

ORIGINAL STUDY

“Suture” techniques in nasal tip reconstruction

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ABSTRACT

Tip plasty is an essential and indispensable part of rhinoplasty. It is important to realise that every nose is different and the attention to fine details is important and defines a good rhinoplasty surgeon. Every rhinoplasty is different and tailor-made to the requirements of the patient. Nasal tip reconstruction is a complex subject, particularly in posttraumatic noses and compliments the operative work on nasal dorsum. The nasal tip can be accessed by the open approach (external approach) or closed approach (cartilage delivery) techniques. Both have their own pros and cons, but we prefer the open approach, as it has got the advantages of good exposure, accurate assessment, good haemostasis and precise suture placement. In this paper we will describe the suture operative techniques of tip plasty.

KEYWORDS: nasal tip reconstruction, suture techniques

INTRODUCTION

Ever since Sushruta laid the foundations of rhinoplasty for the first time in ancient India, a lot of thought and effort has gone into developing the techniques that we know today. Tip plasty is an essential and indispensable part of rhinoplasty. It is important to realise that every nose is different and the attention to fine details is important and defines a good rhinoplasty surgeon. Every rhinoplasty is different and tailor-made to the requirements of the patient. Nasal tip reconstruction is a complex subject, particularly in posttraumatic noses and compliments the operative work on nasal dorsum.

The *aims of nasal tip plasty* are to achieve patient satisfaction with both function and cosmesis. We should aim to achieve:

1. Good definition and symmetry of the nasal tip.
2. Adequate projection of the nasal tip.
3. Adequate rotation of the tip in relation to the dorsum.

Following a pre-operative assessment, the surgeon aims to reconstruct the tip by changing the definition, projection or rotation. Due consideration should be given to the final appearance and position of the tip in relation to the dorsum of the nose, taking into account the skin thickness, race and ethnic variations.

TIP SUPPORT MECHANISMS

Nasal tip deformities should always be assessed in relation to the middle and upper third deformities of the dorsum. It is therefore very important that, for an optimum assessment and pre-operative analysis, the surgeon is well versed with the anatomy. Essentially, the nasal tip is formed by the medial, intermediate and lateral crura of the lower lateral cartilage.

Anderson¹ has compared the tip to a tripod, where the two lateral crura form the lateral legs of the tripod and the conjoined medial crura form the medial leg of the tripod. Various techniques that lengthen or shorten the legs of the tripod can affect the projection, definition and rotation of the tip. Adamson et al, in 2006,² has proposed the M Arch model for a further understanding of tip dynamics. This model allows us to delineate the contribution of each medial and lateral crus and emphasises the importance of the ‘intermediate’ crura. The *primary tip support* mechanisms (Tardy, Johnson)^{3,4} are:

1. The size, shape and the strength of the lower lateral cartilages (alar) cartilages,
2. The attachment of the caudal end of the upper lateral cartilage to the cephalic margin of the lower lateral cartilage at the scroll region,
3. The attachment of the footplate of the medial

crura to the caudal septum superiorly near the anterior septal angle.

The caudal end of the columellar septum forms a *secondary tip support* mechanism.

SURGICAL PRINCIPLES

Nasal tip reconstruction is used primarily to correct tip deformities, which can be explained on the basis of the tip support mechanisms that have been mentioned earlier:

1. Primary deformities of the lateral crus, intermediate crus, medial crus. These deformities may be symmetrical or asymmetrical. These anatomical deformities may result in bulbous tip, lateral alar ballooning, asymmetry due to abnormal tip rotation and projection.
2. Secondary deformities relate to the deformities of the anterior edge of the caudal septum and its attachments to the medial crura.

The nasal tip can be accessed by the open approach (external approach) or closed approach (cartilage delivery) techniques. Both have their own pros and cons, but we prefer the open approach, as it has got the advantages of good exposure, accurate assessment, good haemostasis and precise suture placement. The surgical steps of tipplasty include:

- **Step 1:** Soft tissue skeletonisation and creation of symmetrical rim strip elements.
- **Step 2:** Shaping and unification of the medial crura and creation of basic dome height projec-

tion and symmetry.

- **Step 3:** Shaping of lateral crura and domes.
- **Step 4:** Positioning the unified tip complex in relation to the rest of the nose and face, with reference to projection and rotation.

TIP SUTURING TECHNIQUES

We advise 5-0 ethilon non-absorbable sutures for tipplasty not only in primary rhinoplasty but also in secondary rhinoplasty, as an adjunct to grafting techniques (senior author (NB) has used this suture for over 12 years without any problems). This has the following advantages:

1. It is non destructive.
2. It is reversible.
3. It is less susceptible to fibrosis-induced remodeling of cartilage as the suture material generates less of an inflammatory reaction compared to absorbable sutures.

