

# The Transposition Advancement Flap for Repair of Postsurgical Defects on the Upper Lip

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## Key Words

Transposition advancement flap ·  
Postsurgical defect · Upper lip surgery

## Abstract

**Background:** Skin cancer of the lip is frequent, and reconstruction after Mohs surgery might be challenging mostly when the postsurgical defect has a size of more than 1 cm<sup>2</sup> and is situated adjacent to the philtrum. **Objective:** We present a combination of a transposition and advancement flap for the reconstruction of postsurgical defects of the upper lip. **Methods:** Demonstration of the technique and practical application for this kind of reconstruction. **Results:** The transposition advancement flap (TAF) presents excellent results for medium defects of the upper lip medially adjacent to the philtrum. **Conclusion:** The TAF can be used in the reconstruction of the major part of postsurgical lip defects in the medial two fifths of the upper lip without any risk of lip distortion. As this flap is easy to perform, it is an important tool in the armamentarium of the dermatologic surgeon.

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## Introduction

Skin cancer of the upper lip is frequent. The lip is a difficult area to reconstruct as it has no resistance and follows easily any retraction or tension. Therefore the reconstruction of semimucosal or epidermal de-

fects after Mohs surgery for epidermal skin cancer has to be performed with extreme prudence as distortion of the lip is strongly disfiguring.

## Anatomy

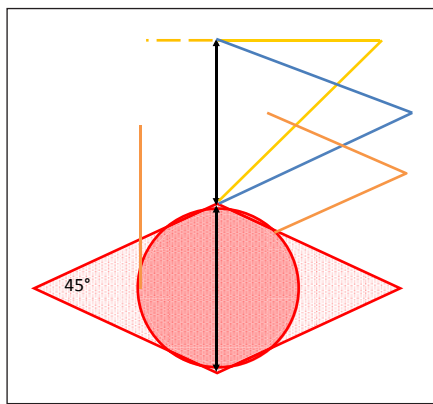
Postsurgical defects of the lips might have three configurations: either it involves only the skin or mucosa or the skin and mucosa. If it involves only the skin, it is possible to cover this defect with only one flap; if the defect involves the skin and mucosa, often a combined solution with a second flap for the mucosa is necessary. Any reconstruction of the lip should respect the principle that the tension for closure of the primary and/or secondary defect should be parallel to the axis of the lip and the incision lines should as far as possible be perpendicular to the axis of the lip. The donor site for skin is the surrounding lip epidermis and idem for the mucosal part. In any operation on the lip, the vermillion border has to be lined out with a skin marker before applying local anesthesia and needs sometimes to be touched up during the operation, for example during Mohs surgery.

## Technique

The classic rhomboid flap generally uses a combination of slight advancement and, dependent on the design, a variable

rotational movement. This rotation might vary from the Limberg flap with 60–70° of rotation down to the Defourmentel variety with 45–60° of rotation. On the lip, the rotational movement is best kept as low as possible because it might lead to lifting of the lip at the end of the second incision line of the rhombic triangle of the raised flap. To diminish the rotation movement there are three possibilities: (1) either one adapts the second incision line of the rhombic triangle to get a tension line parallel to the short axis of the rhombus but keeping the rotation to 60° (yellow in fig. 1) or (2) one turns the rhombus to lie parallel to the defect rhombus (blue) with less rotation and one increases the advancement movement of the triangle by undermining the adjacent tissue on the opposite side of the defect. When we combine 1 and 2, we get the third possibility 3. This means we position the rhombic flap more on one pole of the defect and add a release incision to create a transposition advancement flap (TAF) (orange in fig. 1). If so done, the TAF shows a rotation movement of only 10–30° and in consequence less risk to elevate the lip.

Before beginning the flap design one has to check that the vermillion border is aligned correctly. If not the mucosa can be advanced to get a correct alignment. In some cases a small wedge excision can help to align and to diminish the horizontal extension of the defect (fig. 4). The flap is started with incision of the epidermis and dermis at the upper third of the defect. The incision lines of the rhombic triangle are positioned corresponding to the width of



**Fig. 1.** To achieve more advancement of the rhombic flap there are three possibilities: (1) adaption of the second incision line (yellow), (2) turning of the rhombus (blue) or (3) positioning of the rhombic flap closer to one pole of the defect and adding of a release incision (orange). If so done the TAF shows a rotation movement of only 10–30°. Colors refer to the online version only.



**Fig. 2.** Patient with asymmetry of the lip due to nonexcisional surgery and recurrence of basal cell carcinoma before Mohs surgery.



**Fig. 3.** The same patient as in figure 2 with postsurgical defect after Mohs surgery.

the defect in the upper third. The operator has to try to follow the rules to hide incision lines between two anatomic subunits as shown in figures 4 and 8 (philtrum and nasolabial crease). Then the flap is undermined just above the orbicularis oris muscle. This plane shows a single bigger vessel but this can easily be identified and avoided by blunt dissection. The next step is trying to move in the flap; when there is too much tension or rotation, you have to proceed with undermining. After a certain point there is too much tension on the vermillion border of the lip when trying to advance the flap. This is the point where an incision has to be performed right at the upper limit of the vermillion border so that the flap can be laid into the defect easily without tension (fig. 4, 8). A first polyglycolic acid 5-0 buried suture is placed between the end of the second incision line and the triangular bridge (fig. 4) to verify whether the flap can be laid into the defect without too much tension and without disfiguring the lip. If this is so, the secondary defect is closed thoroughly with subcutaneous sutures. When this is not the case, undermining has to proceed and the incision on the vermillion may have to be prolonged.

