

Standardizing Septocolumellar Sutures: A New Practical Classification

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Abstract

The septocolumellar sutures are very helpful to obtain planned rotation and projection. The goal of this study is to revitalize the septocolumellar techniques described before and present an easy new classification for these sutures, and to present their multiple uses on the same patient as a new option for surgeons. Eighty patients were involved in this retrospective study. All the patients were females except one. A detailed preoperative preparation was performed on all patients by following the principles of precision profileplasty. In this study, five main types of septocolumellar sutures were used. Type 4 septocolumellar suture was used in 39 cases, type 3 in 33, type 2 in 22, type 1 in 5, and type 5 in 2 cases. In 21 cases, more than one suture was used. In conclusion, the new practical classification presented in this study gives the surgeon powerful tools to reshape the tip during surgery.

Keywords

- septocolumellar suture
- projection
- rotation
- tip surgery

The septocolumellar (SC) suture passes from the caudal septum and medial crura, which can help the surgeon adjust the rotation and projection. Jacques Joseph, who is accepted as the father of modern rhinoplasty, has first described it as an orthopaedic suture. He has used it as a basic step in rhinoplasty to rotate and project the tip of the nose after the septum has been shortened in droopy tips.¹ In the following decades, a modified orthopaedic suture, straight SC suture, ventral SC suture, and tongue-in-groove sutures were described as additional SC sutures.^{2,3} This versatile suture has been named as projection control suture,⁴ columellar septal suture,⁵ medial crura-septal suture, and tip rotation suture.⁶

As the structural rhinoplasty techniques evolved, SC sutures with columellar strut⁷ or septal extension graft⁸ have become more popular, but unfortunately, the terminology used by our forefathers has been neglected.

The senior author has been using SC sutures for 23 years during rhinoplasty. If the SC suture is planned to be used in rhinoplasty, the senior surgeon has taken five things into account to decide on the type of SC and additional maneuvers: (1) straight and strong caudal septum in the midline

firmly connected to the anterior nasal spine, (2) preoperative relationship between the inner margin of the medial crura with the caudal septum, (3) shape, strength, and anatomy of the lower lateral cartilages, (4) skin thickness, and (5) primary or revision rhinoplasty. The techniques to correct deviations of the caudal septum are beyond the scope of this article.

The main goal of this study is to revitalize the techniques described before and present an easy new classification of SC sutures. To our knowledge, no detailed classification of SC sutures and regarding their multiple uses on the same patient have been published before.

Materials and Methods

Eighty patients who have undergone rhinoplasty from May 2022 to September 2022 were involved in this study. All the operations were performed by two surgeons (F.A. and M.S.) in private hospitals in Izmir and Kuwait. All the patients were females except one. The mean age was 24 years (range: 16–68). It was executed retrospectively according to the guiding principles delineated in the Declaration of Helsinki.

Written consent was provided, by which the patients agreed to the use and analysis of their data.

To establish the results, a detailed count was made of each type of suture for each surgery as well as sex and age were analyzed. Of all patients, one was male, and the rest were females. The most frequent age was 24 years, with a total of 11 cases.

Preop Preparation

After examining the patients, the pictures of all patients were taken in a studio with two strobe flashes. Imaging was performed using three views: frontal, lateral, and basal. The precision profileplasty method was applied on all patients, that is, the profile changes between preoperative and warped pictures were calculated in seven different zones.⁹ The changes in projection and rotation were calculated in millimeters. The distances from the columellar margin and caudal septum were evaluated at the posterior, middle, and anterior septal angle. Besides, the simulated position of the medial crura with the caudal septum was evaluated for the best possible projection and rotation and the difference was noted at the subnasale, columella break point and tip.

