EVALUATION AND MANAGEMENT OF FINGERTIP INJURIES IN PLASTIC SURGERY DEPARTMENT IN NEPAL MEDICAL COLLEGE: A RETROSPECTIVE STUDY

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ABSTRACT

Our daily activities to professional handicrafts require the use of fingertips one way or other and such important anatomical parts are prone to significant injuries either at home or at work. The injuries if not managed properly can lead to devastating consequences with significant disability. The aim of this study was to identify the incidence of such injuries and the causes behind them along with the treatment options. A retrospective, hospital based study evaluating fingertip injuries at Nepal Medical College Teaching Hospital was conducted from April of 2023 to September 2024. Patients with fingertip injuries presenting to outpatient departments and emergencies were enrolled in this study. Total of 117 patients were enrolled with mean age of 27.37 years and 81.2% were males. Most of the injuries had occurred at workplace (64.1%) and most common mode of injury was cut injury (74.1%). Long finger was most commonly injured finger (25.6%) followed closely by index finger (23.9%) and thumb (16.2%). Allens type 2 was the most common grade of injury (78.6%). Primary repair was successfully performed in most of the patients (82.9%). Some patients required thenar flap (8.5%), V-Y flap (3.4%), cross finger flap (1.7%), FDMA flap (0.9%) and amputation (2.6%). Cut injuries were the most common mode of injury primarily affecting adult males in industrial settings so workplace safety protocols should be implemented to reduce the incidence of these injuries. Different patients and different grades of injuries require different approaches so as to approach each case uniquely.

KEYWORDS

Epidemiology, fingertip injuries, management, plastic surgery

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INTRODUCTION

Fingertip is defined as the portion of finger distal to insertion of flexor digitorum superficialis and extensor tendons on distal phalanx or interphalangeal joint when referring to the thumb.[1] It is a specialized structure that permits fine motor activity and precise sensation and contributes to hand aesthetics.[2,3]

Hand injuries are a major proportion of injuries seen in the emergency department of many hospitals worldwide.[4,5] Among traumatic injuries, one third affects the hand, with fingertips being the most frequently injured portion.[6,7] While large-scale epidemiological studies are scarce, the ones that have been performed suggest that majority of fingertip injuries occur at work place, caused by equipment such as cutting machines, thresher machines, sugarcane grinders, printing presses and so on.[8,9] Finger injuries can be crippling and can affect all ages, none more so than the working-class adults and children.[10,11] Fingertip injuries are often viewed as a relatively minor injury but their improper management may result in short term or long-term impairment of functional and aesthetic outcomes/disabilities.[12] Fingertip injuries can be classified by the mechanism of injury or the level of injury based on the frequently used Allen classification system (Type 1- 4 injuries).[13]

The goals of treatment in fingertip injuries include preservation of useful sensation, maximizing functional length, preventing joint contractures, providing satisfactory appearance and avoiding donor disfigurement and functional loss.[14] Management of fingertip injuries is complex and not without controversy. Treatment options include skin grafting, flaps (V-Y advancement, cross finger flap, Foucher flap, toe pulp transfer), terminalization or revision amputation and distal replantation.[15,16]

Fingertip injuries are very commonly encountered and appear to be an increasingly significant public health problem in Nepal, yet there is a relative lack of available information regarding its evaluation and timely management. This study helps in addressing this information gap regarding evaluation of fingertip injuries and its management.

MATERIALS AND METHODS

Retrospective hospital based observational study on all patients attending Department of Burns & Plastic Surgery via emergency room or outpatient department at Nepal Medical College Teaching Hospital (NMCTH), Kathmandu, Nepal was done from April 2023 to September 2024. The study was conducted as per the guidelines of Nepal Medical College Institutional Review Committee (NMC-IRC) after the formal approval was obtained. All the patients with fingertip injuries, were examined by the plastic surgery team and treated depending on injury type and pattern. The treatment options included healing with secondary intention, primary suturing, grafting, flap repair and if unsalvageable amputation. All data were electronically available in hospital database and were recorded in Microsoft Excel sheet. The data were analyzed using SPSS-17, represented with frequencies, percentage and means.

