Case report

A technical tip in the use of abdominal pedicled flaps in hand reconstruction: A case report

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ARTICLE INFO

Keywords:
Technique
Groin flap
Abdominal flap
Hand reconstruction
Technical tip

ABSTRACT

Introduction: Abdominal pedicled flaps are one of the options utilized in the reconstruction of complex hand defects. In this communication, the author presents a case report demonstrating a new technical tip which was utilized in a young child.

Importance: The technical tip will help closure of further hand defects utilizing the same flap.

Case presentation: An abdominal pedicled flap was used to reconstruct the dorsal aspect of the hand and wrist following a deep contact burn. An “extension” of the flap from the abdomen at the time of flap division was harvested and utilized to cover an adjacent defect in the fingers.

Clinical discussion: Several technical tips in the utilization of the pedicled groin/abdominal flaps in hand reconstruction have been reported. The author presents another tip.

Conclusion: When utilizing abdominal pedicled flaps for hand reconstruction, an “extension” of the flap from the abdomen at the time of flap division may be harvested. This “extension” may be utilized to cover further adjacent defects in the hand.

1. Introduction

Abdominal pedicled flaps are one of the options utilized in the reconstruction of complex hand defects [1,2]. The indications for their use in the current era of microsurgery has been recently reviewed [3]. Microsurgery in infants and very young children carries a higher risk of flap loss and hence groin and abdominal pedicled flaps are commonly used in this age group.

Many tricks and surgical tips have been described while using groin/ abdominal pedicled flaps and these have been recently reviewed [4]. In this communication the author presents a case report demonstrating a new technical tip which was utilized in a young child. This report has been reported in line with the SCARE Criteria [5].

2. Case presentation

A six-month old female infant sustained a deep contact burn (with a hot iron) to the dorsal aspect of the left wrist, hand, and digits. The infant was otherwise healthy with negative medical, drug, and family histories. She was treated at a local hospital with dressing awaiting spontaneous separation of the eschar. All finger tips became necrotic and fell off spontaneously. The eschar on the dorsal aspect of the hand and wrist separated spontaneously leaving a bed of granulation tissue over the periosteum. She underwent split-thickness skin grafting over this bed of granulation tissue.

She presented to the author two years later seeking reconstruction. She had severe extension contracture of the wrist and digits [Fig. 1]. There was no active or passive range of motion at the wrist or digits. X-Rays showed severe dorsal subluxation at the metacarpophalangeal joints (MPJ) with preservation of the joint spaces. No preoperative physiotherapy was given and surgery was planned immediately following presentation to our clinic. The author planned staged reconstruction using pedicled abdominal flaps. Surgery was performed by the author when the child was 2.5 years of age. In the first stage, the wrist and thumb-base contractures were released [Fig. 2]. At the time of contracture release, no extensor tendons were seen indicating complete loss of the tendons from the original injury. An abdominal flap (with length: base ratio of 2:1) was utilized to cover the defect [Fig. 3]. The flap healed well without complications [Fig. 4]. Three weeks later, the flap was divided and detached from the abdomen. The standard division technique is to divide the flap at the edge of the hand defect. Our technical tip was to divide the flap further down the abdomen in a...
tapering fashion (the tapering facilitates primary closure of the donor site of the abdominal donor site) [Fig. 5]. This “extension” of the flap was equal in length to the length of the “healed” flap in the hand and was viable (good bleeding edges) based on the healed part of the flap within the hand. The plan was to utilize this “extension” to cover newly created defects after the release of the MPJ of the fingers. This release was done by dividing the healed distal end of the abdominal flap (at the MPJ of the fingers). No flap undermining was done, and k-wires were used to maintain the MPJ in flexion [Fig. 6]. The flap “extension” was then utilized to cover the defect over the metacarpophalangeal area of the index and middle fingers. In order to utilize one flap to cover the defects in the two fingers, the adjacent skin borders of the two fingers were sutured together (known as “syndactylization” of the fingers) to create a single defect. The remaining defects over the metacarpophalangeal area of the ring and little fingers were temporary covered with split-thickness skin grafts [Fig. 7]. Two weeks later, this skin graft was removed and replaced with another small abdominal flap. The interphalangeal joint hyper-extension contracture of the thumb was also released and the defect covered with a small paraumbilical flap [Fig. 8]. De-syndactylization of the index and middle fingers was also done. The patient travelled to her local village after every surgical intervention and hence, no physiotherapy referral was done. However, the family instructed to encourage the child to use the hand in daily activities. The patient recovered a useful range of motion in the digits at the MPJ [Figs. 9, 10] and was able to grasp objects and hold a pen [Figs. 11, 12]. The child was seen in follow-up one year after the last surgical procedure, and there has been no recurrence of the contractures. The family was satisfied with the outcome. The author discussed with family post-intervention cosmetic considerations with finger protheses after puberty.

