Repositioning of the Lower Lateral Cartilage in Primary Cleft Nasoplasty

Utilization of a Modified Tajima Technique

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Abstract: Repositioning the lower lateral cartilages during primary cleft nose repair often requires external bolsters to place suspension sutures. We describe a series of primary unilateral cleft nasal repairs using a modified Tajima technique. The cleft-side lower lateral cartilage is suspended to the contralateral upper lateral cartilage using a buried polydioxanone suture passed through a reverse-U incision with a hollow needle.

A modified Tajima nasal repair was performed on 13 unilateral cleft patients. The average age was 6.6 months, and average follow-up was 9 months. All 13 patients demonstrated adequate repositioning of the lower lateral cartilage and improved tip symmetry. No postoperative infections, complications, or extruded sutures were observed.

This modification to Tajima’s technique allows suture placement without bolsters. We anticipate that long-term results will be maintained as well, if not better than other series, as placing a buried polydioxanone stitch avoids bolsters. We anticipate that long-term results will be maintained as well, if not better than other series, as placing a buried polydioxanone stitch avoids bolsters. We demonstrate adequate repositioning of the lower lateral cartilage and sustained results in early follow-up.

Key Words: cleft lip, cleft rhinoplasty, Tajima

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The twisted and malformed nose seen in the unilateral cleft patient represents a noticeable stigma of the deformity when left unaddressed by a patient’s primary cleft lip repair. The cleft lip and cleft nose deformities are one and the same. Surgical correction of the cleft lip is incomplete without also addressing the misshapen and spayed lower lateral cartilage. This sentiment is commonly held by modern cleft surgeons, but this was not always true. The nasal component of cleft lip deformity was essentially ignored until the advent of modern rhinoplasty in the late 19th century. After this, a plethora of poorly conceived and poorly executed operations resulted in a generation of cleft patients with badly scarred, constricted, and distorted noses, and the admonition that the cleft nose should not be operated on until adolescence.1 Over the last 35 years, new anatomic study and attention to careful dissection and outcomes has allowed a resurgence of nasal correction along with primary lip repair. We now realize that early repositioning of the nasal cartilages can result in quality results and spare children the social embarrassment of their nasal deformity during their formative years of development.

The cleft nose deformity is created by the pull of abnormally inserted orbicularis fibers on the columella and on a lower lateral cartilage that is inadequately supported by a deficient lateral maxillary segment. This creates a columella that is short and deviated to the noncleft side, along with caudal septum that deviates in the same direction. The cleft-side alar base is posteriorly, laterally, and inferiorly displaced causing the lower lateral cartilage to be flattened and horizontally oriented with an obtusely angled alar dome. Numerous techniques for correction of the above deformity have been described. Many of these involve the use of intranasal stents and conformers.2,3 McComb stressed that the inferior displacement of the lower lateral cartilage lengthened the nose on the cleft side and described a technique to suspend it to the ipsilateral upper lateral cartilage.4–6 He used temporary sutures tied over a bolster, which were removed 1 week postoperatively.

The Tajima technique for cleft rhinoplasty was originally described for use in secondary repairs of the cleft nasal deformity and was subsequently adapted for primary cleft repair.7,8 This technique uses a reverse-U incision to access and undermine the entire lower two-thirds of the nose. The lower lateral cartilage is suspended from the ipsilateral and contralateral upper lateral cartilages. Interdomal sutures are used as well to shape the nasal tip. The publication by Tajima does not describe how these sutures are placed, but exact placement through the incision is difficult, and experience has required the use of either external bolsters or specially designed instruments constructed solely for this purpose.7

We describe a modification of Tajima’s technique using his reverse-U incision to suspend the cleft-side lower lateral cartilage to the contralateral upper lateral cartilage with buried semipermanent suture. We demonstrate adequate repositioning of the lower lateral cartilage and sustained results in early follow-up.

PATIENTS AND METHODS

A retrospective analysis was conducted of a single surgeon experienced using a modified Tajima technique for nasal repair in 13 consecutive patients undergoing primary unilateral cleft lip repair. Demographic data were obtained including patient’s sex, age at lip/nasal repair, complete/incomplete cleft status, cleft side, and length of follow-up.

