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Pattern of Fingertip Injuries at a Tertiary Trauma Care Center in Ethiopia

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Abstract

Background: Fingertip injuries are injuries of the hand distal to the insertion of flexor digitorum profundus or extensor tendons, and are one of the most common injuries of the hand. There are plenty of reconstructive options for a given fingertip defect; however there is paucity of published documents about the types of injuries and management options provided to the patients in Ethiopia. This study aimed to determine the socio-demographic pattern, clinical presentation and management option offered to fingertip injury patients at ALERT trauma center, Ethiopia.

Methods: A single centered retrospective descriptive study was conducted on all medical records of fingertip injury patients who came to ALERT trauma center from January 2019 to February 2020. Data were collected from May 1st 2020 to July 31st 2020 using structured checklist from chart of the patients for whom adequate data were recorded then analyzed using SPSS version 25. Ethical approval was obtained from Addis Ababa university college of health science.

Result: A total of 190 patients' charts were reviewed in this study and there were a total of 227 fingertip injuries. Most of the patients were males (78.4%) with male to female ratio of 3.6:1 mechanism of injury was identified in 188 patients, and machine injury was responsible for majority of the cases (43.1%). From the total of 190 patients, 64.7% had nailbed and associated apparatus injury. Regarding the option of management offered, primary wound closure was found the commonest type (65.6%), followed by V-Y advancement flap (9.3%).

Conclusion: Fingertip injuries are common in young male factory workers or daily laborers and able to be managed with primary wound closure; however, it needs further study to compare outcomes of each reconstructive option.

Keywords: Fingertip injuries; Clinical presentation; Option of management offered; ALERT

Introduction

Fingertip injuries are common injury of the hand because of their prominent position [1]. In adults these injuries are commonly due to occupational activities. In these workplaces, lacerations are the major type of injury, followed by crush and avulsion injuries. In pediatric population, these injuries arise at home and are due to "jamming/crushing", usually by doors, either by their parents or siblings [2]. Long finger is most commonly injured because of its prominent position followed by ring, index and small fingers and the thumb with similar frequency bilaterally as stated on Neligan plastic surgery.

Fingertip injuries can vary from simple pulp laceration to injury extending to lunula with pulp, nail bed loss and with or without distal phalanx fracture. It can vary also from minimal subungual hematoma to complex crushing nailbed injury as it is also mentioned on Neligan. Fassler Paul classified fingertip injury grossly as soft tissue loss with and without exposed bone for the purpose of management. For patients who have soft tissue loss without exposed bone healing by secondary intention or skin graft can be chosen to cover the wound. When there is a soft tissue loss with exposed bone, local or regional flaps can be considered to cover the wound. If there is a fingertip amputation proximally and regional flaps are not an option, corrective amputation can be done. Composite attachment of amputated part can be tried in pediatric patients <10 years of age [3].

Fassler also described proper physical examination has to be done to characterize the wound and asses extent of injury for formulation of reconstructive option which is also depend on age, gender, handedness, occupation, avocation, previous hand problem and systemic disease of the patient. He also mentioned that nail bed injuries are varied and include subungual hematomas, simple and complex lacerations, and avulsion of matrix tissue. It is important that the nail bed be repaired with great attention to detail in order to restore function and prevent annoying or unsightly deformities.

The national institute for occupational safety and health in the United States conducted a survey across multiple emergency departments in 1982 and estimated occupational finger injuries to account for 25%-75% of its workload and 1.6% had amputations of one or more fingers. Fingertip injuries in children also accounts for 1.8% of the workload in the royal hospital.

