International Surgery Journal
*Karthik MS et al. Int Surg J. 2020 Mar;7(3):770-773*
http://www.ijsurgery.com
pISSN 2349-3305 | eISSN 2349-2902

DOI: http://dx.doi.org/10.18203/2349-2902.isj20200820

**Original Research Article**

# Prospective study of hand injuries in Government Royapettah Hospital

**Karthik Muthuram S., Savitha S.***

Department of General Surgery, Government Royapettah Hospital, Kilpauk Medical College, Royapettah, Chennai

**Received:** 27 January 2020
**Revised:** 18 February 2020
**Accepted:** 19 February 2020

***Correspondence:**
Dr. Savitha S.,
E-mail: arvindr84@gmail.com



## ABSTRACT

**Background:** Hands often get injured and can be incapacitating the patient if care is not given properly. Injury to hand leads to loss of function as well as deformity of body image which can cause a lot of psychological consequences. The objective of the study was to analyze the pattern of hand injuries encountered and to compare the functional recovery at first and third month after appropriate management.
**Methods:** Totally 150 consecutive patients presenting with history of injury to hand or hands following road traffic accidents, industrial accidents, assault etc. are selected based on non-probability sampling method appropriate preliminary radiological and blood investigations were done and appropriate management was carried out to analyze the final outcomes.
**Results:** Out of 150 cases in our study fingers contributed 121 (80.6%) of cases followed by palmar and dorsum of hand in about 26 cases (17.3%), wrist and forearm injuries contributing about 3 cases (2%). In fingers most of injuries occurred in third finger 35 cases (23.3%) followed by F2-28 (18.6%), F4-21 (14%), F5-20 (13.3%), thumb-17 (11.3%). Most injuries were in the left hand. required secondary procedures.
**Conclusions:** Early presentation of patients and unlikely prehospital involvement of traditional bone setters reflect the great importance attached to hand injuries. Promotion of safety measures in the workplace and homes and prevention of road traffic crashes would help in reducing the incidence of hand injuries.

**Keywords:** Occupational hand injuries, Hand, Hand injuries, Traditional bone setters

## INTRODUCTION

The hand is a complex and dynamic structure that balances form and function. Too many hands are a highly versatile tool used to interact with the surrounding world. To others, the hand is an instrument of expression and beauty. Hand serves a dual purpose that makes it arguably one of our most important body parts perhaps second only to the face the most representative of humanity.[1] The hand is a very important part of the body used for exploratory and manipulative activities. It is the organ involved in prehension.[2] They play an important role in maintaining body image that serves as a sense of identity as well as an organ of communication to other things. Hands often get injured and which can be incapacitating the patient if care is not given properly.[3] Injury to hand leads to loss of function as well as deformity of body image which can cause a lot of psychological consequences. These injuries can arise out of different ways and the knowledge of these is important to plan for treatment and injury preventive methods.[4] Hand with its 27 muscles and 27 bones is strong and flexible and able to perform many fine movements. In view of this intricate design and function of the hand, any injury to the structures of hand carries the potential for serious handicaps.[5] A rapid and accurate initial evaluation, therefore, remains to be a goal in reducing this risk. Diagnosis and treatment of significant hand injuries are very complex rightly should be performed by a specialist. In this regard the plastic surgeon or

orthopedic surgeons are mostly involved in the management of hand injuries; however, the initial presentation is to the emergency where they are seen by non-specialists who may not thoroughly understand the peculiarity of hand injuries and their management. So, this makes hand injury an often-mismanaged injury.[6]

## METHODS

Totally 150 consecutive patients presenting with history of injury to hand or hands following road traffic accidents, industrial accidents, assault etc., presenting to Government Royapettah Hospital, emergency casualty department in the year 2019 (November and December) are selected based on non-probability sampling method after approval of Institutional Ethical Committee and obtaining informed consent. Appropriate preliminary radiological and blood investigations were done and appropriate management was carried out to analyze the final outcomes.

### *Inclusion criteria*

Patients presenting with a history of injury to hand or hands following road traffic accidents, industrial accidents, assault, firecracker accidents, domestic accidents are included in the study.

### *Exclusion criteria*

Patients with severe head injury based on the glasgow coma scale. Patients with associated severe thoracic and abdominal trauma and lower limb injuries.

Data were presented in frequency, percentage, mean, standard deviation and odd ratio.