Medical records and photographs were reviewed. Note was made of postoperative complications and postoperative infections. Images were reviewed to assess nasal symmetry and overall aesthetic during continued follow-up.

Surgical Technique

The unilateral cleft lip deformity is addressed using a standard rotation advancement technique. The skin incision on the lateral lip element is continued intranasally, superior to the inferior turbinates. This attaches the alar base from the deficient piriiform aperture and allows medialization of the lower lateral cartilage on the cleft side.

The nose is entered using a reverse-U incision, described previously by Tajima.7 The alar base is pushed upward to approximate the contour of the noncleft side, and the curved incision is marked first at the junction of the columella and membranous septum. This is continued cephalad to or slightly past the alar rim at
the junction of the middle and lateral crurae. The incision then
arches caudally and passes back into the nose where it terminates
near the inner web of the nasal ala (Fig. 1). This incision allows
access to undermine throughout the lower two-thirds of the nose,
over the upper and lower lateral cartilages on the cleft and noncleft
sides. The upper portion of the columella is undermined as well to
mobilize the skin from the underlying medial foot plates. Dissection
is carried out using scissors in a subcutaneous plan above the
perichondrium of the alar cartilages (Fig. 2).

Once the skin enveloped is completely mobilized from the
underlying cartilage framework, the suspension stitch can be
placed to reorient the cartilages and allow the skin to redrape over
them (Figs. 2 and 3). To place this stitch, a beveled 25-gauge
needle is passed through the skin and upper lateral cartilage of the
noncleft side, angling down and toward the cleft side. The needle
is then flattened, passed over the caudal septum dorsally, and
reoriented inferior-laterally so that it pierces the lower lateral
cartilage of the cleft side of the defect. The needle pierces the
lower lateral cartilage at the level of the alar dome. As the needle
tip emerges from the internal nasal lining, a 4-O polydioxanone
(PDS) suture is threaded through the aperture toward the nasal

FIGURE 1. A, Design of the reverse-U incision. The curved inci-
sion is marked at the junction of the columella and membra-
nous septum. It courses externally along the alar rim in the re-
region of the soft triangle before arching back into the nose
where it terminates near the inner web of the nasal ala. This
incision allows access to the lower 2/3 of the nose for wide un-
dermining. B, Differential motion of the inner condrocutaneous
flap relative to the external skin causes the incision to rotate
into the nostril where it is hidden. Medialization for the alar
base, narrowing of the angle between the medial and lateral
crurae, and elevation of the lower lateral cartilage round the
previously horizontally oriented nostril opening.

FIGURE 2. Modified Tajima technique. A, Intraoperative view after closure of the cleft lip and before nasal repair. The re-
verse-U incision is marked on the alar margin. B, The lower 2/3 of nose is widely undermined through the reverse-U incision
to allow differential motion of the lower lateral cartilage relative to the overlying skin. C, A 25-gauge needle is driven through
the contralateral nasal dorsum, piercing the upper lateral cartilage, angling down and toward the cleft side. The needle is
then flattened, passed over the caudal septum dorsally, and reoriented inferior-laterally so that it pierces the lower lateral car-
tilage of the cleft side of the defect. The needle pierces the lower lateral cartilage at the level of the alar dome. D, A 4-O PDS
suture is fed through the tip of the needle in a retrograde fashion. Both tips of the suture are grasped. E, The needle is par-
tially withdrawn from the nose till the bevel is just visible at the nasal dorsum. Without removing the needle from the skin, it
is rotated 180° and driven back into the nose in the same trajectory, piercing the lower lateral cartilage in a similar location. F,
The loop of suture is fed back into the nose, so both loose ends are located intranasally. Tying this suture elevates the lower
lateral cartilage and narrows the angle between the medial and lateral cruz. G, A redundant skin web is created in the nasal-
facial groove. This is effaced using a through-and-through effacement suture.
The suture is grasped at each end, and the needle is withdrawn from the nose. Just as the beveled tip is visible at the dorsal skin, the withdrawal is halted, the needle is twisted 180°, and the needle tip is driven through the nose once again in the same trajectory described above. The twisting action protects the suture from the cutting edge of the bevel and drives a loop of suture through the upper and lower lateral cartilages once again. This can be pulled into the nose and tied to the other suture end to complete a buried, horizontal mattress. By not completely withdrawing needle from the skin, the suture does not exit the epidermis on the nasal dorsum and creates a buried stitch.

