين.

الاستنتاج: تُعد غرزة الحاجز والعمود الأنفي تقنية فعالة للتحكم في ديناميكية قمة الأنف أثناء رأب الأنف. حيث تُحسن بشكل كبير من دوران القمة وتتيح تعديلًا دقيقًا في بروزها، مما يُحقق نتائج وظيفية وجمالية أفضل.

الكلمات المفتاحية: تجميل الانف، تجميل قمة الانف، تجميل ارنبة الانف.

INTRODUCTION

Every year, numerous patients undergo rhinoplasty procedures. Facial analysis plays a crucial role in predicting structural deficiencies and guides the formulation of a preoperative strategy to achieve the patient's desired aesthetic and functional outcomes [1-4]. The septocolumellar suture is a major practice in rhinoplasty and the surgeon is able to modify and manipulate the projection, rotation, and stability of the nasal tip, according to what the tripod concept posts as its description [5-7].

The septocolumellar suture serves as a functional substitute for the Pitanguy ligament and superficial muscle aponeurosis system SMAS in open rhinoplasty by restoring tip support and stability. Release of the Pitanguy and SMAS ligament during surgery may compromise nasal tip integrity, leading to loss of structural support [7,8]. The septocolumellar suture is performing well by the interconnection of the medial crura of the lower lateral cartilages with the caudal septum which mainly helps in fixing the tip projection and rotation with preventing the postoperative ptosis. This technique ensures long-term nasal tip stability while allowing for controlled aesthetic refinements [9-11].

Traditionally, the septocolumellar suture is composed of one or two sutures but there exists a debate amongst surgeons of the strength of using three sutures to increase the connection of the medial crura and the caudal septum [10,11]. This study aims to evaluate the impact of the septocolumellar suture on nasal tip rotation and projection following primary open septorhinoplasty.

Comprehensive facial analysis is essential before deciding how to fix the nasal tip abnormality. Changing the shape and size of the nose has a noticeable effect on the rest of the face's appearance. Therefore, surgeons specializing in rhinoplasty must have a firm grasp on facial proportions [12-16].

The normal ranges for the various angles are:

- Nasofrontal (NFr) 115–130 degrees.
- Nasofacial (NFa) 30–40 degrees.
- Nasomental (NM) 120–132 degrees.
- Mentocervical (MC) 80–95 degrees.

Nasolabial (NL) 90-95 degree in male and 95-110 degree in female. [17-22].

PATIENT AND METHOD

Fifty patients, aged between 18 and 44, participated in this study (34 females and 16 males).

Inclusion Criteria

This study research involved all patients who had primary open rhinoplasty with tip plasty of which tip projection and rotation was adjusted with the septocolumelar suture technique.

Exclusion Criteria

- Patients below 18 years
- Revision rhinoplasty
- Congenital anomalies (like micrognathia)
- Chronic medical disease.
- Chronic dermatological diseases.
- Pronounced facial asymmetry.

Ethical Considerations

The patients gave informed consent which was recorded in a paper in ethics with confidentiality (2025133) on 2/7/2025.

Each patient was taken through the proper preoperative history and examined with regard to functional and aesthetic complaints and desires. Routine preoperative nasal examination and investigations included haematological and biochemical investigations for all patients. Every patient had five standard photos recorded before surgery. At three and six months after surgery, the same photos were taken for the follow-up phase. The distance between the camera and the patients is kept constant at around 1 meter. Next, the parameters needed to calculate the rotation and projection of the nasal tip were evaluated, after which important landmarks like the glabella, nasion, alar point, pogonion, columellar point, and subnasale were identified.

Goode's ratio was used in calculating the tip projection since it establishes the right projection. The distance between tip of nose (T) and alar-facial groove(A) in every line drawn should be equal to 0.55 to 0.60 of nasion (N) to nasal tip (AT/NT= 0.55-0.60), figure (1). This ratio does not vary between men and women.

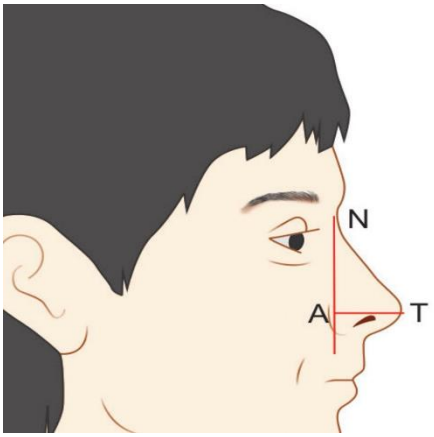

Figure (1) Imaginary lines used to calculate the tip projection by Goode's method [11].