## RESULTS

The mean age of presentation was 33.3 years of age. The age distribution is shown above. The number of patients who presented with age group 1 to 10 years, 11 to 20 years, 21 to 30 years, 31 to 40 years, 41 to 50 years and 51years and above were of injury were 3, 17, 43, 48, 23 and 16 patients respectively. The percentage as follows 2% (1-10), 11.3% (11-20), 28.6% (21-30),32% (31-40), 15.3% (41-50), 10.6% (>50). Majority of cases concentrated in the age group between 21 to 40 years (>60%) followed by age group of 41 years and above. Least presentation was seen in the age group of 1 to 20 years (Table 1).

The aetiologies of our case series are illustrated above. The major burden of our study cases occurred due to road traffic accidents (70%). Followed by assault and domestic accidents (25.3%) and industrial and firecracker accidents (4.6%) (Table 2).

Out of 150 cases in our study fingers contributed 121 (80.6%) of cases followed by palmar and dorsum of hand in about 26 cases (17.3%), wrist and forearm injuries contributing about 3 cases (2%) (Table 3).

**Table 1: Age distribution.**

| Age (in years) | No. of cases | % |
|---|---|---|
| **1 to 10** | 03 | 2.0 |
| **11 to 20** | 17 | 11.4 |
| **21 to 30** | 43 | 28.6 |
| **31 to 40** | 48 | 32.0 |
| **41 to 50** | 23 | 15.4 |
| **51 and above** | 16 | 10.6 |

**Table 2: Etiology of injury.**

| Mode of injury | No. of cases | % |
|---|---|---|
| **Road traffic accident** | 105 | 70 |
| **Assault** | 28 | 18.6 |
| **Domestic accident** | 10 | 6.7 |
| **Industrial accident** | 04 | 2.7 |
| **Firecracker accident** | 03 | 2 |

**Table 3: Pattern of injuries.**

| Site of injury | No. of cases | % |
|---|---|---|
| **Finger** | 121 | 80.7 |
| **Palm and dorsum** | 26 | 17.3 |
| **Wrist** | 1 | 0.7 |
| **Forearm** | 2 | 1.3 |

**Table 4: Pattern of bony injuries.**

| Return to work | No. of cases | % |
|---|---|---|
| **1 to 2 weeks** | 65 | 50.8 |
| **3 to 4 weeks** | 38 | 28.7 |
| **1 to 2 months** | 17 | 13.3 |
| **More than 2 months** | 08 | 6.2 |

**Table 5: Modes of treatment.**

| Treatment type | No. of cases | % |
|---|---|---|
| **Skin suturing and cleaning and dressing** | 54 | 32.7 |
| **Split skin grafting** | 05 | 3.0 |
| **K-wire fixation** | 21 | 12.8 |
| **Shortening closure** | 20 | 12.2 |
| **Buddy strapping and splinting** | 03 | 1.8 |
| **Repositioning** | 09 | 5.5 |
| **Tendon repair** | 07 | 4.2 |
| **Groin flap** | 13 | 7.9 |
| **V-y flap** | 08 | 4.8 |
| **Cross finger flap** | 02 | 1.2 |
| **Multi-modality treatment** | 23 | 13.9 |

Bony injuries were noted in about 70 cases (46.6%) with or without associated soft tissue injuries and about 80 cases (53.3%) had injuries not associated with bony injuries (Table 4).

Primary suturing of wound had been done for majority of cases 54 (36%), various flaps covers were offered for 23 cases (15.3%), k-wiring was done for 21 cases (14%), shortening closure procedure was done for 20 patients (13.3%), splints and repositioning was done in 12 patients (8%), tendon repair in 7 cases (4.6%) and skin grafting was performed in 5 cases (3.3%). Multiple modalities of treatment were required in 23 cases (15.3%) (Table 5).

**Table 6: Complications.**

| Complications | No. of cases | % |
|---|---|---|
| **Wound infection** | 12 | 19.0 |
| **Edema** | 27 | 42.9 |
| **Skin necrosis** | 12 | 19.0 |
| **Partial flap necrosis** | 04 | 6.4 |
| **Stiffness in hand and finger** | 08 | 12.7 |

Among the patients treated in our study 22 patients lost to follow up, 128 patients were followed up at 2 weeks, 1 month and 3 months after the treatment. 63 of patients had complications noted were wound edema in 27 cases (18%) followed by skin necrosis and wound infection in 12 cases each (8%) and stiffness and partial flap necrosis in 8 (5.3%) and 4 (2.5%) cases respectively.

