

Pediatric Facial Plastic and Reconstructive Surgery

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Chapter 15: Secondary Repair of the Cleft Lip and Nose

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There is nothing quite so challenging as, or more exasperating than, the attempt to correct the cleft lip nose, be it unilateral or bilateral. Over the years surgeons have added various techniques, the success of which depend upon the degree of the initial deformity, the type of initial repair, and finally the surgeon's own skill.

The Unilateral Deformity

As with any surgical problem, possible solutions lie in an understanding of the underlying deformity. The unilateral cleft lip nose deformity was beautifully described by Huffman and Lierle in their classic 1949 paper.

A composite base view of the typical unilateral cleft lip nose is shown. The nasal tip is deflected away from the cleft; the dome of the cleft side is retroplaced; the angle between the medial and lateral crus is obtuse, producing a "blunting" of the nares; there is a buckling rather than an outward curve of the ala; and there is an absence of the alar-facial groove with attachment to the face at an obtuse angle. In addition, there is real or apparent deficient bony development under the alar-facial attachment. The nares shows an overly wide dorsal extremity, a circumference greater than its fellow, and the entire nares is retroplaced compared to the uninvolved side.

The columella deformities include a shorter columella on the cleft side, a medial crus on the cleft side that is retroplaced, and an obliquely slanted columella toward the involved side of the nose and lip. In addition to all of the above, Berkeley pointed out the bowstring-like contracture of the inner nostril from its apex to the piriform aperture, and finally Millard noted the asymmetry of the axis of the two nostrils, with normal being almost vertical and the cleft nostril almost transverse.

The Bilateral Deformity

There are several specific deformities with a bilateral cleft lip nose. The columella is very short, and the medial crura are displaced into the prolabium. There is poor tip projection because of separation and downward displacement of the alar domes, resulting in a bifid appearance. The angle of the dome is quite obtuse, enhancing the nasal tip flatness. The axis of the nostrils is nearly horizontal instead of vertical, with the resultant appearance of a webbing overhang of the medial alar rims and flaring of the alar bases.

Intranasally there is contracture and deficiency of the vestibular lining, flatness of the nasal floors, and retropositioning of the maxilla. In short, it is about the same appearance as you would get by depressing the nasal tip to the lip with your thumb.

Surgical Objective

The goal of cleft nose reconstruction is the same, whether unilateral or bilateral: a symmetrical, normal-appearing nose in harmony with the rest of the face and compatible with the patient's ethnic background. The projection desirable in a nasal tip in a patient of Irish background is much more than that needed in an Oriental patient. Additional goals include, of course, improvement in nasal function and patient self-image.

Timing

Nobody has the answer for the best time to perform revision surgery. Surgeons develop during their careers a feeling for timing relative to each patient. Such feelings are based on a knowledge of the psychological and physical development of children.

We usually perform nasal tip/columella reconstruction at 4 to 6 years of age, when the children are entering kindergarten and first grade. The rest of the secondary procedures, ie, further nasal tip, lip, and septorhinoplasty procedures, are delayed until the midteen years.

Since the parents are placing a great deal of trust and high expectations on each procedure, we do not perform nasal tip surgery unless there is a chance of significant improvement in appearance and function, for example, as one would expect in columellar lengthening.

More definitive procedures requiring septoplasty, onlay grafting, osteotomies, etc, are carried out at age 16 to 17 for girls and 17 to 18 for boys. A significant factor in the actual timing of the procedure depends upon the severity of the defect and the emotional strength of the patient. Discussions regarding goals, type of procedure, and postoperative course should be had with the patient as well as with the parents. We have not recommended a major nasal procedure on a 13- or 14-year-old even though Ortiz-Monasterio and Olmendo have shown it can be done. In fact, we prefer to wait as long as possible, often until the junior to senior year of high school. By 16 and 17 these young adults may decide if they really want such a procedure. Usually they have been through multiple other operations including orthognathic surgery, alveoloplasty, and orthodontia, so that rhinoplasty becomes the "icing on the cake" and hoped-for final procedure of their facial rehabilitation. There is the occasional teen who simply is not ready at 16 to 18 for revision rhinoplasty. These patients need to know that the operation can be performed at a later date. We subscribe to the approach of Marsh regarding the "need" to perform secondary surgery: "an intervention is 'needed' when the following triad is fulfilled: appropriate physical findings are present, a solution is possible, and the patient desires services." The point is that it is as important to know when to stop operating on these children as it is to know when to start.

Surgical Approaches to the Unilateral Deformity

The keys for correction of the unilateral deformity are symmetry and visualization. The problem of attaining symmetry is shown by the number of surgical procedures that have been proposed over the years by Blair, Joseph, Gillies and Kilner, and Berkeley. Surgeons recognized early on that an internal approach left major areas of the deformity uncorrected.

The scars of external approaches have become more acceptable considering the overall improvement that external approaches afford the surgeon.

