

Experience of Cross-Finger Flap

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Objective: To evaluate the experience of cross-finger flap in patients presenting in a private setup.

Patients and Methods: The study was conducted in a private setup from January 2006 to December 2008. All the patients undergoing cross-finger flap were included. The cross-finger flap was raised under local anaesthesia in adults and young children whereas in younger patients, general anaesthesia was given. All the flaps were raised under the tourniquet control. The donor site was closed primarily with a full-thickness skin graft and a tie-over dressing was used to stabilize the graft. The pedicle was divided after 2 weeks and the flap was insetted. After the pedicle division, the flap portion was insetted at the donor site using non-absorbable monofilament sutures.

Results: 31 patients underwent cross-finger flap. Majority of the patients were males (64.5%) with male to female ratio of 1.8:1. The average age in female patients was 19.5 years (range 3-36 years) and 28.7 years (range 11-39 years) in males. The post-burn contracture was the main cause (41.9%) followed by road traffic accidents (35.5%). Left hand was predominantly involved (61.3%). Middle finger (35.5%) was the commonest to be involved followed by index (29%), ring (25.8%), thumb (6.5%) and little finger (3.2%). Hyper-pigmentation occurred in 22.6% and partial graft loss in 6.5%. No case of hypertrophic scarring/keloid was seen. There was no loss of flap. The patients were followed up for 6 months and majority of the patients were satisfied with the functional and aesthetic outcome.

Conclusion: The cross-finger flap is a useful and dependable means of resurfacing finger defects.

Key Words: Cross-finger flap, Hand trauma, Pedicled flap, Hand reconstruction.

Introduction

Since its introduction in the literature, the cross-finger flap has gained wide acceptance in reconstructive hand surgery.¹ Its wide use is attributed to its ease of dissection, its anatomical security and the provision of soft and pliable tissue suit very well for the reconstruction of various finger defects.² There are a few disadvantages, the apparent drawback of being a two-stage procedure. More importantly, there are aesthetic concerns which may sometime have hypertrophic scarring. This study was undertaken to evaluate the experience of cross-finger flap in patients presenting in a private setup.

Patients and Methods

This study was conducted in a private setup from January 2006 to December 2008. All the patients in whom cross-finger flap was undertaken, were included in the study. In all the patients presenting with acute trauma, the wound was cleaned, debrided and washed thoroughly. The cross-finger flap was

performed under local anaesthesia in adults and young children whereas in more younger patients, general anaesthesia was given. All the flaps were raised under the tourniquet control. The tourniquet was deflated and haemostasis was secured before insetting of the flap.

Surgical Technique

The cross-finger flap was marked on the dorsum of the finger. The length of the flap was from the dorsal crease to the distal crease. The flap was raised under tourniquet control. The pivot point was kept on one side of the flap. The flap was raised till glistening underlying surface of the extensor mechanism leaving the paratenon behind for graft take. In cases requiring finger straightening, first K-wire was passed and then the flap was insetted using monofilament non-absorbable sutures. The circulation of the flap and finger was checked by deflating the tourniquet. The donor site was closed primarily with a full-thickness skin graft and a tie-over dressing was used to stabilize the graft.

The hand was kept in a fluffy dressing and was elevated. The flap was closely monitored over the next 24-48 hours. The pedicle was divided after 2 weeks and the flap was inset. The donor defect was covered with a full-thickness graft harvested either from the groin or the wrist skin crease. The graft was sutured using tie-over dressing which was removed on 10-12 day. After the pedicle division, the flap portion was inset at the donor site using non-absorbable monofilament sutures.

Results

A total of 31 patients were included in the study undergoing cross-finger flap. Majority of the patients were males (64.5%) with male to female ratio of 1.8:1. The average age in female patients was 19.5 years (range 3-36 years) and 28.7 years (range 11-39 years) in males. In majority of the patients, the post-burn contracture was the main cause (41.9%) followed by road traffic accidents (35.5%) (Table 1). Left hand was predominantly involved (61.3%). Middle finger (35.5%) was the commonest to be involved followed by index (29%), ring (25.8%), thumb (6.5%) and little finger (3.2%).

