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Rhinoplasty in the Cleft Lip Patient

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Several important factors to consider in the surgical repair of the cleft lip nose are described: the importance of an adequate lip closure technique to ensure symmetry can prevent a more conspicuous deformity of the nose during growth, the consequences of secondary rhinoplasty in the growing nose in which the surgeon has to weigh the possible growth inhibition due to scar tissue against the possible functional and esthetic improvement, a systematic surgical approach in which the operative procedure is divided into different steps, and the use of autogenous graft material. In the evaluation of 52 cleft lip patients (5 bilateral clefts, 47 complete unilateral clefts) who had undergone a secondary rhinoplasty, two specific postoperative problems were encountered: slight to moderate recurrence of the caudal septal deviation (in unilateral clefts) and restenosis of the nasal vestibule at the cleft side. Adjustment of the surgical technique and the use of a custom-made vestibulum device diminished these sequelae considerably.

KEY WORDS: *cleft lip closure, cleft lip nose, external approach, nasal growth, rhinoplasty, septal deviation, vestibular stenosis, vestibulum device*

In surgical repair of the cleft lip nose, the timing of the operation (during lip closure, before or after the puberty growth spurt), and the operative technique (the grade of disturbance of the integrity of the nasal framework) play a key role in the final result. Clinical observations and cephalometric studies by Mestre et al. (1960), Ortiz-Monasterio et al. (1959), and Van Limborgh (1964) suggest that there is a normal growth potential of the facial skeleton in cleft lip patients. From the research of Verwoerd-Verhoef (1970), one can conclude that the development of skull deformities in the presence of (artificial) clefts in rabbits is characteristic of the type of cleft. This phenomenon could also be observed in human skulls of adults with untreated clefts. Moreover, the described features are almost identical to those seen in human skulls. These experiments were started in healthy normal rabbits and the conclusion may be drawn that the skeletal deviations in rabbits are secondary to the presence of the cleft. Consequently, the anomalies in skulls of untreated patients have to be considered of secondary nature too.

The characteristic pattern of growth disturbances arises as a result of a special type of cleft. These findings are contra-

dictory to the assumption that the deformities are an intrinsic part of the cleft syndrome. Clinical observation of the 52 cleft lip patients operated on did not show hypoplasia of the bony and/or cartilaginous nasal skeleton, only distortion (i.e., deviation due to the cleft syndrome). This suggests that there is a normal intrinsic growth potential of the nasal skeleton in the cleft lip patient. Normal growth depends on the absence of inhibitional factors such as iatrogenic scar tissue, and a normal location of the alar base (unilateral cleft patient) and normal length of the columella (bilateral cleft patient). The best final results will be obtained with the nasal skeleton and the nasal base (maxilla) in as normal a symmetric position as possible, and with the least disturbance of the skeletal integrity and scar tissue during the process of growing.

Timing of the Operation

Depending on the lip repair technique used, the deformity of the nose will become more or less pronounced in the postoperative period during facial growth. Therefore, re-allocation of the alar base to create an as symmetric and normal a position as possible, and for the bilateral cleft combined with a lengthening procedure for the short columella, may help in preventing some of the surgical and psychological problems in the future. To ensure better symmetry of the tip and alae, and to prevent a more conspicuous deformity during growth, we changed our lip closure technique (Millard) in 1990 into the wave-line technique (Pfeifer et al., 1970b, 1991), combined with his special ala-advancing mattress suture, to ensure better symmetry of the nasal tip. With a follow-up of 1 to 3

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FIGURE 1A and B Pre- and postoperative photographs of cleft lip repair with the Pfeifer wave-line technique.

years, the results (28 patients with a completely unilateral cleft, compared with the results of the patients operated on with the old technique) showed better symmetry (Figs. 1 A and B). Primary surgical repair of the nose (more than an extended lip closure technique as described above) induces—depending on the operation technique—more or less scar tissue resulting in some degree of growth inhibition. When tip surgery is combined with septal surgery, the surgeon should be aware that disturbance of continuity of the nasal septum will interfere with midfacial growth (Nolst Trenité et al., 1987; Verwoerd et al., 1979a, b).

Pigott (1985) described a technique for repositioning the total alar cartilage (cleft site) as primary cleft lip repair in unilateral clefts. After a follow-up of more than 20 years, he concluded that radical undermining of the skin over the nasal cartilage of 3-month-old infants does not impair growth of the tip of the nose. Nevertheless, most of the children operated on with the alar leapfrog technique have suffered some degree of reduction of the circumference of the vestibule.

Although there is a traditional reluctance to perform rhinoplasty on the growing nose as this can interfere with facial growth, the use of new atraumatic operative techniques has created a tendency to correct nasal deformities before puberty. Experimental work of the Verwoerd group (Nolst Trenité et

FIGURE 2A Nose mask for cast making, plaster of Paris cast of the nose, and a vestibulum device.

al. 1987, 1988; Poubon, 1987; Verwoerd et al., 1979a, 1991) has shown that even with these new atraumatic operative techniques, a loss of integrity of the cartilaginous nasal skeleton will result in some kind of growth inhibition of the nose and midface. The surgeon has to weigh the possible advan-

FIGURE 2B Custom-made vestibulum device.

