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COLUMELLAR STRUT GRAFT IN TIP RHINOPLASTY, IS IT OF BENEFIT?

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Abstract

Strut graft is an important, commonly used method to increase nasal tip projection and rotation. This study discuss its benefit by prospective analysis of a group of patients in which strut graft was used and compare it with a control group using digitalized photographs.

The aim of this study is to evaluate the benefit of columellar strut graft and its effect on nasal projection and rotation using digital images.

Thirty two patients were treated with external rhinoplasty. Using their photographs, we analyzed the projection and rotation of the nose before and after operation. The patients were classified into two groups: group A included 18 patients who have strut and group B included 14 patients without strut. The analysis of the photos of the two groups was done with a computer program.

By using Goode method, nasal tip projection decreases from 0.63 to 0.62 for patients using the strut, while in patients without strut nasal tip projection decreases from 0.64 to 0.61. Nasal tip rotation slightly increased in patients with strut graft from 99 to 99.5 degrees, while in those without the graft, nasal tip rotation markedly increased from 95 to 103 degrees.

In conclusion, external rhinoplasty decreases nasal tip projection and the use of strut graft is unnecessary in increasing nasal tip projection but it helps in preserving the projection and slightly increasing nasal tip rotation.

Keywords: Rhinoplasty, Graft, Strut, Columella, Nasal, Projection, Rotation.

Introduction

Rhinoplasty is considered as one of the most challenging procedure in otolaryngology by which the nose is reshaped and resized. A meticulous planning and excellent surgical skill are fundamental for good outcome[1].

The columellar strut graft is certainly a solution element which is precious to the rhinoplasty surgeon[2]. This graft offers the facility to add a dimension to the final result in rhinoplasty further than that which the usual practice will permit[3].

Patients and methods

This prospective and observational study was carried out in the Otolaryngology Department at Basrah Teaching Hospital in the period between February 2017 to February 2018.

The study consists of 32 patients: 14 males and 18 females, their age ranged from 16 years to 46 years with a mean of 26 years. Patients were divided into two groups: Group A; 18 patients who were subjected to rhinoplasty with implantation strut graft. Group B; 14 patients who were subjected to rhinoplasty without implantation of strut graft.

All the patients were interviewed for their sociodemographic information and medical history. Detailed history, clinical and otolaryngological examination was

completed for each patient enrolled in the study focusing on the functional, aesthetic complaints and desire of the patient according to a predesigned questioner which was made to cover the issue of history, examination, pre and postoperative photo measurements.

The results were reviewed with respect to nasal tip characteristics by comparing the preoperative and the six month postoperative photographs. Evaluation was done with respect to two variables when using a columellar strut graft, which are:

Nasal tip projection: calculated using Goodes method; The ratio of the length of a line from the alar crease to the nasal tip, line that is perpendicular to a line tangent to the alar crease should be 0.55 to 0.60 of the length of a line from the nasal tip to the nasion.

Nasal tip rotation: calculated by using nasolabial angle by drawing a line from the lowermost part of the columella to the subnasale and from the subnasale to the labial superiorius and measuring the angle between them in the lateral view which normally should be 90°-105° in males and 95°-110° in females. The photo analysis was done using the computer program AutoCAD 2010 (version 18) as shown in figures 1&2.

