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CASE REPORT

Transoral Cross-Lip (*Abbé-Estlander*) Flap as a Viable and Effective Reconstructive Option in Middle Lower Lip Defect Reconstruction

Hyung Jin Hahn, Hyun Jee Kim, Jin Young Choi, Soo Young Lee, Young Bok Lee, Jin Wou Kim, Dong Soo Yu

Department of Dermatology, Uijeongbu St. Mary's Hospital, College of Medicine, The Catholic University of Korea, Uijeongbu, Korea

The *Abbé-Estlander* flap surgery is a cross-lip procedure that is valuable in repairing a defect on the lower lip using a full-thickness flap, consisting of the skin, muscle and mucosa, from the upper lip. As usefulness and practicality of the flap in reconstruction of lower lip surgical defects in Asian ethnicity have not been documented, the authors present a case of successful lower lip reconstruction with a staged, *Abbé-Estlander* lip switching flap with commissuroplasty as an illustrative example. A 71-year-old male has presented with an ulcerating lip nodule in the middle one third of the lower lip, measuring about 1.5×2 cm across its long and short axes. Wide excision of the tumor was followed by delineation of the triangular *Abbé-Estlander* flap from the upper lip, in which the medial hinge point of the base was chosen as the pedicle. Then, the flap elevation was carried out from the lateral commissure and then was transferred into the lower lip defect. Three weeks later, commissuroplasty was performed to correct the rounding at the new commissure. The patient is currently performing his daily activities with no apparent compromise in *orbicularis oris* strength or oral continence. Given the size of the primary defect and the flap-to-defect ratio of size, the degree of microstomia was acceptable. Even with other myriad of reconstructive options at surgeons' disposal, the *Abbé-Estlander* lip-switching flap is a reliable, and less morbid method of lower lip reconstruction for Asian surgical candidates. The authors illustrate an exemplary case in which a relatively large lower lip defect was successfully repaired using an upper lip flap of a significantly smaller size in an Asian subject of advanced age, without any remarkable long term sequelae which have traditionally been associated with the trans-oral lip switching flap technique. **(Ann Dermatol 29(2) 210～214, 2017)**

-Keywords-
Abbé flap, Asians, Lip cancer, Microstomia, Transoral lip switching

INTRODUCTION

The lips are perhaps the single important anatomical structures which dynamically determine the overall impression of the overtone of the facial expression. Subtle disturbance in the dynamics of the lip elevators and depressors may translate into an exaggerated distortion of the mid- and lower face region. Therefore, this dynamic equilibrium between the opposing lip muscles must be properly restored with an effective reconstruction technique after creation of defects, which may result from congenital anomalies, trauma[1], wide local excision for malignant neoplasm[2], and a variety of other inciting events. Delicacy of the issues concerning the anatomic and histological characteristics of the region mandates a premediated, meticulous repair strategies coupled with an impeccable execution of whatever the reconstructive option the surgeon chooses to

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Corresponding author: Dong Soo Yu, Department of Dermatology, The Catholic University of Korea, Uijeongbu St. Mary's Hospital, 271 Cheonbo-ro, Uijeongbu 11765, Korea. Tel: 82-31-820-3581, Fax: 82-31-846-4799, E-mail: frankyu123@hotmail.com

employ. Although lower face tends to be more or less a forgiving region for surgeons, the lack of any significant supporting fibrous framework[3] nevertheless makes the region vulnerable to distortion of the free margins. Furthermore, the uniqueness of the vermillion border makes it virtually impossible to find the suitable distant tissues that would blend well into the surrounding tissue when the flap is juxtaposed by the neighboring tissues[4].

