



ORIGINAL RESEARCH PAPER

Plastic Surgery

MANAGEMENT OF FINGER TIP INJURY – OUR EXPERIENCE

KEY WORDS: Fingertip injury, flaps, grafting, nail bed repair

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ABSTRACT

Introduction: The fingertip is end organ for touch and is richly supplied with special sensory receptors that enable the hand to relay the shape, temperature, and texture of an object. **Material And Methods:** This retrospective study was conducted on 500 patients who presented to the emergency department with fingertip injury over a span of 5 years from March 2019 to March 2024. A detailed history was taken from the records about the clinical examination and appropriate investigations. **Results:** Age-wise maximum distribution was 21- 40 years. Maximum number of patients were of dye machine injury. Majority of the procedures were Grafting, Flaps (Cross finger flap, Groin flap, V-Y advancement flap), nail bed repair. **Conclusions:** Most injuries happened in the age group 21-40 years, mostly were machine injury victims. The most common treatment was Grafting, Flaps, nail bed repair.

INTRODUCTION

Hand and finger injuries can be crippling and affect all ages including adults and children. In adults, injuries are commonly due to occupational activities. In this setting, lacerations are the major type of injury, followed by crush and avulsion injuries. However, powered machines and non-powered hand tools are more likely to result in multiple types of injuries.

The fingertip is the end organ for touch and is richly supplied with special sensory receptors that enable the hand to relay the shape, temperature, and texture of an object.¹ The glabrous skin of the fingertip is specially adapted for pinch and grasp functions. Its volar surface consists of a fatty pulp covered by highly innervated skin.²

The fingertip comprises of nail bed, nail plate, extensor tendon, flexor tendon, distal phalanx, pulp and digital nerve. It is the specialized structure within the hand that contributes to function through fine motor control, sensation and the aesthetic value of the hand. A stable, mobile and sensate fingertip is important to the overall function of the hand. In addition, the face and hand are the most looked parts of our body.³ The skin of the fingertip is firmly anchored to the underlying terminal phalanx by multiple fibrous septa that traverse the fatty pulp.⁴

Injuries to the fingertip are a very common presentation to the emergency department, yet are often poorly managed. These injuries have a functionally important impact on day to day living as the fingertip is the most used part of the upper limb and as such is frequently prone to trauma.⁵ Fingertip injuries are defined as those injuries occurring distal to the insertion of the flexor and extensor tendons. They are the most common injuries of the hand and can lead to a significant functional and cosmetic deficit if they are not treated appropriately.⁶ After a fingertip injury, restoration of sensibility, stable skin coverage, and adequate padding are the goals of reconstruction. There are many treatment options, which range from allowing the wound to heal by secondary intention to flap coverage or revision amputation.⁷

The planned procedure must be individualized in each case depending on the needs of the patient and the type of injury. Patient related factors including age, occupation, avocation and general health. Injury-related factors including nail bed injuries, angle of injury, bone exposure, digit injured and concomitant injuries.⁸ The aim of treatment for fingertip injuries is to restore a durable fingertip that is free from pain and has normal or near-normal sensation and appearance.

The initial evaluation of fingertip injuries requires careful clinical assessment and quality imaging to define the injury and determine an appropriate treatment plan: non-operative versus operative. Stable fractures without rotational deformity or intraarticular extension are best treated non-operatively with gentle reduction, appropriate splinting and early motion to provide an environment for fracture healing without excessive residual stiffness.⁹ Fingertip injury due to crush injury involving nail and adjacent bone surface will depend on the energy and direction of trauma and effective treatment surgical treatment given to prevent secondary deformities.¹⁰

MATERIAL AND METHODS

This retrospective study was conducted on all patients who presented to the Emergency Department of our institute over a span of 5 years from March 2019 to March 2024.

All patients who sustained injury to the finger distal to the distal inter-phalangeal joint were enrolled in our study. A detailed history was taken from the records about the clinical examination and appropriate investigations. Documentation of the type of injury, presence of any crushing effect in soft tissue or bone, exposure of bone or tendon, nail avulsion and nail bed injury was done. The assessment was done with Allen's classification. **Classification of finger tip injury:**

Allen classified fingertip injuries into four types. This is based on the level of injury:

- Type 1- Injury involving only the pulp
- Type 2- Injury involving the pulp and nail bed
- Type 3- Injury including the partial loss of the distal phalanx
- Type 4- Injury proximal to lunula

The data on epidemiology, mode of fingertip injury,

management and outcome done by using frequency, distribution for all variables, mean standard deviation and percentage. Comparison of categorical variables between subtypes performed using Chi – square test.