Operation

The patients were operated by external and endonasal approaches. In cases where the external approach was used, the tip was exposed first. If deprotection was intended, the Pitanguy ligament and the soft tissues between the medial crura were dissected to expose the caudal septum, and then the dorsum was elevated supraperichondrially. If the projection was intended to be preserved, the intercrural ligaments and soft tissues were left undisturbed or partially excised to reach the caudal septum. In this situation, the caudal septum was put under exposure by pulling the lower lateral cartilages downward. Most of the patients who were operated on had droopy tips. Therefore, in all these cases, a lateral crural steal of 3 to 5 mm was used. This suture was of utmost importance to change the internal forces on the lower lateral cartilages and reshape them. Besides, the lateral crural steal suture was very helpful in increasing rotation and projection bringing the medial crura closer to the caudal septum. This situation reduces the stress on the SC sutures. After the dome-equalizing suture, the SC sutures were put under direct vision starting below, from the posterior septal angle, midportion of the caudal septum, and close to the anterior septal angle. The first suture always passed from the caudal septum and then from the medial crus. If the need for rotation was minimal, the suture was passed from the soft tissues around the medial crura, and then the mattress suture was completed by keeping 2 mm between the entry points. This was described as a type 1 SC suture. If a bit more rotation was needed, then the suture was passed from the inner margin of the medial crus and named as type 2 SC suture. In type 3 SC suture, the suture was passed from the midportion of the medial crus, which could help increase the rotation more. In rare cases, the medial crura was very narrow, so type 3 SC was impossible to use. The biggest

amount of rotation could be obtained by passing the mattress suture from the caudal septum and from the caudal margin of the medial crura, which was described as a type 4 SC suture. This suture was first described by Kridel et al as a tongue-in-groove suture. In all patients, two or three SC sutures were used. Sometimes, different types of SC sutures were used in the same patient. Surely, all these sutures were used to adjust the projection as well. A columellar strut of varying sizes was added between the medial crura in all these cases, except type 4.

If the endonasal approach was used, the above-mentioned techniques were used for delivery cases using a marginal incision. In cases where a transcartilaginous or intercartilaginous incision was used, SC sutures were employed using two techniques. In the first technique, a pocket of different sizes was opened between the medial crura through hemitransfixion incision and the medial crura were identified. Then, the SC sutures started from the caudal septum then from the medial crura. In the second technique, medial marginal incisions of 4 to 5 mm were performed and the medial crura were identified by dissecting with sharp scissors. Then, the suture could pass easily from the medial crura. If type 1 and type 2 SC sutures were needed, the first technique was used. For SC suture types 3 and 4, the second technique was used. In rare occasions, the SC sutures were not enough to rotate the tip desired as the rest of the columella. In these cases, a type 5 SC suture, namely, ventral-SC suture was used. Type 3 SC suture has in rare cases caused columellar retraction, and a columellar augmentation graft was inserted in the columella in front of the caudal margin of the medial crura.

Depending on the situation, the projection was decreased, preserved, or increased. In external rhinoplasty cases where the soft tissues between the medial crura were preserved, there was no loss in the projection; however, when they were excised, there was always a loss of projection of 2 to 3 mm. In these cases, the projection and rotation were both increased at the same time with the help of SC sutures. In this study, a detailed measurement regarding the projection was not considered.

As suture material, 4-0 Polydioxanone (PDS) suture was used in the majority of the cases. In some endonasal cases where there would be some tension created by the suture to rotate and project the tip, a nonabsorbable 4-0 Prolene suture was used to prevent any chance of losing projection.

Apaydin Classification of SC Sutures

The classification was based on the entry point of the suture through and around the medial crura. Each type of SC suture can influence properties such as projection and rotation, so specific nomenclature has been established to describe these changes. "I" means increasing projection, "K" stands for keeping the projection, and "D" means deprojection (►Table 1) (►Fig. 1).

In this classification, there are five types and three subtypes for each type. Therefore, there are 15 possibilities that a surgeon can use to describe the situation. For example, "SC-3^D" means that the SC suture has passed from the caudal

Table 1 Five different types of septocolumellar sutures are listed and the details of each suture are described

Type	Description	Projection
1	The mattress suture passes from the caudal septum and soft tissues behind the medial crura	I, K, D
2	The mattress suture passes from the caudal septum and the inner margin of the medial crura	I, K, D
3	The mattress suture passes from the caudal septum and the mid portion of the medial crura	I, K, D
4	The mattress suture passes from the caudal septum and caudal margin of the medial crura (= tongue-in-groove)	I, K, D
5	The mattress suture passes from the dorsum and from the midportion of the medial crura (= ventral septocolumellar suture)	I, K, D

Note: These sutures can be used to increase, keep, or decrease projection (P: Increase projection; K: Keep projection; D: Deproject). Besides, these sutures change the rotation of the tip and columella and each one of them affects rotation differently. So the choice of the suture is mainly dependent on the need for rotation of the columella and the tip.

