Reconstruction of Wide Cleft Lip Scar by Abbe Flap and Advancement Flap from Lateral Upper Lip

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Primary surgery of cleft lip and palate has dramatically improved with technical and material advances. Some adults who previously underwent surgery still have upper lip deformities or extensive scar, and they are occasionally seen for secondary treatment.
We reported a case of unilateral cleft lip patient who had extensive scar involving the central 1/4 of the upper lip, with gross lip and nasal deformity. In this patient, we reconstructed the entire affected upper lip using an Abbe flap and an advancement flap from the lateral lip. This not only improved the upper lip contracture, but also moved the scar to the margin of the aesthetic unit. This removal of the visible scar from central portion of the lip provided a satisfactory aesthetic result.
A large V-Y advancement flap from lateral upper lip has several advantages. These are sufficient soft tissue volume, inconspicuous scar in accordance with margin of aesthetic unit, and texture and color match. There is no previous report describes the application of V-Y advancement flap for secondary lip reconstruction of unilateral cleft lip deformity in the literature.

Key words: Cleft lip, secondary deformity, V-Y advancement flap, lip reconstruction

INTRODUCTION

Primary surgery of cleft lip and palate has dramatically improved with technical and material advances. Many patients now have barely noticeable residual scar of chieloplasty and can lead social lives without anyone knowing that they had a cleft lip. However, some aspects, such as asymmetry of form and size of upper lip, as well as nasal shape in complete cleft lip, still require further improvement. Some adults who previously underwent surgery still have upper lip deformities or extensive scar, and they are occasionally seen for secondary treatment.

In these types of patients with extensive scars, sometimes with most part of the upper lip, surgical revision that differs completely from conventional cleft lip secondary repair is required. The optimal reconstructive procedure differs in each case, thus creating a demand for novel plastic surgical approaches.

We recently treated an adult with cleft lip who had extensive scar involving the central 1/4 of the upper lip, with gross lip and nasal deformity. In this patient, we reconstructed the entire affected upper lip using Abbe flap and a V-Y advancement flap from the lateral lip. This not only improved the upper lip contracture, but also moved the scar to the anatomical margin of the lip. This removal of the visible scar from central portion of the lip provided a satisfactory aesthetic result.

PATIENT AND METHOD

The investigation conforms with the principles outlined in the Declaration of Helsinki.

25-year-old man had a history of right unilateral complete cleft lip and palate. Surgery at age 3 months included triangular flap repair for the cleft lip and Push back technique for the cleft palate. The surgery was performed at another hospital. The patient subsequently had one revision surgery of the cleft lip.

We initially evaluated the patient at age 25 years. He requested the scar revision of cleft lip and correction of the nasal deformity (Fig. 1a, b). Examination revealed a narrow and tight upper lip, with a hypertrophic scar involving the central 1/4 of the upper lip. In addition, a large suture mark was noted at lateral to the scar. There was a depressed scar lateral to the alar base. The scar obliterated most of the philtrum. Vertical and horizontal maxillary growth deficiency was also noted. The nose appeared as a typical unilateral cleft lip nose. The columella was deviated to the non-cleft side, with a small ala and drooping nostril rim. The nostril floor and alar base were depressed, reflecting the alveolar bone defect.

Surgery was planned to correct these deformities.

RESULT

Operative Findings:

First, before the correction of the upper lip scar and shape, nasal revision and iliac bone graft to the

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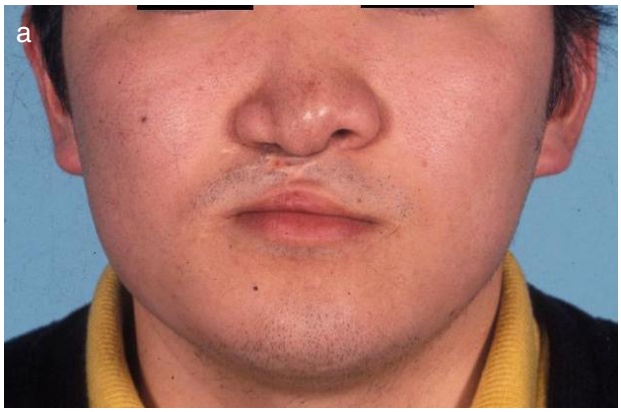

Fig. 1a Lower face of patient at age 25 years. A narrow and tight upper lip, with hypertrophic scar involving the central 1/4 of the upper lip is obvious. The scar obliterated most of the philtrum.