RESULTS

Table 1: Mode/ Mechanism of injury wise distribution

Mode/ mechanism of injury	Frequency	Percentage
Door traps	70	14
Press machine	50	10
Dye machine	95	19
Road traffic accident	51	10.2
Tokka machine	19	3.8
Glass cut injury	15	3
Knife injury	15	3
Fall from bike	13	2.6
Skid and fall	05	1
Slip and fall on glass	07	1.4
Mechanical injury	52	10.4
Kitchen injury	29	5.8
Mixie	09	1.8
Sharp instruments	26	5.2
Playground	10	2
Cycle chain	05	1
Sewing machine	20	4
Trapped under shutter	09	1.8
Total	500	100

As per mode/ mechanism of injury, maximum number of patients were 95 (19%) with dye machine injury and minimum number were 5 (1%) each with skid and fall and cycle chain injuries.

Table 2: Relationship between the treatment and functional outcome

Treatment	Average function	Good function	Normal function	Total
V-Y advancement flap	0 (0.00%)	25 (100.00%)	0 (0.00%)	25 (100.00%)
Conservative	0 (0.00%)	25 (100.00%)	0 (0.00%)	25 (100.00%)
Cross finger flap	05 (11.11%)	40 (88.89%)	0 (0.00%)	45 (100.00%)
Nail bed repair	0 (0.00%)	75 (100.00%)	0 (0.00%)	75 (100.00%)
Revision amputation	0 (0.00%)	35 (77.78%)	10 (22.22%)	45 (100.00%)
K- wiring, tendon repair and suturing	35 (77.78%)	10 (22.22%)	0 (0.00%)	45 (100.00%)
Groin flap	10 (10.00%)	90 (90.00%)	0 (0.00%)	100 (100.00%)
Grafting	320 (50.00%)	320 (50.00%)	0 (0.00%)	640 (100.00%)
Tag suturing and dressing	0 (0.00%)	15 (100.00%)	0 (0.00%)	15 (100.00%)
Total	370 (36.45%)	635 (62.56%)	10 (0.98%)	1015 (100.00%)
p - value				<.0001**

p- value highly significant <.0001**



Figure 1: cross finger flap



Figure 2: v-y advancement flap

DISCUSSION

This retrospective study was conducted on 500 patients who presented to the Emergency Department of our institution with fingertip injury over a span of 5 years from March 2019 to March 2024. All patients who sustained injury to the finger distal to the distal inter- phalangeal joint were enrolled in our study. In the present study the 500 patients who presented to the emergency were:

1. As per age wise, out of 500 patients in age group 0-20 years, total patients were 135 (27%), in 21-40 years, total patients were 295 (59%), in 41-60 years total patients were 60 (12%) and in age group of 61 and above total number of patients were 10 (2%). The maximum number of patients were in 21-40 years age group with the mean age was 26 years among adults.
2. As per the gender wise distribution, maximum number of patients were male i.e. 400 (80%) and number of female patients were 100 (20%). This shows that the mostly male patients were employed in the risky occupation involving machines.
3. As per mode/ mechanism of injury, maximum number of patients were 95 (19%) with dye machine injury and minimum number were 5 (1%) each with skid and fall and cycle chain injuries.
4. According to the findings of the study, sensation was better in the finger without bone fracture in comparison to the fractured finger which was statistically highly significant (p- value <.0001).
5. The treatment given to maximum patients was the Grafting followed by Flaps (Cross finger flap, Groin flap, V-Y advancement flap) followed by Nail bed repair. This was because the large section that we treated were mostly machine injury victims. They were mostly daily wagers and they wanted to return back to work as soon as possible with minimum medical expenditure.

CONCLUSION

1. The maximum number of patients were in 21-40 years age group with the mean age was 26 years among adults.
2. The maximum patients were male.
3. As per mode/ mechanism of injury, maximum number of patients were with dye machine injury.
4. Sensation was better in the finger without bone fracture in comparison to the fractured finger which was statistically highly significant (p- value <.0001).
5. The treatment given to maximum patients was the Grafting followed by Flaps (Cross finger flap, Groin flap, V-Y advancement flap) followed by Nail bed repair.

Declarations

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Conflict of interest: None

Ethical approval: The study was approved by the Institutional Ethics Committee.

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