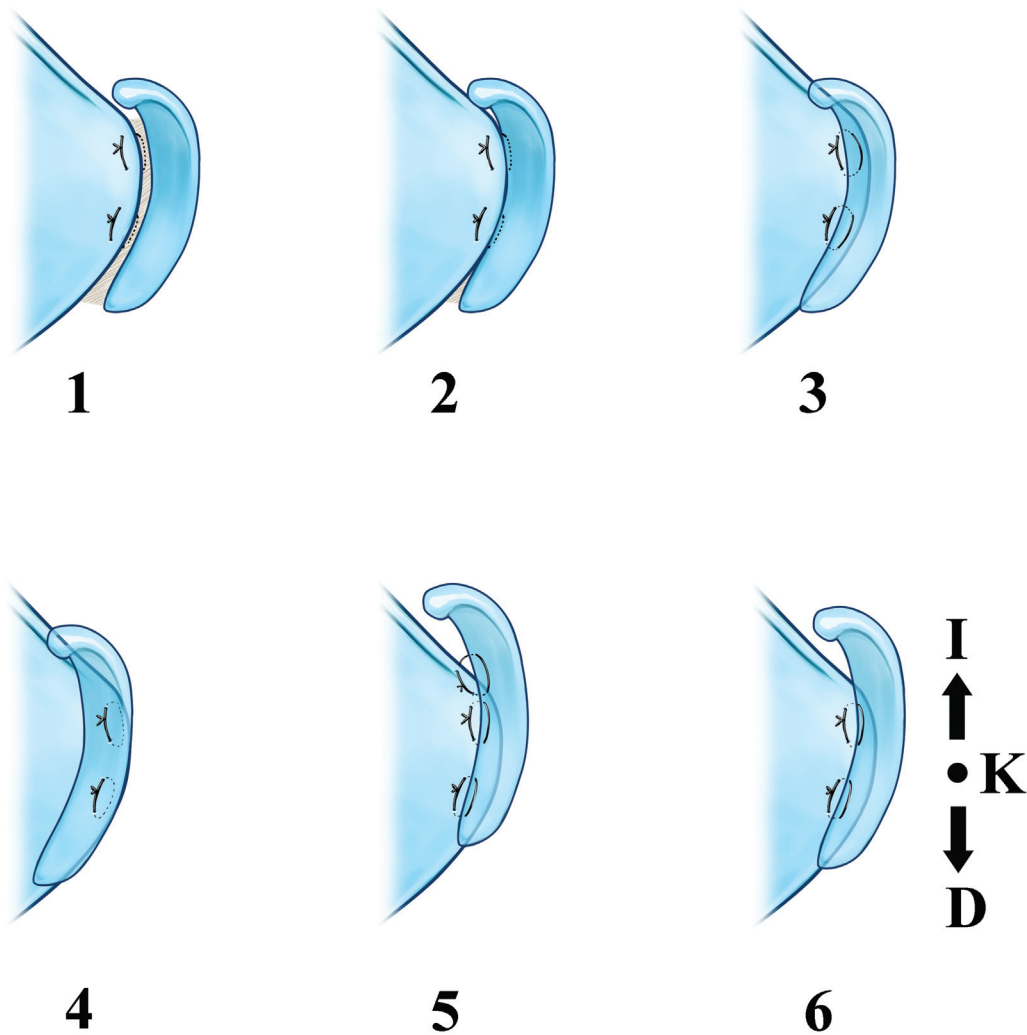


Fig. 1 Septocolumellar suture types are depicted in this illustration. The five types which are described in detail in ►Table 1 are classified according to the proximity of the medial crura to the caudal septum. In type 6, the use of type 2 and 3 is presented. The surgeon can rotate different zones of the columella and the tip by applying different types of septocolumellar sutures. Besides, these sutures can be used to increase, keep, or decrease projection. Therefore, it is possible to describe 15 different applications of septocolumellar sutures by this classification.

septum and the midportion of the medial crura while deprojecting the tip. However, the projection was not measured in detail and was not included in this study.

The main inclusion criterion in this study was the use of SC sutures. To ensure the reliability and study strength, in addition to Gunter diagrams, the 4K video recordings of the operations of these patients were reviewed as well.

The patients without video recordings operated during this period were excluded from the study even though they had Gunter diagrams. All the data obtained were transferred into the Rhinobase 2.0, a database program created for detailed data collection in rhinoplasty. With this approach, the disadvantages of a retrospective study were eliminated.

