



Hand Injuries in a Suburban Hospital Bayelsa State Nigeria

Tabowei I. Benjamin¹ and Amaefula Temple Ejike^{2*}

¹Department of Surgery, Niger Delta University Teaching Hospital (NDUTH), Okolobiri, Bayelsa State, Nigeria.

²Department of Orthopedics and Traumatology, Niger Delta University Teaching Hospital (NDUTH), Okolobiri, Bayelsa State, Nigeria.

Authors' contributions

This work was carried out in collaboration between both authors. Author TIB developed the ideas, the protocol and wrote the first draft of the manuscript. Author ATE revised the draft, managed the literature searches and analysis of data. Both authors read and approved the final manuscript.

Article Information

DOI: 10.9734/BJMMR/2017/30731

Editor(s):

(1) Panagiotis Korovessis, Chief Orthopaedic Surgeon, Orthopaedic Department, General Hospital "Agios Andreas" Patras, Greece.

Reviewers:

(1) Ahmed Hassan El-Sabbagh, Mansoura University, Egypt.

(2) Ayhan Goktepe, Selcuk University, Konya, Turkey.

Complete Peer review History: <http://www.sciencedomain.org/review-history/18378>

Original Research Article

Received 28th November 2016
Accepted 26th December 2016
Published 28th March 2017

ABSTRACT

Aims: To determine the etiology and pattern of presentation of patient with hand injury in a semi-urban center in Bayelsa State Nigeria.

Study Design: This is a retrospective study in which all the case notes of patients who had hand injury at Niger Delta University Teaching Hospital Okolobiri Bayelsa State Nigeria from January 2014 to December 2015 were retrieved and analyzed.

Place and Duration of Study: This study was carried out in the Niger Delta University Teaching Hospital Okolobiri Bayelsa State Nigeria from January 2014 to December 2015.

Methodology: Case Notes of patients who had hand injuries at Niger Delta University Teaching Hospital Okolobiri Bayelsa State Nigeria between the period of study were retrieved and analyzed for age, sex, mechanism of injury, time of injury and presentation to the clinic, and treatment given. Diabetic patients who had hand injury following injections and patients with incomplete data were excluded from the study. The data obtained was then analyzed using the SPSS Version 20 for windows.

*Corresponding author: E-mail: amaetemples@yahoo.com;

Permission for this study was obtained from the ethical committee of the Niger Delta University Teaching Hospital.

Results: The highest incidence, 56 (36.6%) of hand injuries occurred in the 20 to 30 age range. Majority 48(31.37%) of the patients were students. Road traffic accident (RTA), 37(24.18%) was the commonest cause of hand injuries and this was statistically significant [χ^2 (p-value) = 120.77 (0.001)]. The most common injury to hand was laceration 57 (37.25%). Pain, swelling, limitation of movement and infection to the traumatized hand were the common presentations respectively, 153 (100.0%); 120 (78.4%), 80 (52.29%) and 56 (36.60%).

Conclusion: Road Traffic Accident (RTA) remains the major cause of hand injury affecting more males and manual workers in the productive age group. Delayed presentation is often associated with devastating complications.

Keywords: Hand; injuries; tendons; tenosynovitis; crush; amputation.

1. INTRODUCTION

Hand injuries [HI] cause severe pain, sleeplessness, psychological distress, and are a source of cosmetic embarrassment and constant frustration to the patient [1,2]. In a study conducted at the Lagos university teaching hospital Lagos, Nigeria by Adeyemi-doro et al. [1,2], hand injuries are among the common emergency hand problems that presents in the accident and emergency department which demand immediate attention and treatment. HI can involve any or all of the structures in the hand and disorganize the normally well coordinated skilled or unskilled functions of the hand [1,2]. One-third of all accidents, and about 20% of all lacerated wounds occurs in the hand [2,3]. Animal and human bite injuries are also common trauma seen in the accident and emergency department, and their incidence according to Panayotis et al. [4] seem to be rising in recent years.