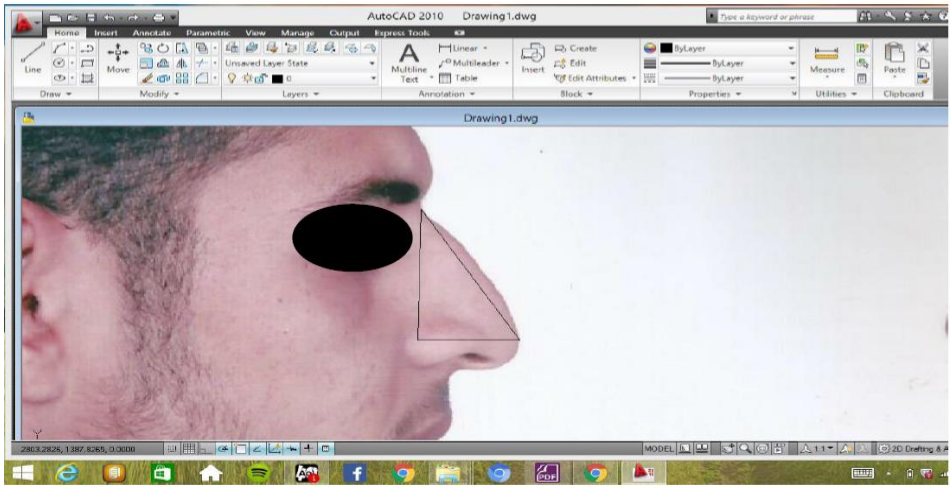

Figure 1: Calculation of nasal tip projection

Figure 2: Calculation of nasal tip rotation

Statistical analysis was done by using SPSS (statistical package for the social sciences) version 23. The variables were entered according to the questioner index cross tab and significant result is considered if the p-value less than 0.05.

RESULTS

This study included thirty-two patients (14, 44%) males and (18, 56%) females, their age ranged from 16 to 46 years with a mean of 26±6.7. Patients were allocated according to age; less than 20 years (4 patients, 12.5%), 20-30 years (18 patients 56.25%), and 30-40 years (9 patients, 28%), and over 40 years (1 patient, 3%). Our highest percentage value group 20-30 years (56%) and lowest group over 40 years (3%).

Regarding patient's complaints; 21 (65%) patients have nasal problems (nasal obstructions) and 11(35%) patient have no nasal problems.

Prior to surgery, the highest value of nasal projection was; over projection in 9 patients (28%) in both groups, and lowest is under projection in group B (2 patients, 6%). Regarding nasal projection after surgery, the highest value was perfect projection in group A (10 patients, 31%) and lowest value was under projection (0) in both groups. The mean nasal tip projection of 18 patients who underwent rhinoplasty with strut graft were 0.63 preoperatively and 0.62 postoperatively. While the mean of 14 patients who underwent rhinoplasty without strut graft were 0.64 preoperatively and 0.61 postoperatively. There was no significant relationship (P- value was 0.137) as shown in figures 3 & 4.

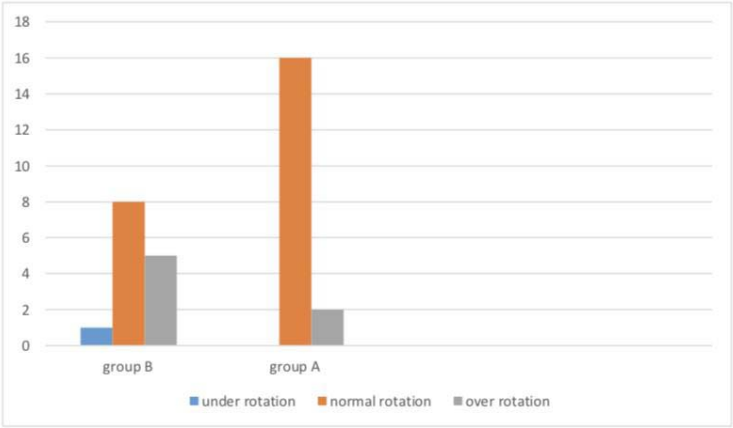

Figure 3: Nasal projection before surgery

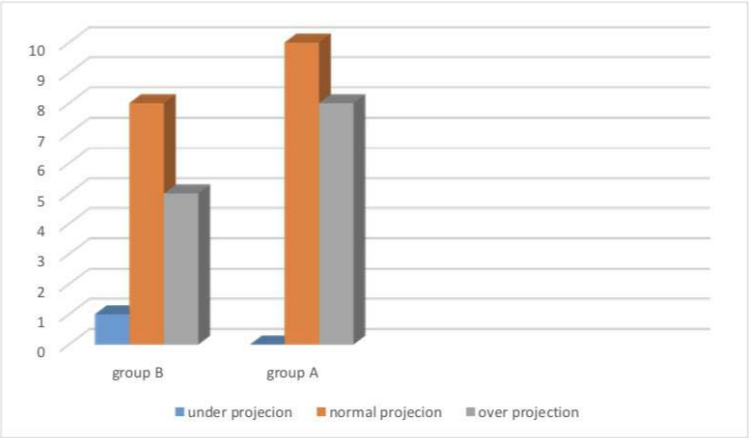

Figure 4: Nasal projection after surgery

Before surgery, the highest value of nasal tip rotation was normal rotation in group B (12 patients, 37.5%) and the lowest value was under-rotation for group B (1 patient, 3%). Regarding nasal tip rotation after surgery, the highest value was in group A; normal rotation (16 patients, 50%) and lowest value in group A under-rotation (0 patients, 0%). In those 18 patients who had rhinoplasty with strut graft, naso-labial angel increased from 99 degrees preoperative to 99.5 degree postoperatively and for the 14 patients (group without strut), the naso-labial angle had increased from 95 degrees preoperatively to 103 degrees postoperatively. There was significant difference (P-value was 0.05). The data regarding nasal tip rotation are demonstrated in figures 5 & 6 .

