

Secondary Correction of the Midline Defect of Upper Lip: A Report of Five Cases

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Abstract

Introduction 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.

Cases In our study, a total of five patients with secondary deformity of the upper lip with the scarred tissue with paucity of the muscle in the midline were operated using the modified Abbe flap.

Conclusion With this technique, we were able to achieve the bulk in the midline over the upper lip and the functional integrity of the muscle was maintained.

Keywords Abbe flap · Inferior labial artery · Midline defect · Secondary deformity

Introduction

The lip defects can be classified into three groups: small, medium and large according to the size of the defect. Those which can be closed primarily are small defects, whereas those that can be closed using one of the standard lip sharing flaps are medium defects and those that are too wide to close with a single standard flap are large defects [1]. With the advancement in technology and materials availability, there has been constant improvement in primary surgeries of cleft lip and palate. Looking back to the previous times, some adults who underwent such surgeries

still struggle with the upper lip deformities or extensive scar. They either have compromised with the aesthetics or are seen for secondary treatment. Correction of residual lip defects after cleft surgery is more challenging, and hence, correct technique plays a vital role.

Lip switch flaps as Abbe or Estlander helped in revising such deformities. The hallmark of bilateral cleft lip deformity is tissue volume imbalance of upper and lower lips, short columella, insufficient/sparse nasal tip, increased columello-labial angle and whistle deformity due to tissue deficiency in central vermillion [2]. Robert Abbe in 1898 introduced the lip switch flap for the correction of the midline deformity of the lip. Usually, Abbe flap colloquially called pedicle flap is a full thickness flap involving the transfer of mucosa, muscle and skin based on a pedicle containing the inferior labial vessels. By placing in the midline, the Abbe flap helps in reconstructing the medial defects of upper lip [3] (Figs. 1 and 2).

The Abbe flap has an excellent cosmetic result and is therefore accepted widely to repair the secondary deformities of a bilateral cleft lip. The aim is to achieve symmetry between two lips, which is done by introducing an adequate amount of lip tissue which alleviates the firmness of apron-like upper lip [4]. Ideally upper lip is slightly protruding in front of the lower lip and to gain normalcy is always the prime concern of a surgeon repairing a cleft lip.

Surgical Technique

A total of five male patients, who had midline defect of the upper lip, were operated using the modified Abbe flap. Surgical procedure is carried out under general anaesthesia with all the aseptic methods. 2% lignocaine with 1:80,000 adrenaline infiltrated over the upper lip and the lower lip.

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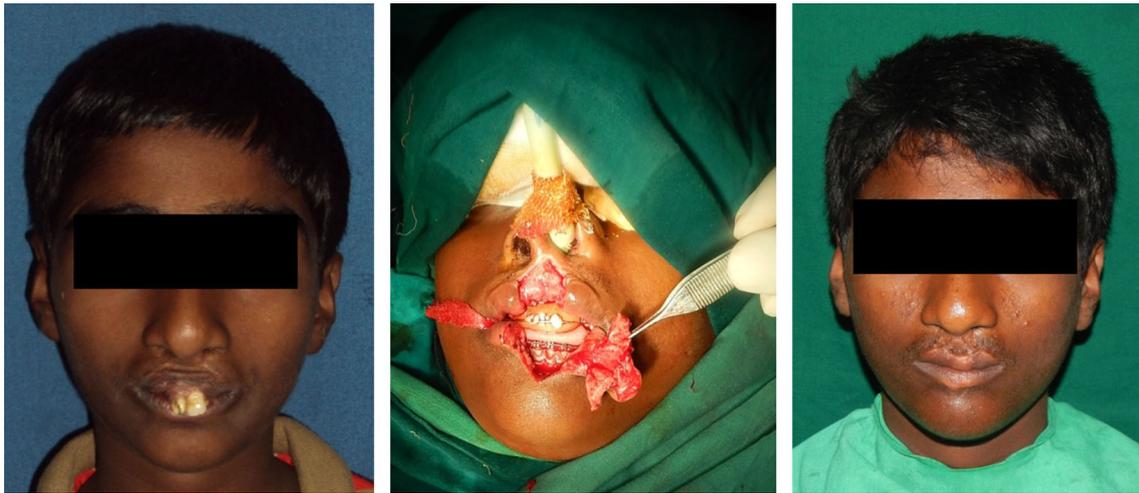


Fig. 1 Case 1

Scarred upper lip and the normal lower lip are marked. Scarred tissue including skin and the fibrosed tissue from the upper lip is removed with orbicularis oris muscle kept intact. The lateral releasing incision is given till the mucosa on either side of the fibrosed tissue of the upper lip [5] (Table 1).

