The Subcutaneous Pedicle Flap in Melolabial Reconstruction

Todd J. Rustad, MD; Duane O. Hartshorn, MD; Ross A. Clevens, MD; Timothy M. Johnson, MD; Shan R. Baker, MD

Objective: To review and report our experience with the subcutaneous pedicle flap in the reconstruction of defects adjacent to the melolabial crease.

Design: Retrospective review.

Setting: Cutaneous surgery unit of an academic tertiary referral center.

Patients: One hundred nine patients with defects of the lateral aspect of the upper lip, the medial aspect of the cheek, and the melolabial crease after Moh excision of cutaneous lesions.

Conclusions: In our experience, the subcutaneous pedicle advancement flap is often ideally suited to the reconstruction of cutaneous defects adjacent to the melolabial crease. We have been particularly satisfied with the results of this reconstructive technique when addressing deep defects adjoining the alar facial sulcus in patients with full cheeks.


The development of subcutaneous pedicle flaps and their use in facial cutaneous reconstruction have been described by several authors.1-14 With this technique, defect coverage is provided by the advancement of 1 or more skin islands bordering the defect. Skin color, thickness, and texture match are optimized by the use of adjacent skin. Such flaps are easily designed to place incisions along relaxed skin tension lines and typically result in minimal wound closure tension with limited distortion of adjacent facial structures. The technique is conservative. The skin island that is used would often otherwise be excised and discarded as a standing cutaneous deformity were the defect to be closed primarily or with a cutaneously pedicled flap.

Despite these advantages, subcutaneous pedicle flaps are not widely used in facial reconstruction for several reasons. Primarily, their utility is restricted by the local thickness, elasticity, and vascularity of the underlying facial subcutaneous tissue. A tendency toward pincushioning and central fullness in these flaps has also been noted. In addition, they require relatively extensive local undermining and result in a circumferential geometric scar at the recipient site.2 These restrictions limit their use at specific locations.3

In our experience, the subcutaneous pedicle advancement flap is often ideally suited to the reconstruction of cutaneous defects of the medial aspect of the cheek and the lateral aspect of the upper lip that are adjacent to or lying within the melolabial crease. The medial cheek has a thick, elastic, highly vascular subcutaneous layer that permits a relatively narrow, mobile subcutaneous pedicle. The linear axis of the facial artery parallels the melolabial crease, providing a generous blood supply to the overlying skin through numerous subcutaneous perforators. In older patients, redundant medial cheek skin serves as an abundant donor resource for this flap. The melolabial crease serves as a boundary for multiple facial aesthetic units. The use of subcutaneously pedicled flaps near this important aesthetic boundary facilitates the preservation of these units and results in minimal distortion of the lip, commissure, and nasal ala because the need for secondary tissue movement is limited. The melolabial crease itself is maintained and effectively hides portions of the donor site scar. By contrast, other local flaps used to reconstruct medial cheek and upper lateral lip defects may traverse, obliterate, or distort the melolabial crease, thereby compromising the aesthetic result. Herein, we report our consistent satisfaction with this application of the subcutaneous pedicle flap and describe the techniques that we believe enhance our results.

Technique

The skin island is designed with its leading edge formed by the margin of the defect that adjoins or faces the melolabial crease (Figure 1, A). Optimally, the axis
PATIENTS AND METHODS

A total of 109 patients underwent subcutaneous pedicle flaps to repair defects of the lateral aspect of the upper lip, the medial aspect of the cheek, and the melolabial crease in conjunction with Moh excision at the University of Michigan cutaneous surgery unit, Ann Arbor, from 1990 to 1996. During this period, a combined total of 854 defects at these sites were repaired by all techniques, including primary closure. Defect size ranged from 0.8 (0.8 × 1.0) to 31.5 cm² (4.7 × 7.0 cm), with a mean of 3.5 cm² (approximately 1.9 × 1.9 cm) and an SD of 4.1 cm².

of flap advancement is designed to parallel the melolabial crease (Figure 1, B). The width of the skin paddle should equal the diameter of the defect at its widest point perpendicular to the axis of flap advancement. The length of the skin paddle should generally be twice that of the defect along the axis of flap advancement. The trailing half of the skin paddle tapers to a point to facilitate donor site closure in a V-Y fashion after flap advancement. Care is taken when designing the taper of the flap to minimize upward or downward pull on the oral commissure and to preserve lip height when the defect is closed (Figure 2). The design of the trailing edge of the flap is particularly crucial when the flap is used in upper lip reconstruction. The skin paddle may extend as far as the inferior border of the mandible if necessary. Locating the trailing tip of the skin paddle directly in the melolabial crease optimally conceals the donor site closure (Figure 3). Insofar as possible, incisions should be designed to place scars at the border of aesthetic units.