In order to determine the tip rotation, we measured the nasolabial angle. It consists of two lines, one between labrale superius to subnasale and the other between subnasale and the most anterior point of columella in figure (2). Usually, this angle is 90-95 in male and 95-110 in female.

Figure (2) Imaginary lines used to calculate the nasolabial angle [18].

Procedure

Following the completion of the traditional steps in an open septorhinoplasty procedure, the septocolumellar suture is applied. A circular needle with a 5/0 or 4/0 Prolene (Ethicon Ltd, UK) is passed through one crura to the caudal septum. The point of entry to the septum is crucial to the final position of the tip. The suture is then passed again through the other medial crura and the suture is gently tightened to bring both medial crura in close contact to the septum. The result is assessed intraoperatively, and once the desired effect is obtained, the suture is tightened securely in place. Another one or two sutures are applied by the same maneuver (Figures (3) and (4)).

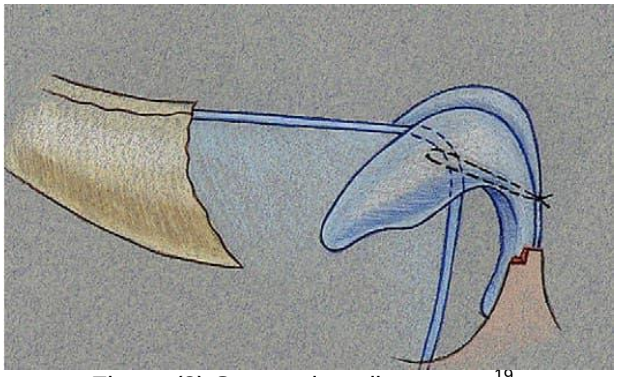

Figure (3) Septocolumellar suture [19].

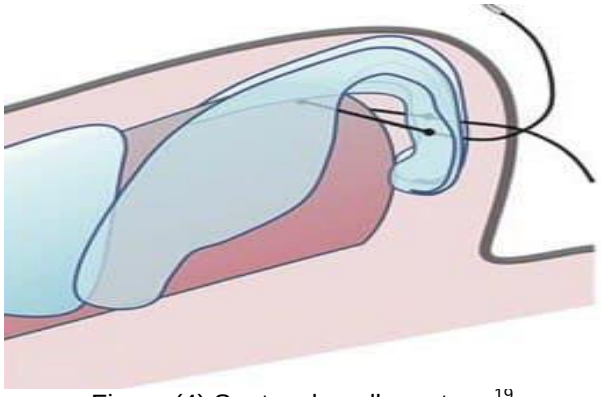

Figure (4) Septocolumellar suture [19].

Follow-up

1. The patients were seen 2 days after the operation and assessed for periorbital ecchymosis, swelling, and the status of the wound. The nasal cavity was examined for any septal hematoma, and the patient is advised for applying cold sponge. Nasal douching and antibiotics were prescribed.
2. The internal nasal silastic splints and external cast are removed after 8 days and periorbital ecchymosis, swelling, wound healing status are assessed in the patients. The nasal cavity was looked up to see the septal haematoma, crust or adhesion. The nose is then taped a month after which saline douching of the patients was advised to continue.
3. The patients were seen and evaluated after 30 days for pain, nasal obstruction, wound healing and functional result.
4. All patients were evaluated again at 3 and 6 months to check for the cosmetic and functional results. Photograph of the nose were taken and clinical examination was conducted to assess patients for tip rotation and projection. Pre- and post-operative photographs are compared regarding tip rotation and projection, Figures (5 and 6).

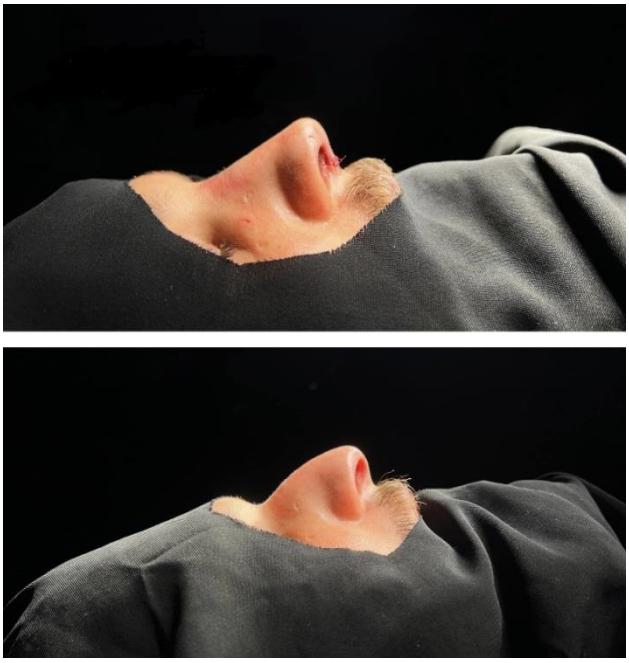

Figure (5) The change of rotation and projection intra operatively by using septocolumellar suture in male patient.

