e-ISSN: 0976-822X, p-ISSN:2961-6042

Available online on http://www.ijcpr.com/

International Journal of Current Pharmaceutical Review and Research 2026; 18(6); 934-940

Case Series

# Evaluation of Management Strategies and Clinical Outcomes in Fingertip Injuries: A Case Series

**Priyanka Kumari[1], Rajat Kumar Singh[2], Sanjay Kumar Gupta[3]**

[1]Senior Resident, Department of Plastic Surgery, PMCH, Patna, Bihar, India
[2]Senior Resident, Department of Plastic Surgery, PMCH, Patna, Bihar, India
[3]HOD & Assistant Professor, Department of Plastic Surgery, PMCH, Patna, Bihar, India

**Received: 01-03-2026 / Revised: 15-04-2026 / Accepted: 21-05-2026**
**Corresponding author: Dr. Priyanka Kumari**
**Conflict of interest: Nil**

**Abstract**

**Background**: Fingertip injuries are very common due to occupational accidents, which range widely from minor cuts to nailbed injuries, as well as traumatic amputations and crush injuries. It is always preferable to conserve as much natural tissue as possible when feasible. Among the various reconstruction techniques available, it is essential to select one that preserves finger length while delivering a pain-free fingertip with a durable skin covering.

**Aim & Objectives**: To evaluate the management and outcome of fingertip injury

**Materials & Methods:** This is an observational study involving 16 cases of fingertip injuries spanning 24 months from April 2024 to March 2026. Reconstructive approaches were evaluated based on size, shape, location, condition of adjacent soft tissues, and exposure of the affected structures. This case series on traumatic fingertip injuries encompasses 16 cases, classified and described according to Allen's system. This will assist us in determining the severity of soft tissue injuries and skeletal damage. In the fingertip reconstruction surgery, methods including the V-Y flap, cross-finger flap, nail bed reconstruction, and bone shortening have been employed.

**Observation and Results:** The age range spanned from 10 to 55 years, with a greater prevalence of males. Various reconstructive techniques were applied depending on the patient's age, injury location, and injury type. The fingers' length, shape, and sensation remained intact.

**Conclusion:** The majority of fingertip injuries resulted from machines. Public education and compliance with workplace safety protocols can prevent these injuries to a significant degree. Treatment should be tailored to each patient according to the structure of their defect.

**Keywords:** Fingertip injury, fingertip reconstruction, V–Y advancement flap, cross-finger flap, nail bed injury, fingertip amputation, hand trauma, reconstructive surgery.

**DOI:** 10.25258/ijcpr.18.6.151



## Introduction

Fingertip injuries are among the most common hand injuries encountered in emergency and reconstructive surgical practice. They frequently result from occupational, domestic, recreational, and machinery-related accidents and may present with varying degrees of soft tissue loss, nail bed injury, fracture of the distal phalanx, or traumatic amputation. Because the fingertip is essential for fine touch, pinch, grip strength, and object manipulation, even a seemingly minor injury can lead to significant functional impairment and cosmetic deformity if not managed appropriately. [1,2] The fingertip possesses a complex anatomical structure comprising specialized skin, pulp tissue, nail complex, sensory nerve endings, and the distal phalanx. Preservation of these structures is important for maintaining sensation, dexterity, and the overall appearance of the hand. Consequently, management of fingertip injuries remains a challenging aspect of hand surgery, requiring a careful balance between restoration of function, preservation of finger length, and achievement of an acceptable aesthetic outcome. [2,4] A wide range of treatment options are available, including conservative wound care, primary closure, skin grafting, local advancement flaps, regional flaps, and nail bed reconstruction. The choice of treatment depends on several factors such as the extent and configuration of tissue loss, exposure of bone or tendon, involvement of the nail apparatus, patient age, occupation, hand dominance, and functional requirements. Selection of an

appropriate reconstructive technique is crucial for obtaining durable soft tissue coverage, satisfactory sensory recovery, and early return to daily activities. [3,10,11] Despite advances in reconstructive procedures, fingertip injuries continue to be associated with postoperative complications such as infection, stiffness, cold intolerance, sensory disturbances, and nail deformities. Therefore, evaluation of different management strategies and their clinical outcomes remains important for guiding treatment decisions. [5,7,15]

The present study was undertaken to assess the various methods employed in the management of fingertip injuries and to evaluate their functional and clinical outcomes in affected patients.