As Ethiopia is one of the fast growing developing countries, a large number of young individuals who are active and working in a construction or factories frequently sustain fingertip injuries. Because of such injuries, they are forced to quit their work until

they had reconstruction of the defect, having healed painless sensate fingertip. So, these injuries have significant economic burden to the patient as well as to the country due to loss of work and medical expense. Even though we don't have study to show this financial burden in our country, there is a study done by Rachel R Yorlets, et al. at Boston children hospital where they reviewed 1807 pediatric patients up to 18 years of age presented to the emergency department from 2005 to 2011 retrospectively and found by the calendar year 2014 the average charge to the patients with fingertip injury was $1195 which is higher than the average charge of $1064 for patients who presented with fever, the most common conditions seen in the emergency department [4].

As far as the author's knowledge is concerned, there is no adequate national data that show the burden, socio-demographic pattern, types of fingertip injuries and their reconstructive options. Hence, this study aimed to describe etiologic, demographic pattern and types of fingertip injury commonly seen at ALERT trauma center and the most common reconstructive options offered to these patients.

Materials and Methods

We conducted a retrospective descriptive study at ALERT trauma center, which is one of the trauma center found in Addis Ababa. It was established in June 18, 2015 with 53 beds. The center had four different departments like emergency room, ward, intensive care unit and operation room. From the establishment of the center till 2018 around 6917 patients treated in the center and 80% operations performed [5].

After preparing a checklist, we collected all the necessary data from charts of patients who were diagnosed as having hand injury distal to the insertion of flexor or extensor tendons and had adequate data starting from January 2019 to February 2020. Data collection was carried out from 190 patients' chart during May 1st to July 31st, 2020.

Data entry and analysis

The collected data were cleaned, encoded and entered into Epi data version 3.5. Then exported to SPSS version 25 for statistical analysis. Descriptive statistics were computed to determine the socio demographic distribution, pattern of injury and their options of management.

Results

A total of 190 patients were included in this study and there were a total of 227 fingertip injuries as one can have multiple finger injuries. The majority of the patients were males (78.4%) with male to female ratio of 3.6:1 and most of the patients were in the range of 16-25 years of age. Children less than five years of age accounted for 15.8% of the study population. Most of (92.6%) of the patients came from urban area and 28.7% of the patients were factory workers followed by daily laborers (22.7%) (Table 1).

Table 1: Socio-demographic characteristics of the study participants (N=190).

Characteristics	Frequency	Percentage
Gender		
Male	149	78.4
Female	41	21.6
Age group		
Less than 5 years	30	15.8
5-14 years	12	6.3
15-24 years	70	36.8
25-34 years	53	27.9
35-44 years	14	7.4
Above 44 years	11	5.8
Place of residence		
Urban	176	92.6
Rural	14	7.4

Occupation (N=181)		
Factory worker	52	28.7
Daily laborer	41	22.7
Student	40	22.09
Carpenter	10	5.5
Farmer	2	1.1
Office worker	2	1.1
Other*	4	2.2
Not applicable**	30	16.6
N.B. *includes domestic worker, housewife, etc.; **includes children less than 05 years of age for whom occupation cannot be assessed		

Out of the total of 190 patients, mechanism of injury was identified for 188 patients and machine was described as a cause of injury in 82 patients (43.6%) followed by blunt trauma (34.04%), stone or construction mixer (8%), sharp cut injury (7.9%), road traffic accident (3.7%), and other (2.6%) which includes assault, human and animal bite injury. Place of injury were assessed in 184 patients, and workplace accounts for 69.5% of the cases followed by home (22.8%). Handedness was assessed for 110 patients and 98.2% of the patients were right handed. When we see the distribution of injuries, right and left hand had comparable incidences (51.6% and 47.9% respectively). Bilateral hand injury occurs in only one patient. Duration of presentation was analyzed and most of the patients (81.8%) reached the trauma center within 6 hours' time of the injury (Table 2).

Table 2: Characteristics of the presented injury.

