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Columella Lengthening With A Split Thickness Costocondral Graft For Secondary Cleft Nose Repair: A Case Series

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Abstract
Background:
Cleft nasal deformity represents an inevitable challenge for reconstructive surgeons.Numerous techniques for secondary cleft rhinoplasty have been described in the literature over the past several decades, yet the lack of wide adoption of any given technique highlights the great variability seen with this problem.In this scenario our study has looked at the advantages and usefulness of split thickness costochondral graft in secondary cleft rhinoplasty.
Aims and Objectives:
To analyse the reliability of split thickness costochondral graft in secondary rhinoplasty and to evaluate nasal profiles before and after the surgery using the photogrammetric method.
Material & Methods:
A retrospective review was performed in 10 secondary cleft nasal deformity patients. All the patients underwent a split thickness costochondral graft to elongate the columella. Preoperative Nasal assessment was done withphotographs especially in worms and lateral view. Postoperative assessments were also done with photograph taken at immediate post op, three months, and six months intervals. Predetermined points were marked on the pre and postoperative photograph.
Results:
The means and standard deviations of the 12 variables were calculated before and after the operation, and p-values < 0.05 were considered to indicate statistical significance.The results confronted were, nasal profiles were improved in all patients. The columellar and nostril heights were increased. Most patients showed improved tip projection. The changes in the nasal profile were statistically significant. Columellar height, nostril height, and the columella-lip angle increased, and the nasal width decreased. The ratios of columellar height to nasal height, columellar height to nasal width, and nasal height to nasal width increased significant.
Conclusion:
In cleft lip nasal deformity correction, columellar lengthening is very important part of nasal reconstructive procedure. Even though various techniques and studies has been published in relation to columellar lengthening with various autogenous,non-autogenous grafts, costochondral graft is proven to be rigid when it comes support. Instead of harvesting a full thickness graft, split thickness graft has reduced complication, less time consuming, reliable, abundant, and relatively accessible donor with which to facilitate successful secondary rhinoplasty surgery.

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I. Introduction

Cleft nasal deformityrepresents an inevitablechallenge for reconstructive surgeons. This is justified because of the underlying anatomic deformities combined with scarring from previous procedures. Downward force of the short columella is due to an inferior-lying seal, underdeveloped medial crura, and contraction scars of previous operations on the cleft side[1]. Weak, inferiorly displaced lower lateral cartilage, which has weaker elastic recoil than the contra lateral side, causes deformity of the alar rim. A wide, depressed seal usually requires width reduction and augmentation. Excess soft triangle requires either displacement superiorly or removal to produce more symmetric nostrils[2].Numerous techniques for secondary cleft rhinoplasty have been described in the literature over the past several decades, yet the lack of wide adoption of any given technique highlights the great variability seen with this problem[3]. Regardless, the fundamental goals of achieving nasal symmetry have driven the progressive evolution of techniques developed to correct various aspects of the cleft

nasal deformity. In this scenario our study has looked at the advantages and usefulness of slpit thickness costochondral graft in secondary cleft rhinoplasty.