**Table 7: Return to work.**

| Return to work | No. of cases | % |
|---|---|---|
| **1 to 2 weeks** | 65 | 50.8 |
| **3 to 4 weeks** | 38 | 28.7 |
| **1 to 2 months** | 17 | 13.3 |
| **More than 2 months** | 08 | 6.2 |

On follow up out of 128 patients at 2 weeks 65 (50.8%) patients had returned to normal work without any complications. 38 patients (29.6%) had minor complications like edema and wound infections. 25 patients (19.5%) had to return to after 1 month or more with a disability who had severe wound infections or required secondary procedures.

## DISCUSSION

Trauma to hand presents with multiple soft tissues and osseous manifestations that appear unrelated, leading to under-recognition and potential under treatment of complex injuries. The logical and systematic diagnostic plan allows surgeons to recognize the location and severity of the muscle-skeletal injury and primary treatment.[7] Understanding trauma mechanisms and patterns of injury in the injured hand will maximize awareness and guide surgical reconstruction, rehabilitation, and prevention.[8] It is a challenge to assess and treat a crushed hand. These are multisystem, combined injuries that can lead to suboptimal functional recovery. Aggressive initial management affords the best chance to optimize results. The cornerstone of hand care is the identification of the pathoanatomy, assessment of the magnitude of the injuries, and focused treatment in the context of the complete injury.[9] The spectrum of injuries ranges from mild lacerations that can be repaired in emergency casualty departments to multiple finger amputations and exploded hand, which requires extensive multiple, reconstructive procedures. The time and loss of work and wages, as well as medical expenses, increase dramatically for severe injuries.[10] Also, there is a tremendous physical and emotional pain. Hand injuries are among the most frequent injuries worldwide, constituting between 6.65% to 28.6% of all injuries and 28% of injuries to the 35 years influenced primarily by industrial accidents and more use of two-wheelers.[11] Venkatraani et al. found that the male to female ratio of patients in their study was 2.2:1.5. Based on personal data in our series, 76.6% were males and 60% were in the age group of 21-40 years. This reflects because many male subjects are increasingly involved in reckless usage of roadways and often involve in feuds associated with alcohol usage than females that places males at a higher risk of injuries.[12] In our study 96% were right hand dominant and 45% had the only right-hand injury, 1% had a bilateral hand injury and 54% had the left-hand injury. In comparison, 48.5% of dominant hand injury and 51.5% of non-dominant hand injury has been reported in a study based in Kenya. Studies in ergonomics suggest that nondominant hand primarily functions in terms of stabilization and positioning whereas the dominant hand has a more active role. It might be thought that passive hand would be more prone to laceration and the active dominant hand to cutting injuries, but both hands are at equal risk whatever the mechanism.[13] In our study finger injuries were commonly present among the fingers middle finger was most commonly injured single finger at 23.3% with terminal phalanx is most commonly injured bone in hand. The presentation to a hospital within 6 hours after injury was noted in about 49% cases reflecting the 108 Emergency Management and Research Institute services rampant in the city for easy and early first aid and quick transportation to the hospital.[14] Lacerations and simple soft tissue injuries were recorded in most of the subjects requiring an outpatient service by simple suturing, dressing, splinting etc. Crush injuries were at a low rate because our hospital does not cater to as much work or industrial injuries.[15] Major amputations were not recorded in our study due to the fact that a well-developed hand surgery and reconstruction center round the clock in the city for about past 30 years and people are well aware of nature of the injury sustained and where to self-refer them in case a major injury happens in this digitalized world.[16] The highlight of this study was that even though a patient presented with minor lacerations over the wrist and/hand, there was a high incidence of associated injury to underlying vital structures, whose repair was vital to

the final function of the hand.[17] A simple-appearing laceration with underlying occult visual structure injury which amounts to grievous injury. Neuro-vascular-tendinous injury combined was present in 27.86% of the patients out of which 25% were complete revascularizations and reimplantation. Injuries of the hand are a common cause of presentation in emergency departments.[18] Patients who require transfer to a plastic surgical unit can be easily identified by a careful history examination and plain X-rays. Criteria for transfer include injury to nerves, tendons or joints, skin loss or complex fractures, injuries requiring skin grafting or reconstruction, and burns.[19,20]

## CONCLUSION

The triad of occupational injuries, injuries in road traffic accidents, and domestic accidents, occurring mainly in the 3rd and 4th decades of life, were commonest causes of hand injuries. Early presentation of patients and unlikely prehospital involvement of traditional bone setters reflect the great importance attached to hand injuries. Promotion of safety measures in the workplace and homes and prevention of road traffic crashes would help in reducing the incidence of hand injuries. Introducing courses on the treatment of hand injury among undergraduate and postgraduate medical students, and encouraging them to take up sub-specialization in this area will increase the skill level of potential care providers.