Characteristics	**Frequency**	**Percentage**
Mechanism of injury (N=188)		
Machine	82	43.6
Blunt trauma	64	34.04
Stone or mixer	15	8
Sharp cut	15	7.9
RTA*	7	3.7
Other**	5	2.6
Injury occurs at (N=184)		
Work place	128	69.5
Home	42	22.8
Leisure time	1	0.5
Another place	13	7.1
Handedness (N=110)		

Right	108	98.2
Left	2	1.8
Injury side (N=190)		
Right hand	98	51.6
Left hand	91	47.9
Bilateral hand	1	0.5
Duration of presentation (N=181)		
Within1 hour	43	23.8
1.01–6 hours	105	58
6.01–24 hours	12	6.6
24.01–72 hours	15	8.3
72 hours later	6	3.3
N.B. *road traffic accident; **includes assault, human and animal bite		

When we analyze the mechanism of injury in each gender, all mechanism of injury is common in males. Mechanism of injury is also analyzed in each age group and machine injury which is the commonest one seen in young and productive age group from 15 to 24 and 25 to 34 years, but blunt trauma is seen in less than 5 years of age group (Tables 3-5).

Table 3: Distribution of mechanism of injury by gender.

Mechanism of injury	**Gender**	
	Male frequency (%)	**Female frequency (%)**
Machine	67 (81.7)	15 (18.3)
Stone or mixer	15 (100.0)	0 (0.0)
Road traffic accident	5 (71.4)	2 (28.6)
Sharp cut	12 (80.0)	3 (20.0)
Blunt trauma	46 (71.9)	18 (28.1)
Other	4 (80.0)	1 (20.0)

Table 4: Distribution of mechanism of injury by age.

Age (in years)	**Mechanism of injury**						
	Machine	**Stone or mixer**	**Road traffic accident**	**Sharp cut**	**Blunt trauma**	**Other**	**Total**
Less than 5	1	0	1	2	25	0	29
5–14	1	0	1	3	4	0	9

15-24	43	5	0	8	12	3	71
25–34	26	8	5	1	14	2	56
35-44	8	2	0	0	2	0	12
Above 45	3	0	0	1	7	0	11
Total	82	15	7	15	64	5	188

Table 5: Distribution of mechanism of injury by handedness.

Handedness	**Injury side**			
	Right hand	**Left hand**	**Bilateral hand**	**Total**
Right handed	52	55	1	108
Left handed	0	2	0	2
Total	52	57	1	110

From the total 227 finger injuries, middle finger is involved in about 29.5% followed by index (24.2%), thumb (18.9%), ring (16.3%) and little finger (11%). Combined injuries occurred in 15% of the cases. Laceration and avulsion injuries account for the majority of the cases and each account for 40.5% followed by crushing type (18.9%). When we assess soft tissue loss, majority (54.2%) of the patient had fingertip injury without soft tissue loss and the remaining (31.7%) patients had soft tissue loss with exposed bone, and soft tissue losses without exposed bone were seen in only 14.1% of the cases. Allen type IV fingertip injury occurred in 47.6% of the cases and majority of the injuries (96.9%) had viable remaining tissue (Table 6).

Table 6: Pattern on the type and clinical presentation of the study participants (N=227).

Characteristics	**Frequency**	**Percentage**
Type of finger involved		
Thumb	43	18.9
Index	55	24.2
Middle	67	29.5
Ring	37	16.3
Little	25	11
Combined	34	15
Type of injury		
Laceration	92	40.5
Avulsion	92	40.5
Crushing	43	18.9
Soft tissue loss		
With exposed bone	72	31.7

Without exposed bone	32	14.1
None	123	54.2
Allen's classification		
Type 1	7	3.1
Type 2	45	19.8
Type 3	67	29.5
Type 4	108	47.6
Viability of the remaining tissue		
Viable	220	96.9
Non-viable	4	1.8
Questionable	3	1.3
Nail bed and associated injury (N=200)		
Avulsion of matrix tissue	60	30
Complete nail bed injury	53	26.5
Injury to the nail wall	37	18.5
Partial nail bed injury	19	9.5
Avulsion of nail wall	16	8
Subungal hematoma	10	5
Avulsion of nail plate	60	30

From the total of 190 patients, 123 (64.7%) of the patients had nail bed and associated apparatus injury. There were a total of 227 fingertip injuries and 143 (63%) of the fingers had also nail bed and associated injuries. One finger could have multiple types of nail bed and associated apparatus injuries and a total of 200 nail bed and associated apparatus injuries were recorded from the total 143 fingertip injuries. Avulsion of matrix tissue were the commonest type of nail bed injury (30%) followed by complete nail bed injury (26.5%).