This, for all practical purposes, leaves surgeons with the utilization of local flaps. Although a long list of reconstructive options have been in use since as far back as three millenia[5], (e.g., Gillies fan flap[6], Karapandzic flap[7], Bilateral advancement flap, Bernard-Burow flap[8], Nasolabial flap, Perialarcrescentic advancement flap[9], etc.), the transoral, lip-switching *Abbé-Estlander* flap has been known as a reliable technique which delivers consistent results and satisfaction for surgeons and patients alike. The flap belongs to the category of full-thickess myocutaneous flap, which feeds off a pedicle from the labial artery. The authors describe a case of lower lip defect successfully repaired with a two-stage, *Abbé-Estlander* flap in an Asian male with a significantly smaller flap from the upper lip.

CASE REPORT

A 71-year-old Korean male, a farmer by profession, has presented with an elliptical, friable, ulcerating lip nodule in the middle one third of the lower lip, measuring 1.5×2 cm across its long and short axes, respectively. The tumor caused a significant edema and distortion of the vermilion border (Fig. 1A). A 4-mm punch biopsy was taken and the pathology report showed a poorly-differentiated squamous cell carcinoma with deep invasion down to the muscle. Preoperative workup included head and neck computed tomography, which revealed no infiltration of the tumor into the adjacent tissue and no significant enlargement of local lymph nodes. Because the projected extent of tumor extirpation, amount of blood loss, and the risk of wound infection, the patient was admitted the day before operation and prophylactic intravenous antibiotics was administered. On the operating table, a wedge-excision of the tumor with a generous tumor-free margin created a triangular defect measuring about 5.1 cm at its base and 4.8 cm and 4 cm at its vertical limbs (Fig. 1B). Delineation of a right-triangular *Abbé-Estlander* flap from the upper lip, measuring about 1.5×1.5×2.3 cm was done and the flap was to be pedicled medially. Flap elevation was then carried out from the lateral commissure, and then the pedicled flap was pivoted 180 degrees and interposed into the lower lip defect. The flap was sutured into place with approximation of the two edges of orbicularis oris muscle using a 5-0 absorbable, followed by the closure of the mucosal side with a 5-0 vicryl. Skin suture was done with a 6-0 nonabsorbable; the donor site was closed primarily with the same suture material (Fig. 2A). The pathology report provided the final diagnosis of poorly differentiated squamous cell carcinoma of the lip, with the carcinomatous cells penetrating down to muscle (Level V invasion). Involvement of peripheral/deep margins, lympho-vasculature, and perineurium was not seen (Fig. 3). For the following three days after the first stage, the patient was allowed liquid diet only, and after tolerability was affirmed, it was gradually replaced with increasingly more solid types of diet. Three weeks later, division of the pedicle