**Aim and Objectives**

The present study aimed to evaluate the management and outcomes of fingertip injuries. It also aimed to assess the pattern of injuries, the reconstructive procedures employed, postoperative functional and cosmetic outcomes, and complications associated with different treatment modalities.

**Materials & Methods**

This observational case series included 16 patients presenting with traumatic fingertip injuries over a 24-month period from April 2024 to March 2026. A detailed clinical assessment was performed for each patient, and injuries were classified according to the Allen classification system based on the extent of soft tissue loss and skeletal involvement. The reconstructive approach was individualized and selected according to the size, configuration, and location of the defect, the condition of surrounding soft tissues, and the presence of exposed bone, tendon, or nail bed structures.

Various surgical techniques were employed, including V–Y advancement flap, Kutler flap, cross-finger flap, thenar flap, homodigital flap, split-thickness skin grafting, nail bed reconstruction, bone shortening, and primary closure, depending on the nature and severity of the injury. Patients were followed up postoperatively, and outcomes were evaluated with respect to wound healing, preservation of finger length and contour, sensory recovery, functional restoration, and the occurrence of postoperative complications.

**Result**

In our study, patient upto 25 years comprised 25% while patients above 25 years comprised 75%. Male predominance with a male to female ratio of 3:1 was observed in our study.

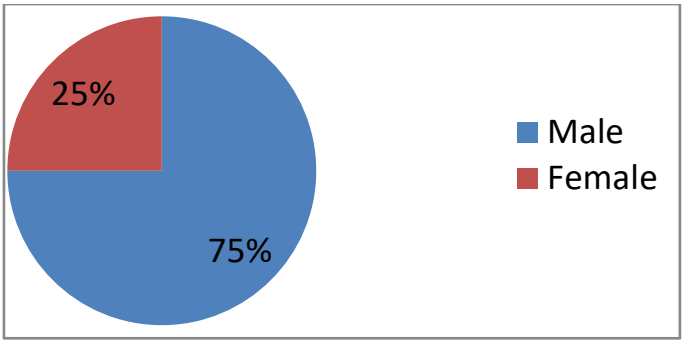


**Figure 1: Sex-wise distribution of study population**

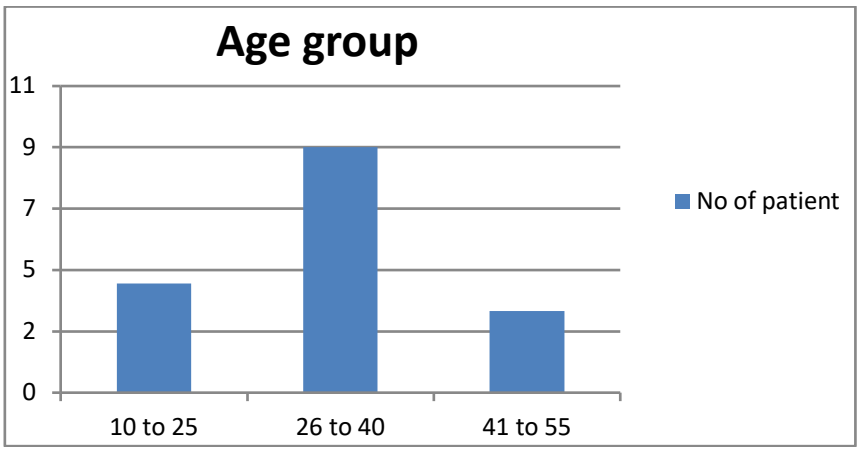


**Figure 2: Age-wise distribution of study population**

The most prevalent cause was machine injury in 8 cases. The household injuresfound in 4 cases (fig 3).