Finally option of management offered to these patients were analyzed and primary wound closure was the commonest type (65.6%) of management offered to these patients during the study period followed by V-Y advancement flap (9.3%), chest wall random flap (4.8%), complete nail bed repair were the commonest type of management regarding to nail bed injury (23.5%). Sixteen cases of fingertip injury (7%) required hypodermic needle or small K-wire insertion in addition to soft tissue management (Tables 7 and 8).

Table 7: Option of management offered to the patient (N=227).

Option of management offered	**Frequency**	**Percentage**
Healing by secondary intention	5	2.2
Primary wound closure	149	65.6
Full thickness skin graft	3	1.3
V-Y advancement flap	21	9.3

Kutler flap	1	0.4
Moberg flap	2	0.9
Cross finger flap	6	2.6
Thenar flap	6	2.6
First dorsal metacarpal A. flap	1	0.4
Chest wall random flap	11	4.8
Corrective amputation	5	2.2
K-wire only	1	0.4
Isolated nail apparatus managed	15	6.6
Unknown	1	0.4

Table 8: Option of management offered to the nail bed and associated injuries.

Nail bed and associated injuries	Frequency	Total	Percentage
Horizontal mattress for avulsion of matrix tissue	6	60	10
Complete nail bed injury repair	47	53	88.6
Nail wall injury repair	34	37	91.8
Partial nail bed injury repair	13	19	68.4
Conservative management for subungal hematoma	3	10	30
Needle drainage for subungal hematoma	2	10	20
Replaced back or other substitute for avulsion of nail plate	5	5	100

The remaining nail bed and associated injuries are managed as part of the soft tissue management.

Discussion

Majority of the patient in this study were males and from 16–25 years of age group since young and males are engaged in most of outdoor activities and jobs, they are usually vulnerable to have fingertip injuries while they are using their hand. This finding is similar with other studies like the one done by Tano, et al. in Kumasi, Ghana that shows mean age of the patients were 26.9 ± 17.5 years and male: female ratio was 7:5 [6].

Most of the patients in our study (69.5%) sustained the injury in a work related environment and machine accounts for the 43.6% of the patient mechanism of injury. Since fingertips are frontier of the hand in any activities and manipulation of machine or other instruments, there will be risk of sustaining injury to this part of the hand during any accident happened at work. This is the reason why most of the injuries occurred in a work related environment and machine is responsible for most of the injury. Even though this finding is similar with most of other studies, motorcycle accident accounts for most of the mechanisms of injury which is 35.6% in one study done on profile of hand injury from January to December 2013 in Sanglah general hospital [7-9]. The pediatric patients less than 5 years of

age in our study account for 15.8% of the total study population and about 73.3% of them had blunt trauma by closing door, since such children in this age group spend most of their time at home, they sustain the injury while they are playing around a closing door. This finding is also seen in one of the Indian study done by Sanjay S et.al and it showed that the pediatric patient predominantly were due to door crush injury.

Literature review from multiple articles was also done by de Alwis W. and found the commonest mechanism of fingertip injuries in pediatric population being jamming or crushing the finger between a door and its frame in the home setting [10].

Middle and index finger are most commonly involved one in our study which is consistent with other studies [11]. Since they are the longest ones as compared to the other fingers, they frequently sustain the accident and injury. However in a study done at pediatric hospital in Nairobi by V.M. Mutiso, et al. showed different finding after they found little finger as the most commonly involved one [12].