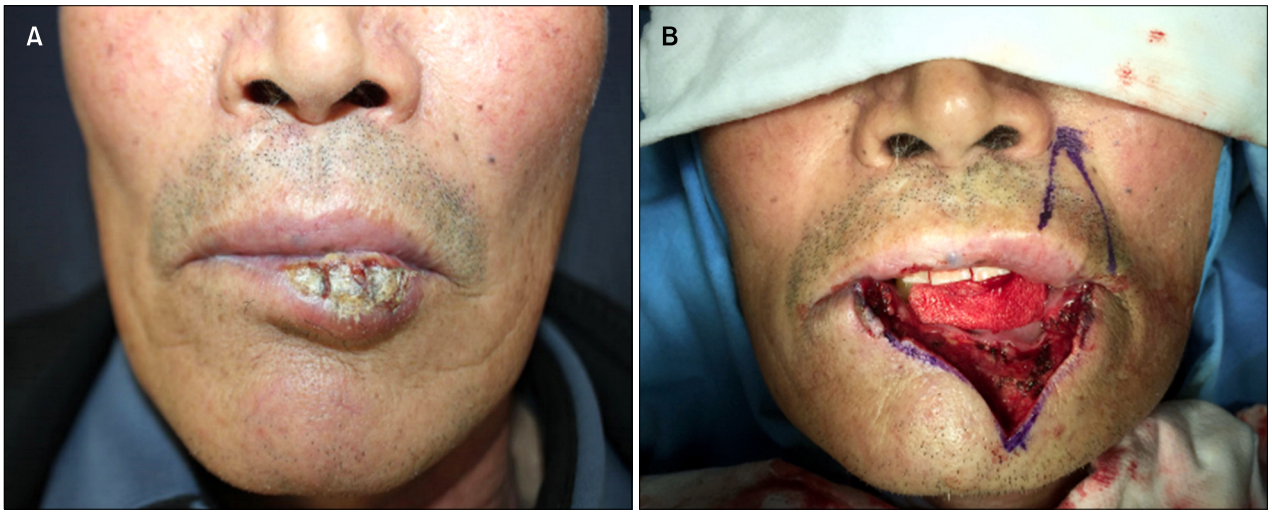

Fig. 1. (A) Clinical photograph of the lesion with extensive involvement of the mid-to-left portion of the lower lip. (B) Wide wedge excision of the primary tumor is followed by design of the flap.

Fig. 2. (A) At completion of the first stage operation and (B) 8 weeks postoperative.

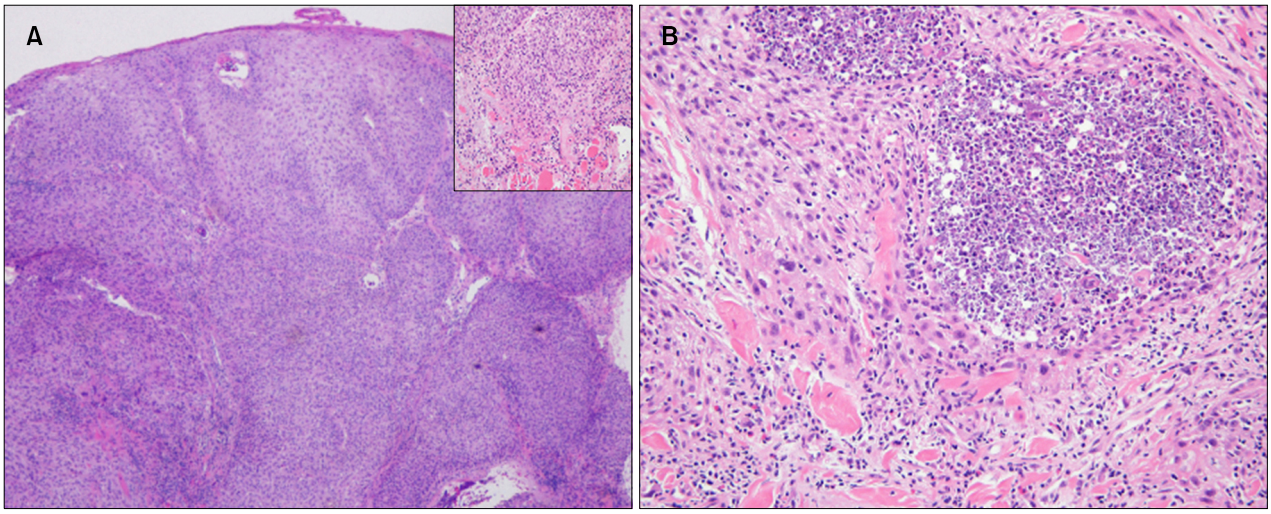

Fig. 3. Histopathological findings of the excised tumor at (A) low magnification (H&E, ×40) shows poorly-differentiated squamous cell carcinoma showing diffuse invasion. Superficial portion of the underlying skeletal muscle is also involved (inset: ×200). Nuclear pleomorphism and intratumoral nercrosis are evident in (B); H&E, ×200.

"hinge" point was performed and the flap was allowed to be set in place. He has hence been followed up with outpatient visit to the clinic every four weeks. The patient reported that he hardly experienced weakening of *orbicularis oris* muscle strength or oral incontinence of solid or liquid content. The degree of microstomia, which is considered more or less inevitable with the lip switching flap procedures, was considered acceptable, given especially the size of the primary defect (Fig. 2B).

