

## A Modified Rhomboid Flap: The “Diamond Flap”

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*The authors have indicated no significant interest with commercial supporters.*

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Rhomboid flaps are frequently used in facial reconstruction to repair rhombus-shaped defects.<sup>1</sup> The aesthetic and mechanical properties of these flaps make them especially useful for reconstruction of defects on the cheek, temple, lips, nose, and eyelids. Rhomboid flaps are full-thickness cutaneous local flaps with a random blood supply; they rely on the dermal–subdermal plexus of blood vessels. Limberg first described a transposition flap for closing a rhomboid-shaped defect in 1946. This flap is used to repair a defect that has a configuration of a rhombus with two opposing 60° and two opposing 120° interior angles.<sup>2</sup> Dufourmentel modified this technique in 1962 to close defects with any acute angle.<sup>3</sup> Quaba proposed a rhomboid flap in 1987 to coverage circular defects.<sup>4</sup>

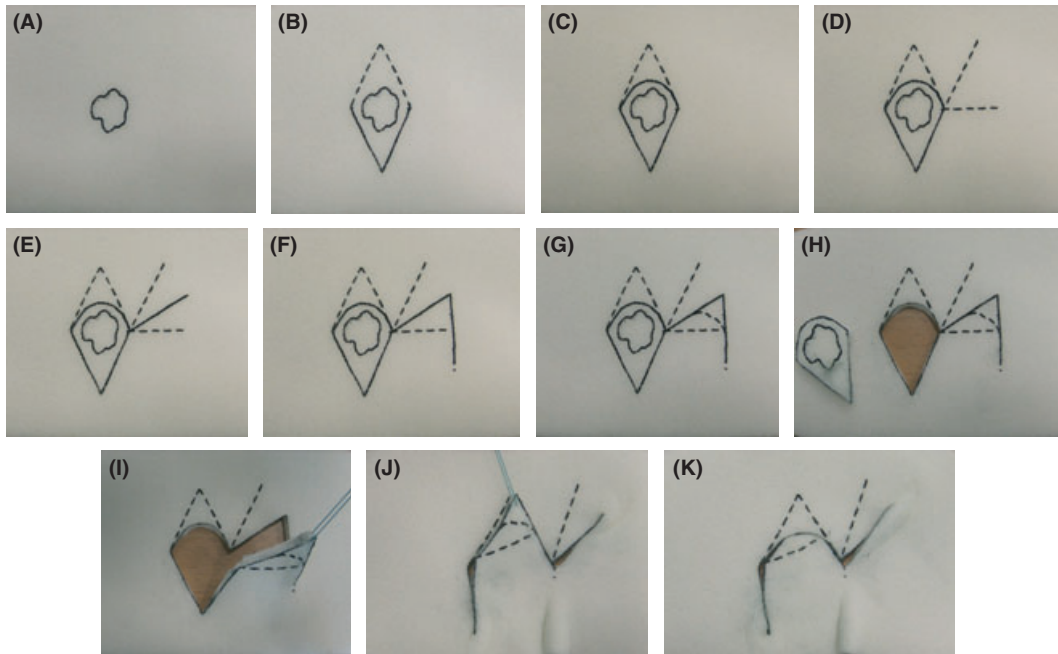
### Patients and Methods

The authors describe a modified rhomboid flap to close defects without having to excise healthy tissue unnecessarily; an acute corner of the rhomboid excision is not sacrificed, giving the defect a diamond shape. The flap is harvested in a diamond shape too, following the geometric design of the classic rhomboid flap. A parallelogram is drawn around the lesion to be excised (Figure 1A,B), and an acute corner of the rhombus is cut in a circular shape (Figure 1C). The excision is designed observing the aesthetic subunits and preserving the integrity of neighboring landmarks.

