

Case Report**Reconstruction of medial upper lip defect with Abbe flap****Dini Widiarni Widodo, Wulan Mega Gustria**Department of Otorhinolaryngology - Head and Neck Surgery,
Faculty of Medicine Universitas Indonesia/Dr. Cipto Mangunkusumo Hospital, Jakarta**ABSTRACT**

Background: Reconstruction of upper lip defect is challenging, because the upper lip is formed by two lateral nasolabial subunits and one philtrum subunit. The most effective reconstruction approach for upper lip deformities is still being debated. **Purpose:** To report a case of upper lip defect, and review the Abbe flap and Estlander flap methods for upper lip reconstruction. **Case report:** A 62 years old female subject with full thickness defect of two third of the upper lip, repaired by Abbe flap. **Clinical question:** What is the best surgical preference for upper lip defect reconstruction? **Review method:** A systematic literature search based on clinical questions, inclusion, and exclusion criteria in the PubMed, ProQuest, EBSCO databases, Scopus and hand searching using keywords. **Result:** No eligible studies were pertinent to answer the clinical question. **Conclusion:** Reconstruction options of upper lip defect were based on thickness, size and the defect in the structure involved. The Abbe flap can be used to reconstruct the full thickness medial upper lip, one-third up to two-thirds of the defect area. Lateral defects and commissure involvement can be repaired by Estlander flap.

Keywords: upper lip reconstruction, Abbe flap, Estlander flap

ABSTRAK

Latar belakang: Rekonstruksi defek bibir atas lebih sulit, karena dibentuk oleh dua subunit nasolabial lateral dan satu subunit filtrum. Pendekatan rekonstruksi yang paling efektif untuk kelainan bentuk bibir atas masih diperdebatkan. **Tujuan:** Untuk menyajikan kasus defek bibir atas, pilihan terapi untuk pasien ini dan meninjau pilihan metode operasi dengan jabir Abbe dan Jabir Estlander untuk rekonstruksi bibir atas. **Laporan kasus:** Seorang wanita 62 tahun dengan defek dua pertiga bibir atas dengan ketebalan penuh, yang direkonstruksi dengan jabir Abbe. **Pertanyaan klinis:** Apakah pilihan bedah rekonstruksi terbaik untuk defek bibir atas? **Telaah literatur:** Pencarian literatur sistematis berdasarkan pertanyaan klinis, kriteria inklusi dan eksklusi di database PubMed, ProQuest, EBSCO host dan pencarian tangan menggunakan kata kunci. **Hasil:** Tidak didapati studi yang memenuhi syarat untuk menjawab pertanyaan klinis. **Kesimpulan:** Pilihan rekonstruksi untuk defek bibir atas adalah berdasarkan ketebalan, luas, dan kecacatan pada struktur yang terlibat. Jabir Abbe dapat digunakan untuk rekonstruksi medial bibir atas dengan ketebalan penuh sepertiga hingga dua pertiga dari area defek. Defek lateral dan keterlibatan komisura dapat diperbaiki dengan jabir Estlander.

Kata kunci: rekonstruksi bibir atas, jabir Abbe, jabir Estlander

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INTRODUCTION

Lips are a layered anatomical structure made up of skin, muscle, and mucosa. The orbicularis oris is the primary muscle of the lips, receiving motoric input from branches of the facial nerve and sensory supply from the trigeminal nerve. The superior and inferior labial arteries, which run near to the mucosal surface, provide the majority of the blood flow.¹ Upper lip function is supported by the orbicularis oris and three other muscles: the depressor septi nasi, the alar part of the nasalis, and the levator labii superioris alae nasi (LLSAN).²

Burget and Menick (1986), described the upper lip was divided into two halves, and each aesthetic subunits of the upper lip consisting of medial subunit (the philtrum) and two lateral subunits.^{3,4,5} The cupid's bow, vermilion tubercles, and philtrum columns are among its distinctive surface features. The intricate nature of lip reconstructions in this location is attributed to the complex architecture of this component.^{2,6}