From the information collected, the types of SC sutures were listed for each patient. The cases in which different types of sutures were performed in the same patient were also counted. The data were also analyzed in relation to the age and sex of the patients.

Results

The most used type of SC suture was type 4, with a total of 39 cases (39%). The next most frequent type was type 3 with 33 (33%) cases, followed by type 2 with 22 cases (22%) (► Fig. 2). Type 1 was used in 5 cases (5%) and type 5 in 2 cases (5%).

In 21 cases, more than one suture was used. In one patient type 1 suture was used with type 4. In three patients, a type 2 suture was used with type 3. In four patients, type 2 was used together with type 4. The most frequent combination was the

use of type 3 and type 4, with a total of 11 cases. In one case, type 1 was used with type 5 (► Fig. 3).

As the suture material, 4-0 PDS was used in 71 patients, and 5-0 Prolene was used in 9 patients.

Discussion

SC sutures have been a mainstay in rhinoplasty since Joseph.¹ Its versatility in terms of defining the rotation, projection, and shape of the nasal tip is unique. Therefore, different types have been described in the literature.²⁻⁵ In this study, a new classification is presented to revitalize the previously presented techniques and broaden the spectrum of SC suture usage. The SC sutures are described as five different types and three subtypes for each type, creating 15 types of suturing which has never been published before. Besides, the use of different types of SC sutures on the same patient has not been published before as far as we know.

In this study, SC type 1 was used in 5 cases. This suture looked very promising that it could be inserted not to violate the membranous septum. Besides, the flexibility of the nasal tip could be preserved up to a certain degree. However, the



Fig. 2 In this case, the patient's main concerns regarding the tip were bulbosity and droopiness. In addition to lateral cural sutures, type 1 and type 5 septocolumellar (SC) sutures were used in this case. The postoperative pictures were taken 1 year after surgery. The technique can be written in short as "SC-1,5" mentioning that septocolumellar suture type 1 and 5 were used and the projection was increased.



Fig. 3 In this patient, in addition to preoperative pictures, four pictures taken during surgery are presented. The native tip is transformed by using lateral crural steal and dome equalization sutures after cephalic trim. Type 2 septocolumellar (SC) sutures and a big columellar strut were used. The postoperative pictures were shot 2 years after surgery. The coding for this case is SC-2', because the projection is also increased.

attempts to pass the suture only from the membranous septum and the caudal septum were not found to be very efficient and robust to keep the projection at the desired level. This is why the sutures were passed from the soft tissues just adjacent to the inner margin of the medial crura. This suture was mainly used in cases where the rotation and projection were good, and it was aimed to preserve them as they were. This suture was reported as “modified orthopaedic suture of Joseph” to increase rotation and projection at the same time. It was claimed that it could surpass the disadvantage of creating a retracted columella by the orthopaedic suture of Joseph.² In this classification, this suture can be used to change the projection in three different ways; namely, deproject, keep the projection, or increase the projection. Some of the prominent rhinoplasty

surgeons in Türkiye such as Cerkes, Cakir, and Tastan coined and liked using the term membranous tongue-in-groove for this suture (Personal communication). In our opinion, this is a mistake because the term “tongue-in-groove” was first used by Kridel et al in 1999 as the mattress sutures used to fixate the caudal portions of the medial crura to the caudal margin of the caudal septum.³ The tongue-in-groove technique is a member of the SC suture family. Therefore, it should not be used as a term to represent the big family of SC sutures.

SC type 2 was used in 22 cases in this series. This type is very versatile when the need for rotation and projection is 1 to 3 mm. In the external approach, when one suture is passed closer from the footplates, and another closer to the anterior septal angle, the medial crura look like an open

book. A long, curved, and thick columellar strut is always sutured between the medial crura. Tebbetts published a paper in 1994 on shaping and positioning the nasal tip with sutures. He presented four stages in his algorithm. In stage 4, the tip complex was repositioned using projection control sutures. He also reported that these sutures could advance the tip complex anteriorly or posteriorly up to 3 mm without excessively compressing the membranous septum in most primary cases.⁴ Pedroza presented routine usage of two SC sutures previously described by Fomon and Berman: The first suture passing from the posterior end of the medial crura and the second suture at the middle of the columella.¹⁰ Tezel and Numanoglu reported to open a pocket between the medial crura of 4 to 5 mm and suture the medial crura to the caudal septum during endonasal rhinoplasty with one nonabsorbable nylon suture.¹¹ This suture can be used to keep, increase, or decrease the projection in this classification.