Inclusion criteria: All patients with fingertip injury seen at OPD or emergency by plastic surgery team were included in the study.

Exclusion criteria: Patients who were treated at another center, who refused to get treated or discharged and those who had missing information in their clinical records were excluded.

RESULTS

Study involved 117 patients who had fingertip injury with age group between 9 months to 61 years (mean 27.37 years) as shown in Table 1.

Table 1: Demographics

Total number of patients			**117**
Mean age			**27.37**
Sex	Male	n=95	81.2%
	Female	n=22	18.8%
Hand	Left	n=34	29.06%
	Right	n=83	70.94%
Place of injury	Home	n=42	35.9%
	Work	n=75	64.1%
Mode of injury	cut	n=82	70.1%
	avulsion	n=20	17.1%
	crush	n=15	12.8%

Majority of the individuals in this study i.e. 81.2% were males and 18.8% of the affected individuals were females. Of all the fingertip injuries, 83 (70.94%) occurred in right-hand dominant individual and 34 (29.06%) in left-hand dominant individual. Most of the injuries were related to work place 75 (64.1%) and home accidents accounted for the remaining. Cut injury was the primary mode of injury in 82 (70.1%) individuals followed by avulsion 20 (17.1%) and crush injury 15 (12.8%).

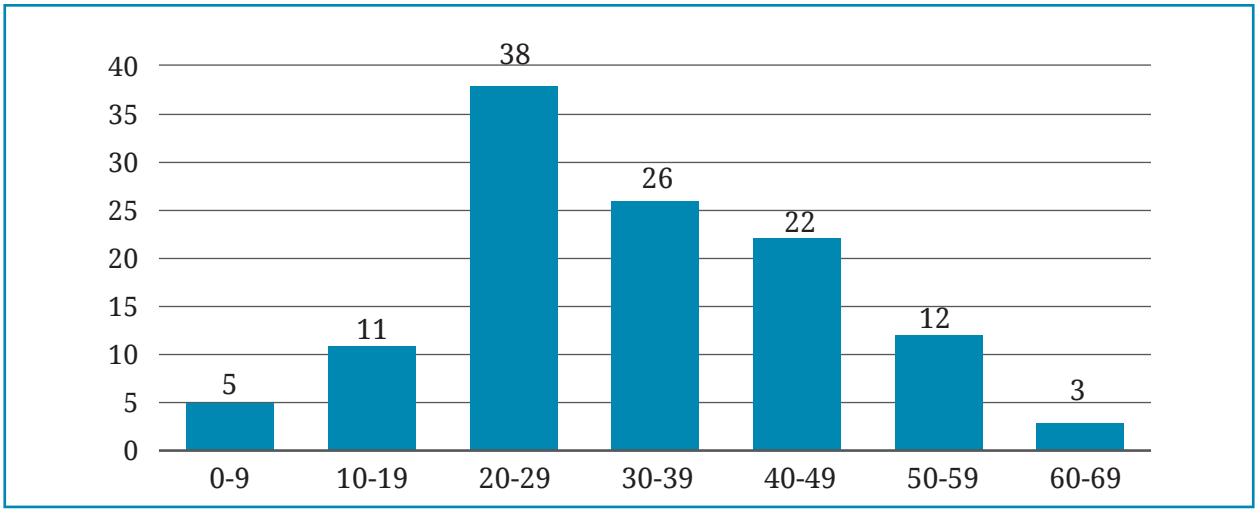

Fig.1: Age-wise distribution of patients

Single as well as multiple fingers were involved in injury. Among the single finger injuries, majority of individuals 30 (25.6%) had long finger involvement followed by index finger 28 (23.9%) and thumb 19 (16.2%) (Table 2).