*Funding: No funding sources*
*Conflict of interest: None declared*
*Ethical approval: The study was approved by the Institutional Ethics Committee*

## REFERENCES

1. Bunnell S. Surgery of the Hand. Philadelphia: JB Lippincott Co, 1944.
2. Prasad R, Bhamidi A, Rajeswaran A, Muthukumar S, Kothandaraman P, Sivaraj M. Epidemiology and sequelae of workplace hand injuries at a tertiary trauma care center. Surg Sci. 2014;5:150-8.
3. Serinken M, Karcioglu O, Sener S. Occupational hand injuries treated at a tertiary care facility in western Turkey. Ind Health. 2008;46:239-46.
4. Adigun I, Ogundipe K, Aderibigbe A. Pattern of hand injuries in a teaching hospital of a developing country: a three-year review of cases. Internet J Hand Surg. 2007;1:1-6.
5. Ahmed E, Chaka T. Prospective study of patients with hand injuries: Tikur Anbessa University Teaching Hospital, Addis Abba. Ethiop Med J. 2006;44:175-81.
6. Ihekire O, Salawu SAI, Opadele T. Causes of hand injuries in a developing country. Can J Surg. 2010;53:161-6.
7. Shrihari V. The spectrum of hand injuries and their management at a tertiary care hospital using the hand injury scoring system. Int Surg J. 2016;3:1761-6.
8. Garg N, Hyder AA. Exploring the relationship between development and road traffic injuries: a case study from India, Eur J Public Health. 2006;16(5):487-91.
9. Gururaj G. Road traffic deaths, injuries, and disabilities in India: current scenario. Natl Med J India. 2008;21:14-20.
10. Olaitan P, Oseni G, Olakulehin O. Pattern of hand injuries in osogbo, south-west Nigeria. J West African Coll Surgeons. 2011;1(3):15-25.
11. Cheung K, Hatchell A, Thoma A. Approach to traumatic hand injuries for primary care physicians. Canadian Family Physician. 2013;59(6):614-8.
12. Venkatramani H, Sabapathy SR. Fingertip Replantation: Technical Considerations and Outcome Analysis of 24 Consecutive Fingertip Replantations. Indian Journal of Plastic Surgery: Official Publication of the Association of Plastic Surgeons of India. 2011;44(2):237-45.
13. Krauss EM, Lalonde DH. Secondary healing of fingertip amputations: a review. Hand (New York, NY). 2014;9(3):282-8.
14. Sandall BK, Keys KA, Friedrich JB. Abstract: Analysis of Thumb and First Webspace Injuries Due to Fireworks. Plastic Reconst Surg. Global Open. 2016;4(9):74-5.
15. Schneider LH. Fractures of the distal interphalangeal joint. Hand Clin. 1994;2:277-85.
16. Jehan S, Chandraprakasam T, Thambiraj S. Management of Proximal Phalangeal Fractures of the Hand Using Finger Nail Traction and a Digital Splint: A Prospective Study of 43 Cases. Clin Orthop Surg. 2012;4(2):156-62.
17. Lukas B, Hartl P, Bäcker K. Soft-tissue reconstruction of the dorsum of the hand and finger to cover the extender tendons. Handchir Mikrochir Plast Chir. 2008;40(2):110-4.
18. Katsaros J, Tan E, Zoltie N. Free flap cover of acute hand injuries. Injury. 1989;20(2):96-7.
19. Sabapathy SR, Venkatramani H, Bhardwaj P. Reconstruction of the thumb amputation at the carpometacarpal joint level by groin flap and second toe transfer. Injury. 2013;44(3):370-5.
20. Muzaffar AR, Chao JJ, Friedrich JB. Post-traumatic thumb reconstruction. Plast Reconstr Surg. 2005;116:103-22.

**Cite this article as:** Karthik MS, Savitha S. Prospective study of hand injuries in Government Royapettah Hospital. Int Surg J 2020;7:770-3.