Cleft Lip Nasal Deformity: Primary Repair

MAHMOUD F. EL-BESTAR, M.D.* and OMAR MANSOUR, M.D.**

The Departments of Otolaryngology and Pediatric Surgery**, Facultty of Medicine, Cairo University.*

ABSTRACT

Primary correction of the unilateral cleft lip nasal deformity has been reappraised in the last two decades, on account of its superior results in nasal symmetry. Our objective was to compare nasal symmetry in patients who underwent primary repair to those who underwent lip repair only. This study was conducted at the Children Hospital, Cairo University, during the period from April 1st, 2001 to March 31st, 2003. Ten patients with unilateral cleft lip underwent the classic Millard advancement rotation lip closure with open structure rhinoplasty to suspend the prolapsed alar cartilage (Group A). The other group of patients (Group B), included ten patients with unilateral cleft lip and underwent only Millard repair of the lip without approaching the nasal deformity. The two groups of patients were followed up for an average of 12.5 months. Assessment of results was carried using linear and angular measurement obtained after photographic documentation and presented as a score. Both individual parameter scores and overall symmetry scores showed better results among group A than group B. No complications as hematoma, skin necrosis or wound infection were encountered in either group. We conclude that primary rhinoplasty improves nasal symmetry in patients with unilateral cleft lip deformity. This does not exclude the possibility of later revision surgery, however, it significantly increases the aesthetic outcome should these surgeries are performed.

INTRODUCTION

Unilateral cleft lip nasal deformity is a challenging problem in all aspects. The continued growth of the nasal septum on one hand and the arrested cleft-side maxilla on the other, subjects the alar cartilage to undue forces, splaying it apart. The resultant deformity possesses considerable psychological burden on children born with unilateral cleft lip [1].

The great multitude of rhinoplasty techniques developed since the 1920s serves as a testament to the difficult nature of the secondary cleft rhinoplasty. Among the controversies encountered in managing this problem is the timing of intervention for nasal deformity correction. With impoevment in cleft lip surgery, there was a growing interest for correction of the nose at the time of lip repair. These trials were hindered by the risk of growth interruption and the relapse of the deformity after primary repair [2].

However, in the last two decades, there has been a re-appraisal to the concept of primary rhinoplasty in unilateral cleft lip management. Senior cleft surgeons, as Millard, McComb and Salyer provided encouraging results after reviewing the long-term results of primary repair. They proved that there was no interruption of growth by early surgery and reported stable results up to 18 years after surgery [1,3,4].

Primary nasal surgery results in a more symmetrical nose and a better overall appearance early in life of a patient with cleft lip nasal deformity. Even when rhinoplasty is required after nasal growth is complete, the deformity at that time is less severe and more amenable to a better final result [5]. At the present time, primary repair of the nasal deformity is an integral part in the protocol for management of unilateral cleft lip at most craniofacial institutions [4]. In this study, we are following the trend for primary rhinoplasty in unilateral cleft lip management. The technique used is presented as well as the postoperative results.

MATERIAL AND METHODS

Twenty patients with unilateral cleft lip were operated upon at Cairo University Hospitals in the period from April 1st, 2001 to March 31st, 2003. Ten patients were subjected to Millard rotation advancement repair of the cleft lip with primary rhinoplasty for the deformed nose (Group A). Included also in the study another ten patients who underwent lip repair without nasal deformity correction (Group B). All group B patients underwent the same technique for lip repair, the Millard rotation advancement repair, without any attempt to correct the nasal deformity.

Preoperative history taking included the date of birth, history of consanguinity between parents, history of risk exposure during pregnancy and history of similar conditions among siblings. Age of patients at surgery ranged from 4 to 6 months. Twelve males and 8 females were included. History of consanguinity between parents was obtained in 5 patients. In one case, the mother reported the use of systemic antibiotic (the exact nature was not known) during the first trimester History of similar cleft in siblings was not obtained among any of the patients. Patients with complex facial clefts other than the lip were excluded from the study. Photo documentation was then performed. Sets of photographs included front views and basal "worm eye's" views. The type of the cleft deformity is defined, cleft lip only (n = 4), cleft lip with alveolus (n = 8) and cleft lip, alveolus and palate (n = 8).