That hand injuries are a leading cause of time lost from work and workers compensation claims has been documented by most workers [3,4]. The United states Bureau of labor statistics reports that hand injury are the second most common injury resulting in days away from work [4]. As was rightly observed by kachalia et al, hand injuries are rarely life threatening, but they are associated with significant patient morbidity and physician medico-legal risk [5].

As a result of its complex anatomy, which comprises of many well separated compartments and the close proximity of the numerous joints and bones to the skin surface, the hand is particularly prone to deep space infections after an injury or a bite injury including septic arthritis, osteomyelitis and in some severe cases crippling limb deformity [1,2,3,6]. As was stated by Talan

DA et al. [7] and Dillinger PE et al. [8] that human bite injury may look like a minor abrasion, but due to the complex anatomical structures of the hand, the underlying sheaths, tendons and ligaments are often involved. Therefore a delay or neglect in treatment of hand injuries may lead to devastating consequences and complications. Weber EJ et al. [6] in their series, found a strong correlation between delay in treatment following hand injuries, the incidence of infection and subsequent morbidity.

Therefore, early recognition of hand injuries and treatment minimizes the infection rate, the complications that may have followed, and hasten the recovery of the patient.

In this environment, no study has been done on the etiology and pattern of presentation of hand injuries. This retrospective study is to determine the etiology and pattern of presentation of patients with hand injury in a semi-urban center.

2. PATIENT AND METHODS

This is a retrospective study in which 153 case notes of 169 patients with hand injuries seen at Niger Delta University Teaching Hospital Okolobiri Bayelsa State Nigeria from January 2014 to December 2015 were retrieved and analyzed for age, sex, mechanism of injury, time of injury and presentation to the clinic, and treatment given using the SPSS Version 20 for windows. Sixteen (16) case notes of patients with incomplete information and poor documentation, and diabetics who had hand injuries following injections were excluded from the study.

Permission for this study was obtained from the ethical committee of the Niger Delta University Teaching Hospital.

3. RESULTS

A total of 169 cases of hand injuries were seen during the period of study, however, only 153 cases of hand injury were analyzed, due to incomplete information and poor documentation in 16 cases. There were 110 males [71.90%] and 43 [28.10%] females given a male to female ratio of 2.56: 1, and this was not statistically significant [χ^2 (p-value) = 4.25 (0.751)]. Their age ranged from 6 to 72 years. The highest incidence, 56 (36.6%) of hand injuries occurred in age range of 20-30 years of age, and this was statistically significant [χ^2 (p-value) = 160.44 (0.001)].

3.1 Occupation

Majority 48(31.37%) of the patients were students, followed by farmers 30(19.61%) and traders 18(11.76%). Only 7(4.58%) patients who were unemployed job applicants presented with hand injuries.

3.2 Mechanism of Injury

Road traffic accident (RTA), 37(24.18%) was the commonest cause of hand injuries and this was statistically significant [χ^2 (p-value) = 120.77 (0.001)]; followed by burns 35(22.90%) and human bite, 26(17.0%) injuries. Matchet cut injury to the hand constituted 20(13.10%) of the

cases. Hand injuries due to grinding machines 2(1.31%), snake bites 2(1.31%) and industrial accidents 1(0.65%) were the least causes of injuries to the hand.

3.3 Distribution of Injuries

The most common injury to hand was laceration, 57 (37.25%), followed by burns injury to the hand, 35 (22.88%). The least injury was Tendon 6 (3.92%), Nerve 5 (3.27%) and vascular 2 (0.65%) injuries. Laceration, Burns and Fractures to the hand occurred more in males than in females, and this was statistically significant [χ^2 (p-value) = 21.38 (0.01)]. Some patients presented with more than one clinical symptom.