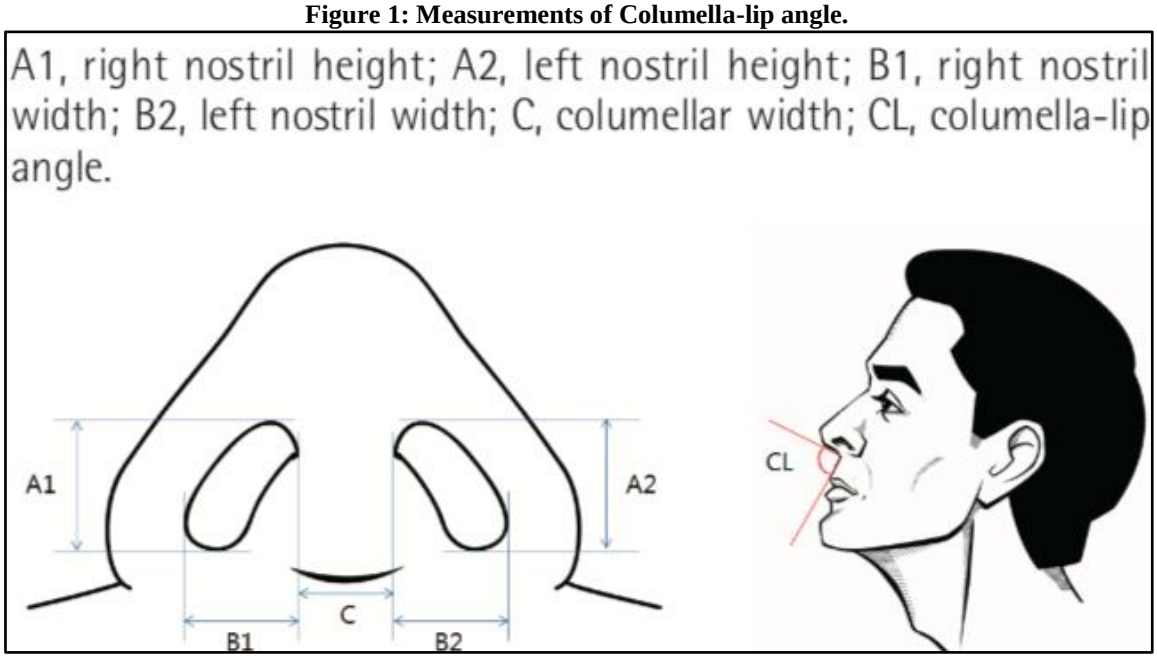
II. Aims And Objectives

To analyze the reliability of slpit thickness costochondral graft in secondary rhinoplasty and to evaluate nasal profiles before and after the surgery using the photogrammetric method.

III. Materias And Methods

A retrospective review was performed in 10 secondary cleft nasal deformity patients.All the patients underwent a slpit thickness costochondral graft to elongate the columella. PreopertiveNasal assesment was done withphotographs especially in worms and lateral view. Postoperative assessments were also done with photographtaken at immediate post op, three months,and six months intervals. Predetermined points were marked on the pre and postoperativephotograph. From the worms view we derive the columellar height, nasal height, nostril height, columellar width, nasal width, and nostril width measurements. Columella-lip angle was measured using lateral-view photographs (Fig -1) [11].

Figure 1: Measurements of Columella-lip angle.



SURGICAL TECHNIQUE

All the procedures were performed under general anaesthesia under aseptic precautions. Surgical site was painted and draped.Incision is marked approximately below the inframammary fold and measures 5 cm in length. The incision should not extend beyond the medial extent of the inframammary fold.In almost all our cases the 7th rib was harvested. The technique to expose the rib is as similar to those techniques described in the literature.When raising the STCG,after exposing the full cartilage expose the lateral and medial perichondrium till the center of the cartilage. Then excise the cartilage in the middle in an axial cut. Raise the STCG with help of any thin elevator or knife with 15 blades till the desired length is obtained[1, 7]. Once raised the remaining portion of the unexcised cartilage is noticed intact. Open rhinoplasty done in all cases, v shape incision placed, STCG placed and trans columellar incision placed with 5-0 prolene.

IV. Results

A retrospective review was performed of 10 cleft lip and nose patients who underwent secondary cheiloplasty with an open rhinoplasty. All operations were performed by a single plastic surgeon. five male patients and five female patients were included, with an average age at the time of surgery of 22.2 years (range, 17–35 years). The average duration of follow-up was 1 year. photographs were taken preoperatively and three months postoperatively for all patients. Using these photographs, we measured the pronasale, columellar peak, subnasale, and alar curvature point. The columellar height, nasal height, nostril height, columellar width, nasal width, and nostril width were measured from worm's eye view photographs. The columella-lip angle was measured using lateral-view photographs. The means and standard deviations of the 12 variables were calculated before and after the operation, and p-values < 0.05 were considered to indicate statistical

significance.The results confronted were, nasal profiles were improved in all patients. The columellar and nostril heights were increased. Most patients showed improved tip projection. The changes in the nasal profile were statistically significant. Columellar height, nostril height, and the columella-lip angle increased, and the nasal width decreased. The ratios of columellar height to nasal height, columellar height to nasal width, and nasal height to nasal width increased significant.

Table1: Patient Criteria Included in The Study-Preoperative Values.

