Maxillofacial Injuries in an Eastern Nepal Tertiary Hospital

Jaisani, Mehul R.; Dongol, Ashok; Acharya, Pradeep; Yadav, Anjani Kr; Pasvan, Chandrakant; Rai, Siddhartha

DOI:
10.33314/jnhrc.v21i1.4270

Publication date:
2023

J Nepal Health Res Counc 2023 Jan-Mar;21(58): 153-8

Maxillofacial Injuries in an Eastern Nepal Tertiary Hospital

Mehul R Jaisani,[1] Ashok Dongol,[1] Pradeep Acharya,[1] Anjani Kr Yadav,[1] Chandrakant Pasvan,[1] Siddhartha Rai,[1] Sean Laverick[2]

[1]Department of Oral and Maxillofacial Surgery, B.P Koirala Institute of Health Sciences, Dharan, Nepal, [2]Department of Oral and Maxillofacial Surgery, Ninewells Hospital, Dundee, UK.

ABSTRACT

Background: Maxillofacial injury is a major health problem, and injury patterns vary in different societies. The purpose of the present study was to evaluate the pattern of maxillofacial injuries presenting to BPKIHS.

Methods: Patients with age >15 years presenting with maxillofacial injuries from May, 2019 to April, 2020 were included in this cross-sectional descriptive study. Demographic profile, etiology, delay in presentation, pattern of soft tissue/ bony/ dental injuries, treatment modality were recorded and analyzed using Microsoft excel.

Results: Within one year study period 190 patients with age group >15 years presented with facial injuries. There were 164 male (86.32%) and 26 female (13.68 %) patients (M:F=6.3: 1) with mean age of 34.96 years. Road Traffic Accident (RTA) (61.58%) was the most common etiology. Majority of the patients reported to hospital within 2-6 hrs of injury. Other associated injuries was present in 36.32 % of patients with orthopedic injury (60.87%) being common. Soft tissue injuries were seen in 80.53% patients, of which 49.02% were associated with facial fractures. Mandible fractures were seen in 56.19% of hard tissue injuries, of which 40.68% had multiple fractures followed by 28.81% with parasymphysis fracture. Within 37.14% patients with midface fractures, zygoma fracture (33.33%) was the commonest. Intervention was done in 80.95 % patients, with ORIF (72.38 %) being the commonest. Dentoalveolar injuries was seen in 22.63 % patients, of which 48.19% were associated with facial fractures.

Conclusions: Our observations show that motor vehicle accidents were the most frequent cause of maxillofacial injury.

Keywords: fracture; maxillofacial injuries; pattern

INTRODUCTION

Trauma is a major public health problem in Nepal.[1] Maxillofacial injuries constitutes hard and soft tissue injuries of the face extending from the frontal bone to the mandible. It may occur in isolation or with other injuries alongside. Maxillofacial injuries can occur in approximately 5-33% of patients experiencing severe trauma.[2] The presence of trauma in the maxillofacial (MF) region has a substantial impact on the psychology and aesthetics of the patient.[3]

An understanding of the cause, severity and pattern of maxillofacial trauma can assist in establishing clinical and research priorities for effective treatment and prevention of these injuries. Further results from these investigations can give an insight of effective implementation of different preventive legislations.

This study was thus designed with the objective to identify pattern of maxillofacial injuries reported to a tertiary hospital. The secondary objectives were to identify the cause of these injuries and record the co-existing injuries.

METHODS

This was a prospective study involving patients with maxillofacial injuries above 15yrs of age reporting from May 2019 to April 2020. Ethical approval for the study was taken from the Intuitional Ethical Review Board.

Inclusion criteria: All patients who reported to the Emergency department with history of trauma with

Correspondence: Mehul R Jaisani, Department of Oral and Maxillofacial Surgery, B.P Koirala Institute of Health Sciences, Dharan, Nepal. Email: mehul.jaisani@bpkihs.edu, Phone: +9779852027325.

age above 15 years and were referred for maxillofacial consultation, whether admitted to hospital and treated in the operation room or seen as out-patients, were included in this study.

Sampling: All inclusive purposive sampling was done.