Then the flap is sutured in with polyglycolic acid 5-0 buried sutures. Corrections have to be made to adapt the flap cor-

rectly to the defect. Final skin adaption can be finished by continued or interrupted polypropylene 6-0 sutures (fig. 5, 6, 9).

## Discussion

The incidence of nonmelanoma skin cancer is constantly rising in the population. Often nonmelanoma skin cancer is situated around the orifices where surgical repair is unfortunately difficult. Tumor excision around orifices needs correct pre-operative evaluation and clinical accuracy to keep costs low. Therefore dermatologists which have the advantage to combine histopathology directly to the clinical appearance are well placed to perform this surgery [1]. Tumor excision in these regions should – when possible – rely on Mohs micrographic surgery [2, 3].

Postsurgical defects of the lips after Mohs surgery are frequent. The defect can involve only the skin or mucosa or the skin and mucosa. This means it might cover one or two anatomic subunits. The lip plays an essential role in nonverbal communication, self-estimation and self-recognition and therefore demands extreme prudence in reconstruction. The basic rule is not to create any asymmetry and to avoid any retraction of the lip. To realize

this goal there are three basic principles to follow: first, any tension of the closure of the primary or secondary defect should be parallel to the lip axis; second, the incision lines should as far as possible be perpendicular to the lip axis, and third, the reconstruction should as far as possible be limited to the anatomic subunit. In the literature there have been different solutions described to cover this kind of defects. Zitelli [4] and Leonard and Hanke [5] have proposed second-intention healing. The major disadvantage is the long healing time, the necessity of keeping a bandage which is difficult to maintain around the lips and the high risk of retraction. Leonard and Hanke [5] showed some nice results but the best results were these cases where the defect was restricted to superficial defects of the mucosa of the lower lip. A split-thickness skin graft is not the first option and should be restricted only to very extended lesions, and there are probably better options. A full-thickness skin graft is a potential solution but needs anesthesia of a new harvesting region which is mostly not close to the primary defect and therefore the procedure is more time consuming and painful for the patient. The aesthetic result is limited due to different skin textures and colors; full-thickness skin grafts may take several months until



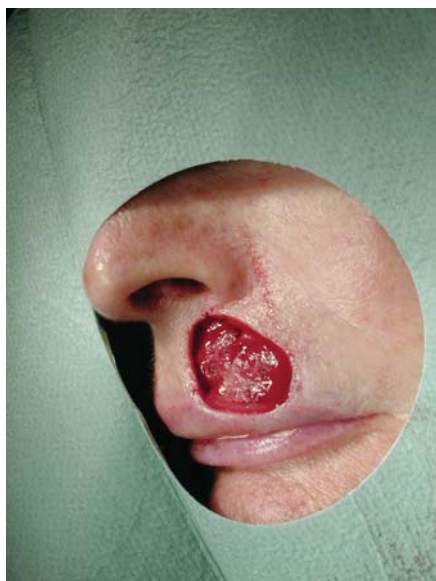
**Fig. 4.** Wedge excision in the vermilion, small adaption on the cranial apex of the defect, design of the flap.



**Fig. 5.** Incision of the flap with regard to one line over the philtrum to recreate the philtrum, release incision on the vermilion border.



**Fig. 6.** Result after 1 year.



**Fig. 7.** Patient with a postsurgical defect just close to the philtrum.



**Fig. 8.** Incision of the TAF with incision lines following the nasolabial crease as well as the vermilion border.



**Fig. 9.** Result after 1 year.

a good aesthetic result is obtained. The risk of disfiguring retraction is potentially important, and mucosal grafts for overlapping defects for the mucosal part carry a risk of necrosis. Side-to-side closure is al-

ways a good solution in smaller defects but might create asymmetry on the upper lip with larger defects.

There have been several publications about pedicle island flaps either perpen-

dicular or parallel to the lip [6, 7]. This is a valuable option but presents a considerable risk of trapdoor deformity. A mucosal advancement flap for the mucosal defect combined with any other reconstruction



of the skin defect is a good possibility but will probably result in a thinning of the red lip and a further incision line on the vermillion with consequent flattening of the vermillion.

For smaller defects, several publications mention OZ plasties, transposition or rotation flaps but for larger defects as we show the only alternative is either a transposition flap from the cheek with all its disadvantages (sebaceous skin from a convex surface with tendency of trapdoor deformity, lack of hair-bearing skin in men) or rotation flaps from lateral parts which was not an option in our patients as the defect was too close to the philtrum and would have created asymmetry and lifting of the labial commissure (fig. 7).

For the isolated mucosal defect, a bilateral vermillion advancement flap is an ex-

cellent option and very convenient for the lower lip [8]. It can always be an adjunct flap for mucosal reconstruction in an overlapping defect to TAF.

For extended defects of the upper lip, we think that the TAF presents several advantages to other reconstructions: the donor site is close to the primary defect, always lateral or medial to the latter (fig. 2, 3, 5, 6), and it allows to respect the parallel tension to the border of the lips. The skin – for men, hair bearing – is close to the defect and will cover it with hair-bearing skin only with a slight change of hair orientation. The skin texture and color are identical to the surrounding skin, the incision lines are more or less perpendicular to the lip axis and there is a variety of combinations to allow to cover even larger defects.

## Conclusion

The use of TAF in the reconstruction of the lip is probably underestimated. Due to the fact that the tension of the primary and secondary defects is parallel to the lip axis, there is practically no risk of lip disfigurement compared to other reconstruction options. The TAF can be combined with any other reconstruction if necessary to reconstruct either mucosal or skin defects. The TAF can be adapted to any localization in the face needing tension parallel to an orifice to avoid creation of asymmetry.

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