The perimeter of the skin island is then incised to the level of the superficial subcutaneous tissue. Undermining of the adjacent facial skin for a distance of 2 cm is performed at this level. Blunt and sharp dissection is then carried through the subcutaneous tissues surrounding the skin island, beveling slightly away from the paddle down to the level of the fascia overlying the facial muscles. This frees the elastic subcutaneous pedicle from its fibrous attachments to the surrounding cheek fat, while preserving its vascular supply as much as possible. The skin paddle is then mobilized into the defect by placing a skin hook at its leading edge (Figure 1, C). At this point, the pedicle can be narrowed to facilitate tension-free mobilization of the flap. This is accomplished by back cutting the leading and trailing edges of the flap in a subcutaneous plane up to one third of the total flap surface area at each edge. Further thinning of the subcutaneous tissue underlying the undermined portion may be performed to produce an appropriate thickness match for the recipient site. A central pedicle that is one third of the total skin island surface area will adequately perfuse the skin island. Further lateral subcutaneous undermining around the flap is required if puckering of the adjacent facial skin occurs with flap mobilization. Subcutaneous undermining at the recipient site is performed, and the recipient site depth and shape may be modified by

Figure 1. A 51-year-old man after Moh excision of a basal cell carcinoma of the left melolabial crease: A, 3.5 × 3-cm defect after excision. B, Island pedicle flap design incorporating adjacent medial cheek skin. C, Flap mobilized into defect after local undermining and narrowing of its subcutaneous pedicle. D, Flap sewn in position. E, Healing at 3 months.
removing skin and subcutaneous fat to place scars along aesthetic boundary lines and to better accommodate the thickness of the advancement flap. Wound closure is performed using buried subcutaneous 5.0 poliglecaprone monofilament sutures (Monocryl) and simple running or vertical mattress 5.0 polypropylene cutaneous sutures. The leading edge of the skin paddle is fixed in place, and then the remaining perimeter is closed such that wound closure tension is equally distributed over the entire length of the flap (Figure 1, D). The donor defect is closed in a V-Y fashion relative to the trailing edge of the flap, with care being taken to compensate for any difference in length of the opposing margins of the donor site.

**RESULTS**

There were no instances of flap loss, significant skin necrosis, or wound hematoma in this series. No postoperative facial weakness has occurred, although we occasionally observed mild asymmetry in upper lip movement when large flaps were used in upper lip reconstruction. While transient swelling of the skin paddle was common, it predictably resolved within several months. Debulking was not required in any flap with an area of less than 4 cm². Secondary debulking procedures were required in one third of flaps larger than 4 cm² to optimize the contour of the flap, particularly its central portion. Final cosmetic results were judged satisfactory by the reconstructive surgeon in all cases.

**COMMENT**

A variety of reconstructive methods are available to the surgeon who is addressing defects adjoining the melolabial crease. Local transposition, rotation, and advancement flaps commonly used in this location take advantage of the abundant skin of the lateral aspect of the cheek. However, these flaps commonly obliterate or distort the melolabial crease and may exhibit trapdoor deformities. Also, these flaps frequently require incisions that are unfavorably oriented with respect to relaxed skin tension lines and aesthetic boundaries.

