

INTEREST OF THE INTERMETACARPAL DORSAL FLAP IN THE TREATMENT OF DORSAL SOFT TISSUE DEFECTS OF THE LONG FINGERS: A CASE REPORT AND LITERATURE REVIEW

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ABSTRACT

The dorsal metacarpal artery flap (DMAF) emerges as a highly versatile option within the arsenal of reconstructive hand surgery, particularly in cases of dorsal tissue loss affecting the long fingers, where viable flap alternatives are often limited. This surgical technique aligns exceptionally well with the fundamental principles of reconstructive surgery, such as 'to replace like with like' replacement, and is characterized by a simple, reliable, and minimally invasive harvesting method, thus minimizing donor site morbidity.

In this report, we present a clinical case illustrating the effectiveness of the DMAF. It involves a 70-year-old female patient with a localized squamous cell carcinoma on the dorsal aspect of the proximal phalanx of the left ring finger. The patient underwent tumor resection with simultaneous reconstruction using a dorsal intermetacarpal flap.

KEYWORDS: Fingers - Loss of skin substance- Dorsal intermetacarpal flap - Epidermoid carcinoma.

INTRODUCTION

By introducing the concept of distal metacarpal vascular anastomoses connecting the palmar and dorsal vascular networks, it becomes possible to isolate a flap with retrograde vascularization on the dorsum of the hand. According to the literature, few options for covering defects of the distal fingers near the proximal interphalangeal joint have been described. The pioneers of this technique, Quaba and Davidson, presented their clinical series as early as 1990. In this article, we share our experience using this flap to cover extensive defects on the dorsal aspect of the long fingers in a 70-year-old patient who underwent dorsal intermetacarpal flap reconstruction following the resection of a hand tumor.

CASE REPORT

A 70-year-old retired woman with no medical history, right-handed, presented with a nodular lesion on the dorsal surface of the first phalanx of the fourth finger, which exhibited central ulceration covered by a crust without any signs of superinfection (Figure 1). A biopsy was performed, confirming the diagnosis of squamous cell carcinoma. The tumor was resected and reconstructed using the Quaba flap simultaneously.

There were no neurovascular deficits in the distal region, and the mobility of her ring finger was within normal limits. Vascular assessment of the affected hand revealed normal skin color, adequate skin tension, normal body temperature, regular distal pulses, capillary recoloration time within expected values, and distal sensitivity comparable to that of the opposite hand. A pneumatic tourniquet was placed at the base of the limb after slightly elevating the arm.

The first stage of the operation involved tumor removal. The donor site was chosen based on the size, distal limit, shape, and position of the defect, as well as its orientation. The donor site did not extend beyond the wrist extension fold. The intermetacarpal flap was then raised, both proximally and distally, along with its superficial venous network, using the technique described by Quaba without modifications (Figure 2) (Figure 3).

Special care was taken to preserve the peritendon and sensory nerve branches up to the juncta tendinosum. The pedicle used was derived from the commissural perforating vessels, the dorsal metacarpal artery (DMA), and the fascia of the interosseous muscle,

which was left in place. The intermetacarpal flap was then rotated around its attachment point and sutured to the wound's edges without the need for a tunnel. The donor site was closed with separate stitches after the skin had been loosened, and a suction drain was inserted. A palmar plaster splint was applied for one week.

Figures



Figure 1: Preoperative view of the tumor before resection, with the incision path of the flap.



Figure 2: Flap design of DMCAP flap.

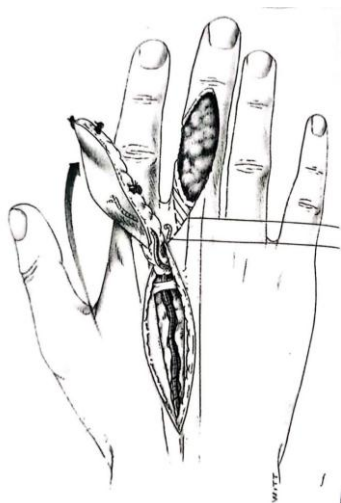


Figure 3: Clinical image of the dorsal intermetacarpal flap after tumor resection.

DISCUSSION

In the surgical treatment of such types of defects, the primary goal is to effectively cover underlying structures such as tendons, nerves, arteries, and, if necessary, to restore flexion creases to ensure optimal function. The Quaba flap stands out for its ease of use as a local perforator flap while minimizing donor site morbidity through a direct harvesting technique.^[1, 2] The palmar and dorsal metacarpal arterial systems anastomose distally, giving rise to a perforator known as the Quaba perforator, which supplies the dorsal part of the hand.^[3, 4] This Quaba perforator, small in size and constant, originates from the interdigital space and is used to create the flap of the same name.^[6] Doppler vascular investigation is generally unnecessary to locate this perforator since its location is reliable and constant: it is found distal to the juncturae tendinea, in the interdigital spaces 2, 3, and 4, approximately 0.5 to 1 cm proximal to the metacarpophalangeal joint.^[5, 13]

In contrast to the dorsal metacarpal arterial flap, the Quaba flap does not compromise the dorsal metacarpal artery, which plays a crucial role in finger blood supply.^[7, 8] While the digital artery perforator flap is also well-known for hand reconstruction, it is primarily used for defects at the fingertip level. In the presented cases, this flap was less suitable due to the position and size of the defect.^[9] Another option could have been the palmar artery perforator flap. Although it has proven effective in the surgical treatment of palm and little finger defects, we chose the Quaba flap to avoid leaving scars on the dominant border of the hand.^[10] Generally, for individuals of Caucasian descent, the dorsum of the hand and palmar skin exhibit similarities in terms of color, thickness, elasticity, and texture, making it a suitable method for local defect reconstruction.^[12-1] However, color mismatch issues may arise in patients with darker skin pigmentation, and concerns regarding hairiness are possible in male patients. Patients readily embrace this reconstruction method as it allows for efficient closure of the donor site with limited morbidity and satisfactory aesthetic results.^[11]

It is worth noting that twisting of the flap pedicle can lead to venous congestion, as can tunneling the flap. Therefore, it is recommended to incise the skin between the donor site and the defect to minimize these risks [12]. Furthermore, the Quaba flap is contraindicated in patients with hand infections due to an increased risk of total flap loss.^[13]

In conclusion the Quaba flap is emerging as the preferred option for reconstructing soft-tissue defects of the hand and fingers. It offers a number of advantages, including its reliability, relatively simple surgical technique, and satisfactory functional and

aesthetic results. Although other surgical options may be available, the Quaba flap stands out for its ease of use and safety, minimizing intraoperative and postoperative complications.

CONSENT STATEMENT

Written informed consent was obtained from the patient for publication and any accompanying images. A copy of the written consent is available for review by the Editor-in-Chief of this journal on request.

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