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FINGER INJURIES - CARE AND CURE

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A B S T R A C T

Background: Finger injuries are commonly encountered injuries in OPD and emergency department. They are quite common among all age groups and all populations. These injuries have a wide range of presentation from minor abrasions to total crush amputations. However early treatment is effective in

1. Preventing deformity
2. Restoring function and
3. Achieving cosmesis.

This study focuses on the incidence, mode of finger injuries, various treatment options, outcome and highlights the possible preventive measures.

Materials and Methods: This is a prospective study of 100 cases of finger injuries in RMMCH for a period of 2 years with 6 months follow up. Patients comprised of 69 males and 21 females 10 children. All procedures were done after proper Clinical examination, and necessary investigations, under local/regional/general anaesthesia depending on the site , nature of injury and age of the patient.

Results: In our study, males have a higher incidence (69%) than females (21%). Among 100 cases, accidental finger injuries (n=49) were most common, where those found to be increasingly occurring in workplace (occupational=21) dominated the scenario. Household, RTA, Door Crush were the next common causes. 33 cases were treated with primary skin suturing, 14 cases involved tendon repair and rest of the cases needed reconstructive procedures. 76 patients had no complaints and 24 patients had minor problems like stiffness, raw area and flap necrosis. 7 patients needed secondary procedures whereas rest of the patients improved with conservative measures.

Conclusion

1. The incidence of finger injuries is higher in male population compare to female.
2. Preventable types of injuries such as occupational, door crush, household were most common. All patients underwent surgical management. With adequate evaluation and early treatment maximum number of cases withstood the primary procedures well, be it primary suturing or reconstructive procedures. With proper guidelines and preventive measures these injuries can very well be prevented.
3. Early intervention after proper evaluation gives good functional and cosmetic outcome.

INTRODUCTION

Finger injuries are extremely common irrespective of age, sex and occupation. A functioning finger tip has sharp sensation with stable padding and an acceptable appearance. Most common cause of finger injuries are

1. RTA,
2. Door crush,
3. Occupational,
4. Household domestic injuries.
5. Cracker burst injuries

The most important function of finger is grip, grasp and sensation followed by cosmesis. Therefore injuries on finger have an effect over entire hand. Recognition and proper management of finger injuries are vital in maintaining proper hand function and to prevent

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permanent disability. This study is about incidence, mode of finger injuries, an evaluation of various surgical options and their outcome and outlining proper guidelines for avoidance of such injuries.

MATERIALS & METHODS

100 cases with finger injuries presenting to casualty and General Surgery OPD and later referred to division of Plastic Surgery were studied. The study was done between October 2016 to September 2018 after getting approval from the ethical committee of our institution. After obtaining consent from the patient, the treatment modalities were carried out. Patient's details were collected under the following parameters: age, sex, type and mode of injury, finger involved, associated tendon/bone/joint injury, viability of finger tip and after treatment, data like procedures carried out, post operative complications and sequeale were documented and analysed. The treatment involved immediate resuscitation, cleaning of injured hand under anaesthesia, proper examination under good vision followed by investigations like x-ray of hand and then planned for surgical managements at the earliest. Assessment of function, sensation and level of injury was analysed then proper debridement and treatment was carried out in main operation theatre under adequate anaesthesia. All patients were treated with post operative antibiotics and analgesics. Immobilization of hand was provided whenever necessary. Patients with co morbidities were managed accordingly. Patients were then followed up in OPD (Out Patient Department). Dressings were changed every 48 hours during hospital stay. Sutures were removed on 10th day. Post operative physiotherapy and secondary procedures were carried out as and when required.

RESULTS

Out of 100 cases in finger injuries, males had a significantly higher incidence, n=69 (69%) than females, n=21(21%). Children contributed around 10%. Maximum number of cases n=46(46%) in male and female patients fell in the age group of 21-40 years (Fig. 1).

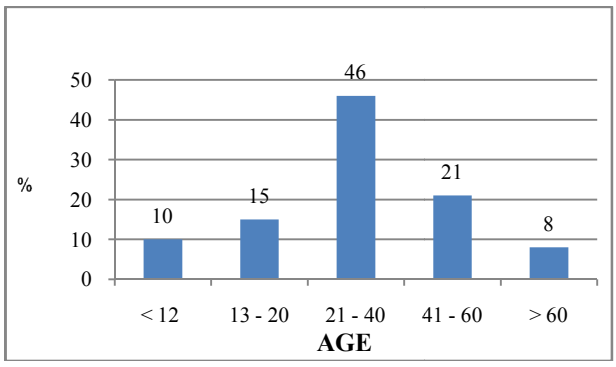

Fig 1 Age Incidence

Considering hand dominance all patients in the study had right handed dominance. Incidence of right hand injuries were around 55% (n=55) whereas the rest were of left hand injuries, 45% (n=45) (Fig. 2).

Out of the 100 patients, 91 patients had single finger involvement and 9 patients had injuries of other fingers too. The most common finger involved was index followed by middle.

70 cases were of crush injury type (crush amputation-partial or total; with or without skin loss) and 30 cases involved lacerative (cut) type of injury (Fig. 3).