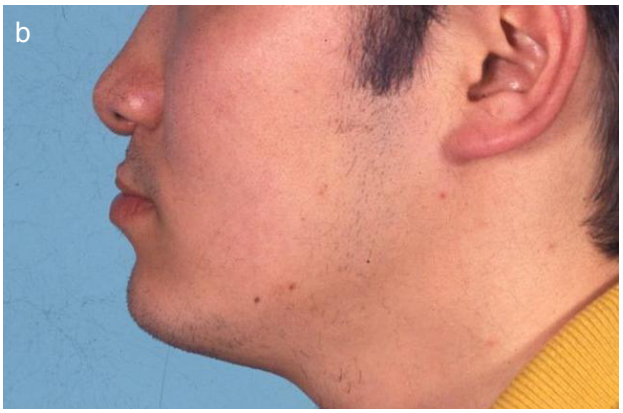

Fig. 1b Lateral view. Vertical and horizontal maxillary growth deficiency was also noted. The nose appeared as a typical unilateral cleft lip nose.

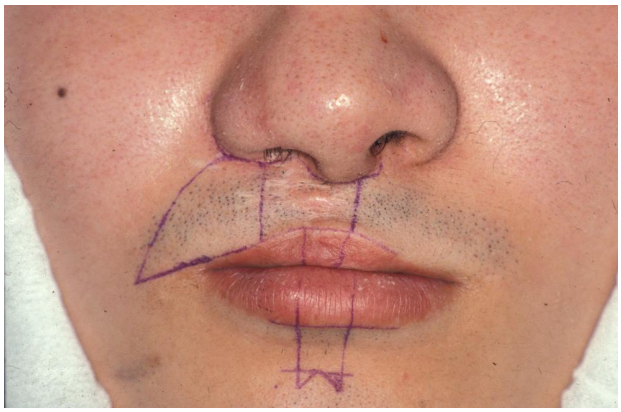

Fig. 2 Operative design. A principle of aesthetic unit was applied to reconstruction of the entire upper lip. An Abbe flap was designed in the central portion of the lower lip, and a V-Y advancement flap was designed in the scarless skin of lateral lip on cleft side.

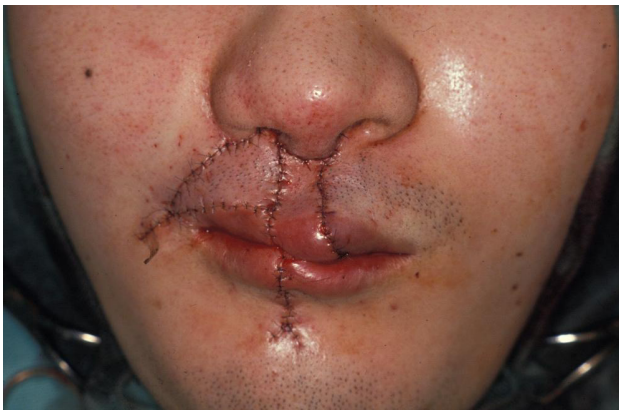

Fig. 3 Intraoperative photo. Abbe flap was used for full-thickness reconstruction of the central portion of the lip. The V-Y advancement flap was used to reconstruct the lateral lip skin on cleft side. At the same time, a rhinoplasty using a rib cartilage graft was performed to refine the appearance of the nose.
The flap pedicle, including the inferior labial artery, was cut 1 week later.

piriform margin were performed. Nasal repair was performed by repositioning the cartilaginous dome and medial crus of alar cartilage.