The buried suspension stitch medializes the splayed lower lateral cartilage and narrows the angle created between the medial and lateral crurae. Refinements to the nasal tip are achieved by placing interdomal sutures through the reverse-U incision. The incision is then closed “as the tissues lie,” rather than as they were oriented when the incision was made. Elevation of the lower lateral cartilage causes differential motion of the skin envelope and cartilage and rotates the alar rim incision within the nose (Fig. 1). With elevation of the slumped nasal alae, the “long” nose on the cleft side is shortened. The external skin becomes redundant and buckles at the nasal-facial groove. This alar web is effaced by placing through-and-through buried 4-O PDS sutures, which are tied within the nose. Care is taken to exit and enter the nasal skin through the same hole so the suture remains buried externally. An alar base stitch aids with medialization of the ala on the cleft side and establishes symmetry of the nostril width. Obicularis and skin closure are completed as described in numerous other texts.

RESULTS

Thirteen cases of primary unilateral cleft lip nasoplasty in conjunction with primary lip repair were reviewed. Eight patients exhibited complete unilateral cleft lip and nose deformities. Five patients had incomplete clefs. Eight patients were male and 5 were female.
female. Clefting was observed on the left in 7 cases and on the right in 6 cases. The average age at primary cleft lip repair and nasoplasty was 6.6 months (4.6–12.6).

All cases reviewed exhibited adequate cartilage repositioning and improvement in nasal symmetry. Patients showed slight overcorrection of the defect, which was maintained in the initial follow-up period to date (Figs. 4 and 5). Follow-up is early at this time with an average of 9 months (1–19). No postoperative wound infections or dehiscences were observed. Importantly, no stitch abscess, extrusions, or failures with recurrent alar slumping were observed.

DISCUSSION

The Tajima technique of nasal repair offers a proven manner for correction of the cleft nose deformity. By suspending the lower lateral cartilage to the contralateral upper lateral cartilage, the vector of pull is improved not only shortening the elongated cleft side of the nose but also medializing and narrowing the intracrural angle.7–10 The reverse-U incision offers additional benefits of differential skin motion that redistributes the alar web skin and prevents alar rim irregularities sometimes seen with other closure techniques.7 It also allows direct visualization of the alar dome and exact placement of interdomal sutures for refinement of the nasal tip.

Published series have shown prolonged maintenance of results.7,10 Only 5 of 17 patients in one of Tajima’s series required minor revisions of the primary nasal repair when performed with primary lip repairs. The corrections were minor, and performance of primary nasoplasty spared patients from living with a significant nasal deformity during childhood and adolescence. All of these patients were spared the need for a major secondary rhinoplasty.

Although very successful in correcting the nasal deformity of clefting, the contralateral upper lateral cartilage suspension stitch is difficult to place. This has prompted the use of temporary bolsters and stitch removal in the early postoperative period. Others have developed their own instruments for stitch placement.9 The modification described here offers 2 benefits. Suspension stitches can be easily placed transcutaneously, requiring only a straight 25-gauge needle, which is available in any operating room. This can be executed simply with 5 minutes or less with experience. Second, placing a buried semipermanent suture avoids the need for suture removal during early follow-up. The alar cartilages remain splinted in place during the entire healing process and may potentially offer improved maintenance of alar repositioning. Most patients showed some degree of defect overcorrection, which has been maintained to this point, suggesting that maintenance of the result over time may be anticipated.

Our early results demonstrate adequate repositioning of the cartilages and no postoperative complications. The experience of Tajima and others suggests that we can expect maintenance of these results, especially with semipermanent suture material that does not require removal.7,10 Continued longitudinal follow-up will be needed to determine if better maintenance of alar repositioning is achieved with the buried, semipermanent stitch.
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REFERENCES