The subcutaneous pedicle advancement flap takes advantage of the abundance of the well-vascularized subcutaneous fat of the medial cheek. The skin overlying the inferior melolabial crease receives a robust blood supply via perforators from the underlying facial artery. In 1978, Herbert published an excellent article in which he describes the vascular supply to subcutaneous pedicle flaps of the medial cheek. He noted that subcutaneous pedicle flaps of medial cheek skin located inferior to the nasal ala are safely based on quite limited underlying subcutaneous pedicles because of the axial relationship of the facial artery and its branches. This observation is consistent with...
the excellent reliability of these flaps in our hands. A greater portion of the vascular supply to the superior medial cheek is provided by the transverse facial artery from laterally. This transition in blood supply necessitates lateral extension of the subcutaneous pedicle in flaps of medial cheek skin designed superior to the nasal ala and limits their potential for superior advancement. The thick elastic subcutaneous tissue of the medial cheek serves to minimize wound closure tension. In most adults older than 40 years, the melolabial crease is well developed, helping to camouflage incisions placed within it. In younger patients, the resultant scar may be conspicuous. The ability to transfer a bulky subcutaneous pedicle into the defect when desired is particularly useful in the repair of the deep surgical defects that are often encountered in the medial cheek. The dissection produces minimal dead space and does not produce standing cutaneous deformities. Thus, the risk of hematoma is minimized, and skin is conserved.

Distal branches of the facial nerve lie on the undersurface of the facial musculature in the melolabial region. Despite the depth of dissection that is necessary to mobilize the flap, the risk to the facial nerve is minimal as long as the facial musculature is not transgressed. Sensation in the skin paddle is preserved by the subcutaneous pedicle.

A propensity toward pincushioning has sometimes been attributed to this type of flap. This has not been our experience. We believe that adequate undermining of the adjacent skin and appropriate initial flap debulking minimize this complication. We advise our patients that the flap will routinely appear full for the first several months after reconstruction. Instructing the patient to massage the skin paddle after initial healing is complete (usually 6-8 weeks) may hasten the reintegration of the flap with the adjacent skin and aids in the patient’s acceptance of this waiting period. During the first several postoperative months, we occasionally inject steroids into areas of the flap that appear particularly bulky. Secondary debulking procedures are occasionally necessary to remove excess subcutaneous fat, usually from the central zone of the flap.

Disatisfaction with the circumferential scar surrounding the skin island of the subcutaneous pedicle flap has led some surgeons to propose modifications of its design. Emmett described one such modification, dubbed the hatchet flap because of its shape, in which one side of the leading edge of the skin island maintains its attachment to the adjacent facial skin. The skin island must be rotated into the defect pivoting about this remaining skin bridge, rather than advancing directly. The flap remains dependent on its subcutaneous pedicle rather than its cutaneous attachment, which is narrowed as necessary to facilitate movement of the skin paddle. This modification eliminates a portion of the circumferential scar surrounding the skin island but limits the flap’s mobility to the extent that its advantage over other local cutaneous flaps is diminished. In our experience, the circumferential scar surrounding the skin paddle will not be conspicuous if the recipient skin is appropriately undermined and the thickness of the flap is meticulously matched with the depth of the defect.

Use of the subcutaneous pedicled flap in upper lip reconstruction may result in the reorientation of perioral rhytids. While this sequela may be problematic in patients with well-developed rhytids, it is inherent in the use of any cheek flap for upper lip reconstruction.

We have been particularly satisfied with the results of this reconstructive option when addressing deep defects adjacent to the nasal ala in patients with prominent cheeks accompanied by deep melolabial creases. Youthful patients and patients with plump “chipmunk” cheeks are also good candidates for this reconstructive approach. These individuals have minimal facial skin redundancy available for use as skin flaps and benefit from the conservative nature of this technique with respect to facial skin. The advancement flap is sufficiently bulky to fill the deep defects that commonly result from Moh surgical excision of basal cell carcinomas located in the region of the alar sulcus.

The subcutaneous pedicle advancement flap in the melolabial region of the face is robust, simple to implement, and accomplished in a single stage. This method provides reliably excellent results when used in the reconstruction of defects adjacent to the melolabial crease.

Accepted for publication August 5, 1997.

Presented in part at the Combined Otolaryngological Spring Meetings, American Academy of Facial Plastic and Reconstructive Surgery Section, Orlando, Fla, May 9, 1996.

Reprints: Shan R. Baker, MD, Department of Otolaryngology—Head and Neck Surgery, University of Michigan Medical Center, 1904 Taubman Medical Center, Ann Arbor, MI 48109.