Fingertip injuries are classified based on the wound pattern to determine the option of management. Not only presence or absence of skin and soft tissue loss with or without exposed bone determine the type of reconstruction, but also the angle of soft tissue loss and whether it is found volary or dorsally predict the overall option of management. There are several types of classification for fingertip injury in order to describe the exact type of injury, tissue loss and predict the option of reconstruction, but have their own draw backs D.M Evans and C. Bernadis describe a new classification for fingertip injuries which is called the Pulp, Nail and Bone (PNB) classification that separate the injury into its effect on the three components of the fingertip: Pulp, nail and bone. This provides a three digit number that accurately describe the injury without a lengthy description. It also used to provide detailed instruction for treatment and indication for referral; even though this classification is not used in our study population during their management (Table 9) [13].

Table 9: The PNB classification of fingertip injuries.

Pulp	
0	No injury
1	Laceration
2	Crush
3	Loss distal transverse
4	Loss palmar oblique partial
5	Loss dorsal oblique
6	Loss lateral
7	Loss complete
Nail	
0	No injury
1	Sterile matrix laceration
2	Germinal+sterile matrix laceration
3	Crush
4	Proximal nailbed dislocation
5	Loss distal third
6	Loss distal two thirds
7	Loss lateral
8	Loss complete
Bone	

0	No injury
1	Tuft fracture
2	Comminuted non articular
3	Articular fracture
4	Displaced basal fracture
5	Tip exposure
6	Loss distal half
7	Loss subtotal (tendon insertion intact)
8	Loss complete

When we see the type of fingertip injury in the current study, laceration and avulsion injuries are common, each accounts for 40.5% of the total 227 injuries. The remaining 18.9% patients sustained crushing type of injury. However; this result is quite different from the other studies like the retrospective study done on Safdarjung hospital, India which showed that crush injury was found to be the commonest type of fingertip trauma followed by laceration and avulsion injuries [14]. This is due to majority of the injuries were agriculture or industrial related accident resulting in mangling or crushing type. In Saveetha medical college hospital it is also found that crush injury was the commonest cause of fingertip trauma followed by laceration and avulsion injuries. In study done by Jalal Fattah, et al. at Hawler medical university, Erbil, Iraq similarly found crush injury as the commonest mechanism of fingertip injury [15]. When we further analyzed the type of injury in our study based on the status of soft tissue loss, about 54.2% of the injuries had no soft tissue loss. This is partly because most of the injuries were laceration type.

The other parameter in the type of fingertip injury seen in our study is the involvement of nail bed and associated apparatus injury which was seen in 64.7% patients, and from the total 227 fingertip injuries, 63% fingers had nail bed and associated apparatus injury. However in study done at university of Colombia, the involvement of nail bed was 98% [16]. Since the study was done in children aged from 9 month to 17 years and crushing injury was the commonest type of injury making nail bed susceptible.

When we come to the management option, there are plenty of options to reconstruct an injured fingertip. The goal of treatment for fingertip injury is restoration of a stable, pain free and normal looking fingertip [17]. The choice of reconstruction depends on various factors like Age and gender of the patient. In older patients with underlying co-morbidities like Diabetes Mellitus (DM), complex procedures like flaps might not give the best result due to poor healing process. Preservation of nail bed apparatus might be prioritized for females than males due to cosmetic reason. The other most important determining factor in choosing option of reconstruction is type of injury whether it is laceration, avulsion or crushing type and also whether there is soft tissue loss or not, the bone is exposed or not. In our study primary wound closure is the commonest type of reconstruction used and it was done in 65.6% fingertip injuries followed by V-Y advancement flaps in 9.3% fingertip injuries and chest wall flap in 4.8% fingertip injuries. Since there is no soft tissue loss in about 54.2% of the injuries and from injuries with soft tissue loss about 30.7% fingertip injuries have no exposed bone. So primary wound closure became the commonest type of reconstructive option as this significant number of injuries can be closed primarily. However; in other studies like the one done by Sanjay Saraf, et al. local flaps like volar V-Y flaps were used commonly since most of the injuries had exposed bone and tendon. In study done by Karthi, et al. also STSG (Split Thickness Skin Graft) and V-Y advancement are the commonly used reconstructive option. In study done at university of Colombia by Enrique, et al. suture of the nail matrix were the commonest type of surgery done in their study, since the nail was compromised in 98% of cases; but when we see soft tissue injury management, suture of soft tissue with nail replacement is the commonest one followed by V-Y advancement flap.