3.4 Clinical Presentation

Most patients, 153 (100.0%) presented with pain to the traumatized hand; this was followed by swelling of the hand, 120 (78.4%). Limitation of movement and Infection occurred in 80 (52.29%) and 56 (36.60%) of the patients. Purulent discharge from the limb occurred mainly on those who had infected wounds following human bite injuries. Severe bleeding occurred only in 10 (6.54%) patients. Most patients presented with more than one symptom and signs. Only 8 (5.23%) who had crush injuries to the limb presented with numbness at their hands.

Table 1. Age and sex distribution of patients

| S/No | Years | Males | Female | Total (%) | Chi-square (χ^2) (p-value) |
|--------------|-------|------------|-----------|-----------------|-----------------------------------|
| 1 | 1-10 | 5 | 3 | 8(5.23) | 160.44 (0.001)* |
| 2 | 11-20 | 15 | 8 | 23(15.03) | |
| 3 | 21-30 | 43 | 13 | 56(36.60) | |
| 4 | 31-40 | 30 | 11 | 41(26.80) | |
| 5 | 41-50 | 7 | 3 | 10(6.54) | |
| 6 | 51-60 | 6 | 2 | 8(5.23) | |
| 7 | 61-70 | 4 | 2 | 6(3.92) | |
| 8 | >70 | 0 | 1 | 1(0.65) | |
| Total | | 110 | 43 | 153(100) | |

*Statistically significant ($p < 0.05$)

Table 2. Occupation

| Occupation | Males | Females | Total (%) |
|-------------------|------------|-----------|-----------------|
| Students | 37 | 11 | 48(31.37) |
| Farmers | 21 | 9 | 30(19.61) |
| Trader | 13 | 5 | 18(11.76) |
| Civil servants | 12 | 4 | 16(10.46) |
| Fishing | 6 | 6 | 12(7.84) |
| Drivers | 14 | 0 | 14(9.15) |
| Teachers | 5 | 3 | 8(5.23) |
| Others/applicants | 2 | 5 | 7(4.58) |
| Total | 110 | 43 | 153(100) |

Table 3. Mechanism of injury

| S/N | Mechanism of injury | Male | Female | Total (%) | Chi-square (χ^2) (p-value) |
|-----|---------------------|------------|-----------|-----------------|-----------------------------------|
| 1 | RTA | 28 | 9 | 37(24.18) | 120.77 (0.001)* |
| 2 | Burns | 19 | 16 | 35 (22.90) | |
| 3 | Human bites | 20 | 6 | 26 (17.0) | |
| 4 | Matchet cut | 17 | 3 | 20 (13.10) | |
| 5 | Gunshot injury | 8 | 2 | 10 (6.54) | |
| 6 | Falling from height | 7 | 0 | 7 (4.58) | |
| 7 | Dog bite | 4 | 2 | 6 (3.92) | |
| 8 | Home accidents | 2 | 2 | 4 (2.61) | |
| 9 | Needle stick injury | 2 | 1 | 3 (1.96) | |
| 10 | Snake bite | 1 | 1 | 2 (1.31) | |
| 11 | Grinding machines | 1 | 1 | 2 (1.31) | |
| 12 | Industrial accident | 1 | 0 | 1 (0.65) | |
| | Total | 110 | 43 | 153(100) | |

Table 4. Distribution of injury

| Distribution of injury | Males freq (%) | Females freq (%) | Total (%) | Chi-square (χ^2) (p-value) | |
|--------------------------|----------------|------------------|-----------------|-----------------------------------|--|
| Laceration | 50 | 7 | 57(37.25) | 21.38 (0.01)* | |
| Burns affecting the hand | 19 | 16 | 35(22.88) | | |
| Fracture | 11 | 6 | 17(11.11) | | |
| Splinter injury | 6 | 7 | 13(8.50) | | |
| Crush injury | 9 | 3 | 12(7.84) | | |
| Subungal hematoma | 5 | 6 | 11(7.19) | | |
| Amputation | 8 | 2 | 10(6.54) | | |
| Tendon injury | 5 | 1 | 6(3.92) | | |
| Nerve injury | 4 | 1 | 5(3.27) | | |
| Vascular injury | 1 | 1 | 2(0.65) | | |
| Total | 110 | 43 | 153(100) | | |