Surgical technique:

All procedures were done under general anesthesia with oral endotracheal intubation. The skin incisions were then marked using a marking pen, after obtaining the classic measurements for lip repair. The nasal incisions included a flying bird incision along the columella, with both wings extending in the nasal vestibule on either side.

After preparing all lip incisions and before approximating both sides of the cleft together, the nasal part was performed. The skin was dissected off the underlying alar cartilages on both sides. On the cleft side, the vestibular skin underneath the cleft side alar cartilage is dissected as well. The prolapsed cartilage is then suspended using permanent sutures to the overlying upper lateral cartilages and to the contralateral normal cartilage. After obtaining skeletal symmetry, the lip and nasal incisions were closed, starting by the nasal floor downwards.

Assessment of results:

Postoperative assessment included sets of photographs in the front and basal views obtained at six months intervals. The photo set that was used for measurement was the one obtained at the last follow up. In that set, linear and angular measurements served to assess the result. Linear measurements included the length of the hemi-columella and the alar base placement. Angular measurements included the columellar angle and the angle of hooding (Fig. 1).

These measurements are obtained on a magnified scale, by projecting the basal view of the patient on a screen, copying the view on a white paper, fixing the points of interest, then obtaining the measurements. For angular measurements, the unit was the "angle degree", while in the linear measurements the unit used was the length in cm (magnified view). There was no need to have a control for linear measurements, since the actual value was not our goal; the goal was comparison between the cleft and the normal sides. By comparing the cleft side measurement to the normal side, we then estimate a score of symmetry. Mild asymmetry was given a score of 3, moderate asymmetry a score of 2 and marked asymmetry a score of 1.

Accordingly, for each patient, we got four parameters in which the cleft side is compared with the normal side: the hemi-columellar length, the alar base placement, the columellar angle and the angle of hooding. For each parameter, the patient got an individual parameter score. Then the average of these four scores was calculated to represent the overall asymmetry score.

The overall asymmetry scores of Group A and B were then compared to assess the difference in outcome between patients who underwent primary nasal correction with lip repair with those who underwent lip repair only.

RESULTS

For group A, the hemicolumellar length asymmetry average score was 2.8. The alar base placement score was 2.2. The columellar angle asymmetry score was on average 2.5, while the angle of hooding average score was 1.9 (Table 1).

For group B, the hemicolumellar length asymmetry average score was 2.5. The alar base placement score was 2.1. The columellar angle asymmetry score was on average 2.2, while the angle of hooding average score was 1.5 (Table 2).

The overall asymmetry scores in group A ranged from 5 to 11, with an average of 9.3. In group B, the overall scores ranged from 5 to 10, with an average of 8.3. The follow up period ranged from three to twenty months, with an average of 12.5 months.

In both groups, no significant complications occurred. There were no complications encountered such as wound infection, hematoma or skin necrosis. In two patients among group A, fibrosis caused a mild degree of vestibular stenosis.

Revision surgery needed in one patient among group A, after relapse of the deformity 8 months after initial repair. Revision surgery simply restored skeletal repositioning using suspension sutures, utilizing the closed technique and fixed externally by bolsters maintained for six months. It is believed that the rapid relapse could have happened due to slipped suture knots or break in the suture material shortly after repair. Closed approach was elected to avoid extensive fibrosis with consequent vestibular stenosis in the future.
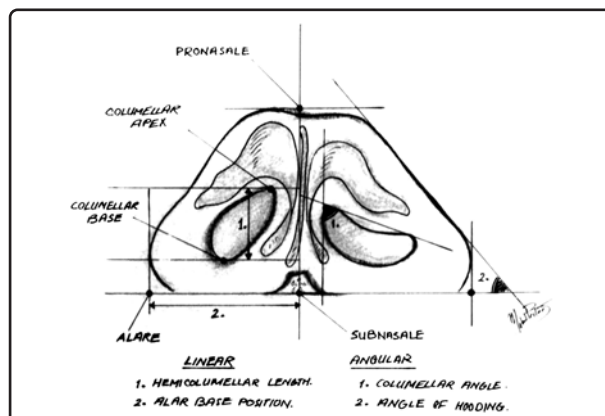

Fig. (1): Diagrams showing: Reference Points (PRN: pronasale/AL: alare/SN: subnasale/CA: columellar apex/CB; columellar base), linear and angular measurements.

