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# Functional and Aesthetic Outcomes of Graft Reposition on Flap (GRF) in Allen Type IV Fingertip Amputations: A Clinical Study

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## Abstract

Background: Allen type IV fingertip amputations are among the most complex hand injuries, often requiring replantation for optimal functional and sensory and cosmetic recovery. In circumstances where replantation is not feasible, graft reposition on flap (GRF) serves as a practical approach that combines repositioning of the amputated distal phalanx and nail bed with vascularized flap coverage.

Aim: To evaluate the clinical, functional and sensory, and cosmetic outcomes of GRF in subjects with Allen type IV fingertip amputations.

Methods: This prospective subject series was conducted between February 2023 and July 2024 in the Department of Plastic Surgery, Government Kilpauk Medical College, Chennai. Three subjects with Allen type IV fingertip amputations were treated using the GRF technique. Each subject involved repositioning of the distal phalanx and nail bed followed by local flap coverage. Follow-up included clinical and radiographic assessments for bone union, flap stability, and cosmetic findings.

findings: All three cases involved thumb injuries—two caused by road traffic accidents and one by machinery. Nail bed survival was complete in two cases and partial in one. Radiological union occurred in all subjects with minimal shortening (2 mm). cosmetic evaluation yielded a mean VAS score of 8/10. None of the subjects experienced donor site morbidity or cold intolerance.

**Concluding Remarks: GRF offers a straightforward, reproducible, and efficient approach for managing Allen type IV fingertip amputations when replantation is not possible. It maintains finger length, function, and nail aesthetics, making it suitable for centers without microsurgical facilities.**

**Keywords**
Graft reposition on flap, Allen type IV, fingertip amputation, nail bed graft, cross-finger flap, subject series

## Introduction

Fingertip amputations represent a common challenge in hand reconstructive surgery, particularly those classified as Allen type IV, where both the nail complex and distal phalanx are lost. Although microsurgical replantation offers the best outcomes in terms of function and cosmesis, it is not always practical, especially in emergency or resource-limited environments. The graft reposition on flap (GRF) technique utilizes the amputated part by reattaching the distal bone and nail bed while covering it with a vascularized flap, thereby restoring contour, length, and cosmetic appearance. This research assesses the findings of GRF executed in three cases of Allen type IV fingertip amputations.

## Materials and Methods

This prospective research was carried out at the Department of Plastic Surgery, Government Kilpauk Medical College and Hospital, Chennai, between February 2023 and July 2024. Three male subjects aged 42–52 years with Allen type IV fingertip amputations were included. All subjects provided informed consent for surgery and publication.
Inclusion criteria were
complete fingertip amputation classified as Allen type IV, availability of the amputated segment, and patient willingness for GRF. subjects with polytrauma, missing amputated parts, or lower-grade amputations (types I–III) were excluded. Under regional anesthesia and tourniquet control, the wound was debrided and the amputated fragment prepared. The distal phalanx was stabilized to the proximal stump using either a K-wire or 21G needle, and the nail bed was carefully reattached with 6-0 Vicryl sutures. Flap coverage was chosen according to defect orientation—cross-finger flap for volar and transverse defects, and V–Y advancement flap for dorsal oblique injuries. Postoperatively, subjects were followed up at regular intervals for evaluation of bone healing, flap viability, range of motion at the DIP joint, and cosmetic outcome using a visual analogue scale (VAS).
findings
All three cases involved thumb injuries, two from road traffic accidents and one from a machine-related trauma. Complete nail bed survival was achieved in two subjects, with partial survival in one. Radiographic evaluation demonstrated bone union in all cases with minimal shortening averaging 2 mm. All subjects attained full DIP joint mobility and satisfactory nail regrowth. cosmetic satisfaction was high, with a mean VAS score of 8/10. No subjects documented donor site issues, cold intolerance, or hypersensitivity during

follow-up.

Table 1. subject Summary

| Case | Age (yrs) | Sex | Finger | Mechanism | Nail Bed Survival | VAS (Aesthetic) |
|---|---|---|---|---|---|---|
| 1 | 52 | M | Thumb | RTA | Good | 8/10 |
| 2 | 46 | M | Thumb | RTA | Good | 8/10 |
| 3 | 42 | M | Thumb | Machine cut | Partial | 8/10 |

## Discussion and Interpretation Additional subject Illustrations:

52-year-old male admitted with history of RTA showing preop and late follow up

preoperative

Intraoperative

Late follow up

46-year-old male admitted with history of RTA

preoperative

Intraoperative

Late follow up

42-year-old male admitted with history of accidental machine cut injury preoperative

Post op pic and xray findings:

All three cases involved thumb injuries—two caused by road traffic accidents and one by machinery. Nail bed survival was complete in two cases and partial in one. Radiological union occurred in all subjects with minimal shortening (2 mm). cosmetic evaluation yielded a mean VAS score of 8/10. None of the subjects experienced donor site morbidity or cold intolerance.

## Discussion and Interpretation

Fingertip reconstruction remains a vital component of hand surgery. While replantation continues to be the preferred option, it demands microsurgical expertise and specialized infrastructure. In situations where these resources are unavailable, GRF serves as a viable substitute that preserves both form and function. The current series demonstrated consistent bone union, optimal flap survival, and aesthetically acceptable findings, reinforcing earlier findings documented by Malshikare et al. (2015). Compared to replantation, GRF offers the advantage of simplicity, shorter operative time, and comparable patient satisfaction. Limitations of this research include the small sample size and limited follow-up duration, but the positive outcomes indicate that GRF is a dependable technique for Allen type IV fingertip injuries.

## Concluding Remarks

Graft reposition on flap (GRF) is a straightforward, cost-efficient, and reproducible intervention for the management of Allen type IV fingertip amputations. It offers satisfactory performance-based and cosmetic outcomes even in centers lacking microsurgical capability, making it a reliable option to replantation.

### Declarations

Ethical approval: Not required (subject series with informed consent).

Patient consent: acquired for clinical use and publication.
Conflict of interest: None declared.
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## References

1. Malshikare V, Kothari D, Bhati A. Graft reposition on flap in Allen type IV amputation: A report of six cases. Hand Surg. 2015;20(1):173–179.
2. Allen MJ. Conservative management of fingertip injuries in adults. Hand. 1980;12(3):257–265.
3. Atasoy E, Ioakimidis E, Kasdan ML, Kutz JE, Kleinert HE. Reconstruction of amputated fingertips with a triangular volar flap. J Bone Joint Surg Am. 1970;52(5):921–926.
4. Crawford GP. The cross-finger flap: Its variations and applications. Hand Clin. 1985;1(3):499–511.
5. Sebastin SJ, Chung KC. A systematic review of outcomes of replantation of distal digital amputation. Plast Reconstr Surg. 2011;128(3):723–737.