Apart from primary wound closure and skin graft other option of management are recommended by different scholars; for instance, after a prospective investigation of 81 consecutive patients with fingertip injuries without bone exposure or bone exposed but covered by less than 2 mm of subcutaneous tissue, Ipsen T, et al. recommend conservative treatment with wound dressing as a safe and simple treatment if the following requirements are met [18].

- The length of the finger must be preserved.
- The stump must be covered with good, comfortable soft tissue.
- The sensibility must be as normal as possible.
- The joint must be supple.

In our study healing by secondary intention with daily wound dressing is given for about 2.2% of the injuries; though the indications or the requirements are not known.

J Boudard, et al. also found healing with an occlusive dressing allows regeneration of the fingertip, with restoration of its shape and dermatoglyphic prints for distal fingertip amputations after they did retrospective study of cases at a single hospital [19].

The other alternative in the treatment of fingertip amputation is revision amputation. Frank Yuan, et al. did a systemic review of articles reporting outcomes and found revision amputation and conservative treatments result in better static two point discrimination outcomes compared with local flaps [20]. Revision amputation used in 2.2% of injuries in our study.

The other non-surgical management of fingertip injury even for severe injury as described by Mennen U and Wiese A is using a semi-occlusive dressing (Opsite); but this is not used in our study. They also mentioned that skin and soft tissue loss of fingertips, especially in children, may be treated by regular dressings only [21].

The role of injection of liposuction aspirate fluid into the fingertip injury site and secondary healing to get better healing and outcome is described by Tarallo M, et al. as variant of non-surgical management option for such injuries [22].

The second most common armammetum used to reconstruct fingertip in our study is V-Y advancement flaps. This flap is used in transverse or dorsal oblique amputation of fingertip injury; however this flap is not used in volar oblique amputation due to failure to advance enough distally to cover the defect [23].

Luis C, et al. describe a technique of double V-Y flap to cover fingertip defects in which a simple V-Y flap is not enough even for volar oblique amputation; but for extensive pulp loss and volary unfavorable wounds of index, middle and ring finger, thenar flap can be used to cover the defect according to Jin Xi Lim and Kevin C [24]. They also mentioned cross finger flaps are also used for volary unfavorable amputation. These flaps, thenar and cross finger, are also used in our study in 2.6% of the injuries each.

Unlike the cross finger flaps, thenar tissues are never hair bearing as pointed out by Charles P. Melone, et al. after they analyzed thenar flap use in 150 cases. The other advantage of thenar flap over cross finger flap is conservation of tissues and the occasional opportunity for direct closure of the donor site [25].

Chest wall random flap also used next to V-Y advancement flap in our study for wounds with greater area of soft tissue loss with exposed bone which are unable to close with regional flaps like cross finger and thenar flaps.

There are also other option of reconstruction for fingertip injury with exposed bone not used in this study like modified anterograde pedicle advancement which is used for transverse, volar oblique and lateral oblique amputation as mentioned by SH Lee, et al. [26]. It is also mentioned that the possibility of doing bone and nail bed graft taken from the amputation and cover it with reverse homodigital artery flap to restore function by M. Sahin Alagoz, et al. [27].

Paik-Kwon Lee, et al., also brought an alternative treatment modality for mid nail and proximal nailbed amputation by replantation of fingertip by using pocket principle by which the amputated part reattached to the proximal stump after debrided and deepithelialized [28]. Non microsurgical reattachment of fingertip amputations as alternative to microsurgical attachment is described by Elliott H. Rose et al., in which the severed tip was filleted and replaced as a cap over the skeletonized distal phalanx of the stump. A 2 mm remnant of germinal matrix was preserved for nail regrowth [29].