Fig. (2-A)
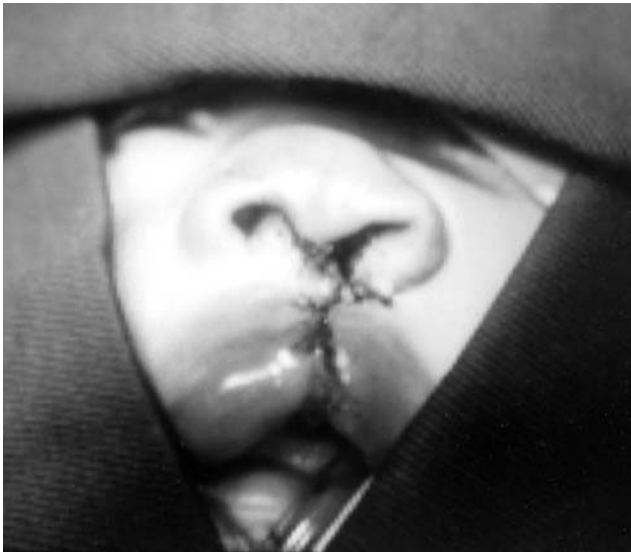

Fig. (2-B)

Fig. (2-C)

Fig. (2): Photographs of a patient with unilateral cleft lip who underwent primary rhinoplasty:

A- Preoperative view.

B- Intraoperative view showing the dissection of the alar cartilages.

C- Intraoperative view after closure.

Fig. (3): Photographs showing another patient who underwent primary rhinoplasty:

A- Intraoperative view after closure of the wound.

B- Immediate postoperative view.

Fig. (4-A): A patient after primary rhinoplasty showing near symmetry of his nose.

Fig. (4-B): A patient with only lip closure, showing the classic nasal deformity.

Table (1): Group A: patients with primary rhinoplasty.

No.	Last F/U	HCL	AB	CA	HA	Symscore
1	20	3	2	2	2	9
2	19	3	2	2	1	8
3	17	2	1	2	1	5
4	15	3	3	2	2	10
5	15	3	2	3	2	10
6	12	3	2	3	1	9
7	10	2	3	3	2	10
8	8	3	2	3	3	11
9	5	3	2	2	3	10
10	4	3	3	3	2	11

No : Patient's number.
F/U : Follow up in months.
HCL: Hemicolumellar length.
AB : Alar base position.
CA: Columellar angle.
HA: Hooding angle.
Symscore: Overall symmetry score.

Table (2): Group B: patients without rhinoplasty.

No.	Last F/U	HCL	AB	CA	HA	Symscore
1	18	2	2	2	2	8
2	18	2	1	2	1	6
3	16	2	1	1	1	5
4	15	3	2	2	1	8
5	15	3	3	2	2	10
6	12	3	2	3	1	9
7	8	3	2	3	2	10
8	7	3	3	2	2	10
9	4	2	3	3	2	10
10	3	2	2	2	1	7

DISCUSSION

Unilateral cleft lip nasal deformity is the resultant of the undue forces, to which the nasal tip is subjected due to uncoupling of the palatal shelves. The alar cartilage is splayed apart and is caudally rotated as a bucket handle [2] (Fig. 2a). Primary nasal repair in unilateral cleft lip has gone in the last seven decades through cycles of development and appraisal, criticism and discouragement then finally reappraisal. Seventy years ago, the methods of cleft lip repair started to improve dramatically. While these methods continued to improve, attempts were also made to correct the associated nasal deformity. Different techniques were then described including skeletal repositioning with or without soft tissue reshaping [1,6]. Enthusiasm was overt in an attempt to produce symmetry as early as possible. This period represented the evolution of the concept, with efforts to standardize a technique for correction.

Then came the time when criticism of the concept evolved, based on the results obtained "Noses that looked good on the operating table usually reverted to the typical cleft lip nasal deformity with additional scarring and stenosis that resulted from this type of early surgery" [2]. These words by a world renown cleft surgeon as McComb, represent the disappointing results obtained, suppressing the previous enthusiasm of the evolving concept. In addition the risk of growth impairment to the underlying delicate nasal cartilages remained in question and consequently applied constraints against primary correction. Accordingly, primary correction has been discouraged for these two reasons, relapse and growth impairment. Relapse was almost a fact and growth impairment was a theoretical fear, that needed research to confirm. This experience with primary repair had led most surgeons to the conclusion that correction of the nasal deformity should be postponed until nasal growth is complete.