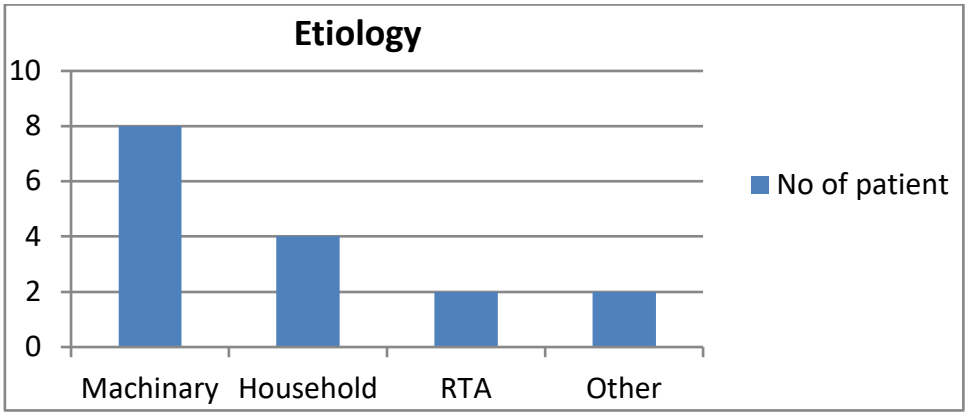


**Figure 3: Graph showing etiology of fingertip injury in our study**

The present study revealed right-hand dominance in 15 patients and left-hand dominance in 1patients.The right hand was injured in 12 patients while the left hand was injured in 4 patient. Most of the men (78.90%) had an injury in the dominant hand. In contrast, only 25% of females had an injury in the dominant.

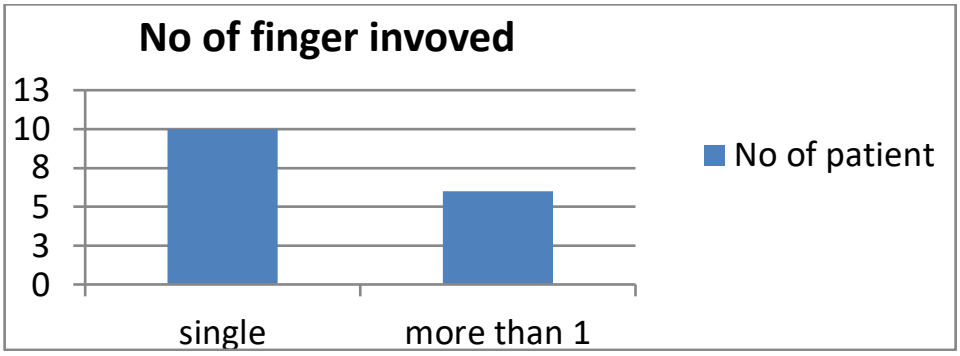


**Figure 4: Graph showing no. of finger involved in our study**

In our study, 10 patients had single digit involvement, whereas 6 had two or more than one-digit involvement. Middle finger injury was the commonest followed by index finger in patients with single-digit participation. We had 1 thenar flaps for index fingers. We performed 4 cross-finger flaps we had volar V-Y advancement flaps in 6 fingers and lateral V-Y advancement flap in 2 fingers.

**Table 1: Table shows procedure used for fingertip injury**

| Procedure done | No of patient |
|---|---|
| V-Y Plasty | 8 |
| kutler flap | 2 |
| Thenar flap | 1 |
| STSG | 5 |
| Cross finger flap | 6 |
| Primary closure | 4 |
| Homodigital flap | 1 |

The common complications encountered postoperatively were joint stiffness in 7 cases fallowed by wound infections in 5 cases, marginal necrosis in 3 cases, wound dehiscence in 3 cases, cold intolerance in 3 cases. By 4months, all the patients with cold sensitivity improved.