Even though it needs further clarification and study; T. Soderberg, et al. mentioned conservative treatment for fingertip amputation with exposed bone showed better long term functional results in their study [30].

The other most important part of fingertip which needs meticulous management is nail bed and associated injury which includes subungal hematoma, nail bed injury either partial or complete, avulsion of matrix tissue and nail wall injury.

From the total two hundred nail bed and associated injury in our study 55% managed surgically, but the remaining injuries were managed conservatively. Complete nail bed repair is the commonest type, even though it was not repaired under loop magnification, followed by nail wall repair and partial nail bed repair. This result actually similar with other studies like the one done by Enrique, et al., they found also suture of the nail matrix with replacement of the same nail or using some substitute as the commonest type. In study done by Alexander George, et al., after nail plate repair/repositioning, nail bed repair is one of the common type used in nail apparatus reconstruction.

Nail plate can be lengthened using eponychial flap which is a backward cutaneous translation to restore good appearance of the nail apparatus as described by Roberto Adani, et al., but not used in our study [31].

One of the nail bed injury management offered in our study is replacement of the nail plate after its avulsion; however it is not specifically mentioned which materials are used. In study done by Leandro Azevedo de Figueiredo, et al. polypropylene prosthesis used for temporary replacement of the nail to provide protection and encourage healing by secondary intention and showed satisfactory result [32].

Conclusion

Fingertip injuries are common in young male factory workers from machine in a factory or daily laborers at construction site by stone or mixer. This is due to accidental engagement of the hand and fingertips during work. Children are also victims of fingertip injury especially less than 5 years of age and most of the injuries are crushing type by a closing door while they were playing at home.

Most of the fingertip injuries in our study were able to be managed with primary wound closure without the need of complex reconstruction; however it needs further study to compare outcomes of each reconstructive option especially the role of conservative management in children and adult with distal fingertip amputation even with minimal bone exposure.

Factory and construction workers should be provided with safety measure equipment especially gloves to protect their hand and fingertips from injury.

Young children need to be supervised in most of the time during playing and it is good to let them play in an open space. We need also mandatory adoption and strict implementation of occupational health standards in the work place.

Ethical Consideration

Before launching the study, ethical clearance was obtained from Institutional Review Board (IRB) of Addis Ababa university college of health science, department of surgery.