The concept of primary repair of the nasal deformity was then reappraised after the long-term results were published. McComb and Salyer reported excellent results on reviewing their patients after more than ten years. Furthermore, these longitudinal studies proved that the nasal cartilage growth is not affected by primary nasal surgery [3,6,7]. With these results in hand, with the embarrassment of the affected children from their appearance and with the increasing resistance of adult cartilages for reshaping, the concept of primary rhinoplasty was reestablished.

Millard, McComb and Salyer utilize the same incisions used for lip repair in their primary rhinoplasties. This evidently is least invasive and minimizes scarring and fibrosis, especially that which can occur in the nasal vestibule with subsequent narrowing of the nostril [1,6,7]. It may be easy for world renowned surgeons as Millard and McComb with their respectable abilities and experience to use lip incisions, however, for teaching curves, exposure is quite limited unless additional incisions are made. Byrd and Salomon reported 60% success in primary nasal correction utilizing the lip incisions, while 40% of their patients who needed further surgery were approached through an open rhinoplasty approach [8]. Armstrong et al., reported excellent results up to five years after their primary repair utilizing the open approach [9]. There is an increasing tendency among cleft surgeons to modify the classic Millard technique of lip repair to suit their approach to the nasal deformity [10,11]. In this study the lip incisions were extended along the caudal margins of the lower lateral cartilages, crossing the columellar base. This open rhinoplasty approach provided a wide exposure of the alar cartilages, which are considered to be the cornerstone in repair of the nasal deformity (Fig. 2b).

Alar lift remains to be the cornerstone in nasal correction. The prolapsed cartilage has to be pulled to its normal position and suspended there by permanent sutures. Absolute perfection should be the goal in this particular key step. The accuracy of repositioning and suspension determines to a great extent the long-term results of the nasal repair. Suspension can be either performed by the closed or open method. The closed method implies permanent sutures placed through the external skin and fixed by bolsters. This has been described with success by Millard, Salyer and McComb [1,6,7]. In this study, the open rhinoplasty approach allowed internal suspension, attaching the cleft alar cartilage, to its contralateral done, to the ipsi and contralateral upper lateral cartilages. Retaining the achieved position of the alar cartilage has been a point of discussion. While most surgeons only depend on their suspension sutures, others recommend additional splintage to maintain the position of the cartilage. The alar cartilage is subjected to deformational forces caused by the scar. External splinting was thus advocated to be retained for six months [12]. With the use of external splints, some drawbacks were reported, such as depression of the nostril sill, skin necrosis in addition to patient noncompliance. Wong, Burvin and Mulliken, presented

a new splinting method using a resorbable internal nostril splint. They reported considerable drop in asymmetry among their patients compared to a control group, without the drawbacks of the external splints [13]. The most valuable advantage for primary nasal repair is that closure of the nasal floor is not performed except after the alar lift has been done and secured [2]. Reversing the alar swing into its normal position changes the orientation of tissues at the region of the nasal floor. Closing the nasal floor thereafter, with the new tissue orientation, adds to the chances of obtaining nasal symmetry after surgery.

Assessment of results can be obtained by raters review or by computer-assisted measurements. The method used in this study consisted of simple linear and angular measurements obtained by projecting the photograph of the basal view (Fig. 1). Certain points were marked as reference points, such as the pronasale, subnasale, alare, hemicolumellar base and apex. Linear measurements included the hemi-columellar length and the location of the alar base. Angular measurements included the columellar angle and the angle of hooding. Comparing the values in the repaired side to the normal side can give an indication of the symmetry obtained. In addition to the individual score for each parameter, the overall score of each patient can be easily calculated. This scoring system was advocated by the same authors in a previous study [14].

Early postoperative results appear encouraging in most series. Satisfactory symmetry of the nose can be obtained with high rate of success after primary repair. Results obtained in this study showed reasonable results obtained through a median follow-up period of 12.5 months (Figs. 2c, 3). Total scores obtained showed better symmetry in the group who underwent primary correction (Group A) than that who did not (Group B). The average score for group A was 9.3 as compared to 8.3 for group B (Fig. 4). Angular measurements, in particular, were evidently improved. This goes with the results of Brusse et al. [15] who reported significant difference in angular measurements obtained by sophisticated computer-aided measurements, between patients who underwent primary rhinoplasty and those who did not.