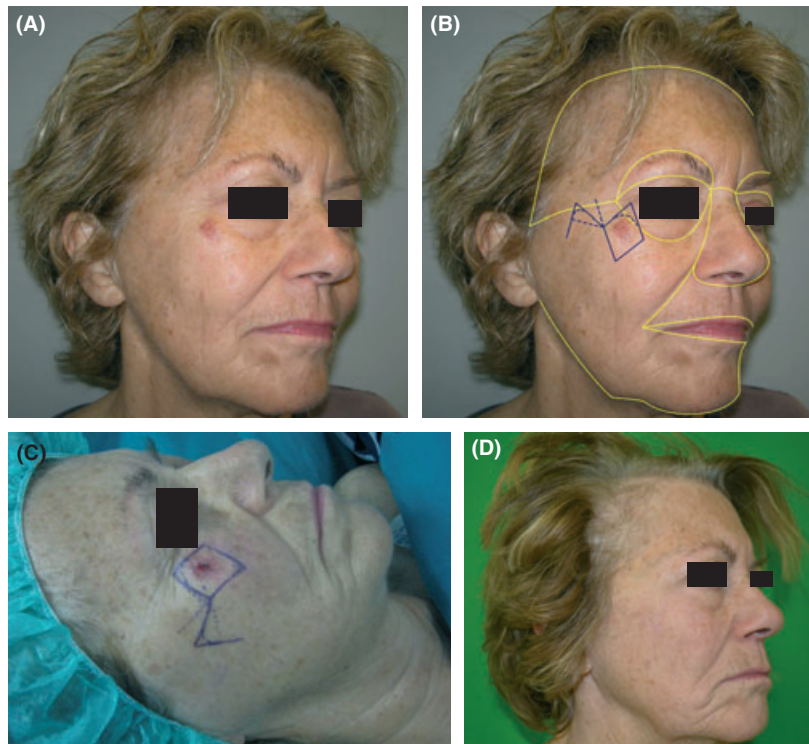
Incisions should ideally be placed in preexisting creases. If this is not possible, they should be parallel to the relaxed skin tension lines (RSTLs), so two opposite sides of the rhombus are drawn parallel to the RSTLs. The scars from closure of the excision and flap’s donor site are hidden in the RSTLs (Figure 6A–E).

Extend imaginary lines from the short diagonal and from one adjacent defect side of the parallelogram (Figure 1D). These lines are selected so that the donor site can be closed most readily and with the least conspicuous scar; pinching the surrounding structures is useful to judge possible distortion caused by closure. Bisect the angle formed by these lines with a line equal in length to one of the sides of the defect (Figure 1E). This becomes the superior–medial side of the rotation flap. Draw a line parallel to the long diagonal of the defect equal in length to a defect side (Figure 1F). The acute apex of the transposition flap is cut in a circular shape to fit in the defect (Figure 1G). After the diamond defect is created (Figure 1H), the flap and surrounding tissue are undermined in the subdermal plane. Frozen sections are used to confirm that the margins are free of disease before the flap is used to cover the area. The diamond flaps rotate neighboring tissue to close the primary surgical defect (Figure 1I), whereas the donor site is closed using primary closure (Figure 1L,M).

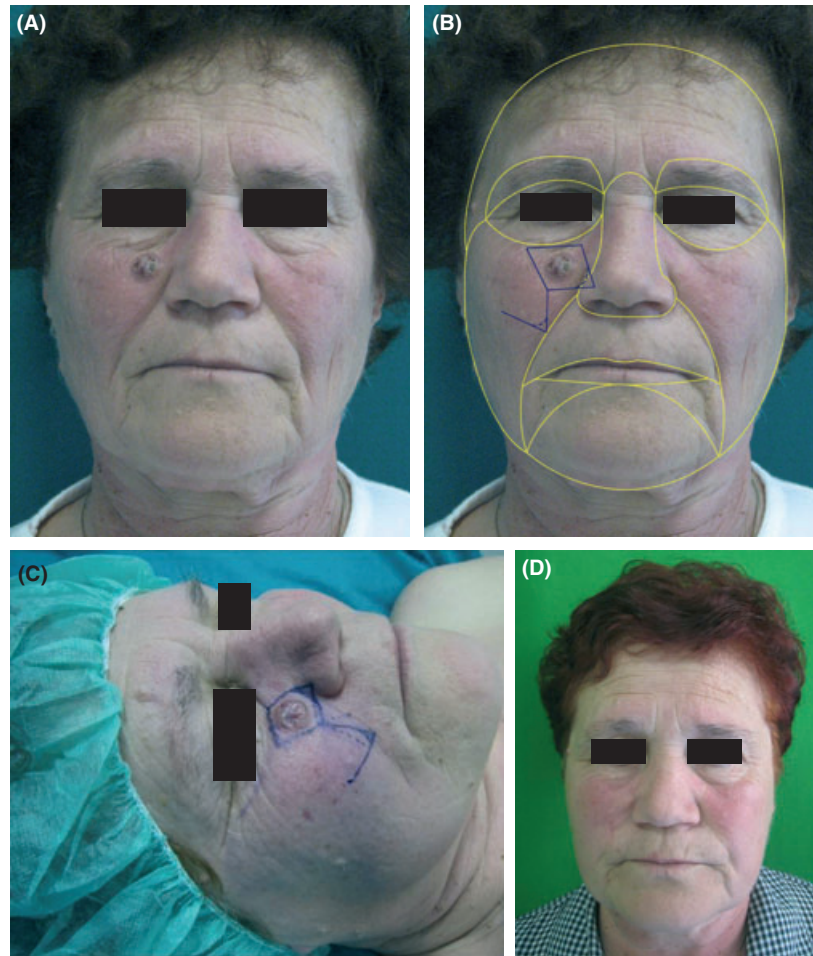
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**Figure 1.** (A–M) Sequence of surgical excision and reconstruction with the diamond flap in a polyurethane foam model (see text).