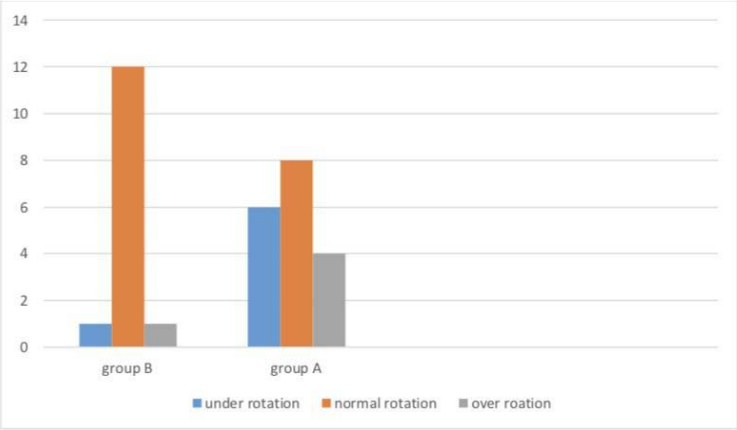

Figure 5: Nasal tip rotation before surgery

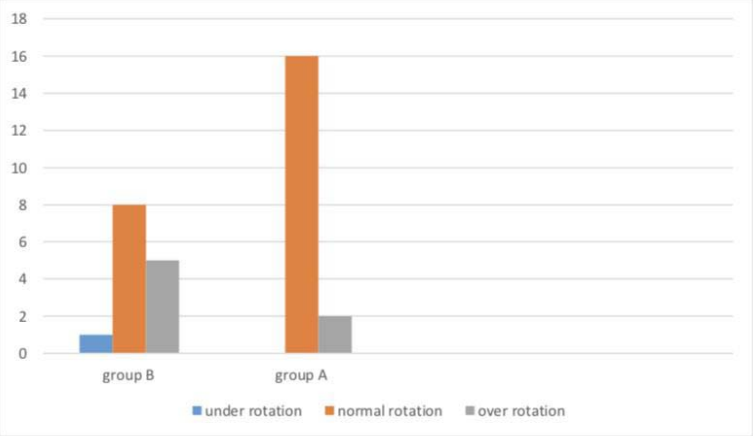

Figure 6: Nasal tip rotation after surgery

Discussion

The columellar strut graft is undoubtedly a key component which is valuable to the rhinoplasty surgeon[2]. It gives the ability to add a dimension to the final result in rhinoplasty beyond that which the standard technique will allow[3].

In the current study, columellar strut graft was used as a dominant procedure for controlling tip projection, tip rotation with minor contribution of suture technique and cartilage resection.

The age of patients participating in this study ranged from 16 to 46 with a mean of 26 years similar to the study of Amr N. Rabie[4] in which patients age ranged from 19-49 with mean of 30.2 years. While Koen Ingels[5], Rod J. Rohric[6] studies did not mention any link to age distribution. Vuyk etal[7] study mentioned patients age from 17 to 68 with a mean of 31 years.

Because younger age groups have more interest in normal looking and social acceptance. Our study as the study of Mohammad Sadeghi[8] found no significant relationship between age and seeking rhinoplasty surgery.

This study showed that 56% of patients are females while only 44% are males with female:male ratio of 1.27:1. This result was similar to the finding of Vuyk et al[7] study (59% females) and (41% males), while Rod J. Rohrich[6] study showed 85% females and 15% males. Amr N. Rabie[4] study demonstrated that males were 30% and females were 70%, In Mohammad Sadeghi[8] study, males were 25% and females were 75%. Koen Ingels[5] study does not mention gender distribution. This difference in gender distribution might be because beauty and good looking is one of the important concerns of females. Our study as the study of Mohammed Sadeghi[8] found no significant relationship between gender and seeking rhinoplasty.