Details pertaining to type of soft tissue injuries and its management was also recorded. The fractures of the mandible were grouped as condylar,coronoid, angle, body, ramus, symphysis, parasymphysis, and dentoalveolar injuries. The fractures of the mid-face included Lefort I,II, III, zygomatico-maxillary complex (ZMC), zygoma fracture, naso-orbital ethmoidal, orbital blow out and nasal fractures. Palatal split if present was also recorded. Likewise, dentoalveolar injuries were further classified as mobile, avulsed, intruded, root fracture, crown fracture, crown fracture with pulp exposure and alveolar fracture. Details relating to type of intraoral soft tissue injury and its management were also recorded. Similarly the type of treatment offered for facial bone fracture was also recorded.

Data from all the patients were recorded and was later entered in Microsoft Excel sheet for analysis.

RESULTS

From May 2019 until April 2020, 190 patients had reported to the Emergency department, with maxillofacial injuries. There were 164 (86.32%) male and 26 (13.68%) female with mean age of 34.96 years(range 15-82 years).

As shown in Figure 1, the major cause of MF injury was Road Traffic Accident (RTA) (61.58%). The major places where these incidents happened were: road (64.74%) and home (21.05%).

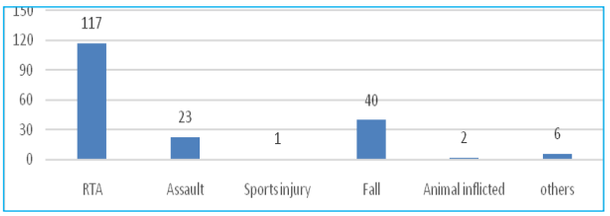

Figure 1. Etiology for maxillofacial injuries

Overall 84.74% patients presented within 24 hours of injury. Majorly 30.53% patients presented within two to six hours time lag.

Co-existing injuries were observed in 69 (36.32%) patients reporting with maxillofacial injuries. Of these, orthopedic injuries were more commonly present 60.87% followed by 20.29% patients with head injury. Poly trauma was observed in 9 (13.04%) patients.

Facial soft tissue injury was seen in 152 (80.53%) patients, of which 75 (49.02%) patients had associated facial fractures. Lacerations were more commonly seen (68.63%) followed by abrasion (15.03%) and bruising (12.42%). Suturing was done in 57.37 % soft tissue injuries under local anesthesia.

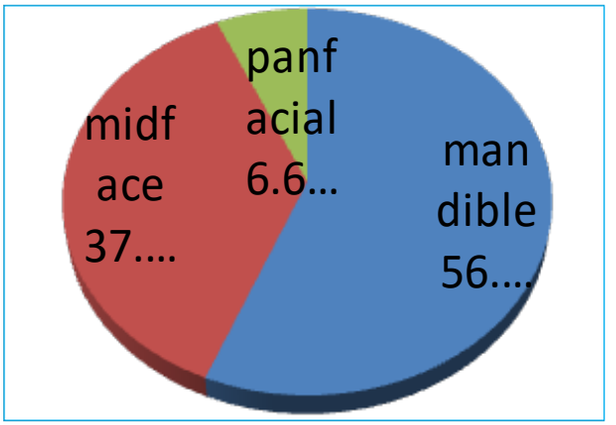

Figure 2. Proportion of facial fractures

Fracture of the facial skeleton was seen in 105 (55.26%) patients, of these, mandible fracture was seen in 59(56.19%), midface fracture in 39 (37.14 %) and panfacial in 7 (6.67%) patients (fig-2). Among patients with mandibular fracture 40.68% patients had multiple fractures followed by 28.81% patients with parasymphysis and 11.86% condylar fractures (figure 3).

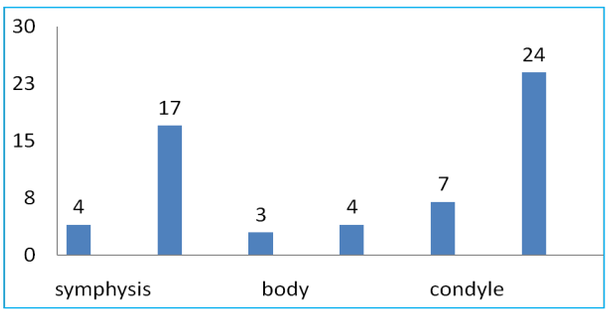

Figure 3. Pattern of mandible fracture

Out of 39 patients having midface fracture, 13(33.33%) patients isolated zygoma fracture followed by 11(28.21%) patients with zygomatico-maxillary complex fracture (figure 4).