**Figure 2.** Seventy-five-year old woman with zygomatic basal cell carcinoma (A), preoperative design (B, C). The excision is set between the zygomatic and lower lid region; postoperative follow-up at 6 months (D).



**Figure 3.** Fifty-seven-year old woman with malar basal cell carcinoma (A), preoperative design (B, C). The excision is set at the nasolabial fold; postoperative follow-up at 6 months (D).

**TABLE 1. Tumor Location in Patients Series**

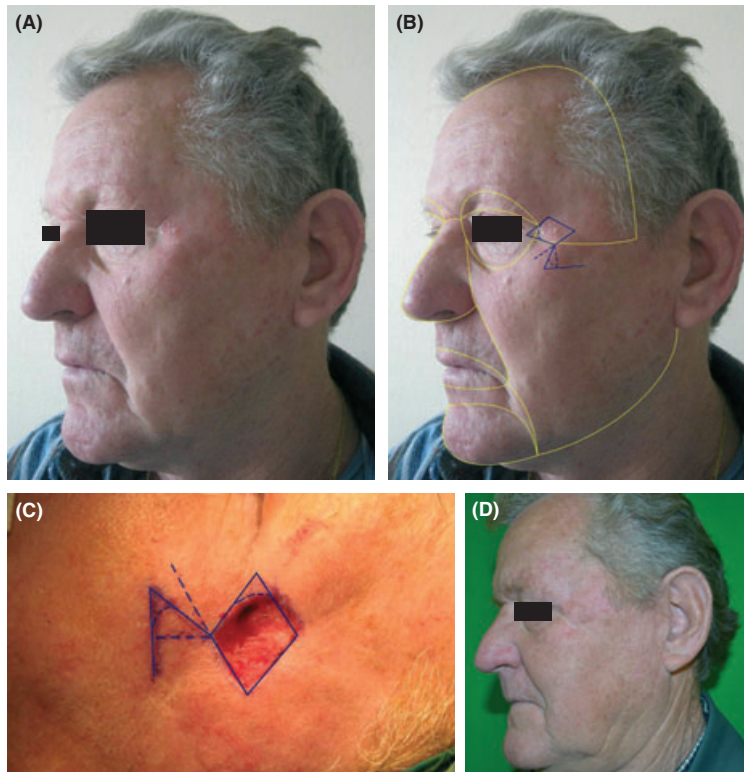
<i>Tumor Location</i>	<i>Patients, n</i>
Temporal	16
Infraorbital	14
Zygomatic	6
Malar	5
Mental	3

From March 2009 to March 2010, 44 patients underwent excision of skin carcinoma of the face (36 basal cell carcinomas, 8 squamous cell carcinomas) under local anesthesia and reconstruction of the defect using the “diamond flap.” The average age was 57, and the two sexes were equally represented. The anatomic distribution of the lesions is shown in Table 1. There were no

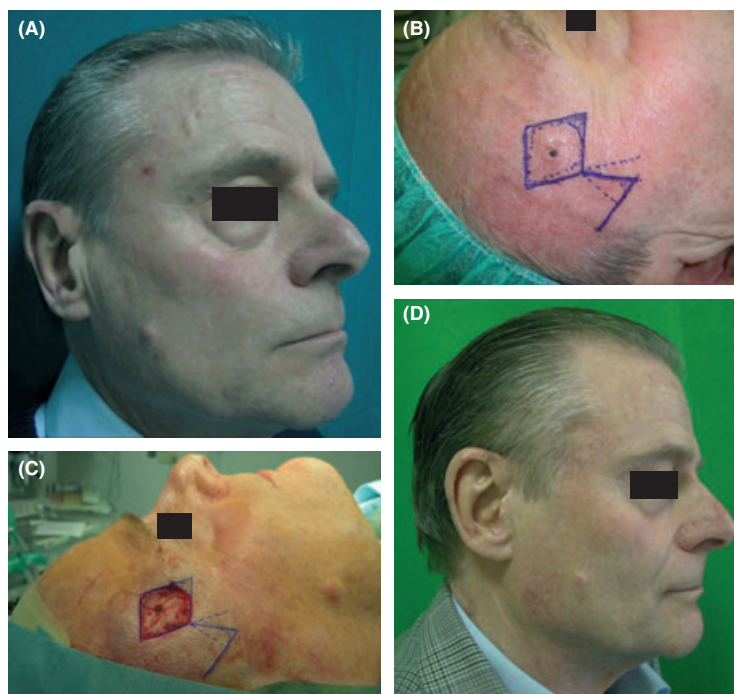
complications such as infection, frontal nerve injury, ectropion, or lid retraction. Partial flap necrosis occurred secondary to a hematoma in a patient undergoing anticoagulant therapy. Clinical follow-up 3 months, 6 months, and 1 year after the surgery have shown no recurrence of disease (Figures 2D, 3D, 4D, 5D, and 6E).