Table 5. Clinical presentation

| Clinical presentation | Freq (%) |
|------------------------|-----------|
| Pains | 153(100) |
| swelling | 120(78.4) |
| Limitation of movement | 80(52.29) |
| Infection | 56(36.60) |
| Purulent discharge | 48(31.37) |
| Bleeding | 10(6.54) |
| Numbness | 8(5.23) |
| Septic arthritis | 7(4.58) |
| Shock | 7(4.58) |
| Hand abscess | 6(3.92) |
| Cosmetic impairment | 5(3.27) |

3.5 Treatment

All patients who had hand injury received analgesics and antibiotics therapy. Suturing and wound debridement was the most common surgical procedure performed on patient with hand injuries. Patients who had amputation had their wound stumps refashioned after control of

homeostasis. Four patients who had crush injury to the hand received blood transfusion as a result of the multiple injuries they sustained to other part of the body. Patients who had fractures to the bones of the finger, tendon injuries and severe soft tissue injuries undergo physiotherapy.

Table 6. Treatment

| Treatment | Freq (%) |
|-------------------------|----------|
| Analgesics | 153(100) |
| Antibiotics | 153(100) |
| Tetanus toxoid | 130(85) |
| Suturing | 68(44) |
| Anti-tetanus serum | 47(31) |
| Exploration/debridement | 23(15) |
| Limb elevation | 25(16) |
| Splinting fingers | 12(8) |
| Bone wiring | 10(7) |
| Tendon repairs | 8(5) |
| Cast | 7(5) |
| Blood transfusion | 4(3) |
| Physiotherapy | 42(27) |



Fig. 1. Matchette injury



Fig. 2. Crush injury of the hand



Fig. 3. Matchette injury with finger amputation

3.6 Complications of Hand Injuries

The most common complication seen was wound infection especially among those who had human bite injury. Ten patients had amputation of their fingers. One had all the four digits amputated following a matchet cut injury. Permanent nerve damage and compartment syndrome was seen in two cases each. No case of death was reported following hand injury.

Table 7. Complication of hand injuries

| Complications | Freq (%) |
|-----------------------------|-----------|
| Wound infection | 43(28.10) |
| Amputation | 10(6.64) |
| Permanent limb deformity. | 8(5.23) |
| Tenosynovitis (suppurative) | 7(4.58) |
| Osteomyelitis | 4(2.61) |
| Permanent nerve damage. | 2(1.31) |
| Compartment syndrome. | 2(1.31) |

4. DISCUSSION

Hand injuries are among the most common affliction of mankind [1,2,3,9]. The common emergency hand problems which demands immediate treatment are hand infection and injury. They cause severe pain, discomfort, sleeplessness to the patient. The injured hands are usually inefficient, a source of cosmetic embarrassment and constant frustration to the owner [1,2,3]. In our environment, about 1/3 of all accidents involves the hand, and about 20% of all lacerated wound occurs in the hand [1,2,3].

In a study conducted in the United states by Chah SS et al. [10], and laren et al. [11] in the Netherlands and Denmark hand injuries were commoner in males than in females and are more frequent among individuals aged above 18 years. In another study conducted in Nigeria by Inyang U C et al. [9] hand injuries occurred more

also in males than in females in the ratio of 8:1, and the peak age incidence of these injuries was between 20-40 years. In our study, hand injury was commoner in males than females in the ratio of 2.6:1, and the peak incident of the injuries occurred between the same age ranges. This is the age of active physical activities and since there is hardly any activity of daily living that does not involves the use of the hand, the hand is therefore vulnerable to injuries of various kind.