Out of 105 patients with facial fractures, intervention was done in 85 (80.95%) and 20 (19.05%) were conservatively managed (figure 5). Out of 105 patients with facial fractures, 76 patient underwent or managed by open reduction and internal fixation. Zygoma (45%) was the most common fracture that was managed

conservatively.

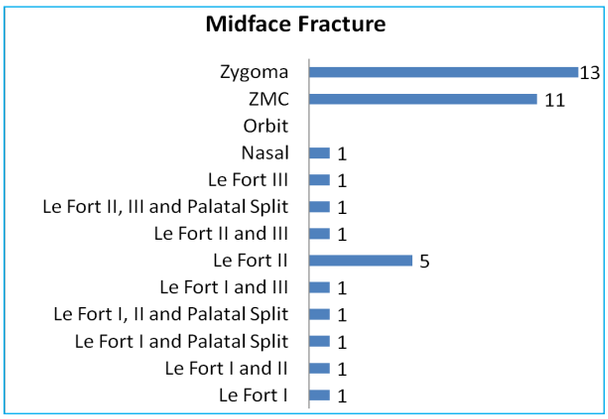

Figure 4. Pattern of midface fracture

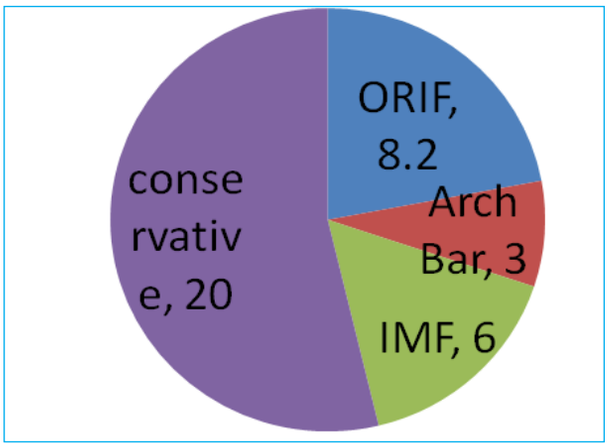

Figure 5. Interventions for maxillofacial fractures

Out of 92 (48.42%) patients with intraoral soft tissue injury, 35.87% were associated with facial fracture. Intraoral laceration (79.35%) was more commonly seen. Primary closure of intraoral soft tissue injury was done for 85.87% cases.

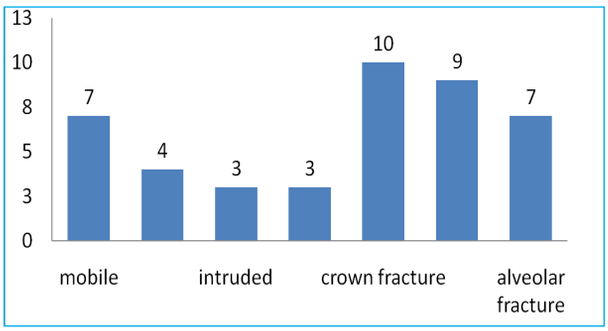

Figure 6. Pattern of dentoalveolar injury

Out of 190 patients with MF injury 43 (22.63%) patients had dentoalveolar injury, of which19(48.19%) were associated with facial fractures. Within patients with dentoalveolar injuries 23.26% had crown fracture while 20.93% had crown fracture with pulp exposure. Similarly alveolar bone fracture was seen in 16.28% patients (fig-6).