Considering bone and joint injury, 8 cases had #TPx, 3 cases involved #MPx and one case involved fracture of proximal phalanx. 88 patients had no fracture of phalanges. There were no reported cases of joint injury in our study. All those patients who had fracture of any of the phalanges were treated by k-wire fixation (Fig. 4).

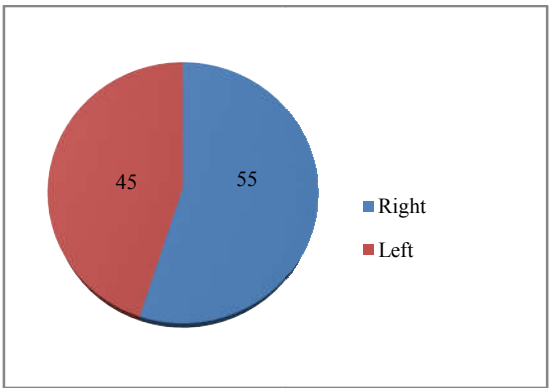

Fig 2 Hand Dominance

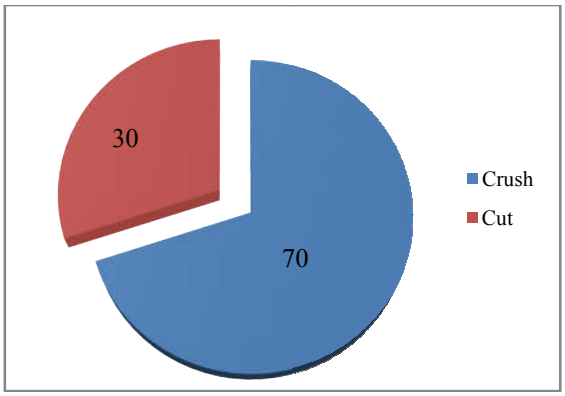

Fig 3 Nature of Injury

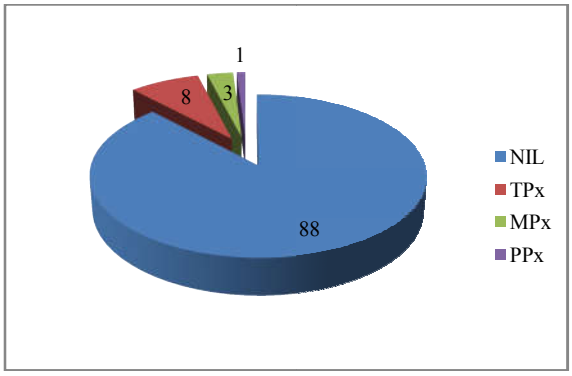

Fig 4 Incidence of Bone Injury

TPx – Terminal Phalanx
MPx – Middle Phalanx
PPx – Proximal Phalanx

When nail and nail bed injuries were assessed, 4 cases had partial nail avulsion without loss of nail/nail bed. 29 cases had loss of both nail and nail bed.

Considering the mode of injuries, maximum number of cases were contributed by accidental type of injuries, n=49 (49%). Among such injuries, those occurring in workplace (occupational) dominated the scenario with n=21 (21%). The next most common cause was household domestic injuries, n=16 (16%) followed by RTA, n=15 (15%) and

door crush, n=12 (12%).4 cases were due to assault and 3 cases because of human bite and one patient had electric burn injury (Fig. 5).

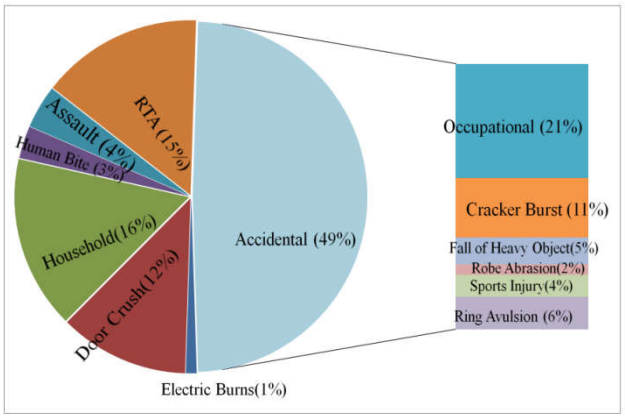

Fig 5 Mode of Finger Injuries

All patients after initial evaluation and assessing the nature of injury were taken up for surgery (Table. 1). For cases of cut injury without tendon/bone involvement, primary skin suturing was done. And for those cases involving tendon injury (flexor= 10; extensor=4) primary tendon repair was carried out. For cases which involved avulsion of nail (partial), n=4 (4%) primary skin suturing with nail repositioning was done. All cases had good aesthetic outcome. When there was total loss of nail & nail bed n=29 (29%), V-Y Plasty and shortening & closure was performed depending on soft tissue injury. Those cases which presented with loss of skin with only soft tissue exposed where V-Y Plasty was not feasible SSG n=18 (18%) and second layer palmar grafting n=4 (4%) was done. Cases with soft tissue loss with underlying bone or tendon exposed were treated with cross finger flap n=7 (7%) and full thickness skin graft n=1 (1%). Two cases which had multiple finger injuries with soft tissue loss underwent groin flap coverage.