The lateral unit can be further subdivided into medial and lateral elements in terms of function and reconstruction. Because of its relationship to the nasal sill and underlying maxilla, the medial element is less movable. The lateral portion, which is propelled by the muscles of face expression, is much more mobile.⁷ Lips are crucial for a variety of tasks such as communication, swallowing, and facial expression. It contributes to mouth seal and plays a significant part in facial cosmetics.¹ The upper lip's primary function is dentition coverage and facial animation.²

Lip defects are classified as either congenital or acquired. Congenital abnormalities can be caused by cleft lip deformities, or hamartomatous lesions such as hemangiomas. Acquired abnormalities can occur as a result of tumor ablation or as a result of a traumatic event.¹ Depending on the thickness of the tissue involved, defects

might be partial or full thickness. Based on amount of lip involvement it can be ranged from less than one-third to two-thirds or more than two-thirds of the whole lip. Options for reconstruction are based on the depth of the lesion and whether it includes the mucosa/skin or extends to the underlying muscles.^{1,2,4,5,7,8}

Lip reconstruction is particularly difficult for plastic surgeons because the lips are the dynamic center of the lower third of the face.^{1,9} No other tissue substitute can replicate their role in aesthetic balance, facial expression, speech, and deglutination. Lip reconstruction has both functional and aesthetic goals.^{5,9}

Full-thickness, one-third to two-thirds lip defects were surgically repaired by local flaps: include the Abbe flap, Abbe Estlander flap, and Karapandzic flap.^{1,2}

The Abbe flap can be used for lip reconstruction with medial defect, and Estlander flap can be used if the defect is on the lateral lip and has commissural involvement.^{1,2,4,5,8,10} The use of these two flaps can maintain orbicularis oris muscle competence. Facial animation can be preserved with Abbe flap, but Estlander flap is an insensate flap that changes the position of the modiolus, causing oral and facial animation to be distorted.^{1,2}

This report aimed to present a case of upper lip defect, and review surgical preferences method the Abbe and Estlander flaps for upper lip reconstruction, which provides better anatomical and functional results.

CASE REPORT

A 62 years old female came with history of small abscess under the nose for three months prior to admission. The abscess was getting bigger. The skin area was hyperemic, fluctuated and produced pus. The wound area became necrotized. Patient had history of uncontrolled diabetes mellitus. She had undergone debridement in one of local

hospitals. After debridement, the area became a defect in the middle of the upper lip sized 3.1x1.3 cm. The gum of the upper jaw was exposed. (Figure 1)



Figure 1. Medial upper lip defect

The patient was referred to Cipto Mangunkusumo Hospital for reconstruction and closure of the defect. The ENT surgeon collaborated with an internal medicine specialist for regulating the blood glucose, and the patient was treated with intravenous (IV) insulin. Reconstruction of the upper lip defect was performed with a two-stage Abbe flap. These two stages cross-lip flap, comprised of a triangular-shaped full-thickness segment of lower lip tissue being transferred to an upper lip full-thickness defect. (Figure 2)



Figure 2. Abbe flap

The donor flap was placed on the labial artery of the opposite lip from the defect. Nasogastric tube for feeding was inserted during the post-operative period until the next stage of surgery. The pedicle was detached four weeks later considering that the patient had a history of diabetes mellitus. (Figure 3)

The patient was able to eat normally by mouth after the pedicle had been detached. (Figure 4)



Figure 3. Three weeks post-Abbe flap



Figure 4. Eight weeks post-Abbe flap

CLINICAL QUESTION

What is the best surgical preference for upper lip defect reconstruction?

P: Upper lip defect

I: Abbe flap

C: Estlander flap

O: Functional and aesthetic outcomes, post-surgery complications

METHOD

A systematic literature search was EBSCOhost, Scopus, and hand searching from September 28th until October 5th, 2022.

The selection of articles was made based on inclusion and exclusion criteria then adjusted for clinical question. The inclusion criteria were: Abbe flap, AND

Estlander flap, and the variations of these terms. The articles explored were those compliant with a systematic review of Randomized Controlled Trial (RCT), RCTs, systematic review of cohorts, and cohort design research for intervention question. The population included was patients with upper lip defect. Other inclusion criteria were full text availability. Studies that were not written in English or Bahasa Indonesia were excluded.