Adequate exposure of the lower lateral cartilages is important. Any scar tissue between the medial crura is removed and the cartilages are dissected free in the SMAS plane. We describe the following six sutures, which we commonly use for primary nasal tip reconstruction.

1. Medial Crural Fixation Suture – (MCFS)

This suture (Figure 1) gives structural support to the medial crura and is often the first suture performed in tipplasty. We consider this suture as a “base-

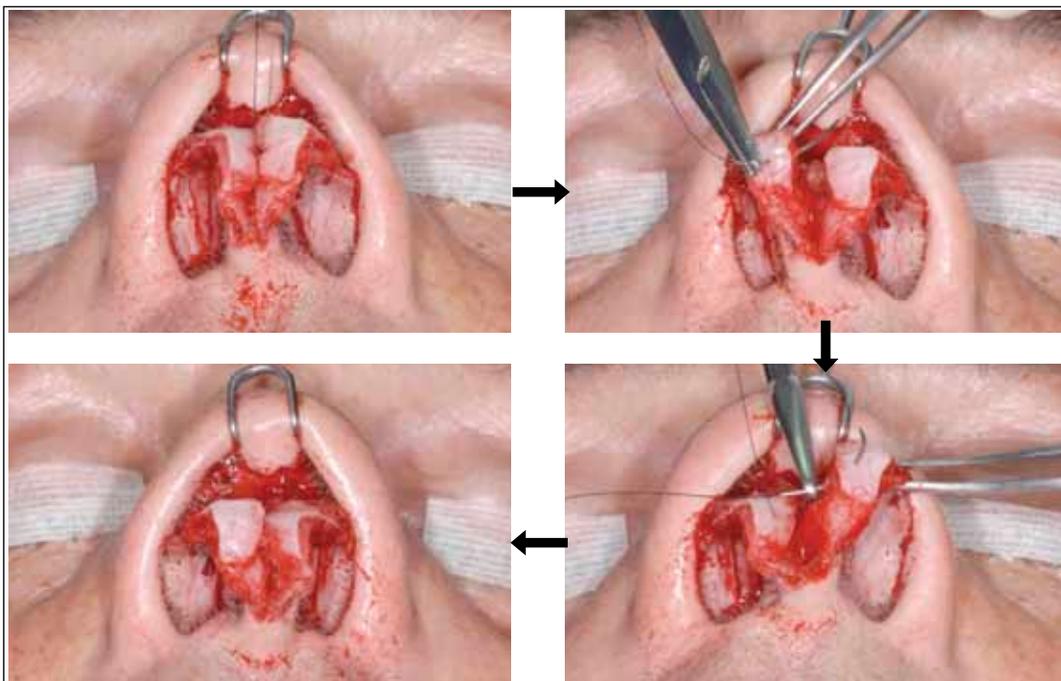


Figure 1 Medial crural fixation suture

ment" suture before building the rest of the tip. The posterior-superior free border of the medial crus is sutured together by a simple 5-0 ethilon suture. The suture goes "outside in"; it starts at the posterior-superior margin of the lateral crus starting from the right side, staying just below the intermediate segment and going through the other side from "inside out", at the posterior-superior margin of the medial crus. A single knot is tied and is buried between the two crura. The knot brings the two medial crura together and stabilises the complex.

This suture:

1. Prevents the two medial crura moving away from each other.
2. By adjusting the point of entry and exit of the sutures, we can address the asymmetric tip height.
3. It helps to prevent posterior migration of the columellar strut cartilage.

2. Medial Crural flare control suture (MCFCS)

This is a vertical mattress suture that is placed along the vertical length of the medial crus to control the flare of the medial crus (Figure 2), thus narrowing the width of the columella. The suture begins at the lower end of the medial crura footplate on the medial surface and comes out superiorly; it goes similarly on the other side, starting superiorly and coming out inferiorly, as shown in the picture below.

The tightness of the suture determines the width of the columella. The suturing can be done with or without a columellar strut.

Thus this suture helps in:

1. Narrowing the width of the columella.
2. Changing the direction of the medial crura from an abnormal "coronal plane" to an anatomically normal "sagittal plane".
3. Stabilising a fractured / dislocated medial crural footplate causing a medial crural 'flare' that can contribute to external nasal valve obstruction.

3. Trans-domal suture (TDS)

This is a unilateral dome suture (Figure 3) to increase the projection of the nasal tip without altering the tip support mechanics. This is a mattress suture in the axial plane starting from the medial crus just below the dome and entering the lateral crus about 2-3mm below the intermediate crus; it sutures the knot medial to the dome and secures the knot between the domes, as shown below.