DISCUSSION

Our observation of age range from 15-82 years suggests that all the age group are prone for maxillofacial injuries. Gender distribution clearly demonstrates higher incidence of MF injuries in male over females as quoted in world literature.[4-8] However, what differs is the ratio between them owing largely to cultural variability. A similar ratio was observed in India,[4]Sabah[5] and Italy.[6] In Nepal males are more exposed to the outdoor activities such as driving, sports and active social life in contrary to females who are largely involved in activities in and around the home. However, a much higher ratio was observed in Iran[7] and UAE.[8]

Almost one third of injuries leading to death globally occur as a result of violence, with other main causes including RTA, falls and drowning.[9] RTA are a common cause of trauma in Nepal [10] and police data suggest that the number is increasing annually with high morbidity and mortality.[11] The major causes of MF injuries were RTA, fall and interpersonal violence which was consistent with the national injury trend.[10,12] Our observation of RTA as a major cause of MF injury is consistent with other reports.[5,13] On the contrary, studies reported from Ethopia,[14] Kenya,[15] Brazil,[16] France[17] report interpersonal violence as the major cause of MF injury. The increasing number of motor vehicle accidents may be attributed to many factors such as sharing of roadways between pedestrians, animals and fast and slow moving vehicles, with limited segregation of pedestrians from wheeled traffic; the large numbers of old and poorly maintained vehicles on roads; low driving standards; large numbers of overloaded buses; widespread disregard for traffic rules; defective roads; poor street lighting; and defective layout of crossroads and speed breakers.[18] Environmental factors like landslides and floods highly enhance the incidence of RTA injury in Nepal.[1] Especially in this part of Nepal, narrow, defective roads and hilly, tortuous roads could also be a contributory factor.

In a study reported from Nepal,[12]fall injuries represented37.2% of total injuries reported, thus it was obvious to have fall as the second major cause of MF injuries in our observation. Assault as another cause to MF injuries can be attributed to interpersonal violence secondary to alcohol consumption and unemployment. A growing body of research, within the Russian Federation and internationally, suggests that heavy alcohol

consumption is closely related to violent behavior.[1]Social violence, self-directed violence, political violence, religious violence is all prevalent causes of injury in Nepal.[1]

Although we have not specifically investigated the use of alcohol in this study but its consumption is known to increase maxillofacial injuries likelihood, due to reflex reduction, especially in young people, the abuse of velocity and neglect of safety measures.[16] Though driving under the influence of alcohol is prohibited with zero tolerance policy and Nepal police continues to arrest people for driving under influence, the records make it clear that people have not been discouraged from doing so.

Our data shows that there is a time lag between injury to presentation. Majority of our patients reported within six hours of injury suggesting adequate access to health care facility in eastern part of the nation. There are limited centers providing complete care for maxillofacial injury patients presently, but the number is increasing though with adequate training of health care professionals across the nation in oral and maxillofacial surgery.As reported only 61.8% of the Nepalese households have access to health facilities within 30 mins, with significant uraban (85.9%) and rural (59%) discrepancy.[19] In a national survey of fall injuries 8.5% patients were unable to access surgical care. Barrier to care included reasons like no money for health care, facility/personnel not available and fear/ no trust.[12] Similarly in another study sex, ethinicity and distance were found to significantly influence access to health care services.

Contrary to a previous publication from our unit we observed a decline in patients sustaining head injury concomitantly.[20] This can be a reflection of strict implementation of safety laws like wearing helmets in particular. However, there has been a great increase in orthopedic injuries from our last report (36.5%) [20] to 60.87%. Motorbike riders are constantly physically exposed to bodily impact, and in an event of crash, a rider is likely to sustain some form of injury even in a relatively low-impact collision. Head injury and cervical injury are the life-threatening injuries that may occur. [21] Also as observed by Fama F et al [6] sometimes concomitant injuries can be over-looked in the face of significant maxillofacial injuries. Based on their observation, they recommend the routine use of whole body CT scan when the maxillofacial injury appear prevalent, mainly in patients affected by significant maxillofacial trauma.

Injury to the facial envelope (80.53%) was found to be a common occurrence in MF injuries. A similar observations have been reported by Kapoor and Kalra (84%) [22], Leles et al. (98%) [16] and Gassneret al. (81.4%). [23] Laceration (68.63)% was the most common type of soft tissue injury followed by abrasion (15.03%) and bruising(12.42%). Lacerations are more frequently associated with road traffic accidents and gunshot injuries[24], whereas contusions and abrasions are secondary to interpersonal violence. [25] Soft tissue covering over the bone tends to dampen the impact and hence we observed only 49.02% of these soft tissue injuries being associated with underlying fracture.