RESULT

After a thorough critical review, the authors were unable to get any relevant studies to answer the clinical question. Authors' search for articles through 4 databases (PubMed, ProQuest, EBSCOhost, Scopus) and manual searching resulted in 5 articles. Filtering the titles and abstracts resulted in 1 article, which was a clinical review of upper lip anatomy and function, as well as various repair techniques and considerations for reconstruction. Furthermore, this article provided an algorithmic approach to upper lip reconstruction. No study was found comparing between Abbe flap and Estlander flap in upper lip reconstruction.

DISCUSSION

In implementing upper lip reconstruction, the surgeon must pay attention to animation muscles for good aesthetic and functional outcomes. The upper lip dermis, orbicularis oris, and modiolus are all insertion points for animation muscles. The modiolus, a muscular structure just lateral to the commissures, acts as a point of convergence for facial muscle animation and lip function. When animation muscles are involved, the goal is to restore function.

Janis proposed applying 'the rule of thirds' to approach upper and lower lip reconstruction, which is less than one-third

one third to two-thirds, and more than two-third of the lip width.² Using these rules, the authors performed a brief analysis of the available flaps, focusing on animation, orbicularis oris restoration, modiolus position preservation, and sensation for each.

Defects can be divided depend on the thickness, size, and the structure involved. One-third to two-thirds full-thickness lip defects were surgically repaired by pedicle flaps such as Abbe flap, Abbe-Estlander flap, and Karapandzic flap.^{1,2}

The Abbe flap can be used to reconstruct upper lip defects that affect up to two-thirds of the upper lip, as well as lateral defects, if the commissure or philtrum is not affected.^{1,2,4,5} It is especially useful for philtrum reconstruction because incision lines at the flap edges can recreate the philtrum's skin folds.²

Abbe flap is first described by Robert Abbe. It preserves the cupid's bow, oral commissure, and modiolus position. However, it is an insensate flap that does not maintain orbicularis oris continuity. The function of animation muscles is not adversely affected by central defects.²

The Estlander flap is a single-stage flap that uses donor tissue from the opposing lip to reconstruct lateral defects up to two-thirds of the upper lip with commissure and philtrum involvement.^{2,11} It is an insensate flap that alters the position of the modiolus, causing oral and facial animation to be distorted.²

The patient had medial upper lip full thickness defect with size 3.1x1.3 cm, which were categorized as up to two-thirds of the total lip defect. Defects less than 30% of the transverse width of the lip can be corrected predominantly using local/pedicle flaps, and in this case Abbe flap could be applied to reconstruct the defect.^{1,5}

The Abbe flap is cross-lip flaps in which tissue from the lower lip is harvested and transferred.² (Figure 2) It is considered as a

lip defect reconstruction with the opposing lip tissues, where the upper lip defect was closed from the lower lip donor template flap by rotating it.^{3,4,7,11} Lower lip tissue is the only tissue suitable (has the appearance, form and bulk required) for the aesthetic restoration of moderate size defects of the upper lip.³ This flap is still used to repair secondary deformities widely used for lip reconstruction after cancer resection.^{1,4}

The size of the donor flap is usually half the width of the recipient site.^{5,6,11,12} This measure will usually result in both lips having proportionally the same size after the donor is transferred to the recipient. According to McDonald and Park (2005) the donor flap may be the same size as the defect.^{4,7} Design of the Abbe donor flap can be triangular or “V” in shape, or it can be modified to a W-shaped, rectangular, or other configuration based on the defect.^{4,8,10} In our patient, the donor flap was a triangular design, and the same size as the defect.