SC type 3 was the second most frequent type with 33 (33%) cases in this study group. It was possible to get more rotation and projection with this suture because the medial crura are sutured to the caudal septum closer. A thinner and longer columellar strut was added in external rhinoplasty cases, but not in nondelivery endonasal techniques. It is possible to project, keep the projection, or deproject the tip with this suture. The orthopaedic suture of Joseph is this type to increase both rotation and projection (SC-3P).¹ The tension created by this suture could create a retracted columella and that is why a modification was described passing the suture from the membranous septum.² In cases with nice tips, which needed very slight increase in projection and rotation, a SC suture by using nonabsorbable sutures are precious although they were under slight tension in this series. They were used in 9 cases in this study whereas in 71 cases PDS was the material of choice. The follow-up period is relatively short to comment on the long-term effect of suture materials in this study. However, it is the experience of the senior surgeon that PDS works pretty well to keep the projection and rotation unless some tension is created, where Prolene sutures are reserved for those situations. The good thing is that no infection was seen in the follow-up period in the study population. Second, it is the observation of the senior author when the ligaments between the medial crura are cut or removed, the tip deprojects 2 to 3 mm. Therefore, the projection is increased again by using SC sutures. Third, one of the main reasons for the droopy tip is the short medial crura and long lateral crura. To change this condition and to compensate for the drop created by cut ligaments between the medial crura, lateral crural steal is of great help in reducing the tension created by the SC suture. A retracted columella was observed only in one case during surgery after applying SC type 3, and a columella contour graft was added to solve the problem. It must also be mentioned that in cases with very narrow medial crura, a distinction between SC types 2 and 3 can hardly be done.

Type 4 SC suture, tongue-in-groove suture, was the most used type with a total of 39 cases in the study group. In thick-

skinned patients and in revision cases, type 4 SC was always the primary choice of the senior author, so this strong fixation of the medial crura to the caudal septum or extension graft could resist the contractual forces on the caudal septum. Kridel et al have reported the use of this technique as a very versatile technique for positioning the tip on the caudal septum and arrange projection and rotation.³ The tongue-in-groove technique has been very popular among structural rhinoplasty surgeons since then, and even for some surgeons, it was the only technique for arranging the rotation, projection, and shape of the tip.⁷ The tradeoff with this type of suture is to obtain more stiffer tips. Therefore, on one hand, there are surgeons who believe that obtaining more consistent tips in terms of rotation and projection is the most important thing, whereas there are surgeons who want to keep the tip more flexible and not use the tongue-in-groove technique. Tezel and Ersoy later switched to the addition of a caudal septal extension graft and use of four SC sutures.¹²

The type 5 SC suture was used only in two cases of the study group, which proved that it was rarely needed. It is quite normal because in each case, lateral crural steal sutures have been used to overcome intrinsic forces on lower lateral cartilages and change the projection and rotation according to need. Besides, the first three sutures and a columellar strut or type 4 with additional grafts obviated the need to use this suture. However, in two cases of nondelivery type of endonasal approach, it was used as an adjunct to further rotate the upper one-third of the tip. Although rarely used in this series, this suture can be a last-minute saver for the surgeon in avoiding insufficient tip rotation. It was described as the main suture for tip rotation in many articles before.⁴⁻⁶ However, we do believe that the importance of changing the architecture of the lower lateral cartilages by using lateral crural steal sutures or similar techniques were not used by these authors. Moreover, this suture is unique because it is the only suture among all SC types which can change the rotation of the upper third of the medial crura.

In 21 cases of the study group, more than one SC suture type was used, which was never published in the literature before. The most frequent combination of using type 3 and type 4 was performed in 11 cases. The use of different sutures gives versatility to the surgeon to adjust the shape of the columella and infratip lobule, the location of the subnasale, the nasolabial angle, rotation, and projection. In this series, no resection was performed on the caudal septum.

Conclusion

The use of SC sutures is a crucial step in rhinoplasty. In this study, five types of SC sutures were described as a practical new classification with three subtypes under each type. This classification gives the surgeon powerful tools to finalize the location of the tip in terms of projection, rotation, and reshaping the tip during surgery. The tongue-in-groove technique (type 4 SC suture) was the most often used technique in this study group followed by type 3 SC suture. However, it must also be kept in mind

that more than one type of SC suture can be used during rhinoplasty.

Conflict of Interest

None declared.

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