NASAL PROFILE	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10
CLEFT SIDE	L	R	L	L	L	R	R	R	L	L
Columellar height (mm)	6.9	6.1	6.3	6.8	6.3	6.6	6.8	6.9	6.9	6.6
Columellar width (mm)	9.2	8.6	8.6	9.0	8.6	8.3	8.8	9.0	8.8	8.5
Nostril height, right (mm)	6.8	6.0	6.6	6.6	5.8	6.8	6.0	5.6	6.0	5.8
Nostril height, left (mm)	6.7	6.6	6.0	5.8	5.6	6.9	6.2	6.0	5.5	5.5
Nostril width, right (mm)	10.3	9.8	9.9	10.0	9.9	10.2	10.2	8.8	10.2	9.8
Nostril width, left (mm)	10.5	10.0	10.0	10.2	10.2	10.2	10.3	9.0	10.3	10.0
Nasal height (mm)	24.2	22.8	25.0	24.8	24.0	23.9	24.0	24.4	24.3	24.3
Nasal width (mm)	46.1	44.8	46.8	44.6	44.4	42.6	46.9	46.8	46.1	45.8
Columella-lip angle (°)	99.2	98	99	96	98	98	96.6	98.2	98	96.8

Table 2: Patient Criteria Included in The Study-Post Operative Values.

NASAL PROFILE	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10
CLEFT SIDE	L	R	L	L	L	R	R	R	L	L
Columellar height (mm)	11.3	11.8	11.4	12.0	11.6	11.6	11.8	10.9	11.2	11.4
Columellar width (mm)	8.8	9.2	8.9	8.8	9.0	8.8	9.0	9.2	8.8	9.0
Nostril height, right (mm)	9.6	9.6	10.0	10.1	9.9	10.6	10.0	10.2	9.8	10.0
Nostril height, left (mm)	9.8	10.0	9.8	8.4	9.8	10.0	9.9	10.2	8.6	9.8
Nostril width, right (mm)	9.3	9.2	9.0	9.1	9.0	9.4	9.2	9.2	9.2	9.3
Nostril width, left (mm)	9.6	9.6	10.0	10.1	10.0	9.6	9.6	9.8	10.1	9.4
Nasal height (mm)	26.4	28.0	29.0	29.3	29.0	27.8	28.2	28.0	29.3	26.0
Nasal width (mm)	43	44.2	44.8	46.0	44.8	44.2	44.2	44.2	44.8	43.2
Columella-lip angle (°)	108	110	108	102	106	111	105	106	108	104

V. Discussion

Therefore, it can be ascertained that the objectives of a rhinoplasty are positioning of lower lateral cartilage to a more normal anatomic position, achieving symmetric projection of both alar domes, elongation of columella when deemed necessary, moving the cleft alar base more medially to achieve nasal floor symmetry and to provide a structural support by means of bone or cartilage grafts. In patients with a severely shortened columella, elongation of the columella is necessary to achieve the desired shape of the nose without any tension or distortion[5,10].There are five potential donor sites for autologous grafts in secondary rhinoplasty: septal cartilage, auricular cartilage, rib cartilage, and iliac and calvarial bone. The septum is the preferred source in secondary rhinoplasty because it requires no additional incisions, there is no significant donor site morbidity, and its harvest may correct septal deviations and improve the airway. Unfortunately, the quantity of septal cartilage available is frequently insufficient, which mandates the use of alternative donor sites.use of rib cartilage has several disadvantages. First, an additional incision at a distant donor site is required to harvest the cartilage. Fortunately, the resulting scar is relatively short (approximately 5 cm) and is generally inconspicuous in women because of its placement under the breast. Additional concerns include postoperative pain, the risk of pneumothorax, and the potential of rib cartilage to warp. The latter may lead to long-term postoperative distortions of nasal shape. In older patients, ossification of the cartilaginous rib is a significant concern[1,4].The rib offers an abundant supply of cartilage for use in virtually every aspect of secondary rhinoplasty and is the preferred donor site when rigid support is necessary with reliable structural support . The most significant advantage of rib cartilage is that grafts can be produced with considerable versatility with respect to shape, length, and width. This facilitates reconstruction of the nasal framework in patients with virtually all types of functional and aesthetic requirements[9].

VI. Conclusion

In cleft lip nasal deformity correction, columellar lengthening is very important part of nasal reconstructive procedure.Even though various techniques and studies has been published in relation to columellar lenghtening with various autogenous , non autogenous grafts, costacondral graft is proven to be rigid

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