

Case Series

Limberg flap revisited: for closure of facial soft tissue defects

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ABSTRACT

The Limberg or rhomboid flap can be used to close defects almost anywhere on the body. It is versatile in that a random pattern flap can be raised from any one or all corners of the rhomboid. The defect is filled with tissue of the same thickness and colour, and with good vascularity. The purpose of this paper is to demonstrate the versatility that a single flap can be used to close defects almost anywhere on the body. This study was conducted in the department of plastic and reconstructive surgery, Saveetha Medical College and Hospital, during the period between January 2018 and December 2019. Twenty patients (fifteen males and five females) took part in this study. Their ages ranged from 20-60 years with a mean age of 42 years. From each patient history was taken and physical examination was performed. All the procedures were done under local anaesthesia. Postoperatively suture removal was done on the 5th post-operative day. There were twenty patients who took part in the study. Seventeen patients had naevi and three had basal cell carcinoma. The size of the lesions ranged from 2.0×1.8 cm to 4.8×4.5 cm. All the flaps settled well with no complications. The procedure resulted in a very fine and less noticeable scar with smooth contour of the skin which was acceptable in all patients. Limberg flap is a safe and reliable option that could be used in the reconstruction of small and medium-sized cutaneous defects of the face especially in elderly patients with no morbidity.

Keywords: Limberg, Rhomboid, Facial defects, Local flap, Reliable

INTRODUCTION

Local flaps are the second best option when primary closure of a defect is not possible according to the principles of the reconstructive ladder. Local flaps provide cover for small and medium sized defects of the face with good texture and color match.^{1,2} The rhomboid flap is a safe and reliable flap that can be used to reconstruct defects in any part on the body especially the face giving good functional and aesthetic results.³⁻⁵ These flaps are full thickness cutaneous with random blood supply relying on the vascularity of the dermal-subdermal plexus.⁶ Flaps are developed to protect the function of surgical area, reduce the tension and postoperative complications and beautify the appearance.⁷ Rhomboid flaps are associated with a good prognosis and rapid healing time.⁸

CASE SERIES

This is a prospective study of twenty cases who underwent limberg flap for soft tissue facial defects between January 2018 and December 2019. Cases included seventeen benign naevi and three were post-basal cell carcinoma excision defects. The flap was designed with skin incision placed along the skin crease parallel to the relaxed skin tension lines. The flap was raised under local anaesthetic infiltration- 2% lignocaine. The flap was raised in the subcutaneous plane and rotated about a pivot point into the adjacent defect. Haemostasis was secured and inset was given in layers with 4-0 vicryl and 6-0 ethilon. The secondary defect is also closed primarily with the same sutures. Dressing was applied post procedure. All cases were followed up post-operatively from a minimum of 4

months to a maximum of 12 months. The photographs of the cases done are described below (Figures 1-4).



Figure 1: (a) Clinical picture showing naevus rt. cheek, (b) markings of Limberg flap, (c) immediate post-operative, and (d) 2-month post-operative picture.

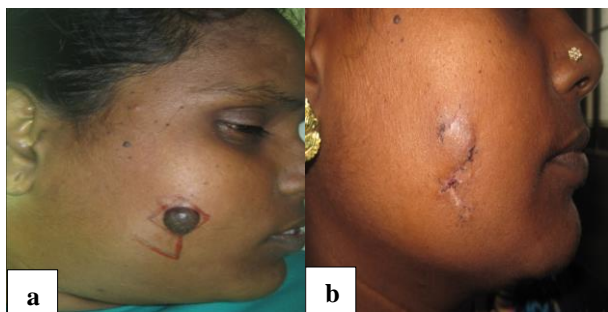


Figure 2: (a) Pre-operative, and (b) post-operative picture.



Figure 3: (a) Pre-operative, (b) Limberg flap raised, and (c) early post-operative photograph.