Secondary lip repair were planned 1 year later. To remove the extensive central lip scar, a principle of aesthetic unit was applied to reconstruction of the entire upper lip (Fig. 2). The upper lip scar, including normal skin, was resected as an aesthetic unit above the orbicularis oris muscle. The area of resection extended horizontally from the philtrum ridge on non-cleft side to the lateral margin of the scar on cleft side, and vertically, from the nostril base to the vermilion border. The orbicularis oris muscle was divided and released. Then the scar tissue between the loosen muscles, included oral mucosa, were resected.

An Abbe flap was designed in the central portion of the lower lip, and a V-Y advancement flap was designed in the scarless skin of lateral lip on cleft side. The Abbe flap was used for full-thickness reconstruction of the central portion of the lip, including the labial mucosa, orbicularis oris, and labial skin. The V-Y advancement flap was used to reconstruct the lateral lip skin on cleft side. The right and left upper lip orbicularis oris muscles and orbicularis muscle in Abbe flap were sutured (Fig. 3). At the same time, a rhinoplasty using a rib cartilage graft was performed to refine the appearance of the nose.

The flap pedicle, including the inferior labial artery, was cut 1 week later.

Post operative course:

As shown in the photograph, the tissue volume of the cleft side lip provided by the large advancement flap from the lateral lip, is similar to that of the non-cleft side lip. As compared to the contracture of affected side lip, prior to surgery, a lip symmetry was well reestablished. Movement of the scar from the center of the philtrum to the margin of the bearded skin of the upper lip made the scar inconspicuous and virtually invisible. The preoperative close-up photographs (Fig. 4a, b) and post operative close-up views (Fig. 5a, b) is shown.

The postoperative course was good, and the patient has been satisfied with the surgery (Fig. 6a, b).

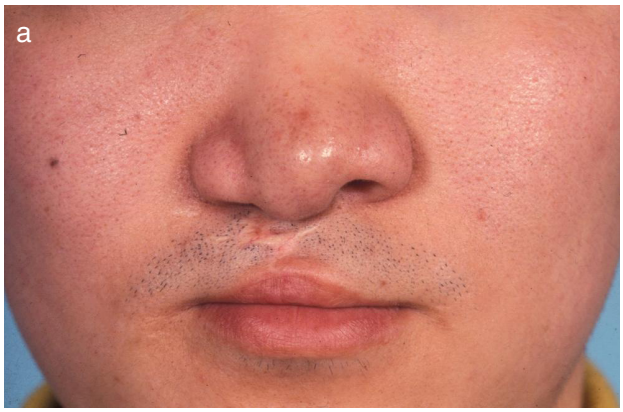

Fig. 4a Close-up view of preoperative lip, before the first surgery in our hospital. A narrow and tight upper lip, with a hypertrophic scar involving the central 1/4 of the upper lip is obvious. The scar obliterated most of the philtrum.

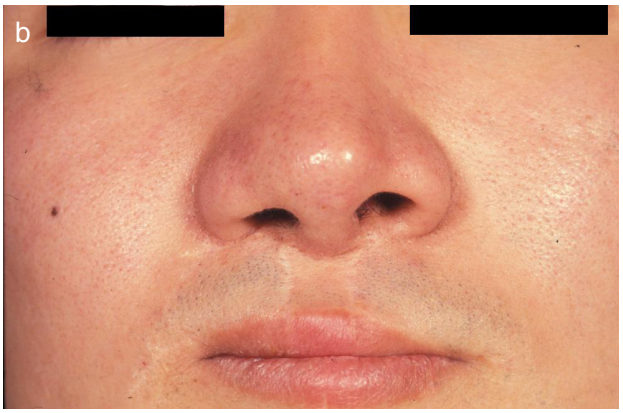

Fig. 4b Close-up view of 2 years postoperative lip. As compared to left side photograph, the lip symmetry was well reestablished. Movement of the scar from the center of the philtrum to the margin of the bearded skin of the upper lip made the scar inconspicuous and virtually invisible.

