

# Metacarpal and Phalangeal Fractures due to Road Traffic Accidents – an Epidemiological Analysis of 37 Cases

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## ABSTRACT

**Introduction:** Hands are very important for daily living with varied functions being carried out from simple to complex. Any trauma which affects the composite tissues of hand may significantly affect the function depending upon the severity of injury. Road traffic accidents are one of the cause of trauma to hand and this study aimed to know the epidemiological patterns of metacarpal and phalangeal fractures in Road Traffic Accidents (R.T.A) and the pattern of surgical procedures done in metacarpal and phalangeal fractures.

**Material and Methods:** This was a retrospective record analysis of 37 cases of metacarpal and phalangeal fractures conducted by Dept of Plastic Surgery at St John's medical college hospital, Bangalore. Records of R.T.A presenting with metacarpal and phalangeal fractures irrespective of age and sex were analysed. The records of pure soft tissue injuries of hand, wrist bones and burns were excluded. Data were analyzed and projected in the form of tables and figures.

**Results:** 37 patients had R.T.A, with a male preponderance of 89% and the mean age was 28 yrs. Right hand bone involvement were seen in 43% with most injuries being open (70%) and multiple fingers with little finger were affected in equal proportions (24%). Predominant surgical procedures done were bony stabilization in 35%, followed by tacking sutures in 27% of pts.

**Conclusion:** The pattern recorded were young males with multiple compound bone fractures with a predominance of little finger involvement.

**Keywords:** Road Traffic, Accidents, fracture

at St Johns medical college exclusively deals with hand injuries thus becoming imperative that we have a hand injury registry.

## MATERIAL AND METHODS

This was a retrospective record (descriptive) analysis of 37 cases of metacarpal and phalangeal fractures during the period from 2012 to 2014 conducted at St John's medical college and Hospital, Bangalore, Karnataka, India. All the emergency hand injury cases initially come to the emergency dept of the institution and then these cases were referred to the dept of plastic surgery. After obtaining ethical clearance from the ethical committee of the institution with Registration No. [IEC 186/2017], record review were done and the observational data of all hand injury cases were noted in a hand proform, fractures were recorded upon noting the radiographs carefully and the data were analyzed and projected in the form of tables and figures.

**Inclusion criteria:** Metacarpal and phalangeal fractures with R.T.A.

**Exclusion criteria:** Soft tissue hand injuries, burns, carpal bone fractures.

The reason for such a small number being the study is very specific for only metacarpal and phalangeal fractures with mechanism of injury being road traffic accidents only. Upon literature search we could not find any metacarpal and phalangeal fractures analysis study being specifically done for RTA alone. Thus much of our results couldn't be compared, but we have taken the nearest literature survey and compared the results.

## STATISTICAL ANALYSIS

A cross tabulation was done and analysed. Descriptive statistics like mean and percentages were used for the analysis.

## INTRODUCTION

Functioning hands are important for maintaining daily living. One of the commonest injuries seen in the emergency department are hand injuries<sup>1</sup> with most of these injuries causing disability,<sup>2</sup> depending upon the severity of the injury of hand, while the survivors including their families experience unfavorable social, physical and psychological effects.<sup>3</sup>

India contributes to 6% of the global RTAs<sup>4</sup> and adults being commonly suffering from R.T.A their accident patterns are also different.<sup>5</sup> Based on the above statements the present study aimed to know the epidemiological patterns of metacarpal and phalangeal fractures in Road Traffic Accidents (R.T.A) and the pattern of surgical procedures done in metacarpal and phalangeal fractures. Hence data on metacarpal and phalangeal fractures were recorded wherein observational study like age, sex, site, side, fingers involved, surgical procedures done and the specific sites involved were observed. The department of plastic surgery

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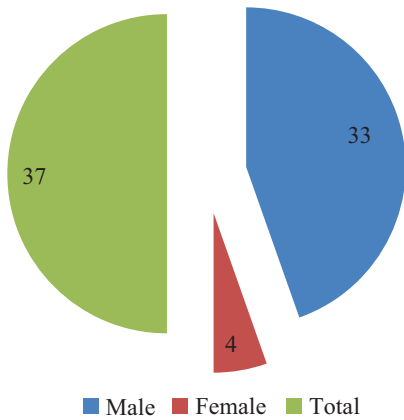