**Table 2: Table showing post-operative complication after surgery of fingertip injury**

| Complication | No of Patient |
|---|---|
| Infection | 5 |
| Wound dehiscence | 3 |
| Marginal necrosis | 3 |
| Joint stiffness | 7 |
| Cold intolarance | 3 |

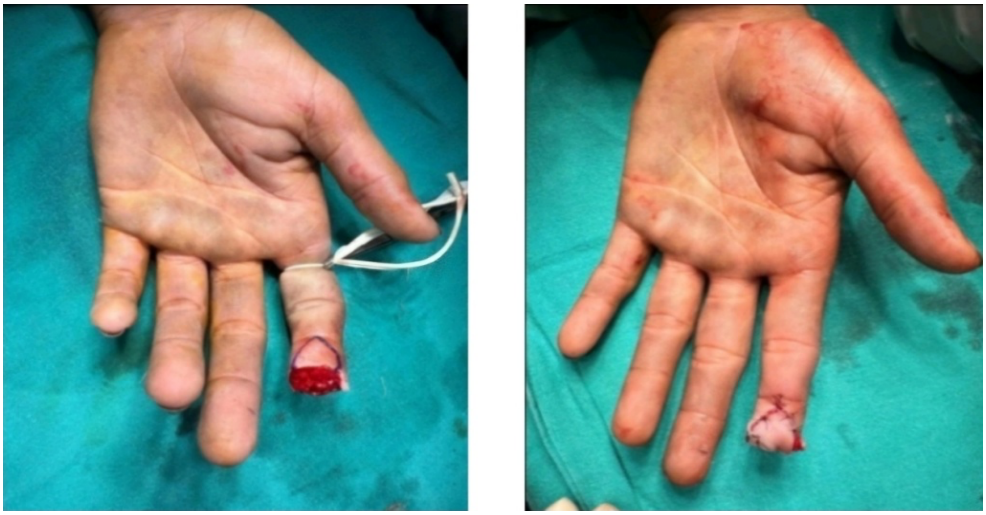

**Figure 5: showing v y plasty done for index finger tip injury of a male patient**

**Figure 6: Showing V Y Plasty done for left index finger of female patient**

**Figure 7: showing V Y Plasty done for middle and little finger and for index finger cross finger flap done**

**Figure 8: showing V Y flap done for index finger, thenar flap done for middle finger and STSG done for ring finger**

**Figure 9: showing cross finger flap done for little finger tip injury**

**Figure 10: showing kutler flap done for index finger tip injury**

## Discussion

Fingertip injuries continue to be one of the most frequently encountered hand injuries despite advances in industrial safety measures and protective equipment. Although often considered minor injuries, they can result in significant functional impairment, reduced hand dexterity, and loss of productivity if not managed appropriately. Because the fingertip plays a crucial role in sensation, grip, and fine motor activities, successful treatment requires restoration of both function and appearance. [2,4]

In the present study, patients older than 25 years constituted the majority (75%) of cases, while those aged 25 years or younger accounted for 25%. A clear male predominance was observed, with a male-to-female ratio of 3:1. This finding may be attributed to the greater involvement of males in occupations associated with manual labor and machinery use. Similar observations have been reported by Saraf et al. and Karthi et al. [5,6]. Machine-related injuries were the most common mechanism of trauma, followed by household injuries. In contrast, Hongaiah et al. [7] reported a higher proportion of female patients, largely due to mixer-grinder injuries occurring during domestic activities.

Most patients in our study were right-hand dominant, and injuries more frequently involved the dominant hand. The higher incidence of dominant-hand injuries among males may be related to occupational exposure and increased use of the dominant hand during work-related activities. Comparable findings have been documented by Beaton et al., Saraf et al., and Hongaiah et al. [5,7,8]. Single-digit involvement was more common than multiple-digit injuries, with the middle finger being the most frequently affected digit. This may be explained by its relatively greater length and exposure during daily activities. Crush injuries constituted the majority of machine-related trauma in our series. Allen type II injuries were the most common injury pattern observed, which is in agreement with previous reports. [3,7,16]