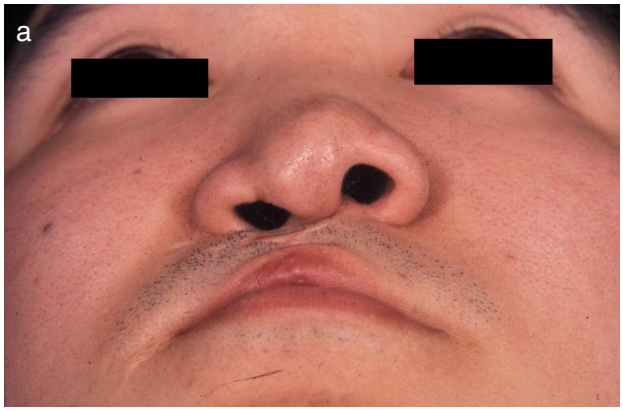

Fig. 5a Look up view of preoperative lip, before the first surgery in our hospital. The nose appeared as a typical unilateral cleft lip nose. Columella was deviated to the non-cleft side, with a small ala and drooping nostril rim. The nostril floor and alar base were depressed, reflecting the alveolar bone defect.

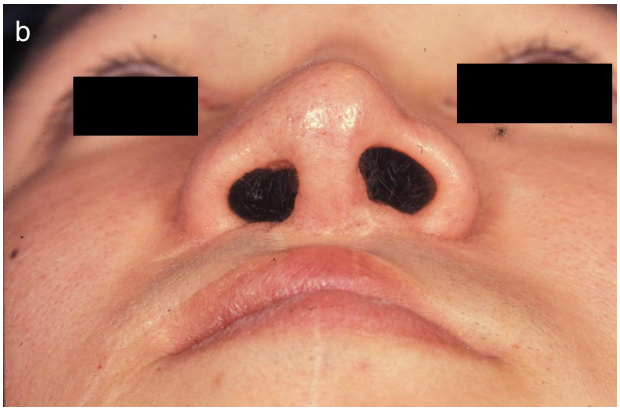

Fig. 5b Look up view of 2 years postoperative lip. Columella was repositioned in the center of the lower face, drooping of the nostril rim was resolved. The nostril floor and alar base were elevated.

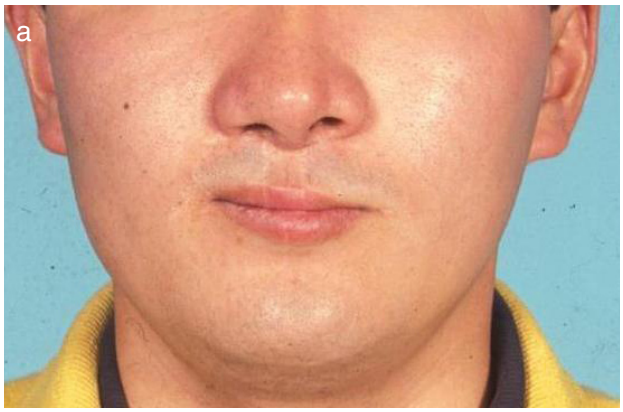

Fig. 6a Lower face at 2 years Post operation. As compared to the photograph before operation, a lip symmetry was well reestablished. Cleft lip scar in the upper lip is inconspicuous and virtually invisible.

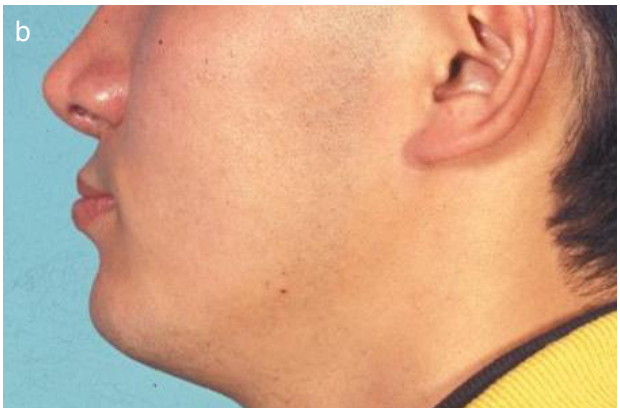

Fig. 6b Lateral view at 2 years Post operation. A rhinoplasty using a rib cartilage graft improved the profile of the nose. Nasal dorsum is prominent.