Among cases operated 14 cases had stiffness post operatively which was dealt by physiotherapy. 7 cases had developed raw area post primary procedure. Flap necrosis noted in 3 cases. 76 cases had no complication. Secondary procedures were carried out in 7 cases (SSG=6; CFF=1).

Overall 41 patients had satisfactory (good) aesthetic outcome. 59 cases had fair to poor aesthetic outcome. Local flaps (V-Y Plasty) hold satisfactory outcome in our study compared to SSG and CFF. Patients who underwent shortening and closure, SSG, CFF were dissatisfied because of the mismatch of the grafted skin and unacceptable cosmetic appearance.

Table 1 Surgical Procedures Done

Sl. No	Surgical procedures	No. Of cases
1	Primary Skin Suturing	33
2	Nail Repositioning	15
3	Flexor Tendon Repair	10
4	Extensor Tendon Repair	4
5	Split Skin Grafting	18
6	2nd Layer Palmar Grafting	4
7	Shortening & Closure	11
8	VY Plasty	17
9	Cross Finger Flap	7
10	Full Thickness Skin Grafting	1
11	Groin Flap	2
12	Kirschner Wire Fixation	9

Fig 6 Nail Repositioning

Fig 7 Volar VY ADV Flap

Fig 8 Groin Flap With K Wire In Situ

DISCUSSION

Injuries of fingers are extremely common. Any finger injury, no matter how apparently trivial, has the potential to cause serious loss of function if inadequately assessed and treated. The site of injury should be recorded together with any abnormal findings on examination such as deformities, loss of movement and sensation.

It is believed that in most finger injuries, the middle finger and the thumb are most frequently injured as the middle finger is the longest one, and the thumb is the most common finger used to grip something when the injury happens.[1] However, in our study, the most commonly injured finger was index followed by middle.

Accidental/Occupational injuries were the most common cause in our study. George, *et al*[2] reported that trauma remains the most cause of nail injury. Household domestic injuries accounted for second most common cause. Working under proper vision, keeping sharp things and heavy objects in safe place are mandatory in preventing these injuries. Door crush injuries were the next common cause. These can be prevented by fitting a chain to the wall beyond the reach of the child, hooked to the door and kept opened and triangle shaped wooden, plastic or rubber stopper can be kept at the bottom of the door to prevent child closing the door.[3] Australian plastic door guard at hinge site, rubber stopper at lock side, Danish 'pinch-free' door are some of the available techniques used in doors to prevent door crush injuries.[3] Cracker burst injuries were next common cause in our study. Most of the injuries presented with loss of skin and soft tissues. After initial debridement and assessing the viability of the tissues, SSG, local or regional flaps were provided accordingly. Rajeshwari *et al*[4] reported that among cracker blast injuries 66% involved hand and finger injuries. These injuries are preventable by proper awareness and education about the seriousness of the injuries.

All injuries were meticulously debrided with the aim to restore normal anatomy and better cosmesis. Lacerative injuries healed better on primary suturing. Langlois, Jean *et al*[5] reported that the use of Dermabond (2-octyl cyanoacrylate) in repairing nail bed injuries in children was faster than suture repair, while providing similar cosmetic and functional results. But in our study we used only suture repair for nail bed injuries which had an equally good outcome. Shortening and closure was done for crush injuries which involved loss of both nail & nail bed. Unacceptable cosmetic appearance was a major factor influencing the outcome of the technique. Crush injuries with minimal skin loss were treated with V-Y Plasty. The V-Y Plasty technique allows most patients to regain sensation and two-point discrimination in the finger tip[6]. In our study cases who underwent V-Y Plasty had 4 mm two point discrimination and good aesthetic result. Injuries which presented with increased area of skin loss without soft tissue injury were treated with SSG and 2nd layer palmar grafting. The later had better aesthetic value. Patients for whom CFF was done reported fair satisfaction since the procedure is a staged one and the donor site being the uninjured finger, for which one patient failed to give consent. Hence full thickness skin grafting was performed in that case. Associated tendon injuries were repaired at the earliest. Phalangeal fractures were treated by inserting K-wire through the fracture segments. These procedures resulted in stiffness later. Adequate physiotherapy was given when these patients were followed up in out patient department. In patients who had a total amputation proximal to the nail, reimplantation is a good technique if facilities are available[7]. Abdominal flaps were used for multiple finger injuries. They were bulky and insensate. Hence used as a last option when adequate local flaps were not available.

CONCLUSION

Male predominance was noted in the epidemiology of our study on finger injuries. This is mainly due to the nature of manual work and labour as also indicated by the increased incidence of injuries occurring in work place (occupational). Adequate training in the area of labour involved, appointing skilled technicians and providing proper guidelines are pivotal in avoidance of these injuries. All cases were treated with the sole aim of restoring normal anatomy and function thereby regaining sensation and achieving good cosmesis. Nail repositioning should be done however the injury might be followed by nail bed repair which had satisfactory results in our study. Local flaps should be considered wherever feasible to achieve cosmesis and to regain sensation.

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