

# Rhomboid Flap for Large Cutaneous Trunk Defect

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**Summary:** Resection of large cutaneous malignancies may result in substantial skin defects. Often, skin grafting is a first-line option for reconstruction of such defects but may be limited by poor cosmetic outcomes and incomplete graft acceptance. Accordingly, skin flaps, tissue rearrangement techniques, and more complex procedures may be needed. This case report presents the successful use of a rhomboid flap for reconstruction of a 20 × 19 cm<sup>2</sup>-sized trunk skin defect left after a squamous cell cancer resection. The flap was quickly and easily fashioned, did not require any special instruments, and resulted in a good cosmetic outcome. There were no major wound complications despite postoperative radiation therapy. At 1-year follow-up, the flap healed completely with excellent contour, texture, thickness, color match, and complete patient satisfaction. In the past, rhomboid flaps have been used for small defects. This case is a unique example of a versatile and successful rhomboid flap reconstruction of an extremely large defect, instead of a more complicated reconstructive option. (*Plast Reconstr Surg Glob Open* 2020;8:e2932; doi: 10.1097/GOX.0000000000002932; Published online 18 June 2020.)

The concept of the “reconstructive ladder” suggests that primary closure of a defect should be considered first in reconstruction. However, many cases are not eligible for primary closure, and local flaps become the best option.

The rhomboid flap is popular and can be used to reconstruct defects in most parts of the body.<sup>1</sup> Rhomboid flaps are full-thickness cutaneous local flaps that typically rely on dermal-subdermal plexus blood supply.<sup>1,2</sup> First described by Alexander Alexandrovich Limberg in 1928, the traditional design consists of a parallelogram with 2 angles of 120 degrees and 2 angles of 60 degrees. The rhomboid flap, a transpositional flap design, consists of skin and subcutaneous tissue rotated around a pivot point into an adjacent defect.<sup>1,3</sup> Over the years, several modifications have been reported.<sup>1,4</sup> Traditionally, rhomboid flaps have been safely used to reconstruct small to moderately sized skin defects. This report presents a case where a large 20 × 19 cm<sup>2</sup> defect was successfully reconstructed with a rhomboid flap.

## CASE PRESENTATION

A 60-year-old white man with considerable sun exposure history presented with a 10-year history of a nonhealing ulcerated area of right back (Fig. 1). The patient stated

that the area had become progressively larger, ulcerated, and painful. There was no previous personal or family history of skin cancer. On physical examination, he was a healthy man with a body mass index of 33.03 kg/m<sup>3</sup>. The examination of the right upper back skin revealed a 12.0 × 19.0 cm<sup>2</sup> diameter ulcerated, irregular open wound with mild drainage. The biopsy revealed invasive squamous cell carcinoma (SCC).

Under general anesthesia, the SCC was excised in a rhomboid design down to the muscle (Fig. 2), leaving an approximately 20 × 19 cm<sup>2</sup> defect. The maximum skin laxity was noted along the inferior lateral side of the defect. Accordingly, a rhomboid flap was marked. No undermining was performed along other sides. Doppler ultrasound was used to identify perforators in the territories of parascapular artery and thoracodorsal artery (Fig. 3). The flap was raised in a fasciocutaneous plane at the level of underlying muscle. The flap was rotated and inset using numerous No. 2 nylon interrupted sutures (tied over dental rolls) and 2-0 nylon sutures. Both primary and secondary defects were obliterated under acceptable tension. The final pathology specimen (18.5 × 18 × 3 cm<sup>3</sup>) was invasive high-grade basosquamous carcinoma with negative margins.

In the immediate postoperative period, the patient was asked to limit right shoulder mobility. The maximum tension was at pivot point. This resulted in some minor sloughing and superficial flap loss, which healed with secondary intention. The positron emission tomography and computerized tomography (PET/CT) scan was negative for distant disease. He was evaluated by an oncologist, and a 60.00 Gray radiation was administered to the tumor bed. At 1-year follow-up, the flap healed completely without problems or limitations (Fig. 4).

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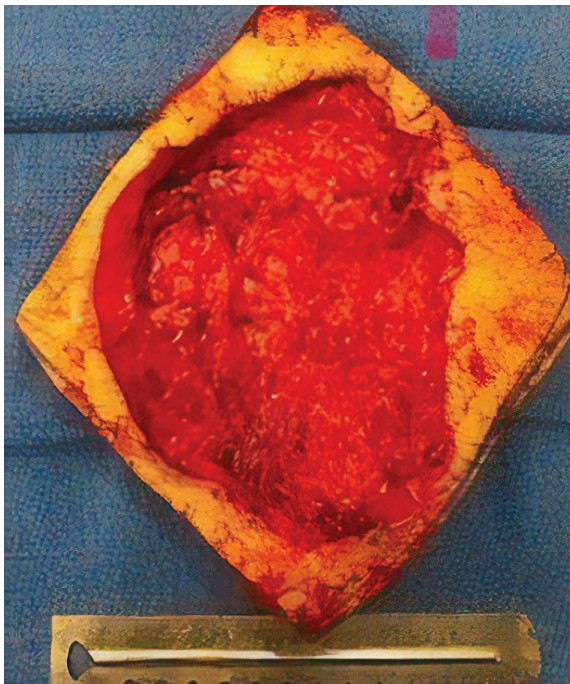
**Fig. 1.** Preoperative view of the ulcerated mass of the right back.