We found that 65% of the patients have nasal problems and 35% have no nasal problems. There was no mention for any significant importance for nasal problems in previous studies (Koen Ingels[5], Rod J. Rohrich[6], Vuyk etal[7], Amr N. Rabie[4] and Mohammad Sadeghi[8]). This study showed no significant relationship between nasal problem and seeking rhinoplasty surgery (p-value 0.240) .

An external rhinoplasty approach destroys some of the minor nasal tip support mechanisms that subsequently needed to be repaired[9]. Strut said to be a versatile method to avoid collapse of the tip by preventing it from falling off the cartilaginous nasal pyramid, and that strut graft maintains nasal tip projection[10] . We found that nasal tip projection slightly decreased from 0.63 to 0.62 in strut group of patients by using Goode ratio. In addition, we found that 50% of the patients in strut group have an increase in nasal tip projection and 50% of patients have decrease in nasal tip projection. These findings were correlative with the study done by Vuyk et al[7] in which the increase in nasal tip projection was 45% of the patients and the decrease was 40% of the patients. While 15% of the patients have no change.

The current study differ from the study done by Rod J. Rohrich[6] who found that tip projection increase in 65% and decrease in 27% , 8% had no change. Moreover, Amr N. Rabie[4] study found an increase in 70% of the patients and a decrease in 11% of the patients and unchanged results in 17% of the patients. The reason for this contradiction may be that they used another techniques to enhance tip projection other than columellar strut.

Our study differs from Koen Ingels[5] study as nasal tip projection is slightly increased from 0.58 to 0.60. Mohammad Sadeghi[8] study found an increase in nasal tip projection from 0.58 preoperatively to 0.63 postoperatively. While in our study, we found that external rhinoplasty caused a decrease in nasal tip projection, which is different from the study of koen ingels[5] in which external rhinoplasty does not cause an increase in nasal tip projection. In addition, we found that there is significant role of strut graft in maintaining nasal tip projection, which is similar with Rod J. Rohrich[6] study that strut graft does not necessarily increase the nasal tip projection. We agreed with Vuyk etal[7] study that the strut graft helps to maintain nasal tip projection as well as Amr N. Rabie[4] and Mohammad Sadeghi[8] studies. Moreover, in our study we found there are strong relationship between strut graft implantation and nasal tip projection (p-value 0.016).

Our results of patients with strut graft indicates minor increase in naso-labial angle. It is about 99 preoperatively to 99.5 postoperatively. This is similar to Koen Ingels[11] results in which there was an increase in nasolabial angle from 96 preoperatively to 97 postoperatively. Mohammad Sadeghi[8] study found an

increase in naso-labial angle preoperatively 97.5 to 107 postoperatively, Amr N. Rabi[4] study found an increase in naso-labial angle from 82 preoperatively to 97 postoperatively, but he used broad base strut graft that differ from our study. This study also is consistent with the study done by Koen Ingels etal[11] who concluded that columellar strut increases nasal tip rotation. Other studies like Rod J. Rohrich[6] and Vuyk etal[7] did not mention naso-labial angle.

This study showed that nasolabial angle increases in 44% of patients with implant strut graft and decreases in 33% with no change in 23% of the patients which similar to Rod J. Rohrich[6] study in which naso-labial angle increases in 46% patients and decreases in 34% patients with no change in 20% of the patients.

Our study showed no significant outcome on nasal tip rotation which means that strut graft has no effect on nasal tip rotation. If no changes occur to tripod mechanism, there is no significant relationship between strut graft and nasal tip rotation (p-value 0.461).

In the current study, we used other techniques (Pastorek etal[12]) other than columellar strut, which may enhance tip rotation including resection of cephalic end of lower lateral cartilages, lower lateral crural overlap and the use of septo-columellar suture. Thus, our study is similar to the study done by Sadeghi etal[8] which concluded that columellar strut graft is not an essential technique to enhance nasal tip rotation. Also this explain our result about nasal rotation of non-strut group from 95 to 103 which can be explained as the patients had subjected to cephalic trimming which affect the tripod mechanism and lead to a change in nasal tip rotation.

Conclusion; this study found that strut grafts are effective in maintaining the nasal tip projection and external rhinoplasty decreases nasal tip projection. In addition, we found that ' AutoCAD' program is a useful tool to evaluate operative results. The relative way of expressing parameters in ratios seemed to be a reliable good alternative than measuring photographs with a ruler.

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