Management of fingertip injuries should be individualized, taking into account factors such as patient age, occupation, hand dominance, level of injury, extent of tissue loss, involvement of the nail bed, and exposure of underlying structures. The primary goals of treatment are preservation of finger length, restoration of sensation, achievement of durable soft-tissue coverage, maintenance of joint mobility, and attainment of an acceptable cosmetic outcome. [9,10,12,13,15] In our series, a variety of reconstructive procedures were performed depending on the characteristics of the defect. V–Y advancement flaps were the most frequently utilized local flap technique and provided satisfactory coverage while preserving fingertip contour and sensation. Split-thickness skin grafting was performed in selected cases with soft-tissue defects without significant exposure of vital structures. Cross-finger and thenar flaps were reserved for more complex injuries where local advancement was not feasible. The outcomes achieved with these procedures were comparable to those reported in previous studies. [5,6,14,15]

Postoperative complications included joint stiffness, wound infection, marginal necrosis, wound dehiscence, and cold intolerance. Joint stiffness was the most common complication observed. All cases of cold intolerance improved during follow-up, and wound-related complications responded well to conservative management. Similar postoperative complications have been reported in earlier studies of fingertip reconstruction. [5,7]

Overall, the findings of the present study highlight the importance of selecting an appropriate reconstructive technique based on the nature and severity of the injury. Individualized management can provide satisfactory functional recovery, preservation of sensation, and acceptable cosmetic outcomes in patients with fingertip trauma.

## Conclusion

Managing fingertip trauma is highly challenging due to the varied types of injuries and the abundance of surgical treatment methods available. Treatment of fingertip injuries should be tailored to each patient based on factors such as their age, gender, existing health issues, job, dominant hand, affected finger, type of injury, and the wound's shape and size.

## References

1. Kelsey JL, Pastides H, Kreiger N, et al. Upper extremity disorders: A survey of their frequency and cost in the United States. St Louis, MO: Mosby; 1980.
2. Pencle FJ, Waseem M. Fingertip Injuries. In: StatPearls. Treasure Island (FL): StatPearls Publishing; 2020.
3. George A, Alexander R, Manju C. Management of nail bed injuries associated with fingertip injuries. Indian J Orthop. 2017;51(6):709-713.
4. Yeo CJ, Sebastin SJ, Chong AK. Fingertip injuries. Singapore Med J. 2010;51(1):78-87.
5. Saraf S, Tiwari V. Fingertip injuries. Indian J Orthop. 2007;41(2):163-168.
6. Karthi SV, Suresh GB, Shanmuga SP. Surgical management of fingertip injuries. Int J Res Orthop. 2017;3:19-22.
7. Hongaiah D, Abhilash, Kumar D, Vijay KS. Mixer grinder fingertip injuries and treatment

outcome in a rural-based tertiary center: A retrospective study. Int Surg J. 2019;6:2458-2463.
8. Beaton AA, Williams L, Moseley LG. Handedness and hand injuries. J Hand Surg Br. 1994;19(2):158-161.
9. Beasley RW. Reconstruction of amputated fingertips. Plast Reconstr Surg. 1969;44(4): 349-352.
10. Lister G. The Hand: Diagnosis and Indications. 3rd ed. Edinburgh: Churchill Livingstone; 1993. p.121-125.
11. Brown RE. Acute nail bed injuries. Hand Clin. 2002;18(4):561-575.
12. Stevenson TR. Fingertip and nail bed injuries. Orthop Clin North Am. 1992;23(1):149-159.
13. Russell RC, Casas LA. Management of fingertip injuries. Clin Plast Surg. 1989;16(3): 405-425.
14. Henry M, Stutz C. Homodigital antegrade-flow neurovascular pedicle flaps for sensate reconstruction of fingertip amputation injuries. J Hand Surg Am. 2006;31(7):1220-1225.
15. Pencle F, Doehrmann R, Waseem M. Fingertip injuries. StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2025.
16. Evans DM, Bernardis C. A new classification for fingertip injuries. J Hand Surg Br. 2000; 25(1):58-60.