In a study Inyang et al. [9] had a male to female ratio of 8:1. This figure is higher than those from our study. But our figure was similar to those of Frazier w et al. [12] which had a male to female ratio of 1.7:1. The difference in sex ratios may have been from the fact that our study covered all types of hand injuries including human bites(which occurs more commonly in males)and burns wounds of the hand which was not among the indices they analyzed in their study. As was observed by Lin S et al. [13], 50% of major burn victims have significant burn injuries to the hand. (Thus the inclusion of burn patients in our study). The differences in our case selection criteria may have accounted in the dissimilarity in the ratios between men and women, when compared with their studies.

It is not surprising that students were the most commonly affected group in the population that had hand injuries. Based on previous works of Inyang et al. [9] and Fraziers et al. [12] the students are active, they fall into the age rage 20-40 years, that had the highest physical activities using their hands. This in turn will predispose them to injury ofthe hand more commonly.

The small number of applicants 4.58% who presented with hand injury in our study reflects their state of economy. This may be attributed to the fact that the applicants who have hand injury are not likely to seek medical attention in the

hospital but are more likely to patronize alternative health providers such as the patent medicine dealers and traditional healers in the environment.

In advanced countries such as US and Europe, [12,14] the most common cause of hand injuries is industrial accidents especially among those who are working in mining and construction industries however in our study, road traffic accident (24.18%) was the most frequent cause of hand injuries. This was followed by burns 22.90% and the least cause of hand injury was industrial accident (0.65%). Our study was carried out in a semi-urban center that had a few construction industries. This may account for the differences in the etiological factors causing hand injuries in this environment.

The mechanism of injury varies widely from crush, human bite, avulsion, laceration, amputation and burns. They can involve any and all of the structures in the hand and if not addressed promptly, can result to irreversible ischemia, or in gangrene and eventual amputation of the hand or finger. In their series, Ootes D et al. [14], laceration was the most common injuries to the hand(49.8%), this was followed by fracture(15.3%) strains/sprains and contusion. Our study was similar to those of Ootes D et al. [14]. Although, laceration to the hand was the most common form of injury to the hand, our figure 37.25% was slightly lower than that of their study. Again, burn injuries which constituted 22.88% (secondly placed) was significantly high in our study compared to the work of Ootes et al. [14] that had fracture of the hand placed next to laceration as causes of hand injuries. Our facility located in the crude oil producing region with several illegal local refineries and frequent fire and explosions may have accounted for the significant high number of patients with burn injuries to the hand.

Swelling and pain caused the patient to restrict exercise of the injured hand, which permits contractures to develop. The limitation of movement of the injured hand may cause the hand to heal in abnormal position especially if there is injury to the vascular system. Bunnell [15] believed that ischemic contracture is due to vascular impairment, often caused by tight encasement of the hand in plaster or in constricting bandages. Brook [16] also found that venous occlusion causes hemorrhage, edema and degeneration of the muscle fibers resulting in acute inflammation progressing to fibrous

contracture. Therefore, cast and bandages must be applied with care to avoid these crippling complications.

In multi system trauma, life threatening injury must be addressed first. However, for best long term result hand injury must be recognized earlier.

Most hand surgeons [2,3] believe that the earlier a tendon is repaired the better the final result. They however, believe that repair of a lacerated flexor tendon is not a surgical emergency mediating immediate repair and that life threatening conditions must be addressed before considering a tendon repair. In our study, tendon repairs following hand injuries was done after life threatening conditions were addressed and the patients has been successfully resuscitated with excellent result.

In a literature review Lins et al. [17], stated that fifty percent of major burns victims have significant burn injuries to their hands. Our finding seems to be in agreement with this assertion. The burning victim would attempt to remove the source of injury with his hands thereby predisposing the hand to more flame and burn wound. This and the fact that th hhuyere were two major catastrophic burn accidents due to petrol tanker explosion near our facility could explain why most major burn patient have burns in their hands and why burn injury was next to laceration as a cause of hand injury in our series.

