Modification of VY flap to preserve fingertip contour

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Abstract

Background VY flap is a reliable treatment for fingertip amputation injuries. Insetting the flap to replicate fingertip contour can be challenging with the conventional method of using sutures. We propose a modification of inset technique with K-wire to simplify contouring during flap inset.

Methods Seven patients underwent VY flap reconstruction with the modified inset technique for fingertip defects ranging from 10×15 to 20×15 mm. The flaps were advanced between 6 and 10 mm and inset with K-wires. The donor site is allowed to heal by secondary intention. At 6 months, static two-point discrimination, sensitivity, and flap appearance were assessed.

Results All flaps healed uneventfully, and each patient returned to work between 8 and 10 weeks. Fingertip and nail contour were satisfactory in every case.

Conclusion This modification simplified contouring during flap inset and provided a viable alternative to flap inset and contour adjustment.

Keywords Fingertip · Fingertip amputation · Fingertip injury · Fingertip defect · VY plasty · Fingertip flap

Introduction

The pulp is a specialized tissue unit that confers stability and malleability to the fingertip [7]. Replicating its form and function can be a formidable challenge. In amputation injuries with exposed bone, shortening the distal phalanx is a practical solution [1, 6]. However, this can compromise

support for the nail bed, and the contour of the pulp may not be fully restored.

Originally described by Tranquilli-Leali in 1935 and later popularized by Atasoy in 1970, the VY advancement flap is a tried and tested option in fingertip reconstruction, indicated in volar favorable or neutral amputation injuries, and can be reliably advanced up to 5 mm [2, 4]. The potential difficulties include fingertip contour distortion (Fig. 1) and flap ischemia along suture line.

During a few of such cases, we transfixed the flap with a fine wire and allowed the donor site to heal by secondary intention [3, 5]. This resulted in esthetic restoration of hyponychial and pulp contour. We report the results of our technical modification in this article.

Material and Method

Seven patients underwent fingertip reconstruction with this modification of VY flap for volar neutral or favorable amputation injuries. Each procedure was performed under digital block with tourniquet. The VY flap was raised in the manner described by Atasoy—subperiosteal elevation of flap with preservation of the volar terminal branches of the digital arteries and incision of tethering septal fibers [2, 4].

The flap was advanced and pinned to the distal phalanx with a 0.8-mm K-wire, and its sides sutured to the lateral nail fold with 5/0 sutures (Fig. 2). The contour of the hyponychium was adjusted by varying the position of the pin (Fig. 3). Tourniquet was released to assess vascularity of the flap. Instead of closing the donor site, it was allowed to heal by secondary intention. Dressing changes were performed twice a week for 2 to 3 weeks, until epithelization has taken place. Thereafter, the donor site was exposed. Digital mobilization was initiated within the first postoperative week. The wire was removed 2 weeks after surgery.

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Fig. 1 Fingertip contour distortion

The patients were followed up for a minimum of 6 months, during which the reconstructed digits were assessed for sensitivity, static two-point discrimination, and nail and fingertip contour.

Results

All flaps healed with satisfactory pulp and nail contour (Fig. 4). At 6 months, static two-point discrimination tests were between 5 and 6 mm. None of the patients complained of hypersensitive digit. All patients returned to work between 8 and 10 weeks after injury. Dressing changes and therapy were well tolerated, and no complications were encountered (Table 1).

Discussion

The sophistication of the VY flap may be trivialized by its simplicity and reproducibility. Although an experienced operator is able to strategically position sutures to control the contour of the reconstructed fingertip, this skill is not readily

Fig. 2 Flap was advanced and pinned to the distal phalanx with a 0.8-mm K-wire, with its sides sutured to the lateral nail fold with 5/0 sutures

Fig. 3 Adjustment of the contour of the hyponychium by varying the position of the pin

reproducible. Suboptimal flap design and overzealous suturing can result in contour distortion and/or flap ischemia. Having analyzed the designs of some esthetically challenged flaps, we combined two previously known concepts to preserve pulp contour.

First, it is recognized that the flap has been advanced to cover the critical defect, and the resultant secondary defect will heal by secondary intention [5]. Had sutures been used to advance the flap, we anticipated suture line ischemia and narrowing of the fingertip. Secondary intention healing of the “V”-shaped defect allows replacement of lost volume by granulation tissue, albeit with some degree of secondary contracture. Although this maneuver necessitates frequent dressings that may be inconvenient for some patients, the long-term benefits of contour and volume preservation are worth considering.

The hyponychium is characterized by its convexity in coronal and sagittal planes, and reconstituting this subtle contour in the reconstructed hyponychium may be difficult with sutures. In our observation, suturing the flap to the lateral nail fold and draping the flap over a slightly protuberant distal phalanx maintain convexity of the reconstructed hyponychium in both planes. Pin transfixation

Fig. 4 Healed flaps with satisfactory pulp and nail contour. With permission from Techniques in Hand & Upper Extremity Surgery

provides control of the coronal and sagittal profiles of the flap without deft suturing techniques. The drawbacks of pinning are potential loosening and pin tract infection. We attribute the lack of complications to early pin removal (2 weeks).

This modification does not replace the usual method of flap inset with sutures that allow expedient healing of donor site by primary intention. It is indicated as a bailout option for suboptimal flap designs, relieving

surgeons of the burden to achieve primary closure in difficult cases.

Conflict of interest None.

Reference

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Table 1 Patient profile and outcome

Case	Digit	Defect (mm)	Advancement (mm)	Sensitivity	2PD (mm)	Complication
1	Thumb	10×15	5	Nil	5	Nil
2	Middle	20×10	8	Nil	6	Nil
3	Middle	20×15	8	Nil	5	Nil
4	Ring	20×10	10	Nil	6	Nil
5	Ring	15×20	10	Nil	6	Nil
6	Thumb	10×20	6	Nil	5	Nil
7	Ring	15×15	8	Nil	5	Nil