Table 2: Fingers involved

Finger involved	n patients	%
Thumb	19	16.2
Index finger	28	23.9
Long finger	30	25.6
Ring finger	19	16.2
Small finger	5	4.3
Index finger and long finger	7	6.0
Index finger and ring finger	4	3.4
Ring finger and small finger	2	1.7
Long finger and ring finger	3	2.6
Total	**117**	**100.0**

Table 3: Allen's classification

Allens type	Frequency	%
Type I	7	6.0
Type 2	92	78.6
Type 3	15	12.8
Type 4	3	2.6
Total	**117**	**100.0**

According to Allens classification, 92 (78.6%) individuals had type 2 injuries, 15 (12.8%) had type 3, 7 (6%) had type 1 and 3 (2.6%) had type 4 fingertip injuries as shown in Table 3.

Primary repair was done in most of the cases i.e. 97 (82.9%) patients followed by thenar flap in 10 (8.5%) and V-Y advancement flap in 4 patients (3.4%). The treatment performed in remaining patients are summarized in Table 4.

Table 4: Type of repair performed

Surgery performed	Frequency	%
Primary repair	97	82.9
Thenar flap	10	8.5
V-Y flap	4	3.4
Cross finger flap	2	1.7
FDMA	1	0.9
Amputation	3	2.6
Total	**117**	**100.0**

DISCUSSION

Fingertip injuries can occur at any age with predominance seen in young adults.[16,17] The highest incidence in our study was also seen in young adults between the ages of 20 and 30 yrs (mean 27.37 years). Males (81.2%) had higher rates of fingertip injury claims than women, but this was mostly attributable to occupational factors like increased exposure to potential work place hazards (64.1%) such as power tools, machinery, and activities with a higher risk of hand injuries.[16,18] Understanding these age and sex-related patterns is crucial for implementing targeted prevention strategies and optimizing treatment approaches for fingertip injuries across different populations.

In our study 70.94% individuals were right hand dominant which corroborates with Bhat *et al*[19] and most injured finger was long finger

(25.6%) followed by index finger, ring finger and thumb contradicting the study that showed involvement of the index finger (55.0%) followed by long, ring, little fingers and thumb.[20] This may be due to its prominent position and frequent use in gripping or applying force mostly in a mechanical accident.[21]

Treatment choices of fingertip injury mainly depend on the injury's severity, location and patient's occupation. Several local or regional flaps can be used effectively like thenar flap, V-Y flap etc. which have become workhorses in managing fingertip injuries and are most commonly performed surgery.[22] Our patients also underwent surgical management like primary repair of pulp and nail bed (82.9%) followed by thenar flap, V-Y flap, cross finger flap and FDMA flap with good outcome.

Replantation was not performed in any of the individuals but instead underwent amputation. These patients (n=3) had Allens type 4 crush injury. Allens type 4 crush injuries are extremely challenging to manage due to poor survivability of replanted portion.[14,23] The reason behind could be contamination, fractures and complete fingertip avulsion. In addition, especially in our part of the world, lack of awareness regarding appropriate transportation of amputated stumps and delays in performing replantation due to resource-limited settings are some of the reasons for increased replantation failure.[24]

This study has some limitations. As the data were collected retrospectively there is a risk of information bias and observer bias. Cultural and socioeconomic factors, such as access to healthcare or poor quality of safety education leading to occupational hazards, can also influence injury patterns and outcomes not addressed by this study. Another key aspect is the lack of long-term follow-up which is needed to understand the functional disability encountered in future.

In conclusion, this retrospective study provides valuable insights into the evaluation and management of fingertip injuries. Considering that cut injuries were the most common mode primarily affecting adult males in industrial settings, workplace safety protocols should be implemented to reduce the incidence of these injuries. Our study underscores the importance of prompt and appropriate management including repair of nail bed and pulp along with local or regional flaps to optimize functional outcomes. Further studies with larger populations and long-term follow-ups are recommended to better understand optimal treatment and rehabilitation for fingertip injuries. Educational campaigns on injury prevention, especially in industrial environments, are a must.

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