THE EFFECTS OF TIP-BINDING SUTURES AND CARTILAGINOUS GRAFTS ON NASAL TIP PROJECTION AND ROTATION

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Abstract

Although many techniques have been described to achieve a desired result in tip surgery, there are few studies that define or analyze the changes that occur after surgery. This study was made to document changes in nasal tip projection, crural and lobular lengths of the columella, columellar length, and proportional relationships of tip projection and columella with dorsal length.

This study was conducted on 20 patients who underwent primary rhinoplasty. Patients were classified into 2 groups: group 1, the tip-binding suture group, and group 2 (the cartilaginous graft group). Analysis was based on data collected from preoperative and 1-year postoperative lateral views of patients. The measurements were obtained using the parameters regarding tip projection and rotation on standardized photographs. The values were statistically analyzed with paired and unpaired t tests.

The changes in all parameters except crural length were statistically significant in the tip-binding suture group. In contrast, the statistical analysis of the cartilaginous graft group revealed prominent dimensional changes in tip projection and especially in crural and lobular segments.

It is recommended that the cartilaginous grafts should be considered if the dimensional changes have priority in the preoperative plan. The columellar strut graft provides satisfactory structural tip support and dimensional changes in crural length. Shield grafting causes augmentation in the lobular segment. If minor dimensional changes with more rotational alterations are planned, tip suture techniques should be preferred.
Introduction

Nasal tip rhinoplasty is one of the challenging operations to oto-
aryngology head and neck sur-
geon and plastic surgeon as well. 
Tip surgery remains the most dis-
cussed aspect of rhinoplasty, as it 
has a complex three-dimensional 
anatomy (Tardy, 2004).

Surgical procedures for the tip 
include suture techniques; carti-
ilage remodeling techniques such 
as crushing, scoring, or dividing; 
and the use of cartilaginous 
grafts. However, each technique 
may cause unpleasant conse-
quences while trying to solve a 
problem. For instance, a Gold-
man-type division technique may 
cause a sharp-edged tip with nar-
row alar wings, or cartilaginous 
grafts may be seen and felt in 
thin-skinned patients.

Among these, suture tech-
niques and cartilaginous grafts 
are excellent means of restoring 
tip strength and projection. They 
involves the manipulation of the 
lower lateral cartilage, which is 
the chief provider of structural 
support to the tip of the nose 
(Rochr.icht, 1996 & Adams et al., 
1999). Although numerous tech-
niques are available to achieve 
desired result in rhinoplasty, no 
consensus exists on how to define 
or analyze the changes that occur 
after surgery (Werthein & Freemas 
1998). Therefore, the aim of this 
study was to document changes in 
nasal tip projection, cranial alar 
lobular lengths of the columnell 
columnellar length, and the propor-
tional relationships of tip projec-
tion and columnell with dorsum 
length using suture techniques 
and cartilaginous grafts.

Patients and Methods

This study was conducted 
the period between January 200 
and March 2004 on patients who 
underwent primary rhinoplasty. 
Patients were classified into 
groups: (group 1 The tip-binding 
suture group) and group 2 (the 
cartilaginous graft group). Patients 
who did not attend follow up after 
one year were excluded from the 
study. All patients undergone a 
thorough history and physical ex-
amination. Every patient was dis-
cussed about the problem in his 
or her nose shape. The patient’s 
name, address and telephone 
numbers were recorded in the p
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tient file. A written consent was signed by every patient after the nature and technique of the operation has explained.

Group 1 (the tip-binding suture group) included 11 patients who underwent mainly an interdomal suture, which was a loop suture placed from the original or planned tip-defining point of one dome to the contralateral dome by using a delivery approach. While group 2 (The cartilaginous graft group) included 10 patients who underwent a transdomal suture, which was a horizontal mattress suture that spanned the domal arch and brought the lateral crura toward the medial crura by using an open approach. Afterward, a strut graft made from sepal cartilage was inserted between the two medial crura. To prevent a possible bossa deformity after strut application, the two lateral crura were approximated with a suture that was located behind the strut. Finally, a shield graft was placed over the middle crura (Figs. 1-4).

The lateral views taken preoperatively and postoperatively at 1 year with a Sony FC707 (Sony, Tokyo, Japan) digital camera with a 100-mm lens were transferred to the photoshop program. The facial section between the horizontal planes running above the eyebrows and below the mentum was copied from the postoperative photograph (Fig. 5). The size and location of this image were then manipulated by focusing and magnifying to adapt the same facial section on the preoperative photograph (Fig. 6). This provided an accurate analysis of the same facial sections of the preoperative and postoperative photographs (Fig. 7).

The starting point of the nose, the most projected point on the tip, the tip break point, the nasal spine, the most projected point on the convex margin of the alar crease, and the blue reflection point of the angular vein at the medial canthal area were marked on these images (Fig. 8 and Table 1). Afterward, dorsal length, tip projection, crural length, lobular length, and columnellar length (sum of crural and lobular lengths) were measured using these six points. The ratios of tip projection and columnellar length
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to dorsal length were calculated for each preoperative and postoperative image.

The preoperative and postoperative measurements of dorsal length, tip projection, crural length, lobular length, columellar length, and intercanthal-tip angle were compared in the tip-binding suture group and the cartilaginous graft group independently, and then between the two groups. In addition, the ratio of tip projection to dorsal length and the ratio of columellar length to dorsal length were compared in each group and between the two groups.

The values were evaluated using descriptive statistical methods (mean ± SD). The paired t test was used in the repeated measurements for each group and the unpaired t test was used in the comparison of the groups. The results were expressed at a significance level of p < 0.05.

Results

The study included 20 patients who completed the prescheduled follow up. Their ages ranged from 19 to 43 years old (median age was 26 years old). There were 13 females and 7 males. In group 1 (the tip-binding suture group), the difference between the preoperative and postoperative measurements of dorsal length, tip projection, crural length, lobular length, columellar length, and intercanthal-tip angle were statistically significant. While, the difference in crural length was not significant. The difference in the proportional relationships of tip projection and columellar length with dorsal length between preoperative and postoperative measurements were highly significant (Tables 2-9).

In group 2 (the cartilaginous graft group), the changes in and columellar length and co-columnellar length were statistically significant. A comparison of the results of the two groups revealed no significant differences.
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...ble findings, there was no statistically significant difference between the changes in dorsal length of the two groups. The changes in tip projection and crural length were significantly in favor of the cartilaginous graft group. Moreover, the change in columnellar length revealed statistical significance. However, the changes in lobular length and intercanthal-tip angle were insignificant. Although the proportional relationship of tip projection with dorsal length between the two groups was not statistically significant, the difference in the ratio of columnellar length to dorsal length was statistically significant in favor of the cartilaginous graft group (Tables 2-9).

In tables from 2 to 9, the differences between preoperative and postoperative measurements for the tip-binding suture and cartilaginous graft groups that were compared in each group independently and then compared between the two groups.

Figure (1): Perioperative view of the application of the tip-binding suture using the delivery technique (left) and perioperative view of the application of the shield graft using the open technique (right).