FIGURE 2C Patient with unilateral cleft after secondary rhinoplasty with a device in situ.

tages (functional, growth directional, and psychological) against the possible disadvantages in form and function, due to growth inhibition. Positive short-term results can be overshadowed by growth disturbances, which express themselves during the puberty growth spurt. A rhinoplasty before the puberty growth spurt, indicated in cases of severe functional impairment, severe psychological problems, or to stop further expression of the deformity induced by septal growth, can increase tip deformity caused by postoperative scar-tissue retraction. To prevent this scar-tissue retraction and to ensure good form and function, a special custom-made device was developed (Nolst Trenité, 1994, 1995), based on the nostril splint as described by Nakajima et al. (1992) (Figs. 2A–C). The patient must wear this vestibulum device day and night during the first 6 postoperative weeks, and for the following 6 weeks only at night. All patients (N = 26, follow-up 3 months to 3 years) tolerated their vestibulum device very well. There was no local reaction of the vestibulum skin. The preliminary results are encouraging; however, they should not diminish the reluctance to operate before the puberty growth

FIGURE 3A and B Preoperative lateral and basal view of a bilateral cleft patient.

spurt until experimental and long-term clinical research has proven the applicability of such a device.

Operative Technique

Rhinoplasty in the cleft lip patient (and especially in combination with an alveolar cleft) is very challenging due to its complex pathology, and also frustrating due to its limitations in the final postoperative result. This complex operative procedure (Nolst Trenité, 1992, 1995; Verwoerd et al., 1995) can be divided into: (1) septal surgery, (2) tip surgery, (3) osseocartilaginous vault surgery, (4) maxillary augmentation, and (5) vestibuloplasty with alar base reallocation.

Although the sequence of the operative steps may change according to individual cases and personal preferences, it should be as logical as possible. The choice of the surgical approach, external or endonasal, depends on the severity of the deformity. If there is a mild deformity of the nasal tip, a closed (endonasal) approach is appropriate. Nevertheless, in most cases, the external approach is the approach of choice (Figs. 3A–H).

To rebuild a nose, the following grafts and implants are often indicated: (1) columella strut for tip projection, (2) shield graft/tip graft for tip definition, (3) dorsal graft for

FIGURE 3C and D Columella V incision followed by dissection in a sub-perichondrial plane with converse scissors.

dorsal height, and (4) premaxillary implant to restore maxillary support for the nose (ala).

Autogenous septal or ear-cartilage grafts are the first choice over allogeneic and nonbiologic material. For maxillary augmentation, nonbiologic material such as Proplast and Gore-tex can also be used. In case of a severe retroposition of the maxilla, a maxillary advancement procedure is indicated.

FIGURE 3E and F E: Shield graft sutured in place.

F: V-Y advancement procedure to lengthen the columella.

RESULTS

From 1988 to 1994, 52 rhinoplasties were performed in cleft lip patients (27 females, 25 males), of which five had bilateral clefts and 47 had completely unilateral clefts. The age distribution ranged from 15 to 44 years, with 30 adolescents between the ages of 15 and 18 years.

FIGURE 3G and H Direct postoperative situation after vestibular Z-plasty and alar-base wedge resections.

FIGURE 4A through F Pre- (A–C) and postoperative (D–F) photographs in a unilateral cleft lip patient (2 years' follow-up).

Follow-up was from 1 to 6 years. From the adolescence group, four male patients had follow-up to the age of 18. Since the caudal septum has a tendency to grow beyond the end of the growth spurt, an end result could not be assessed in these four cases. Evaluation of the results comparing the pre- and postoperative photographic base views of the nose showed subjective and objective functional esthetic improvement in 95%, although no complete symmetry in basal view was achieved (Figs. 4A–F). Two specific postoperative problems were encountered: the first was a slight-to-moderate recurrence of the caudal septal deviation (nearly 30%); this recurrence diminished considerably after using a fixation suture around

the reallocated anterior nasal spine, which ensured the midline position of the caudal septum. The second postoperative problem was the recurrence of the postoperative narrowing of the vestibulum after vestibuloplasty. We observed more narrowing than in the preoperative situation in 10%. The use of a vestibulum device, as described above, should prevent the postoperative narrowing of the vestibulum. The preliminary results are encouraging.

CONCLUSION

Several important factors to consider in surgical repair of the cleft-lip nose were described above. An adequate lip-closure

technique to ensure symmetry can prevent a more conspicuous deformity during growth and eliminate the need for primary nasal surgery with formation of scar tissue as a consequence, resulting in growth disturbance. Secondary rhinoplasty before the puberty growth spurt should only be done if strictly indicated, in which event the surgeon has to weigh the possible growth inhibition against the possible functional and esthetic improvement. In view of the complexity of this pathology, it is helpful to divide the operative procedure into different steps, as described above. The use of a custom-made vestibulum device seems to prevent scar retraction in the earlier postoperative period. Experimental work and long-term follow-up are mandatory before the traditional reluctance to perform a rhinoplasty on a growing nose can be diminished.

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