Pedicle blood supply of the Abbe flap comes from the labial artery from the labial tissue of the opposite lip.^{3,4,7,11} The blood vessels are usually about 1.5-2.5 cm from the free edge of the lip, and 1 cm from the free lip at the center. The inferior labial artery is 100% in the midline and 80% in the vermilion of the commissure.^{4,5} As a result, the medial-based pedicle allows more rotation. It is very important to leave sufficient tissues around the pedicle to allow adequate drainage through the small veins that run parallel to the arterial pathway.^{4,7} The pedicle of the lip-switch flap is posterior vermilion and mucosa at least 1 cm wide.³

This is a two-stage procedure where the pedicle must be detached after 2-3 weeks.^{1,4,6} In our case, the authors decided to separate the pedicles at week-4 because the patient had a history of uncontrolled diabetes.

All patients must be re-examined after three weeks, three months, and six months to

assess the functional and aesthetic outcomes. The key to optimal restoration of lip function is the reconstitution of the orbicularis oris muscle with its reinnervation.¹²

Upper lip reconstruction options are based on thickness, size and the defect in the structure involved. The Abbe flap can be used to reconstruct the full thickness medial upper lip, one-third up to two-thirds of the defect area. Lateral defects and commissure involvement can be repaired by Estlander flap.^{1,2,4,5}

The Abbe flap preserves the cupid’s bow, oral commissure, and modiolus position. Facial animation can be preserved with Abbe flap, meanwhile Estlander flap is an insensate flap that changes the position of the modiolus, causing oral and facial animation to be distorted.²

The authors chose to use Abbe flap for this patient, as the defect was categorized as up to two-thirds of the total lip.

REFERENCE

1. Dadhich A, Shah S, Nilesh K, Saluja H, Girhe V, Agarwal S, et al. Reconstruction of acquired lip defects: Ten-year experience at a tertiary care center. *J Oral Biol Craniofac Res.* 2020;10: 698-704.
2. Boson AL, Boukovalas S, Hays JP, Hammel JA, Cole EL, Wagner RF. Upper lip anatomy, mechanics of local flaps, and considerations for reconstruction. Vol. 107, *Cutis.* Frontline Medical Communications; 2021. p. 144-8.
3. Burget, G. C., Menick, F. J., & Burget, G. (1986). *Aesthetic Restoration of One-Half the Upper Lip.* *Plastic and Reconstructive Surgery,* 78(5), 583-593. doi:10.1097/00006534-198611000-00005
4. *Encyclopedia of Otolaryngology, Head and Neck Surgery.* Encyclopedia of Otolaryngology, Head and Neck Surgery. Springer Berlin Heidelberg; 2013.
5. Geelan-Hansen K, Clark JM, Shockley WW. Reconstruction of Defects Involving the Lip and Chin. Vol. 27, *Facial Plastic Surgery Clinics of North America.* W.B. Saunders; 2019. p. 67-83.

6. Salibian AA, Zide BM. Elegance in Upper Lip Reconstruction. *Plast Reconstr Surg*. 2019; 143:572-82.
7. Luce EA, Jing XL, Carlson T. Abbe flap reconstruction of the upper lip. *Plast Reconstr Surg*. 2020; 606E-607E.
8. Taub PJ, Sanati-Mehrizy P. Abbe and estlander flaps. In: *Operative Dictations in Plastic and Reconstructive Surgery*. Springer International Publishing; 2016. p. 357-9.
9. Baumann D, Robb G. Lip Reconstruction. *Semin Plast Surg* [Internet]. 2008; 22: 269-80. Available from: <http://www.thieme-connect.de/DOI/DOI?10.1055/s-0028-1095886>
10. Filimon S, Richardson K, Hier MP, Roskies M, Mlynarek AM. The use of a modified Abbé island flap to reconstruct primary lip defects of over 80%. *Journal of Otolaryngology - Head and Neck Surgery*. 2016; 45.
11. Ebrahimi A, Maghsoudnia GR, Arshadi AA. Prospective comparative study of lower lip defects reconstruction with different local flaps. *Journal of Craniofacial Surgery*. 2011; 22: 2255-9.
12. Kumar A. Versatility of Abbe-Estlander Flap in Lip Reconstruction – A Prospective Clinical Study. *Journal of Clinical and Diagnostic Research*. 2014.