Crush injury is more complex and may affect all of the tissue of the hand and forearm. The risk of long-term disability after a crush injury is quite high. According to Carle et al. [18] crushing injury to the hand causes an exploding kind of injury characterized by ragged and irregular skin, laceration from which extrude muscle bellies, torn vein, fascia and areola tissues. There may be little or no bleeding. In our study, there were only 12 cases (7.84%) with crush injury following road traffic accident and falling from a height. As a result of injuries to the chest, the abdomen and other vital organs, they were resuscitated with fluid and blood transfusion in addition they had other surgical intervention and wound debridement of the hand after resuscitation. Although, the hands were crushed, however, life threatening circumstance took precedence over the hand condition.

Severe hand injury especially following a human bite or crush injury are almost always

contaminated and infected and hence wound infections in these patients are frequent. As was stated by Patil PD et al. [19] the high rate of infection in human bite to the hand is due its compact nature with numerous potential spaces and relative avascular structures like the tendon and joint that have limited ability to fight infection. Therefore wound toilet, the removal of foreign materials from the wound and its surrounding, disinfection and debridement of dead tissues are essential in the treatment of human bite injury to the hand. Boyce [19,20] was the first hand surgeon to recognize and prove the value of prophylactic antibacterial agents in cases of human bites. He believed that if such a wound is not treated prophylactic with appropriate antibiotic, they will eventually be infected and this may lead to devastating consequences [20]. He used the early antibiotics penicillin, streptomycin and sulfadiazine to treat his patients. Although, studies by Thirlby Rc et al. [21] and Roberts AHN et al. [22] have reported no benefit in the use of prophylactic antibiotic in patients with hand laceration that are at a low risk of being infected, Our study seems to agree with those of Boyce's, since all the patient in our series had antibiotic therapy with excellent result. It is our belief that prophylactic antibiotics are useful in patient who had hand injuries especially those who had human bite injury.

The treatment of these injuries as was seen in our series varies with the clinical presentation and the severity of the injury. When treatment are delayed, or inadequate, hand injuries may result in serious complication especially when they become infected [1,2,3]. As was shown in our study, the treatment vary widely from simple splinting to complex micro vascular reconstruction and nerve repair where the experience and facility is available. As was observed by Adeyemi-doro et al, proper management of hand injuries requires a good knowledge of the anatomy and functional relationships of the structures in the hand and forearm [1,2,3]. Hand surgeons all over [1,2,3, 8,10] agrees that the goal of treatment of hand injury is to restore an aesthetically pleasing, painless, tactile, mobile, stable finger that can sense pain, temperature, pressure, stereogenesis and fine touch. Non-displaced, closed fracture, either transverse or longitudinal are generally treated with a splint or protective covering from the tip to the proximal end of the middle phalanx, for about 2 to 4 weeks in order to allow the pain and swelling to subside and

prevent re-injury while encouraging proximal interphalangeal joints (pip) motion [23].

Hand injuries when neglected may lead to crippling complications. Our series showed a more devastating complication associated with crush injuries of the hand. This is in agreement with the work from other centers [1-22,24].

5. CONCLUSION

Hand injuries are emergencies seen among the economically active groups with economic and cosmetic implications. However many patients presents first to patent medicine dealers and traditional healers delaying early appropriate orthodox response leading to crippling complications.

CONSENT

All authors declare that written informed consent was obtained from the patient (or other approved parties) for publication of this paper and accompanying images.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Adeyemi-Doro HO. Manual of emergency surgery, edited by Adeyemi-Doro H O. University of Lagos Press. 1991;224-251.
2. Adeyemi-Doro. Operated hand injuries and hand infections in an urban emergency service. Nigerian Medical Practitioner. 1988;16(5-6):171-173.
3. Adeyemi-Doro HO. Management of hand infections. Nigerian Medical Practitioner. 1981;1(4):5-10.
4. Bureau of Labour statistics, U.S department of Labour: Non-fatal occupational injuries and illness requiring days away from work; 2011. Available:http://www.bls.gov/news.release/archives/osh2_11082.pdf (March 3 2014)
5. Kachalia A, Ganhi TK, Puopolo, et al. missed and delayed diagnosis in the emergency department, a study of closed malpractice claim from 4 liability insurers. Ann Emerg Med. 2007;49(2):196-205.