Figure-1: Gender distribution in R.T.A injuries number

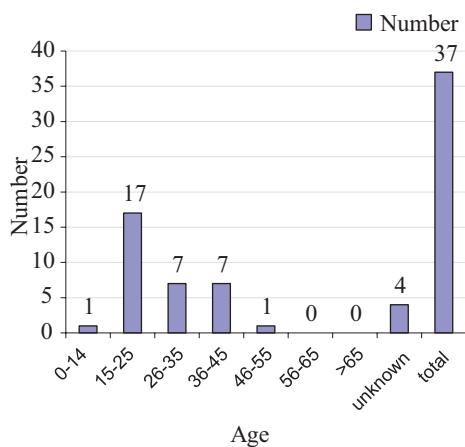


Figure-2: Age distribution R.T.A

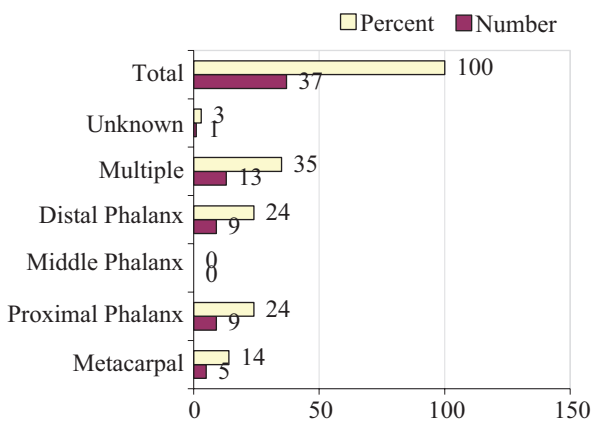


Figure-3: Anatomical site of fracture- R.T.A

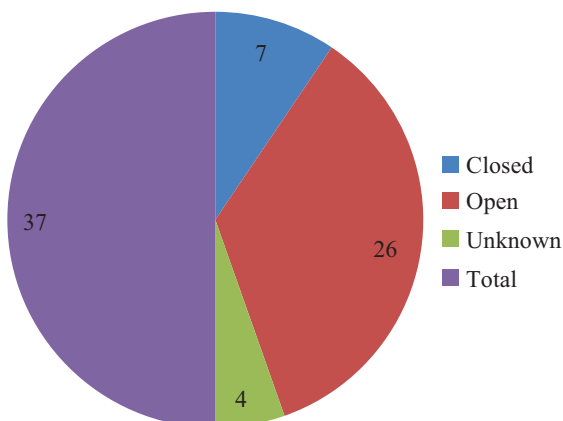


Figure-4: Closed or open in R.T.A

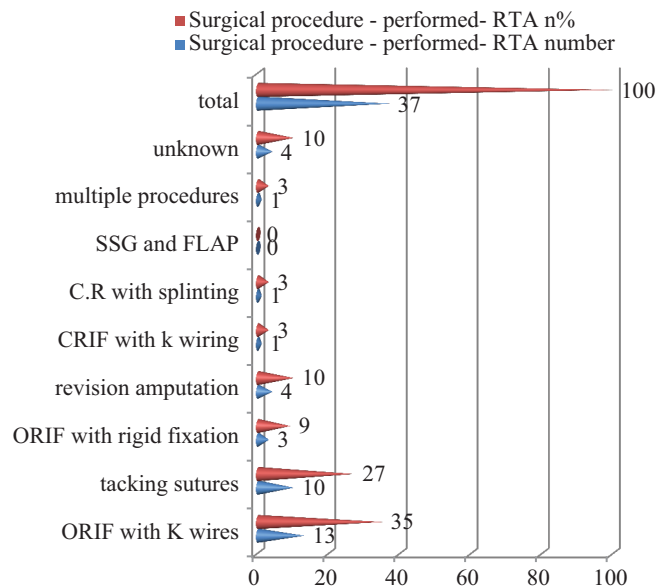


Figure-5:

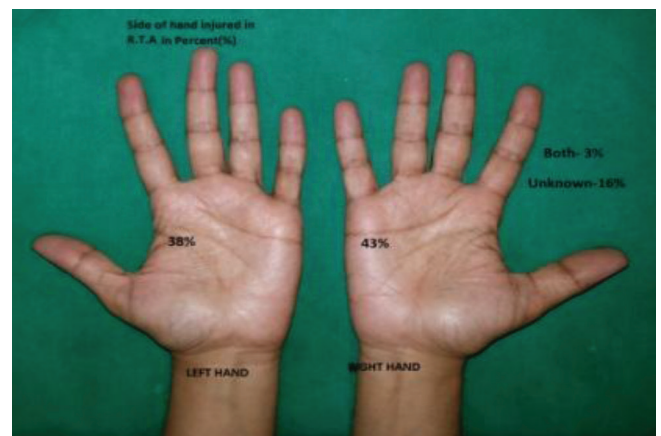


Image-1: Fingers injured

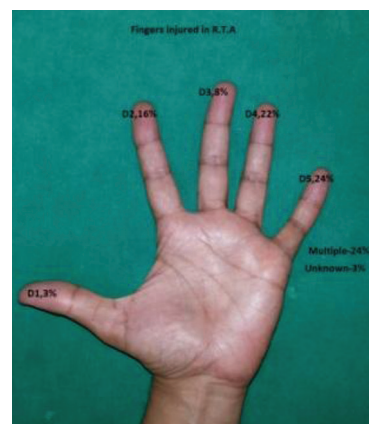


Image-2:

RESULTS

Figure 1 Depicts a total 37 cases of which (89%) males, 20 (11%) females. Figure 2 shows most of the age group belonged to 15 to 25yr in R.T.A. The mean age in our study was 28 yrs excluding the unknown cases. Figure3 describes that most of the common site of fractures seen in an individual bone is distal phalanx (24%) and proximal phalanx (24%) and also multiple bones were involved in 35% of cases.

Figure 4 shows that most of the injuries seen in R.T.A are open injuries. Side of hand Injured – Right or Left. Image 1 shows that right hand had a 43% involvement and left hand had 35% involvement. Image 2 shows that both little and multiple fingers involved in equal frequency followed by index finger. Figure 5 shows the distribution of surgical procedures done. Bony stabilization with open reduction and internal fixation with k wires were done in 35% of fractures and tacking sutures were done in 27% of patients.

## DISCUSSION

This study was initiated to have a hand injury registry and to capture the data related to R.T.A. injuries to metacarpal and phalangeal fractures presenting to our Dept. Upon literature search we could find most of the literature on studies of hand fractures due to varied etiology and includes carpal bones also but none on metacarpal and phalangeal fracture analysis being specifically done for RTA. Hence we could compare our findings to available literature.

In our study the mean age observed for R.T.A. causing specifically metacarpal and phalangeal fractures is 28 yrs (fig-2). While the study by Anakwe showed the mean age as 33yrs.<sup>6</sup>

In our study (fig 1) pure R.T.A have 89% male affection, which reflects in the study by Jindaal,<sup>1</sup> which had 70% male affection and 30% females. In the study by Anakwe<sup>6</sup> male affection was more commonly seen than female in R.T.A group.

In R.T.A category we observed that multiple bones (32%) were involved more commonly and 24% frequency of fractures were seen as isolated cases of both proximal phalanx and distal phalanx fractures (fig 3).

In the study done by Jindaal<sup>1</sup> 75% had both metacarpal and phalangeal fractures combined. In a study done by Van Onselen et al phalanges were the highest proportion of fractures in the hand followed by metacarpal.<sup>7</sup> In the study done by Turki et al phalangeal fractures constituted the highest proportion of fractures in the hand also he noted that distal phalanx are more prone to fractures.<sup>8</sup>

In our study 43% had right hand bone involvement and 38% had left hand bone involvement. Bilateral hand involvements were extremely less (image 1). The same was observed in the study by Jindaal and Turki.<sup>1</sup> After going through the literature none of the studies actually categorized open vs closed injuries for R.T.A specifically for metacarpal and phalangeal fractures. However we noted in our study that most common were open injuries (70%) (fig 4).

In our study little finger with multiple finger involvement were more commonly observed, study by Turki et al showed the same finding of little finger ray receiving most of the fractures but in study by Jindaal showed thumb fractures predominated with number being 48 and little finger 37 cases.<sup>1</sup>

There was no mention of multiple finger involvement in his study. In our study on surgical intervention done we noted that bony stabilization were achieved in 35%, followed by tacking sutures were put in 27% of pts (fig 5).

We could not find any literature on specificity of surgical intervention done for R.T.A. This study highlights that we need such specific studies to be done to corroborate the findings and to devise preventive methods during travel to bring down such fractures and ultimately improve the quality life of young people. The limitation of our study was that numbers are less to come to specific conclusions.

## CONCLUSION

1. The pattern recorded were young males with multiple compound bone fractures with a predominance of little finger involvement.
2. The common surgical intervention performed were open reduction and internal fixation with k wiring.
3. We feel that more specific and in depth studies are needed in the era of superspecialty to understand the nature and severity of fractures and hence devise the best possible preventive measures.

## ABBREVIATIONS

R.T.A – Road Traffic Accidents.

PTS- Patients.

Dept - Department

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