It is convenient to regard this as a composite of flaps—skin, mucosa and muscle sharing a common vascular pedicle containing the inferior labial vessels. The skin, mucosa and muscle flaps are raised as triangles. The flap join at the red margin of the upper lip defect and sandwich technique applied. The flap is then rotated on the pedicle and sutured into the position, and the lower lip skin, muscle and mucosa are closed in the layer-wise fashion. The muscle and the mucosa are closed using 3-0 vicryl and the skin using 5-0 Prolene. Pressure dressing is given for 24 h.

Depediclization of the flap is done after 21 days.

Cases

Five patients with the secondary deformity of the upper lip were operated in our unit using the surgical procedure mentioned above. All the patients were male. Age ranged between 11 and 24 years. All the patients underwent cheiloplasty before. All the patients were medically fit for the surgery.

Discussion

The goals of lip reconstruction are both functional and aesthetic. Oral competence, muscle integrity and adequate stomal aperture are critical to a functional lip reconstruction. Respect for the anatomic landmarks of the lip, such as the white roll or vermilion-cutaneous junction, allows for a

cosmetically natural reconstruction [6]. Bilateral cleft lip repair remains one of the most challenging problems for plastic surgeons, demanding not only repair of the lip clefts, but also elongation of the columella, deepening of the labial sulcus and, of course, creation of functional lips. For reconstructing the philtrum and Cupid's bow of severely deformed bilateral cleft lip patient, Abbe procedure still provides several advantages [7]. The first reported case of a 2-stage pedicled "lip switch" flap is credited to Sabbatini in 1838. However, the use of a flap based on the labial branches of the facial artery was popularized by Dr Robert Abbe in 1898 as a complete philtral reconstruction for bilateral cleft lip deformities. Abbe flap consists of a transfer of mucosa, muscle and skin based on a pedicle containing the inferior alveolar vessels. Placed in the midline, the Abbe flap reconstructs the middle structures of the upper lip, including the Cupid's bow and the philtral tubercle [3].

A number of procedures can be used to manage the different forms of lip defects that involve only slight or moderate tissue deficiencies.

Converse et al. in 1968 used the combined nose–lip repair technique in the selected group of patients in whom the repaired bilateral complete cleft lip was functionally and aesthetically not acceptable. In this technique, the prolabium was advanced into the columella and the continuity of the Abbe flap was restored by a central Abbe flap which provides a philtrum and cupid's bow from the similarly defined structures of the lower lip [8].

In 1952, Bradford Cannon and Joseph E Murray used the split vermilion bordered lip flap described in 1941 which is actually a modification of so-called Stein Estlander Abbe flap. The principle of this method is to discard the prolabium and replace it with the flap with a flap from the lower lip, and they found that this can be employed even at