This suture helps:

1. To unify and bring together the medial and the lateral crura on only *ONE* side, thus ultimately helping to narrow the lower lateral cartilage on that side.
2. To narrow the tip, when done on both sides.
3. To increase the projection of the tip.

4. Interdomal suture (IDS)

This is a simple horizontal suture passing through both the domes, around 2-3 mm above the caudal border of the two intermediate crura, thus helping to bring the domes together (Figure 4). In this case, care must be taken not to introduce a "Unified Unicorn nasal tip", which will give an unsightly pointed "single" tip.

This suture helps:

1. To increase tip definition. This suture helps to unify and narrow the lower lateral cartilages on both sides, thus ultimately helping to narrow the tip.
2. To narrow a boxy tip.

5. Lateral crural flare control suture (LCFCS)

This suture is a horizontal mattress suture (Figure 5) between the two lateral crura to reduce lateral alar ballooning. This suture helps in the medial and upward movement of the lateral crus, thus reducing the lateral alar ballooning and under-rotating the tip. The suture should be placed in the lateral crus at the level of the alar ballooning, as far laterally as it allows, starting from "inside out / outside in on the right side"



Figure 2 Medial crural flare control suture



Figure 3 Trans-Domal suture

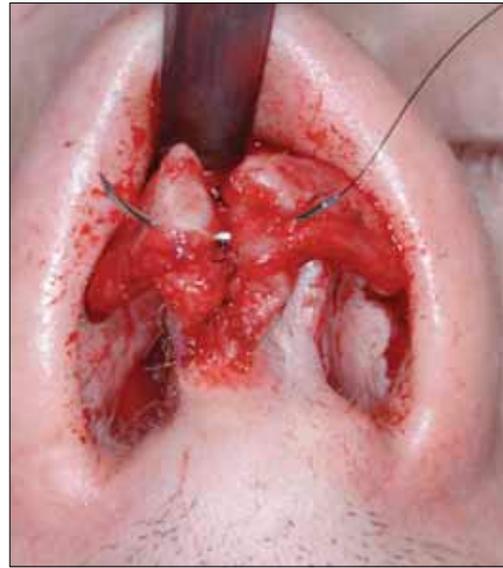


Figure 4 Interdomal suture

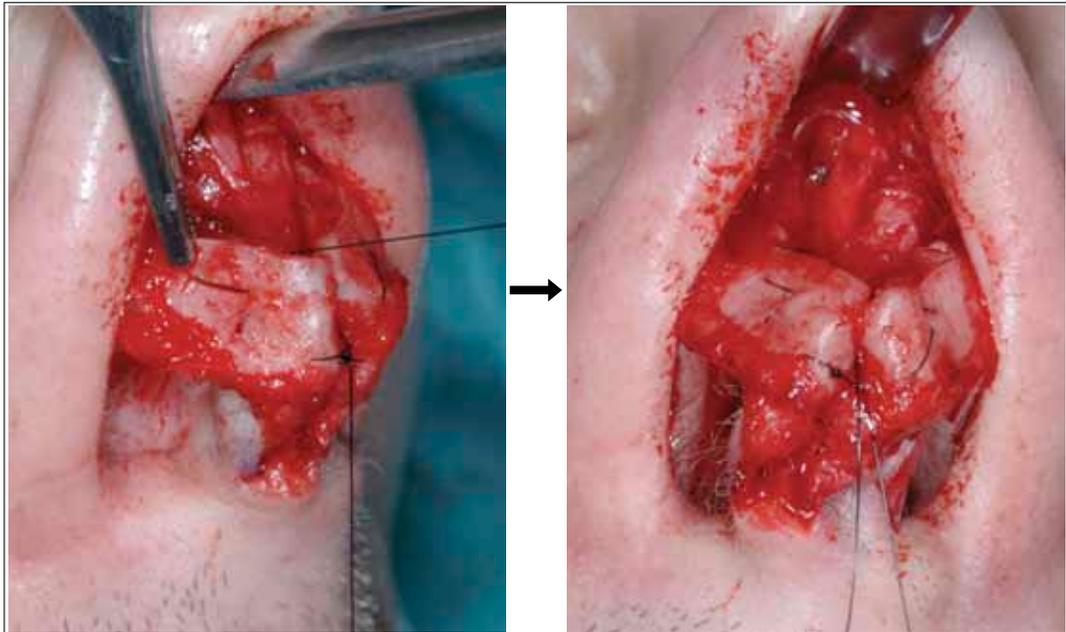


Figure 5 Lateral crural flare control suture

and going “inside out and outside in on the opposite side”. The knot is placed internally, in the middle, between the two domes. In this case, care must be taken to prevent too much tightening, as this may cause internal lateral alar wall narrowing and also unwanted under rotation of the tip with deprojection.