DISCUSSION

For reconstructing the philtrum and Cupid's bow of severely deformed bilateral cleft lip patient, Abbe procedure still provides several advantages [1]. Poorly defined philtrum and Cupid's bow in association with abnormal skin texture, or discrepancy of soft tissue volume between the upper and lower lips, are well corrected by this procedure [2, 3]. In contrast, for the unilateral cleft lip patient, it is rare to apply Abbe procedure for repairing the secondary deformity. Because in the lip after successful unilateral cleft lip surgery, philtrum or central portion of upper lip is usually preserved with good aesthetic results. In such patients, secondary scar revision can be mainly performed to remove hypertrophic scars. However, in some patients with history of multiple revisions, extensive scar may involve most of the upper lip, leaving little available normal skin. In these cases, planning de novo reconstruction of the upper lip defect may lead to a better outcome.

In the case we presented, a large V-Y advancement flap combined with Abbe flap brought about satisfactory result in entire upper lip reconstruction. The large V-Y advancement flap from lateral upper lip is extended to restore entire lateral lip. This procedure is able to move the visible cleft lip scar from central portion of the lip to the anatomical margin of the aesthetic unit. The scar in accordance with the margin of aesthetic unit is inconspicuous and virtually invisible.

There are several reports introducing V-Y advancement flap for the repair of cleft lip patient. Most of articles reported small V-Y advancement flap in the nostril, applied for primary or secondary nasal repair of cleft lip deformity [4, 5]. In this procedure, the V-Y flaps are designed in the nasal lining not in the upper lip. Consequently, these V-Y advancement flaps simply advance skin in the nostril, and release the contracture of nasal dome. Martins DM *et al.* reported 92 patients of The unilateral cleft lip-nose, with V-Y advancement of a mucocartilaginous flap for the correction of alar cartilage shape and position [4]. Cho BC *et al.* combined nostril rim reverse-U incision with nasal floor V-Y plasty for 31 patients with unilateral cleft lip nasal deformities [5].

Some of articles presented small V-Y advancement flap in the red lip for correction of red lip deformity [6, 7]. Tamada I *et al.* reported the use of vertical V-Y flap in the red lip for the correction of vermillion deformity [6]. The flap was elevated with a thin muscle layer and moved superiorly to form central tuberosity.

The large V-Y advancement flap we introduced is completely different from small V-Y flap in nostril or red lip. There is no previous articles in the literature, describes the application of large V-Y advancement flap in accordance with aesthetic unit as same manner as we presented, for secondary lip reconstruction of unilateral cleft lip deformity.

A large V-Y advancement flap from lateral upper lip has several advantages. The first advantage is that it can provide the affected side of lip with sufficient soft tissue volume as same as the unaffected side of lip. Especially in the vertical height of the lip, short lip with sever contracture is difficult to be reconstructed with other local flap design. The second advantage is inconspicuous scar in accordance with margin of aesthetic unit of the lip [8, 9]. Through the introduction of the large V-Y advancement flap design, scar can be moved from the central portion of the upper lip to the margin of the aesthetic unit. This makes the scar inconspicuous and virtually invisible.

The third advantage of a V-Y advancement flap from the lateral lip is that the donor site of the flap is bearded area which texture and color are similar to upper white lip skin. This is important to male patient who is going to grow beard. After surgery when the beard grows, the upper lip skin maintains a natural appearance.

Another design of local skin flap in the literature is rotation fan flap. Camacho *et al.* reported this procedure to cover entire lateral upper lip [10]. They stated that a rotation fan flap is useful for upper lip reconstruction, particularly to restore lip movement.

Broadbent reported using an Abbe procedure, in a 16 patient with bilateral cleft lip and palate, followed by replacement of the entire upper lip, as a single unit, with full-thickness skin harvested from the supraclavicular fossa [11]. They stated that After 8 months, lip function, shape, and color match were satisfactory.