6. Weber EJ, Callahan M. Animal bites and rabies, In; Rosen P, Barken RM. Emergency medicine: Concepts and clinical practice, 4th Ed. St Louis, Mosby. 1997;901-921.
7. Talan DA, Abrahammina FM, Moran GT, et al. Clinical presentation and bacteriologic analysis of infected human bites in patients presenting to emergency department. Clin Infect Dis. 2003;37(14): 81-9.
8. Dellinger PE. Hand infection, bacteriology and treatment. Arch. Surg. 1988;123:745-750.
9. Inyang UC, Dim EN, Ofoegbu CKP et al. pattern of hand injury in Ilorin North central Nigeria; A review of 42 cases. Pioneer Medical Journal. 2013;3(5):1-11.
10. Chan SS, Rochette LM, Smith GA. Epidemiology of pediatric hand injuries presenting to United States emergency department 1990 to 2009. J Trauma Acute Care Surg. 2012;72(6):1688-1694.
11. Larsen CF, Mulder SS, Johnson AM, Stam C. The epidemiology of hand injury in the Netherland and Denmark. European Journal of Epidemiology. 2004;19:323-327.
12. Frazier W, Miller M, Fox R, et al. Hand injuries, incidence and epidemiology in an emergency service. JACEP. 1978;7(7): 265-268.
13. Lin S, Chang J, Chen P, et al. hand function measures for burn patients, A literature review. Burns. 2013;39(1):16-23.
14. Ootes D, Lambers KT, Ring DC. The epidemiology of upper extremity injuries presenting to the emergency department in the United states. Hand. 2012;7(1): 18-22.
15. Bunnell S, Dubeerty EW, Curtis RA, Ischemic contracture local in the hand. Plastic and Reconstruction Surgery. 1948; 3(4):424-433.
16. Brooks I. Human and animal bites infection: In: Pediatric anaerobic infection; diagnosis and management St Louis, Mosby. 1989; 336-342.
17. Lin S, Chang J, Chen P. Hand function measures for patients: A literature review. Burns. 2013;39(1):16-23.
18. Swan AH, Azadian BS, Wakeley CF, et al, management of blisters in minor burns. BJM. 1987;295(6591):181-185.
19. Carle E, Neinethi I. Crushing injury of the hand-prevention of ischemic contracture. 1959;90:3.
20. Patil PD, Panchabhai TS, Galwankar SC. Managing human bites. J Emerg Trauma Shock. 2009;2(3):186-190.
21. Rittner AV, Fitzpatrick K, et al. Best evidence report: Are antibiotics indicated following human bites? Emerg. Med. J. 2005;22:654.
22. Thirlby RC, Blair AJ, Thal ER. The value of prophylactic antibiotics for simple laceration. Surg Gynecol Obstet. 1983; 156(2):212-215.
23. Roberts AHN, Teddy PJ. A prospective trail of prophylactic antibiotics in hand laceration. Br J Surg. 1977;64(6):394-397. Management of burn blister is controversial. There is evidence that blisters left intact are associated with faster healing and lower infection rate. (17) (Swan AH, Azadian BS, Wakeley CF, et al. Management of blisters in minor burns. BJM. 1987;295(6591):181.
24. Boyce FF. Human bites. South Med. Journal. 1942;35:631-638.

© 2017 Benjamin and Ejike; This is an Open Access article distributed under the terms of the Creative Commons Attribution License (<http://creativecommons.org/licenses/by/4.0>), which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is properly cited.

Peer-review history:
The peer review history for this paper can be accessed here:
<http://sciencedomain.org/review-history/18378>