Table-1: Aetiology (n=31)

Cases	Patients	Percentage
Post-burn contracture	13	41.9%
Road traffic accidents	11	35.5%
Workplace accidents	04	12.9%
Domestic accidents	04	12.9%

Only a few complications were noted in the study including hyper-pigmentation in 22.6% and partial graft loss in 6.5%. No case of hypertrophic scarring/keloid was seen. Similarly there was no loss of flap during the whole study. The patients were followed up for 6 months and majority of the patients were satisfied with the functional and aesthetic outcome (Table 2).

Table-2: Patient satisfaction

	No. of cases	Percentage
Satisfied	17	54.8%
Concerned about donor site	11	35.5%
Dissatisfied	03	9.7%

Fig. 1: Pre and Post operative result of cross-finger flap in acute trauma.

A 34 years old right-handed male worker suffered sharp injury of the left index finger while working. A cross-finger flap from middle finger middle phalanx dorsum was raised to resurface the defect. After 2 weeks, the flap was divided and inset. The postoperative result was satisfactory with good flap take and satisfactory donor site.



Discussion

The cross-finger flap is a reliable method in soft tissue reconstruction of the fingers. The provision of soft and pliable tissue is very well suited for defects on the fingers; the anatomical security and ease of flap harvest make the cross-finger flap a widely used reconstructive option. However, there are a few drawbacks. Firstly it is a two stage procedure.

Fig. 2: Cross-finger flap in postburn contracture. A 32 years old male had postburn contracture of left ring finger. A cross-finger flap from middle finger middle phalanx dorsum was raised (**Fig. 2**). After 2 weeks, the flap was divided and insetted. Post operative result was satisfactory.



Secondly, temporary fixation of the donor and recipient finger impairs the joint movements and may result in joint stiffness. Finally, there is donor site morbidity which is somewhat controversial in the literature.^{1,3,4}

Various studies have been reported on the personal experiences of cross-finger flap.⁵⁻⁷ Various modifications have also been made in the flap, e.g., the heterodigital arterialized cross-finger flap, radial

innervated cross-finger flap, sensory cross-finger flap, cross-thumb flap, an innervated cross-finger flap, de-epithelialized cross-finger flap, dual innervated cross-finger flap, C-ring flap.⁸⁻¹² Paterson et al¹⁶ reviewed patients who had undergone cross finger flap for fingertip reconstruction with cross-finger flaps.⁴

Similarly in the study by Woon et al, cross-finger flap was used in 31 patients for resurfacing hemi-pulp losses of the thumb whereas we used it in 6.5% cases having thumb defect.¹⁶

In the present study, the mean age of the patients was 28.7 years which is also similar to the observation noted by Al-Qattan et al.¹⁷ We divided the pedicle after 2 weeks rather than 3 weeks used in the study by Al-Qattan et al.¹⁷ Majority of the flaps in the present study were used in post-burn contractures (41.9%).

Only a few complications were noted in the follow up. No flap loss or graft loss was seen in the present study, whereas 7% of the patients were re-grafted in the study by Al-Qattan et al.¹⁷

Hyper-pigmentation was seen in 22.6% cases whereas in 50% of the patients in the study by Koch had colour mismatch.⁶ No case of hypertrophic scar/keloid was seen in the present series. The overall patient satisfaction was also noted to be fully satisfied in 54.8%.

Similarly self estimation by the patients was also noted by Kappel et al¹ in which two-third patients revealed good or excellent aesthetic results. Only 9.7% patients were dissatisfied with the overall experience and 35.5% patients were concerned about the donor site. In the study by Woon et al, 25.8% patients were satisfied whereas 3.2% patients had hypersensitivity and cold intolerance.¹⁶

Conclusion

The cross-finger flap is a useful and dependable means of resurfacing finger defects. It is an acceptable alternative in patients unsuitable or unfit for micro-surgical free tissue transfers.

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Picture Quiz

Following is a picture of a person who had high grade fever with severe body pain, photophobia and prostration for the last 4 days.

1. What is the most likely diagnosis?
2. What further tests may be indicated?
3. How can you protect the close contacts?
4. How will you treat him?
5. What are the most dreadful complications of this disease?



See Answer on Page No. 28