During the late 1970s and early 1980s, we used an external columella incision after the technique of Bardach (personal communication, 1973). The incisions extend along the margin of the lower lateral cartilage on each side and continue along the edge of the columella. The two are then jointed by a horizontal incision running across the face of the columella at its junction with the upper lip if the columella does not have to be lengthened. Usually lengthening is needed. The incision on the cleft side of the columella is extended down onto the prolabium of the lip. The length of this segment equals the difference between the noncleft and cleft sides of the columella. The longer segment on the cleft side provides for lengthening of the columella. This incision allows for wide elevation of the tip skin to the nasion and excellent visualization of the underlying deformities. The cleft side lower lateral cartilage is completely freed from the vestibular skin and mucosa. In fact, we frequently free the noncleft lower lateral cartilage as well, feeling that this gives the best opportunity to produce symmetry. The cleft side lower lateral cartilage is "recruited" to help lengthen the medial crus on that side. A fleur-de-lis configuration is produced and held with permanent white 5-0 nylon. The tip skin is redraped and suturing completed in a V-Y fashion.

Dibbell, in 1982, published a unique approach utilizing an external incision and excision of tip skin that addresses the deformities of the unilateral cleft lip nose and, of major importance, changes the long axis of the cleft nostril. It builds upon the basic concepts of the Blair alar rotation and the Cronin columella lengthening procedure for bilateral cleft nose deformity. With this procedure there is complete release of the cleft side of the nose. Essentially the entire nostril is freed including the alar cartilage and is rotated as a "sock" or "sleeve" into its new location. The incision is designed to match the noncleft side and a deformed crescent moon of skin above the cleft nostril is removed. The incision then extends inferiorly down the margin of the columella across the vestibule just inferior to the nasal sill and around the ala. The skin over the nasal tip is freed and a pocket created for rotation of the underlying cartilage-nostril complex. A permanent suture may be placed from the new dome to the opposite alar cartilage and/or the opposite upper lateral cartilage to hold the rotated nostril in place. A second mattress suture is placed over a bolster to hold the lateral ala in its new position. A wedge of cleft side lip tissue may be removed to allow the cheek to move medially to fill the space vacated by the cleft nostril.

We found the Dibbell procedure to be elegant, since it addresses a multitude of the previously described anatomic problems, and yet it is primarily a soft tissue operation applicable to most age groups. However, for those performing a limited number of such cases a year, it is not an easy operation to master. We felt that it might be possible to combine the advantages of the Dibbell procedure with that of the external approach rhinoplasty popularized by Goodman and Zorn. The advantages of the combined approach include (a) exposure of the cartilaginous structures without distortion; (b) removal of the edge of the alar rim matching the noncleft side; (c) complete freeing of the cleft nostril from the piriform aperture with rotation into a symmetric position; (d) lengthening of the columella on the cleft side; (e) exact placement of permanent sutures; (f) direct application of onlay cartilage grafts, if needed; (g) correction of associated lip deformities; and (h) excellent exposure for septoplasty and/or bony work.

For the past 7 years we have been using this combined approach incision for the majority of unilateral revisions. General anesthesia is used in all patients. The amount of local anesthetic with epinephrine used in the tip area is kept to a minimum. A crescent moon-shaped piece of alar tip skin is marked for excision. The incision on the cleft side continues inferiorly along the face of the columella about 2 mm from the edge. It extends around just inferior to the nasal sill sweeping laterally into the alar-facial groove. This incision on the cleft side joins a standard external incision on the noncleft side with the typical inverted V. The entire nostril is freed widely from the noncleft medial crus, septum, floor of nose, lip, and piriform aperture. It may be necessary to incise through mucous membrane to allow for complete freedom of rotation. The nasal skin is elevated as far superiorly toward the nasion and laterally over the alar cartilages as possible, to provide enough exposure. Once rotated into position the nostril should sit freely without any tugging on adjacent tissues.

The rotation of the nostril brings the lower lateral cartilage into its normal position, lengthens the cleft side columella, and should create a symmetric tip. The new position of the nostril is maintained with permanent sutures from the cleft ala to the noncleft upper lateral cartilage. Other deep sutures are placed as necessary. Most of the time, a cartilage strut is placed between the medial crura and sutured to them with several sutures. The strut should extend from the level of the anterior nasal spine to just inferior to the nasal domes. A longer strut may produce a visible tenting beneath the tip skin. Occasionally it may be necessary to completely free the lower lateral cartilage on the cleft side from its attachment to the vestibular skin in order for it to move to its normal position. If this is necessary then a permanent 5-0 nylon mattress suture gathering lateral-medial-lateral cartilage and back (after the technique of Mc Collough and English) is often used. Further onlay septal or auricular cartilage grafts may be applied as needed. Because the nostril moves medially as well as superiorly, the cheek must be advanced; thus the need for excision of a wedge of lip tissue inferiorly to the vermilion cutaneous junction in some cases. However, in a number of patients revision of the lip scar is needed anyway. If the above procedure is being performed on a child, then the skin is redraped and the columella closed with 6-0 black nylon. The intranasal incisions are closed with 5-0 chromic. The nose is taped, a cast applied, and the nostril filled with cellulose cotton.