### DISCUSSION

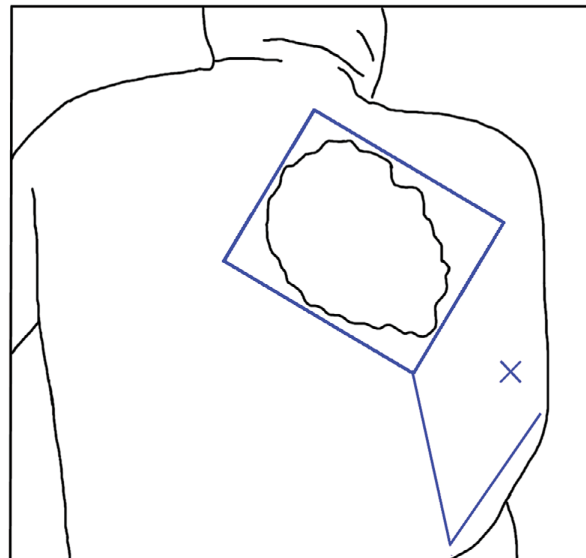
We agree that reconstruction of each defect should be tailored to the unique characteristics of the defect, patient expectations, and surgeon's experience.<sup>5</sup> Plastic surgery is a rare specialty that offers numerous options for coverage of a defect. The reconstructive ladder framework suggests using first the simplest technique that proves effective.<sup>5</sup> Primary closure and skin grafts offer relatively simple and

satisfactory outcomes for many wounds. However, when distortion, contour deformity, or unacceptable scarring is likely, skin flaps often prove advantageous. Borges<sup>6</sup> has suggested that in facial reconstructions, flaps are preferable to primary closure and/or grafting even for small lesions.

Fusiform (elliptical) excision with primary closure may leave a central depression with a flat contour and "dog ear" peaks on both ends.<sup>4</sup> To avoid dog-ear deformation, an incision length-to-width ratio of 3:1 is required, creating a longer linear scar.<sup>7</sup> Thus, relatively large portions of healthy skin around the defect are lost, and aesthetic outcomes may



**Fig. 2.** Intraoperative picture of the excised ulcerated mass of the right back. The scale represents a 15-cm span.



**Fig. 3.** Illustrative preoperative schematic of Figure 1 showing the marking (in blue) for rhomboid flap. X represents the location of perforators.



**Fig. 4.** Postoperative 1-year view of the well-healed rhomboid flap (reconstructed right back).

suffer.<sup>7</sup> These problems are further exacerbated in areas of insufficient skin redundancy and greater tension, such as the area near the joint.<sup>4</sup> Local flaps do not have these limitations.

Another benefit of rhomboid flap closure over primary closure is better distribution of tension. The point of maximum tension is less in rhomboid flap because the surrounding skin participates in closure.<sup>4</sup> Also, the line of donor closure being placed along the line of maximal extensibility reduces tension and decreases the likelihood of necrosis. This decreases the risk of distortion of adjacent anatomic architecture. The “broken” scar also makes it less apparent.<sup>8</sup> In a recent meta-analysis of sacrococcygeal pilonidal surgeries, a lower relative risk of dehiscence and wound infection was found with rhomboid flaps, compared with primary closure.<sup>9</sup>

The current case further underscores the versatility of the rhomboid flap design. The 20 × 19 cm<sup>2</sup>-sized cutaneous defect was successfully reconstructed with a rhomboid flap. This was not a purely random pattern flap but contained perforators from latissimus dorsi and scapular/parascapular area.<sup>10</sup> One potential possibility for reconstruction is to mobilize the margins of the defect to make the overall size smaller. Additionally, multiple smaller rhomboid flaps can be considered to reduce tension and potentially recruit tissue from all around the defect.

We acknowledge that other options such as the keystone flap exist, but the senior author has an extensive experience with rhomboid flaps and felt that the final result would be most predictable with this design. The major limitation is in patients with lower body mass index and with less available skin.

Our results are consistent with other reports in the literature that note advantages and applicability of rhomboid flaps in numerous parts of the body, yet to our knowledge, this is the largest defect area reported to be successfully reconstructed with this design.

Our humble recommendation is that rhomboid and other local flaps should be considered as a first-line reconstructive strategy for covering defects of various sizes and defects in various body locations, with minimal complications, high patient satisfaction, and best reconstructive and cosmetic outcomes. No special instrumentation is required, making this technique suitable in a resource-limited environment.

### SUMMARY

Our case report demonstrates how a rhomboid flap design can successfully treat even large cutaneous defects. The rhomboid flap was used to reconstruct a 20 × 19 cm<sup>2</sup> trunk defect resulting from excision of an SCC, producing excellent long-term cosmetic and functional results.

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