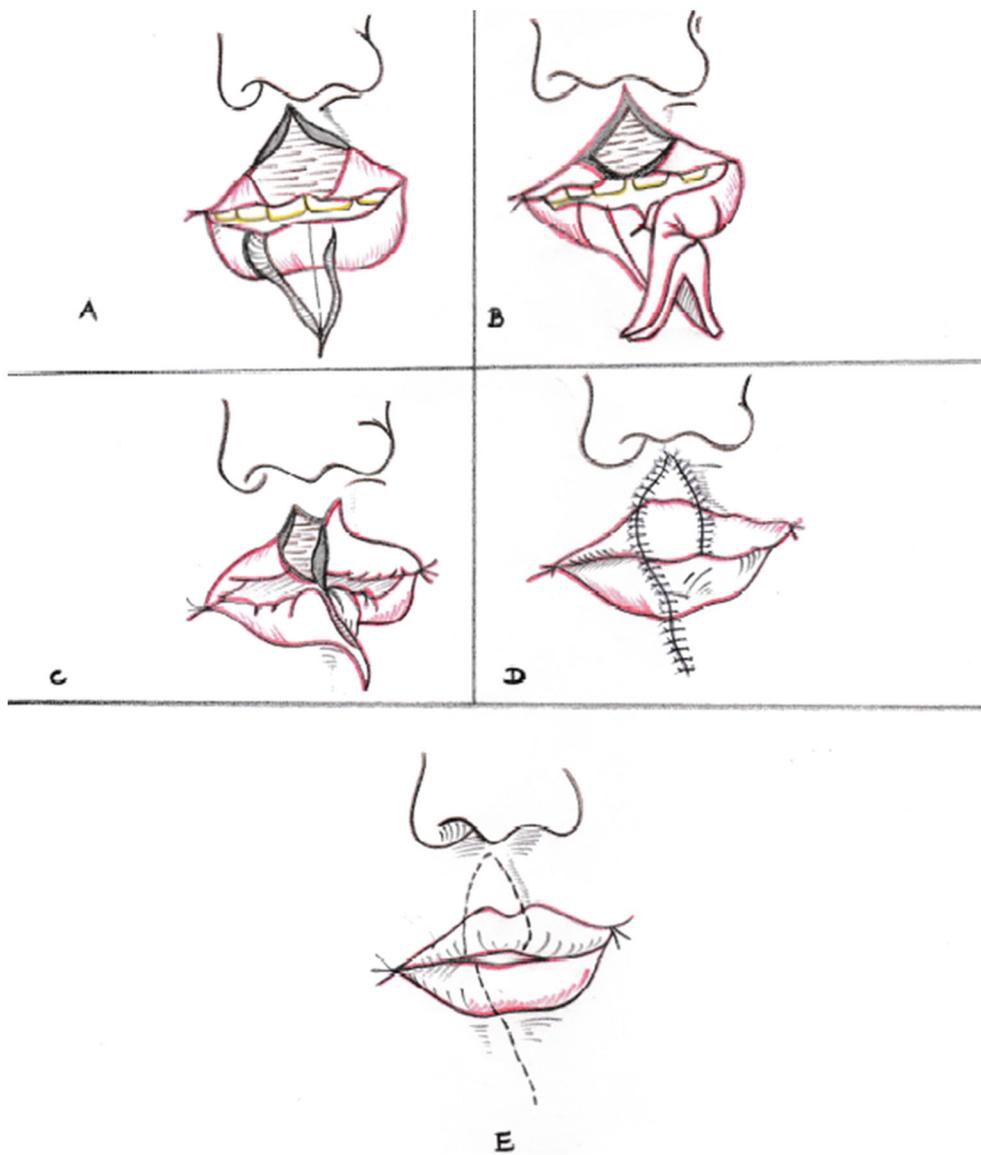
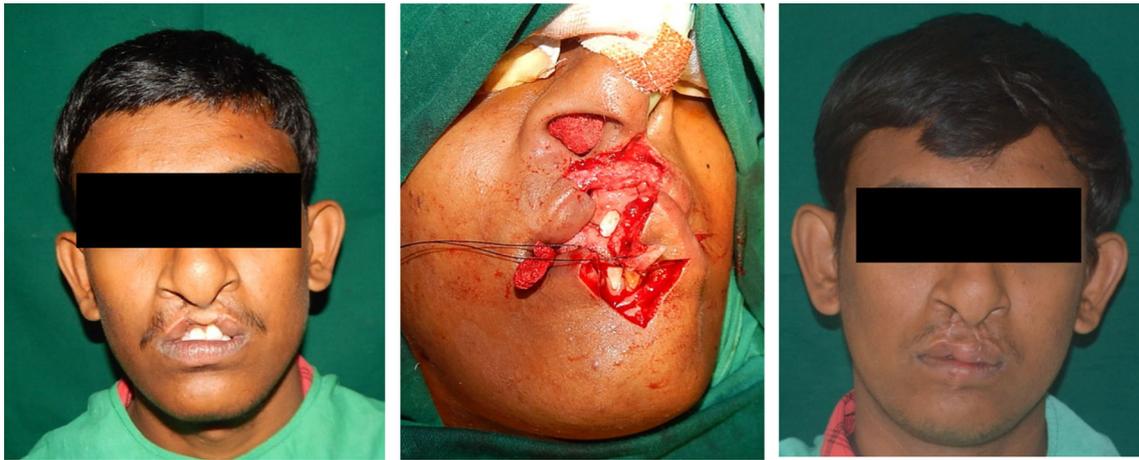