In patients having fracture of the facial skeleton, fracture of the mandible was predominant (56.19%). This finding is in accordance with the literature.[8,22]Mandible due to its prominence, its mobile nature and less bony support makes it a vulnerable site of fracture within the facial skeleton.[4] Multiple fractures within the mandible (40.68%) was more commonly observed followed by parasymphysis (28.81%) and condyle (11.86%). The anatomical location of parasymphysis around the curvature of the mandible and the presence of long rooted canine makes this area prone to fracture. Similarly, the thin condylar neck tends to fracture easily during an impact and this mechanism prevents significant cranial injury.[7] As reported by Al Ahmed et al. [8] when fractures due to automobile accidents were considered, the condylar region was the most common site. When motor bike accidents were considered, the symphysis and parasymphysis were affected most often and when assault was considered, the angle demonstrated the highest incidence of fracture.[8] Angle is the other site prone to fracture because of the presence of third molars and abrupt change in the direction between the large, strong body of the mandible and the thin ascending ramus. Most often angle fracture was observed as a part of multiple fracture within the mandible.

In midface isolated zygoma fracture was the commonest occurrence followed by ZMC and lefort II which is in contradiction to other reports[26,27] where ZMC and lefort I fracture were the commonest in the midface. The prominence of the zygomatic bone makes it vulnerable to external trauma. Further the act of instinctive turn of the head when anticipating a blow to the midface to protect the eye may lead to zygomatic complex fractures.

Pan facial trauma was witnessed only in 6.67% of patients with facial fractures. This could be due to reduced number of high velocity injuries.

The incidence of dentolaveolar injury was 22.63%. 48.19%

of these injuries were associated with facial fractures. Most common injury was crown fracture with/ without pulp exposure followed by alveolar bone fracture. This observation can be attributed to its its prominence and vulnerability during RTA and fall injury especially in the upper jaw. They further tend to absorb the impact and prevent significant transmission of injury to cranial base. All the dentoalveolar injuries with salvageable teeth were managedby the endodontist and rest were managed by simple extraction. Alveolar fractures were managed by splinting with composite/ arch bars/ essigs wiring.

ntraoral soft tissue injury was present in 48.42% of cases , of which 35.87% were associated with fracture. Intraoral laceration was the commonest. This could be due to the shearing effect of impact over the bony attachments.

All the soft tissue injuries that needed repair were exclusively repaired under local anesthetics. This was largely to reduce the financial impact of trauma to the patient.

Out of 105 fractures, intervention was done in 85 patients and 20 patients were managed conservatively. ORIF was done in 76 patients , where as arch bar to one of the jaw was placed for 3 and IMF was done for 6 patients. 9 zygoma fractures were treated conservatively. Indications for ORIF of zygomatic complex fractures include diplopia, enophthalmus, poor aesthetic, and limited mouth opening. Few of the cases were treated conservatively on patient request because of the financial constrains and if they were minimally displaced/simple. Surgical management of maxillofacial fracture with open reduction promises a shortened period of bone fixation, rapid restoration of anatomy and function, bony union with less callus formation.[28]

As this study presents a picture of maxillofacial injuries in Eastern Nepal, the inference drawn hereby cannot be generalized. Alcohol as the cause of maxillofacial injuries was also not investigated in the present study.

CONCLUSIONS

This study has highlighted the fact that RTA is the main cause for maxillofacial injury as is globally largely, affecting the age group of 21-30 years. Soft tissue injuries were the most common pattern of injuries. Among bony fractures, the mandible was the most frequently fractured bone.

Our observation of co-existing injuries enforces the idea of having Advanced Trauma Life support trainings for all the medical practitioners to reduce the associated morbidity and mortality.