Fig. 1. Appearance of the hand. Note the severe extension contracture of the digits and wrist.

Fig. 2. Release of the wrist and thumb base contractures.

Fig. 3. Inserting of the flap into the defect.

Fig. 4. The healed flap.
3. Discussion

Previously reported technical tips in the utilization of the pedicled groin/abdominal flaps in hand reconstruction includes: raising of the flap based on its vascular territory, adequate debridement of the hand defect, the use of mattress sutures to suture the flap of the defect, the use of K-wires to immobilize the finger joints, tubing of the flap if possible, and avoiding kinking of the flap pedicle [2,6]. Several other modifications of abdominal flaps in hand reconstruction have also been described such as: the simultaneous use of 2 flaps for coverage of combined dorsal and volar hand defects [7], the “bilobed” groin flap design [8], modifications of the para-umbilical “perforator” flaps [9,10], raising the abdominal flap as an “island” flap [11], and the “super-thin” abdominal flaps [12]. One of the major disadvantages of pedicled abdominal flap reconstruction is postoperative finger stiffness. Al-Qattan et al. [4] described technical tips in flap in-setting and hand positioning on the abdomen to allow physiotherapy of the attached hand (before flap division).

Our tip described utilizes an “extension” of the flap from the abdomen at the time of flap division. This “extension” is used to cover further adjacent defects in the hand. Several points should be taken in consideration. Firstly, the extension should be tapered as a half-ellipse (see Fig. 5) to facilitate closure of the abdominal donor site. Secondly, the base of the abdominal flap (in the original flap design) should be kept wide (see Fig. 4). Thirdly, this extension should not be divided further at the time of its in-setting (division of the distal part of this extension will risk distal flap necrosis). Hence, the fingers were “syndactylized” in our case. Finally, the current case demonstrates that the length of flap “extension” could be equal to the length of the healed flap in the hand in young healthy children. This may not be applicable to the elderly with co-morbidities. Regardless of the age, adequate blood

Fig. 5. Division of the abdominal flap with an “extension” which is tapered as a half-ellipse to facilitate closure of the abdominal donor site.

Fig. 6. Following the release of the metacarpophalangeal joints of the fingers, the joints were maintained in flexion with K-wires.

Fig. 7. In-setting of the flap “extension” into the index and middle fingers.

Fig. 8. Final appearance after de-syndactylization (separation) of the index from the middle finger and further flap coverage of the little/ring fingers and the interphalangeal joint of the thumb.
supply should be ensured by assessing bleeding from the skin edges; and in-setting of the flap “extension” should be done under no tension.

4. Conclusion

When utilizing abdominal pedicled flaps for hand reconstruction, an “extension” of the flap from the abdomen at the time of flap division may be harvested. This “extension” may be utilized to cover further adjacent defects in the hand.

Funding

None.
Ethical approval
The study was approved by the Research Committee at National (CARE) Hospital.

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

Research registration
Not applicable.

Guarantor
M M A-Qattan

Provenance and peer review
Not commissioned, externally peer reviewed.

CRediT authorship contribution statement
The author did the surgery, collected the data and wrote the manuscript.

Declaration of competing interest
None.

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