The cast is removed along with sutures and packing under a short general anesthesia in 5 to 7 days in children. Adolescents are cared for in the office as with any other adult. If tip rhinoplasty is being combined with septorhinoplasty, we like to perform the septoplasty after all of the tip work has been completed but before permanent sutures have been placed. Because of the excellent approach afforded by the external incision, the nasal septum is easily identified and straightened as with any septoplasty. Septal cartilage is harvested and set aside for later use. Suturing of the tip cartilages is then completed as above, followed by hump removal, and medial and lateral osteotomies as needed. Skin closure, taping, casting, and packing are the same.

Surgical Approaches to the Bilateral Deformity

The major problem with the bilateral deformity is the short columella. Most of the time it was probably pressed into service to help close the original lip. An additional problem is poor tip projection due to separation and downward displacement of the alar domes. At least they are usually symmetrical.

There are three common procedures for addressing the bilateral deformity: the Cronin, the Millard forked flap, and V-Y advancement flaps of the prolabium, often used in conjunction with an Abbé lip switch. The reader is referred to Cronin's 1978 article for an excellent review of the multiple ways to lengthen a short columella.

The Cronin procedure is best used when there is minimal shortening of the columella, a normal-appearing Cupid's bow of the upper lip, and scars that do not need to be revised. The incisions extend along the alar-facial grooves, sweep medially just inferior to the nostril sills and then into the columella in an inverted V. A parallel incision within the nostril and along the nasal floor creates bipedicle flap on each side. Half-thickness alar wedge excisions may be used to facilitate relocation of the ala. The entire base of the nose is then freed widely and advanced medially to lengthen the columella. The flaps are sutured together in the midline and septal or auricular cartilage grafts may be placed between the medial crura to give additional support if needed.

Millard's forked flap technique is useful when the prolabium is quite wide, the philtral scars need to be redone, and there is deficient skin in the nasal floor. The forked flaps are based superiorly on the base of the columella and include the lip scars plus prolabial skin. Thus, the lip scars are revised, the symmetry of the philtrum improved, and no new scars are introduced into the lip. The lateral incisions can be extended as in the external approach to give enough exposure to reposition the alar cartilage. Wedges from the nostril floors are removed if needed to allow lip closure and decrease alar flaring. It is not as useful for lips that are tight. The procedure does tend to produce a columella that is thick and wide appearing. Secondary reduction and refinement of the columella may be needed.

The third most-common method of columella lengthening is to advance the entire prolabium into the columella closing the upper lip in a V-Y fashion. The incisions can be extended along the margins of the alar cartilages as in an external approach rhinoplasty. There is excellent visualization of the lower lateral cartilages. This is our procedure of choice for nasal tip surgery in the 4- to 5-year-old in whom we anticipate an Abbé flap from the lower lip at the time of definitive rhinoplasty at about age 16 to 18. The lower laterals are completely released from the underlying vestibular skin and "recruited" to form lengthened medial crura and new nasal domes in a fleur-de-lis configuration. If needed, an auricular cartilage strut is placed between the medial crura to give support. Two to three sutures of 4-0 or 5-0 nylon are used in a mattress fashion to suture this new tip complex together. It may be necessary to use additional onlay and plumping grafts. After the skin flap is sutured in place, bilateral mattress sutures are placed abutting the vestibular and nasal tip skin to the tip cartilages over cotton bolsters at the level of the dome on each side. The lip is closed in a V-Y manner. The nostril is packed with cellulose cotton, which is removed at 5 to 6 days. There is usually significant improvement in facial appearance from this procedure. It does have the disadvantage of placing a scar in the midline of the philtrum and may produce further tightening of the upper lip. If the prolabial V-Y flap is used in the 16- to 18-year age group, then routine rhinoplasty or septorhinoplasty can be performed through the same incision. In addition, these patients often have pouty excessive lower lips that can supply a very nice Abbé flap in the midline of the upper lip and not in a lip scar. When this flap is used in conjunction with nasal tip/rhinoplasty surgery, extreme care must be exercised in protecting and observing the airway during the first 2 to 3 postoperative days. Short straws may be placed between the lips on each side to facilitate the airway. The swelling will be significant

and the patient should be forewarned. The lips are separated under local anesthesia at 12 to 14 days.

Summary

Secondary cleft lip nose deformities offer a continuing challenge to the rhinoplastic surgeon. The goal of a symmetrical nose that is harmonious with the rest of the face and functions well is not easily attained. Emphasis has been placed on the use of external incisions, rotation of entire anatomical units, plus supporting and onlay cartilage grafts. Revisions of these major procedures will often be needed and the surgeon must keep in mind the associated problems of the maxilla, mandible, and upper lip.