A 66-year-old woman was referred for Mohs micrographic surgery of a basal cell carcinoma on the left upper cutaneous lip. The tumor was cleared after one stage resulting in a defect measuring $1.4 \times 0.9$ cm that did not penetrate the underlying orbicularis oris muscle (Figure 1). How would you reconstruct this surgical defect?

Figure 1. Surgical defect following excision.
Resolution

A number of repair options can be utilized to close lip defects including complex linear closure, full-thickness skin graft, second intention healing, or skin flap. The dermatologic surgeon must consider both the functional and aesthetic results when evaluating repair options. Complex linear closures, if horizontal in this area, may lead to upward pull on the lip. If performed vertically, a complex linear closure in this area would compromise the lateral oral commissure. Moreover, a full-thickness skin graft would result in poor color and texture match. Lastly, a transposition flap, whether superiorly or inferiorly placed, would lead to postoperative swelling and numbness that may last several months. A subcutaneous island pedicle flap is a good alternative in this location as it recruits tissue from the same cosmetic unit. However, it also can be confounded by postoperative swelling and numbness that is uncomfortable for the patient, especially in areas such as the upper cutaneous lip.

We chose to repair this patient’s defect with a triple advancement flap. The defect produced following Mohs surgery was in a location where the minimum skin tension lines of the lip and the cheek intersect. To place all the incision and closure lines within the minimum skin tension lines and avoid distortion of the lip, a multidirectional advancement flap was used (Figure 2). The flap was oriented in such a way so that all the suture lines were parallel to the minimum skin tension lines (Figure 3). Four months after surgery, the patient was pleased with her results (Figure 4). It should be noted that when placing sutures, care must be taken to orient tension vectors in a horizontal fashion so as not to result in a postoperative elevation of the lip. Additionally, the surgeon should be prepared to cut through the vermilion border as needed to place tension vectors appropriately, but care must be taken to realign the vermilion during reconstruction.

The triple advancement flap, also referred to as a “Mercedes flap,” is a three-sided advancement that can be used for small and large defects in the skin and subcutaneous tissue. This flap allows the surgeon to recruit tissue and spread tension over multiple vectors. It is particularly useful in areas of bifurcation or trifurcation of contour and tension lines. Skin closure lines are kept in the lines of minimal tension and a three-sided closure is made instead of a two-sided closure.

Sutures are placed after establishing the lines of tension in the area in such a way that the three radiating arms of advancement merge into existing relaxed skin tension or contour lines. To determine the best three sites for suture

Figure 2. Illustration of multidirectional advancement of tissue.

Figure 3. An immediate postoperative photograph of the triple advancement flap.

Figure 4. Follow-up 4 months after surgery shows a well-healed flap.
placement, three skin hooks may be placed in distant points of the wound followed by pulling toward the center. Several combinations of points along the wound edge may be tested in this manner.

The triple advancement flap can be applied to close circular or oval defects on the lateral forehead, temple adjacent to the lateral canthus, upper lip adjacent to the nasal ala, cheek, lateral neck, and sternal notch. It is also useful for larger defects where one wishes to use donor skin from three different locations. The flap results in shorter closure lines than if a defect is closed as a linear side-to-side closure. The round to oval defect is undermined and dog-ears are removed using skin tension lines for directional guidance. A central three-point anchoring suture is placed first and the rest of the wound is closed in subcutaneous and epidermal layers.

The triple advancement flap allows closure of round defects, especially in areas of trifurcation of skin tension lines, while avoiding extensive tissue manipulations which otherwise might be required for local or distant rotation or transposition flaps.¹ When dog-ears and subsequent closure lines are placed in the minimum skin tension lines, the best long-term cosmetic results are obtained.

Conundrum Keys

- The triple advancement flap is useful in areas of bifurcation and trifurcation of the skin and tension lines.
- All incision and closure lines can be placed within the minimum skin tension lines.
- This flap is useful for larger defects where one wishes to use donor skin from three different locations.
- The closure lines are shorter than those of a linear side-to-side closure.

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