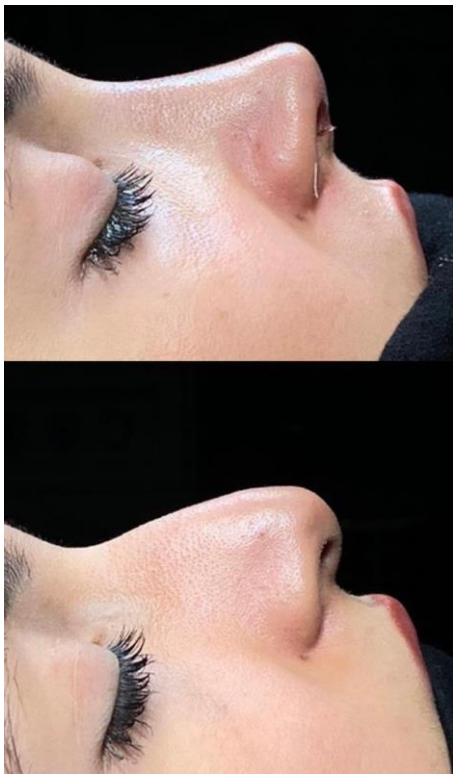

Figure (6) The change of rotation and projection intra operatively by using septocolumellar suture in female patient.

RESULTS

The current study comprised 50 patients aged between 18 and 44 years; 36 are females (72%) while males are 14 (28%) Figure (7).

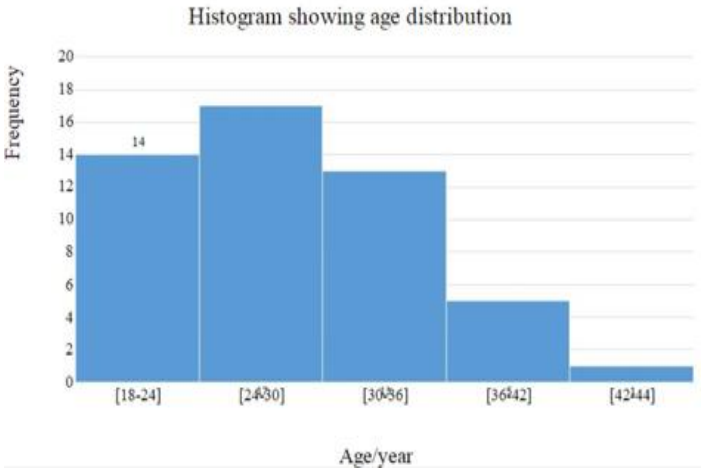

Figure (7): age distribution.

Tip Projection According to Goode's Ratio

The preoperative Goode's ratio is 0.63 ±0.053, whereas the postoperative ratio is 0.61 ±0.030 indicating a significant decrease of tip projection (P-value < 0.001), tables (1) and (2).

Table (1) Nasal projection pre and post operatively according to Goode's ratio for the whole sample.

	Range	**Mean**	**Standard deviation**	**P value**
projection pre operatively	0.52-0.73	0.63	0.053	≤0.001
Projection post operatively	0.56-0.68	0.61	0.030	

Table (2) Distribution of nasal projection according to Goode's ratio values before and after surgery.

Goode's ratio	Patients number and % pre operatively		Patients number and % post operatively	
	No.	%	No.	%
<0.55	4	8 %	0	0 %
0.55-0.60	12	24 %	27	54 %
>0.60	34	68 %	23	46 %
Total	50	100.0	50	100.0

Tip Rotation In Females

The nasolabial angle in the females group before surgery was 91.56 ±5.514 which increased to 100.01 ±5.825 after surgery. This indicates significant improvement of tip rotation in female patient (P-value < 0.001), as shown in tables (3) and (4).

Tip Rotation in Males

The preoperative nasolabial angle in males was 87.11 ±7.16 which increased to 97.88 ±6.21 after surgery. Significant difference is noticed (P-value < 0.001), as shown in tables (5) and (6).