References

1. Neligan P (2013) Plastic surgery. Hand and upper extremity. Elsevier: London, UK.
2. Yeo C, Sebastin S, Chong A (2010) Fingertip injuries. Singapore Med J 51:78-86
3. Fassler PR (1996) Fingertip injuries: Evaluation and treatment. J Am Acad Orthop Surg 4:84-92
4. Yorlets RR, Busa K, Eberlin KR, Raisolsadat MA, Bae DS, et al. (2017) Fingertip injuries in children: Epidemiology, financial burden, and implications for prevention. Hand 12:342-347
5. ALERT (2018) ALERT center magazine. Addis Ababa.
6. Tano EK, Adu EJ, Yiadom JB, Buunaaim AD (2021) The pattern of fingertip injuries in Kumasi, Ghana. East Afr Ortho J 15:26-32
7. Sanjay S, Tiwari V (2007) Fingertip injuries. India J Orthop 41:163-68
8. Karthi Sundar V, Suresh Gandhi B, Shanmuga Sundaram P (2017) Surgical management of fingertip injuries. Int J Res Orthop 3:19-22
9. Wiradiputra AE (2014) Profile of hand injury from Januari–December 2013 in Sanglah general hospital descriptive study.
10. De Alwis W (2006) Fingertip injuries. Emerg Med Australas 18:229-237
11. George A, Alexander R, Manju C (2017) Management of nail bed injuries associated with fingertip injuries. Indian J Orthop 51:709-713
12. Mutiso V, Muoki A, Kimeu M (2013) Pattern of fingertip injuries amongst patients admitted at a paediatric hospital in Nairobi: A retrospecive study. East Cent Afr J Surg 18:184-189
13. Evans DM, Bernadis C (2000) A new classification for fingertip injuries. J Hand Surg Br 25:58-60
14. Miller AJ, Rivlin M, Kirkpatrick W, Abboudi J, Jones C (2015) Fingertip amputation treatment: A survey study. Am J Orthop (Belle Mead NJ) 44:E331-339
15. Fattah JH, Awla RH (2013) Management of fingertip injury in Erbil, an evaluation study. Zanco J Med Sci 17:518-525
16. Vergara-Amador E, Castillo-Perez S, Tovar-Cuellar W (2016) Recommendations on treatment of nail and fingertip injuries in children. Cases series and literature review. Revista de la Facultad de Medicina 64:499-504
17. Martin-Playa P, Foo A (2019) Approach to fingertip injuries. Clin Plast Surg 46:275-283
18. Ipsen T, Frandsen PA, Barfred T (1987) Conservative treatment of fingertip injuries. Injury 18:203-205
19. Boudard J, Loisel F, El Rifai S, Feuvrier D, Obert L (2019) Fingertip amputations treated with occlusive dressings. Hand Surg Rehabil 38:257-261
20. Yuan F, McGlinn EP, Giladi AM, Chung KC (2015) A systematic review of outcomes after revision amputation for treatment of traumatic finger amputation. Plast Reconstr Surg 136:99-113
21. Mennen U, Wiese A (1993) Fingertip injuries management with semiocclusive dressing. J Hand Surg Br 18:416-422
22. Tarallo M, Fino P, Ribuffo D, Casella D, Toscani M, et al. (2018) Liposuction aspirate fluid adipose derived stem cell injection and secondary healing in fingertip injury: A pilot study. Plast Reconstr Surg 142:136-147
23. DIaz LC, Vergara-Amador E, Fuentes Losada LM (2016) Double V-Y flap to cover the fingertip injury: New technique and cases. Tech Hand Up Extrem Surg 20:133-136
24. Lim JX, Chung KC (2020) VY advancement, thenar flap, and cross-finger flaps. Hand Clin 36:19-32
25. Melone Jr CP, Beasley RW, Carstens Jr JH (1982) The thenar flap—an analysis of its use in 150 cases. J Hand Surg Am 7:291-297
26. Lee SH, Jang JH, Kim JI, Cheon SJ (2015) Modified anterograde pedicle advancement flap in fingertip injury. J Hand Surg Eur Vol 40:944-951
27. Alagoz MS, Uysal CA, Kerem M, Sensoz O (2006) Reverse homodigital artery flap coverage for bone and nailbed grafts in fingertip amputations. Ann Plast Surg 56:279-283
28. Lee PK, Ahn ST, Lim P (1999) Replantation of fingertip amputation by using the pocket principle in adults. Plast Reconstr Surg 103:1428-435
29. Rose EH, Norris MS, Kowalski TA, Lucas A, Fleegler EJ (1989) The "cap" technique: Nonmicrosurgical reattachment of fingertip amputations. J Hand Surg Am 14:513-518
30. Soderberg T, Nystrom A, Hallmans G, Hulten J (1983) Treatment of fingertip amputations with bone exposure: A comparative study between surgical and conservative treatment methods. Scand J Plast Reconstr Surg 17:147-152
31. Adani R, Marcoccio I, Tarallo L (2003) Nail lengthening and fingertip amputations. Plast Reconstr Surg 112:1287-1294
32. Figueiredo LA, Ribeiro RD, Melo AL, Lima AL, Terra BB, et al. (2017) Polypropylene prosthesis for the treatment of fingertip injuries. Descrip ion of surgical technique and results. Rev Bras Ortop 52:685-692