Fig. 2 Case 2

Table 1 List of patients

S. no	Age	Sex	Diagnosis (secondary cleft upper midline defect)	Flap used	Aesthetics	Complications	Function
I	14 Years	Male	Yes	Sandwich Abbe flap	Satisfactory	Nil	Good
II	18 Years	Male	Yes	Sandwich Abbe flap	Satisfactory	Nil	Good
III	20 Years	Male	Yes	Sandwich Abbe flap	Satisfactory	Nil	Good
IV	22 Years	Male	Yes	Sandwich Abbe flap	Satisfactory	Nil	Good
V	24 Years	Male	Yes	Sandwich Abbe flap	Satisfactory	Nil	Good

an earlier age and this lip flap ensures normally full and loose upper lip [9].

Ohtsuka et al. studied seven patients with secondary bilateral cleft lip deformity who underwent reconstruction using a forked Abbe flap and simultaneous columellar elongation using the upper lip. In their study, they found that none of the flap exhibited serious necrosis, except for marginal necrosis in one case. The authors also found that the resultant upper lip was full and attractive with an acute cubic contour of the philtrum, the residual scar at the donor site was concealed in the mentolabial fold as well as the inversely grown beard in the transferred forked Abbe flap was not conspicuous in male patients, because the hair from the relatively sparse part of lower lip was mobilized. They concluded that the objectives achieved by forked flap were to reconstruct the impressive philtrum subunit with columellar elongation, and to reverse the discrepancy between the upper and lower lips [10].

Oki et al. in 2007 described for the first time a novel one-stage reconstruction method using the inferior labial artery island flap. In their technique, they harvested the inferior labial artery island flap with a vascular pedicle, and then, the vascular pedicle was returned through the inside of the flap. They found that the flap survived completely, and liquid leakage from the lip and the appearance of the injured area were clearly improved. The authors recommended that if the labial veins are not confirmed during the vascular pedicle elevation, the submucosal tissue and the orbicularis oris muscle cuff around the labial artery be preserved for venous drainage of this flap. Furthermore, they said that there was no dysfunction of the orbicularis oris muscle, and the recovery of sensory function was not different from that seen after a conventional Abbe flap [11].

Rea et al. did the immediate reconstruction of the left side lower lip excised due to squamous cell carcinoma, using the Gillies Fan flap, and 1 year later did the reconstruction of the right side lower lip excised due to squamous cell carcinoma using the Abbe–Estlander flap. The authors stated that the electromyographic examination of a left Gillies fan flap 29 months after operation and of a right Abbe–Estlander flap 17 months after operation showed

complete motor innervations. They finally concluded that in the properly constructed composite flap of the lower lip, subsequent aberrations in the kinetics of facial function could be due to the following: disorderly reinnervation of motor end points resulting in redirection of muscle pull, scarring, redistribution of soft tissue mass between the upper and lower lips, or loss of proprioceptive function from the donor tissue [12].

Yonehara et al. used one-stage operation involving the simultaneous placement of an Abbe flap, septal cartilage graft, and cantilevered iliac bone graft in the patients who have upper lip deficiency with the severe nasal deformities. The authors stated that all the patients achieved the natural contour of the upper lip; the facial contour was improved with a marked decrease in the disproportionality between the upper and lower lips. The authors concluded by saying that Abbe flap combined with the open rhinoplasty is an effective reconstructive procedure for patients with secondary bilateral cleft lip and nasal deformity [13].