Table (3) Nasal tip rotation according to nasolabial angle in female patients.

nasolabial angle	Range	Mean	Standard deviation	P value
Before surgery	79.52 -108	91.56	5.514	≤0.001
After surgery	86.9-111.4	100.01	5.825	

Table (4) Nasal tip rotation according to nasolabial angle in male patients.

nasolabial angle	Range	Mean	Standard deviation	P-value
Before surgery	72-98.2	87.11	7.16	≤0.001
After surgery	88.03-109	97.88	6.21	

Table (5) Distribution of nasal tip rotation according to nasolabial angle in female patients.

nasolabial angle	Before surgery		After surgery	
	Frequency	%	Frequency	%
<95	28	77.77 %	11	30.56 %
95-110	8	22.23 %	23	63.89 %
>110	0	0 %	2	5.55%
Total	36	100.0	36	100.0

Table (6) Distribution of nasal tip rotation according to nasolabial angle in male patients.

nasolabial angle	Before surgery		After surgery	
	Frequency	%	Frequency	%
<90	9	64.29 %	1	7.14 %
90-95	3	21.43 %	6	42.86 %
>95	2	14.28 %	7	50%
Total	14	100.0	14	100.0

DISCUSSION

The study included 50 cases, 36 of them were females (72%) and 16 were males (28%). The study by Sirinoglu [23] supports this finding, which points to a females predominance. Of the 44 cases he examined, 35 were females, and 9 were male. Women have historically been more drawn to seeking beauty and placing a higher value on aesthetics than men. This explains the higher proportion of women asking for rhinoplasty. The age range of these 50 cases is 18–44, with a mean of 25.32, suggesting that younger patients tend to be the ones who undergo rhinoplasty. This is in line with the findings of Sirinoglu [23] who found an average age of 24.6 years.

Khorasani et al [24] found a reduction of 0.05 in tip projection after surgery, which is consistent with the average reduction of 0.02 in current study. Numbers of participants whose tip projection increased and decreased were 25 (50%) and 23 (46%) respectively looking at the proportion which was calculated in the current study. This aligns with the conclusions of Tezel et al [20] and Mocellin et al [25], who claim that the septocolumellar suture can enhance or reduce tip projection. Sirinoglu [23] asserts that the septocolumellar suture solely enhances tip projection, potentially due to implementing alternative methods for improving tip projection beyond this suture. For deprojected nasal tips, the septocolumellar suture builds the tip up, whereas it can also be used in cases of hyperprojected nose to reduce the tip projection.

With regards to the tip rotation that is defined by the nasolabial angle, the range of preoperative rotation among the males was between 72- 98.2 degree with 64.29 percent recording a reading that is less than 90 degrees, 21.43 percent between 90 and 95 degrees, and 14.28 percent above 95 degrees. The angle postoperatively is between 88.03 and 109 degrees that make up 7.14 percent, 42.86 percent and 50 percent respectively.

The post-op nasolabial angle made the average male turn out an extra 10.77 more compared to the pre-op one.

Before the procedure, 79.77% of females had nasolabial angles below 95 degrees, while 22.23% had angles ranging between 95 and 110 degrees. Postoperatively, the findings in females ranged from 86.9 to 111.4; of these 30.56% were less than 95 and 63.89% were between 95 and 110 degrees, and 5.55% were greater than 110 degrees.

The average increase in the nasolabial angle in females after surgery is +8.45 degrees while the increase in the whole study population including males and females is +9.8 degrees. This is consistent with several other researchers that observed an improvement of 13.4 degrees at follow up of one month and 8.8 degrees at follow up of one year [23-26]. Moreover, with the help of Mocellin et al [25], their work suggests 8.4 increment of nasolabial angle.

CONCLUSION

In the study, the data indicates that septocolumellar suture is a workable reagent in personalizing control of nasal tip projection and rotation, potential in augmentation or reduction procedures, and dependent on the patient-specific anatomy. This is a successful way of enhancing the nasolabial angle by enhancing the rotation of the nasal tip. It also assists in adding and subtracting the projection of a nasal tip within a small range. Limitation of the study is the size of the sample; the study should involve more patients and have a long follow-up, to assess the effect of such an approach and determine the long-term postoperative changes. The other drawbacks of this procedure are that improperly done may cause collumellar retraction. Also, these sutures can be loosened through time.

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Conflict of Interests

There are no conflicts of interest regarding the authors in this paper, as well as any financial and/or non-financial interests.

Ethics Approval

Ethics approval was demonstrative and all the participants of the study were notified of the processes involved and signed informed consent forms. The above study was approved by the local ethical committee.

Authors' Contributions

All the authors participated a great deal in the conception, design, data collection, analysis and writing of the manuscript.

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