### Discussion

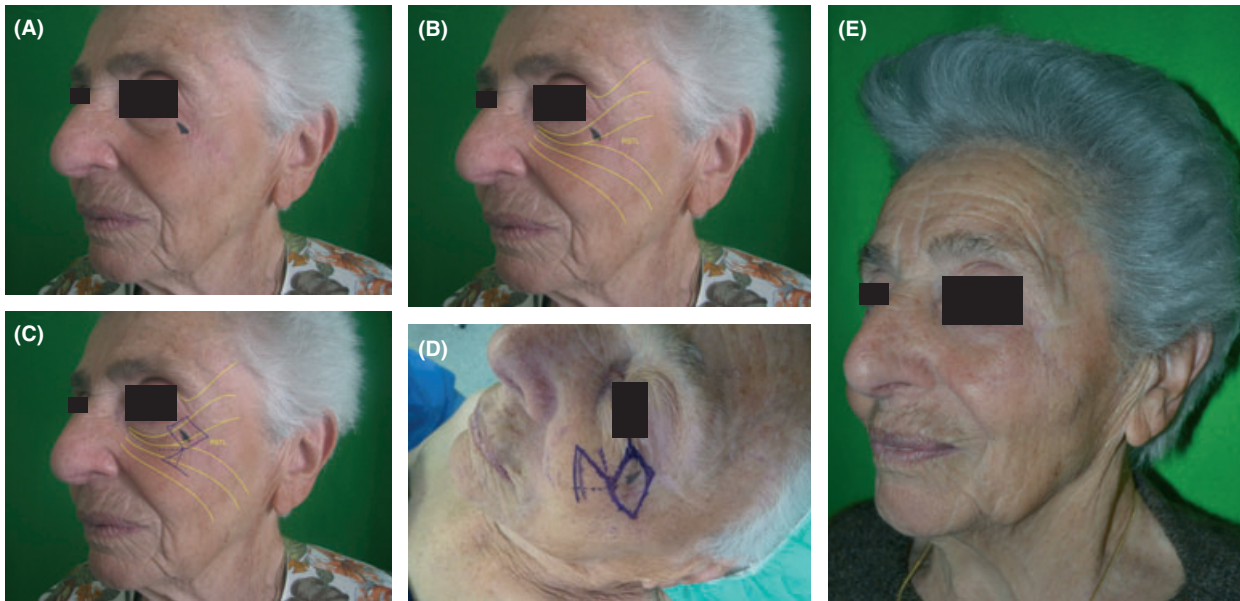
Circular skin defects are the most commonly encountered defect in the face after surgery. These excisions are generally converted to an elliptical shape by adding extra healthy tissue to allow for direct closure. When direct closure is not possible, the excisions are converted to rhomboid defects, and reconstruction is



**Figure 4.** Sixty-nine-year old man with temporal-zygomatic basal cell carcinoma (A); preoperative design (B). The excision is set between the temporal, zygomatic, and lower lid regions; intraoperative excision (C); postoperative follow-up at 1 year (D).



**Figure 5.** Seventy-four-year old man with temporal basal cell carcinoma (A), preoperative design (B), intraoperative excision (C), postoperative follow-up at 6 months (D).



**Figure 6.** Seventy-nine-year old woman with zygomatic squamous cell carcinoma (A), relaxed tension skin lines (RSTLs) drawn on the face (B), the diamond flap oriented along the RSTLs (C), preoperative design (d), postoperative follow-up at 6 months (E).

performed using a transposition rhomboid flap by making additional excisions in healthy skin.

The diamond flap is useful in cases in which the corner of healthy tissue is set among different aesthetic subunits or situated in proximity to important vascular or nervous structures such as branches of the facial nerve or vessels. The flap is designed observing the aesthetic subunits, preserving the integrity of neighboring landmarks such as the nasal ala, eyelid margin, or lip, and distributing the tension evenly along the length of the flap. The flap is designed in a donor site where the skin has the greatest relative laxity; lines of maximal extensibility lie perpendicular to skin creases. Failure of a classic rhomboid flap is uncommon, although partial necrosis of the distal tip of the flap can occur if the angle is too acute. The diamond flap does not have this complication because the acute corner is cut in the design of the flap.

Cosmetic results at follow-up were good. There was no distortion of facial landmarks and no dog-ear at the hinge-point of the base of the flap or at the apex of the donor site. No hypertrophic scars were noticed.

## Conclusion

The diamond flap is simple to perform and more versatile than the classic rhomboid flap, has few complications, and gives good cosmetic results. The diamond flap has become our workhorse for facial reconstruction to preserve important vascular and nervous structures and aesthetic subunits.

## References

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