Jackson et al. introduced a modification in which only skin and mucosa are transferred as the sandwich Abbe flap. The authors used this technique to ensure the functional success of surgery by using not the orbicularis of the lower lip but that of the upper lip, and of course obtaining the benefit of the conventional Abbe flap by inserting the skin and mucosa only into the lip defect. They concluded that the technique of careful reconstruction of the orbicularis oris muscle combined with the sandwich Abbe flap offers the surgeon more flexibility in dealing with the secondary cleft lip deformity, gives better cosmetic results, and restores lip function immediately and completely. In our study, we presented five cases of secondary deformity of the upper lip who were operated using the modified Abbe flap. Unlike the conventional sandwich Abbe flap technique, we left the orbicularis oris muscle of the upper lip intact and divide the muscle of the lower lip. In the upper lip, we also gave the lateral releasing incision till mucosa on both the sides of the removed fibrosed tissue. This modification helped in maintaining the tissue bulk in the midline and it further reduced the chance of fibrosis. It also helped in properly approximating the tissues without tension and helped in the uneventful healing. This not only

improved the upper lip contracture, but also moved the scar to the margin of the aesthetic unit, and in addition to the cosmetic result, the function was also established.

Conclusion

In our study of five cases, we have observed that lip length increased, scarring over the lip reduced, whistle deformity subsided, and the tight apron-like lip condition became normal and we were able to maintain the good functional as well as aesthetic result. In our technique, we did not dissect the orbicularis oris of the upper lip, which helped us maintain the function of the sphincter and also reduced the chances of fibrosis following dissection of the muscle. We also gave the lateral releasing incision adjacent to the removed fibrosed part which helped us in closing the flap without tension, and proper approximation was achieved. Hence, we can suggest that the modified Abbe flap can be considered one of the best flaps for the reconstruction of the midline defect of the upper lip. Though more sample size is needed to come to any conclusion.

Compliance with Ethical Standard

Conflict of interest The authors declare that they have no conflict of interest.

Ethical Approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical Standards.

Informed Consent Informed consent was obtained from all individual participants included in the study.

References

1. Kroll SS (1999) Reconstruction of the large lip defects. *Oper Tech Plast Reconstr Surg* 6:21–227
2. Yoshimura Y, Nakajima T, Nakanishi Y, Yoneda K (1998) Secondary correction of bilateral cleft lip deformity with simultaneous abbe flap and nasal repair. *J Craniomaxillofacial Surg* 26:17–21
3. Steinberg B (1996) Modification of the abbe flap for reconstruction of the vermilion tubercle and cupid's bow in cleft lip patients. *J Oral Maxillofac Surg* 54:256–261
4. Antia NH (1965) Primary abbe flap in bilateral cleft lip. *Br J Plast Surg* 19:215–219
5. Jackson IT, Soutar DS (1980) The sandwich abbe flap in secondary cleft lip deformity. *Plast Reconstr Surg* 66(1):38–44
6. Nyame TT, et al (2014) The abbe flap for upper lip reconstruction. www.eplasty.com, interesting case, August 27
7. Akamatsu T, Tanaka R, Imagawa K (2009) Reconstruction of wide cleft lip scar by abbe flap and advancement flap from lateral upper lip. *Tokai J Exp Clin Med* 34(3):117–121
8. Converse JM, Hogan VM, Dupuis CC (1970) Combined nose-lip repair in bilateral cleft-lip deformities. *Plast Reconstr Surg* 45(2):109–118
9. Cannon B, Murray JE (1952) Further observation on the use of split vermilion bordered flap. In: Annual meeting of the american association of the plastic surgeons
10. Ohtsuka H, Nakaoka H (2009) Forked abbe flap for philtrum reconstruction. *J Plast Reconstr Aesthet Surg* 62:e484–e486
11. Oki K, Ogawa R, Feng L, Hyakusoku H (2009) The inferior labial artery island flap. *J Plast Reconstr Aesthet Surg* 62:e294–e297
12. Rea JL, Davis WE, Rittenhouse LK (1978) Reinnervation of an abbe-estlander and a gillies fan flap of the lower lip. *Arch Otolaryngol* 104:294–295
13. Yonehara Y, Mori Y, Chikazu D, Saijo H, Takota T (2008) Secondary correction of bilateral cleft lip and nasal deformity by simultaneous placement of an Abbe flap, septal cartilage graft, and cantilevered iliac bone graft. *J Oral Maxillofac Surg* 65:581–588