Most cleft surgeons, if not all, report the need for secondary surgery at adolescence [9,10,16]. It is however, the extent of the deformity to be corrected that makes the difference. In patients who underwent primary nasal correction with lip closure, the extent of further correction is limited to touch-ups and fine-tuning with excellent results [10]. Otherwise, leaving the nose untouched can lead to a long standing complex nasal deformity, with mature cartilage, resistant to molding and reshaping. The only deformity that is left for adult life is the nasal septal deviation. Most authors prefer to deal with it at the secondary session [3,4]. Another factor that encourages early intervention in this study is the absence of complications, such as skin necrosis, wound infection or breakdown and vestibular stenosis. In this study, no wound infection, break-down or skin loss was encountered. However, in two patients, the rim incision ended up with a thick band, that causes an element of nostril stenosis.

In conclusion, the concept of primary correction of the nasal deformity at the time of lip repair is attractive. It provides an opportunity to obtain symmetry, with pliable cartilage that can be shaped without difficulty. Perfect alar lift remains to be the cornerstone in such surgery, to be followed by closure of the nasal floor. The classic Millard advancement rotation technique for repair of unilateral cleft lip can either be utilized to approach the nose, or modified by adding minimal incisions for wider exposure.

REFERENCES

1- Millard R.: Unilateral cleft lip deformity. Mc Carthy, Plastic Surgery, Volume 4, WB Saunders, Philadelphia PA, 52/2627-52, 1990.

2- McComb H.: Primary repair of the cleft lip nose: McCarthy, Plastic Surgery, Volume 4, WB Saunders, Philadelphia, PA, 53/2708-14, 1990.

3- McComb H. & Coghlan B.: Primary repair of the unilateral cleft lip nose: Completion of a longitudinal study. Cleft Palate Craniofac. J., 33: 23-30, 1996.

4- Salyer K.: Early and late treatment of unilateral cleft nasal deformity. Cleft Palate Craniofac. J., 29 (6): 556-69, 1992.

5- LaRossa D. and Donath G.: Primary nasoplasty in unilateral and bilateral cleft nasal deformity. Clin. Plast. Surg., 20: 781-791, 1993.

6- Salyer K.: Primary correction of the unilateral cleft lip nose: a 15-year experience. Plast. Reconstr. Surg., 77 (4): 558-68, 1986.

7- McComb H.: Primary correction of unilateral cleft lip nasal deformity: a 10-year review. Plast. Reconstr. Surg., 75 (6): 791-9, 1985.

8- Byrd H. and Salomon J.: Primary correction of the unilateral cleft nasal deformity. Plast. Reconstr. Surg., 106 (6): 1276-86, 2000.

9- Armstrong G., Burk R., Griffin D., et al.: A modification of the primary nasal correction in the rotation-advancement

unilateral cleft lip repair. Ann. Plast. Surg., 38 (3): 236-45, 1997.

10- Clark J., Skoner J. and Wang T.: Repair of the unilateral cleft lip/nose deformity: Facial Plast. Surg., 19 (1): 29-40, 2003.

11- Shih C. and Sykes J.: Correction of the cleft-lip nasal deformity. Facial Plast. Surg., 18 (4): 253-62, 2002.

12- Yeow V., Chen K., Chen Y., et al.: The use of nasal splints in the primary management of unilateral cleft nasal deformity. Plast. Reconstr. Surg., 103 (5): 1347-54, 1999.

13- Wong G., Burvin R. and Mulliken J.: Resorbable internal splint: an adjunct to primary correction of unilateral cleft lip-nasal deformity. Plast. Reconstr. Surg., 110 (2): 385-91, 2002.

14- Mansour O. and El-Bestar M.: Skeletal repositioning in repair of unilateral cleft lip nasal deformity: assessment of results. Egypt. J. Plast. Reconstr. Surg., 25/2: 89-96, 2001.

15- Brusse C., Van der Werff J., Stevens H., et al.: Symmetry and morbidity assessment of unilateral complete cleft lip nose corrected with or without primary nasal correction. Cleft Palate Craniofac. J., 36 (4): 361-6, 1999.

16- Cussons P., Murison M., Fernandez A.E., et al.: A panel based assessment of early versus no nasal correction of the cleft lip nose. Br. J. Plast. Surg., 46: 7-12, 1993.