Nadjmi *et al.* applied full-thickness skin graft from the right post auricular area to 13-week-old boy with bilateral complete cleft lip and palate, and six-month postoperative result was satisfactory [12].

In oriental patients, pigmentation after skin graft cannot be avoided, and large color differences between the face and other skin make it difficult to apply this technique. Skin grafts should be used for superficial defects in selected female patients. Nevertheless, they are less suitable for men, since they do not match hair-bearing skin of the lip. Local flaps are the best aesthetic option, because adjacent skin guarantees the best skin match in color, thickness and texture.

The procedure we presented in this case is still effective in certain patients of the day. In the past, preserving as much normal lip tissue as possible, creating slightly excess volume, or banking of excess skin in the nasal cavities were performed.

With recent advances in techniques and materials, the results of primary surgery become more reliable. Surgeons now apply optimal design to the initial surgery providing better aesthetic outcomes. In other words, sacrificing initial aesthetic results for the sake of preserving excess normal tissue is no longer necessary. Once complications develop, however, for example, due to postoperative infection or poor wound healing, the risk of extensive loss of normal lip tissue consequently increases.

Ensuring successful initial surgery is critical, and every effort must be expended in order to avoid losing normal lip tissue. In patients such as the one presented, further surgical approaches involving reconstruction of the entire lip should be explored.

CONCLUSION

A case of unilateral cleft lip patient who had extensive scar involving the central 1/4 of the upper lip, with gross lip and nasal deformity was reported. we reconstructed the entire affected upper lip using an

Abbe flap and a large V-Y advancement flap from the lateral lip. This not only improved the upper lip contracture, but also moved the scar to the margin of the aesthetic unit. This removal of the visible scar from central portion of the lip provided a satisfactory aesthetic result.

REFERENCES

1) Abbé R. A new plastic operation for the relief of deformity due to double harelip. Med Rec 1898; 53: 477.
2) Zapater E, Simón E, Ferrandis E, Vendrell JB. Reconstruction of the upper lip, columella and premaxilla with an extended Abbé flap. Auris Nasus Larynx. 2002; 29(3): 305–308.
3) Lo LJ, Kane AA, Chen YR. The Abbé island flap for the reconstruction of severe secondary cleft lip deformities. Plast Reconstr Surg. 2003; 112(5): 1219–1227.
4) Martins DM, Martins JL.Surgical treatment in unilateral cleft lip-nose patients long-term follow-up using a personal approach based on rose and spina techniques. J Craniofac Surg. 2003 Sep; 14: 797–799.
5) Cho BC, Baik BS. Correction of cleft lip nasal deformity in Orientals using a refined reverse-U incision and V-Y plasty. Br J Plast Surg. 2001; 54: 588–596.
6) Tamada I, Nakajima T, Ogata H, Miyamoto J. V-Y advancement labial tubercle plasty for primary unilateral cleft lip repair. J Plast Reconstr Aesthet Surg. 2009; 62: 150–152.
7) Měst'ák J. Multi-stage augmentation of a narrow lip by the V-Y advancement. Acta Chir Plast. 2002; 44: 39–42.
8) Millard DR Jr. Aesthetic aspects of reconstructive surgery. Ann Plast Surg. 1978; 1: 533–541.
9) Burget GC, Menick FJ. Aesthetic restoration of one-half the upper lip. Plast Reconstr Surg. 1986; 78: 583–593.
10) Camacho F, Moreno JC, Conejo-Mir JS. Total upper lip reconstruction with bilateral fan flaps. J Dermatol Surg Oncol. 1992; 18: 627–628.
11) Broadbent. T. R.,; The badly scarred bilateral cleft lip : Total resurfacing. Plast. Reconstr. Surg. 1957; 20: 485–488.
12) Nadjmi N, Jackson IT. Full-thickness skin graft in the secondary repair of bilateral cleft lip. Int J Oral Maxillofac Surg. 1999; 28(3): 176–178.