DISCUSSION

Lip defects can either be classified as partial defects that involve only skin or mucosa or full-thickness defects involving skin and muscle, with or without mucosal involvement[10]. The defect can also be categorized in accordance to its location, i.e., left, the middle or the right third of, or overlap lesions involving a combination of two or more of these sites[11]. The defect may be limited to the cutaneous lip or vermilion or involve the both. More often than not, the goal is to utilize a smaller sized flap of the upper lip to make up for a larger defect on the lower lip, where lip malignancies, mostly squamous cell carcinoma, occurs with a greater frequency[12]. Inevitably, varying degrees of postoperative microstomia is almost bound to occur. Of note is the proportion of the flap size to that of the defect in the

present case; the triangular defect, measuring about 5.1 centimeters in its base and 4.8 cm and 4 cm at each vertical limb, was successfully repaired with a right triangular-shaped flap of only $1.5 \times 1.5 \times 2.3$ cm in dimension. This minimization of the secondary defect allowed us to salvage the commissure and hence the more acceptable cosmetic outcome. Although there is no single consensus as to the "optimal" ratio of the flap to the defect size (i.e., yielding the best aesthetic results without flap failure) our case demonstrates that it may be as small as one to three, granted that the patient represents lower surgical risk group, and flap insetting is technically sound. When properly executed and appropriate postoperative care is given, the *Abbé-Estlander* flap surgery is associated with minimal risk of flap failure[13]. Our patient was free from any significant postoperative morbidity such as wound dehiscence or necrosis.

In any case of lip and perioral reconstruction, preservation of the muscle function should be prioritized. Successful restoration of adequate lip function and strength hinges on the structural integrity of *orbicularis oris* muscle with its reinnervation[14-16]. We postoperatively evaluated the integrity of *orbicularis oris* muscle with mouth opening and closing, oral continence and presence or absence of lip asymmetry and dynamic distortion, at four-week intervals postoperatively. Our patient has not experienced any difficulty in phonation or lip incompetence up to three- month postoperative follow-up. The integrity of the muscle function after the surgery has been well documented in a previous study by Zhai et al.[17]. As demonstrated by our case, restoration of adequate lip function and its natural positioning traditionally embodies a two-stage procedure with the commissuroplasty step performed three weeks after the flap insetting, although a handful of authors have reported success with single-stage techniques[18,19].

In reconstruction of lower lip with defects of significant size in Asian subjects, selection of the right repair technique would be dictated by safety considerations, track record for its reliability, and perhaps most importantly, utilization of like tissue from neighboring tissues. With a fairly predictable blood supply from branches of the superior labial artery, rapid neovascularization ensures survival of the pedicle after the second stage "division" in only after 2 weeks after the first stage. Another major strong point from aesthetic perspective is that the final donor scar area hardly stands out because it was effectively hidden into the nasolabial fold (in case of a more medial defect it would have lain parallel to it. Put together, this flap surgery is straightforward from the conceptual and technical aspects, and most often yields functionally and aesthetically pleasing results for reconstruction of middle lip defects. For still larger defect involving the entire lip, radial forehead free flap can be used to for repair[20].

Since the current report is based on a single case of well-excuted lip switching flap in an Asian subject, it came up short in addressing other various issues regarding effectiveness of the *Abbé-Estlander* flap in Asian patients and inherent difference of the Asian lip tissues in microscopic level will perhaps serve as a guiding light for the reconstructive specialists faced with the challenges of ideally restoring the natural lip contour and texture in Asian patients.

To author's knowledge, the effectiveness and long-term results of the *Abbé-Estlander* flap in Asian population have not been seriously looked into in previous literature, in the form of case reports or otherwise. We posit that even with the myriad of reconstructive options is at available today, the old *Abbé-Estlander* lip-switching flap is still the technique surgeons can fall back on for lower lip defect reconstruction in Asian surgical candidates.

CONFLICTS OF INTEREST

The authors have nothing to disclose.

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