This suture helps:

1. To narrow the lateral alar flare and ballooning.
2. Also, to a degree, to narrow the tip.
3. To achieve mild under-rotation of the tip.

6. Tip anchoring suture (TAS)

As the name suggests, this suture is invaluable for achieving the final position of the unified tip complex.

This suture helps to prevent “Tip Ptosis” and is something similar to the tongue holding suture used in snoring surgery.

Like in a dome spanning suture, the surgeon takes a bite from one dome, going from “inside out”; he goes through the “Anterior Septal Angle” and comes out through the other dome from “inside out”, and secures the knot on the dorsum, thus “anchoring” / “positioning” the tip in relation to the dorsum of the nose (Figure 6). This is a simple suture and not a mattress one.

This suture helps in:

1. Stabilisation of the tip
2. Preventing “Tip Ptosis”

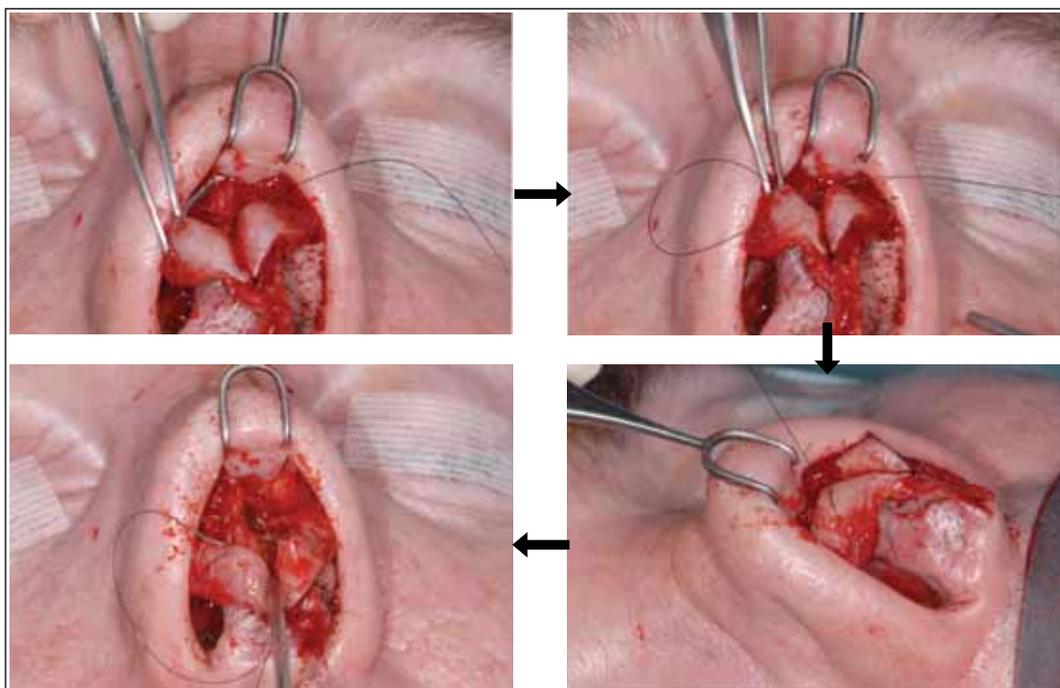


Figure 6 Tip anchoring suture

3. Locating the unified tip complex to a favourable position in relation to the dorsum, particularly in women, when an overriding tip is aesthetically pleasing.

CONCLUSIONS

Thus, non-absorbable sutures can be used in a variety of ways to achieve nasal tip definition, projection and rotation. We suggest the use of the following algorithm (Table 1) for the appropriate suturing techniques in tipplasty:

Declaration:

Please note that the photographs were taken with written consent from the patients and are the property of NHS Lanarkshire and should not be used for any publication, lectures or be reproduced in any form without the consent of the author (NB).

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Table 1
Suture Technique Algorithm for nasal tip reconstruction

To secure the medial crura together and to narrow the width of the columella	➔	Medial crural fixation suture, Medial crural flare control suture
To narrow and unify the tip complex in a bulbous or bifid tip	➔	Transdomal suture Interdomal suture
To correct the lateral alar ballooning	➔	Lateral crural flare control suture
To reposition the unified tip complex and to help in correcting a ptotic tip	➔	Tip anchoring suture

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