Figure 4: (a) Clinica; picture of BCC It. preauricular region, (b) defect after excision and Limberg flap marking, (c) immediate post-operative picture, and (d) 4-month post-operative picture

DISCUSSION

The rhomboid flap design was first described by Professor Alexander Alexandrovich Limberg of Leningrad in 1928. The first description was a chapter in *Modern Trends in Plastic Surgery* edited by Thomas Gibson in 1963.^{2,9} This flap is quick, easy and relatively simple to perform as a single stage under local anaesthesia and has been described in head and neck regions, and reconstruction, breast reconstruction and pilonidal sinus reconstruction.^{1,5,10} The rhomboid flap is a flap of skin and subcutaneous tissue that is rotated around a pivot point into an adjacent defect.¹¹ As many as four flaps can be raised from one rhomboid, if required.² The pedicle of the flap maintains subpapillary and sub-dermal vascular plexuses to provide superior results when compared to skin grafts of similar size and location.^{12,13} A reduction in tension on the flap decreases the likelihood of necrosis of the donor tissue.¹⁴ The design is a parallelogram with two angles of 120 degrees and two angles of 60 degrees. All sides are equal, and typically four flaps can be raised from one rhomboid. The final quality of the scar is related to the underlying tension. When a scar is parallel to relaxed skin tension lines (RSTL), tension is exerted along its axis, along a direction of minimal tension and maximal extensibility, and new collagen is oriented in this direction.^{3-5,7,8,10,15} Ultimately, this results in a narrower and a better scar.¹⁶ Many modifications have been done over the years like the diamond flap modification which showed no complications and no hypertrophic scars in 44 patients.⁶ Claude Dufourmental proposed a modification which broadens the pedicle width and therefore enhances flap safety.¹⁷ Quaba in 1987 proposed a modification to cover circular defects.¹⁸ Rhomboid flaps have shown great effectiveness over primary closure in the literature and this is attributed to better distribution of tension in the former and the

surrounding skin helps to participate in closure.¹⁸⁻²⁰ Borges in his paper mentioned that in small facial reconstructions, local cutaneous flaps are preferable to primary closure or grafting, thus avoiding distortions of adjacent structures and breaks in scar lines.²¹ These factors made Chasmar to propose that the rhomboid flaps can be done with extreme safety and should be the first choice for many full thickness defects.² The rhomboid flap has a low rate of complications, including epitheliolysis with partial necrosis of the flap, hematoma and bacterial infection.^{5,22} Chasmar gives examples of its application in skin cancer, lupus, cystic acne, spina bifida. The special application for eyelid, floor of nose, alar rim and chin defects are highlighted in his paper.^{2,3} Alvarez et al. reported that the face was the most common site for Limberg flaps, followed by the lumbosacral region, the dorsal, inguinoscrotal regions, anterolateral arm, thorax, shoulder, and supraclavicular region.³ Becker stated that cutaneous flaps have become the preferred method of facial reconstruction.^{15,23} Aydin et al reports a series indicating that rhomboid flaps can be safely used to reconstruct small to moderately sized skin defects.¹ Quaba in his rhomboid flap series of 400 patients mentions this versatile flap the “workhorse for facial reconstructions”.¹⁸ The predictability, high safety degree, low complication rate and tension free closure, makes rhomboid flap the first option for great majority of reconstructions.^{3,22} A single institution experience in 70 patients of malignancies of the face, revealed local flaps gave the best results and were the first choice of reconstruction of the face. The study notes that smooth contour and scar quality are very important for plastic surgery patients and hence requires the proper execution.²⁴⁻²⁷ Li et al in his series of 48 patients, 25 cases of benign pigmented nevi, with defect of sizes from 0.9 cm to 11 cm were treated with local flaps where 41 patients achieved satisfactory postoperative results.²⁸ A series of 27 patients who underwent a medial canthal reconstruction with a rhomboid flap showed rapid healing with no complications.²⁹

Alvarez et al states that the large number of facial reconstructions in the temporal-zygomatic and malar regions, about 44% of the facial defects, demonstrates the versatility of the rhomboid flap and is the preferred technique in these facial units with very few complications in this study.³

CONCLUSION

Rhomboid flaps can be considered a first-line option for reconstruction of almost any defect caused by any etiology, without any limitations. The technical ease, aesthetic outcome, continuity of function, short operation time, matching skin texture and color, safety, early functionality, and no complications are the reasons to justify extensive application of rhomboid flaps.

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