CONFLICT OF INTEREST

The authors declare no conflict of interest

REFERENCES

1. An epidemiological study on injury and violence in Nepal. 2009. http://www.nhrc.org.np
2. Shahim FN, Cameron P, McNeil JJ. Maxillofacial trauma in major traumapatients. Aust Dent J 2006;51(3):225–30. 10.1111/j.1834-7819.2006.tb00433.x
3. De Sousa A. Psychological issues in acquired facial trauma. Indian J Plast Surg. 2010;43(2):200-5. 10.4103/0970-0358.73452
4. Bali RK, Sharma P, Garg A, Dhillon G. A comprehensive study on maxillofacial trauma conducted in Yamunanagar, India. J Inj Violence Res. 2013;5(2):108–16. 10.5249/jivr.v5i2.331
5. Lee C W, Foo Q C, Wong LV, Leung YY. An Overview of Maxillofacial Trauma in Oral and Maxillofacial Tertiary Trauma Centre, Queen Elizabeth Hospital, Kota Kinabalu, Sabah. CraniomaxillofacTrauma Reconstruction 2017;10(1):16–21. 10.1055/s-0036-1584893
6. Fama F, Cicciu M, Sindoni A, Nastro-Siniscalchi E, Falzea R, Cervino G et al. Maxillofacial and concomitant serious injuries: An eight year single center experience. Chinese Journal of Traumatology 2017;20(1), 4-8. 10.1016/j.cjtee.2016.11.003
7. Moafian G, Aghabeigi MR, Heydari ST, Hoseinzadeh A, Lankarani KB, SarikaniY. An epidemiologic survey of road traffic accidents in Iran: analysis of driver-related factors. Chin J Traumatol 2013;16(3):140–144.10.3760/cma.j.issn.1008-1275.2013.03.003
8. Ahmed AHE, Jaber MA, Fanas SHA, Karas M. The pattern of maxillofacial fractures in Sharjah, UnitedArab Emirates: a review of 230 cases. Oral Surg Oral Med Oral Pathol Oral RadiolEndod 2004;98:166–70. 10.1016/j.tripleo.2004.01.020
9. World Health Organization. Injuries and violence: the facts. Geneva: World Health Organization; 2010.
10. Shrestha R, Shrestha S, Kayastha S, Parajuli N, Dhoju D, ShresthaA.A comparative study on epidemiology, spectrum and outcome analysis of physical trauma cases presenting to emergency department of Dhulikhel Hospital, Kathmandu University hospital and its outreach centers in rural area. Kathmandu Univ Med J. 2013;11(3):241-6. 10.3126/kumj.v11i3.12513

11. Choulagai B, Ling H, Sharma P, Mishra S,Ahmed m, Chand P. Edidemiology of road traffic accidents in Nepal: data review and qualitative analysis. SM J Public Health Epidemiology. 2015;1(3):1014.[Download PDF]

12. Gupta S, Gupta Sk, Devkota S, Ranjit a, Swaroopp M, KushnerAL, et al. Fall injuries in Nepal: a countrywide population –based survey: Ann Global Health. 2015;81(4):487-94. 10.1016/j.aogh.2015.07.004

13. Erol B, Tanrikulu R, Görgün B. Maxillofacial fractures. Analysis of demographic distribution and treatment in 2901 patients (25-year experience). J Craniomaxillofac Surg. 2004;32(5):308-13. 10.1016/j.jcms.2004.04.006

14. Teshome A, Andualem G, Tsegie R and Seifu S. Two years retrospective study of maxillofacial trauma at a tertiary center in North West Ethopia. BMC Res Notes. 2017; 10(1):373. 10.1186/s13104-017-2670-1

15. Owino RO, Macigo FG, Onyango FJ. Pattern and aetiology of mandibular fractures at Kenyatta national hospital. Afr J Oral Health Sci. 2003;4(1):178–80. [Article]

16. Leles JLR, dos Santos ÊJ, Jorge FD, da Silva ET, Leles CR. Risk factors for maxillofacial injuries in a Brazilian emergency hospital sample. J Appl Oral Sci. 2010;18(1):23-9. 10.1590/s1678-77572010000100006

17. Pham-Dang N, Barthélémy I, Orliaguet T, Artola A, Mondié J-M, Dallel R. Etiology, distribution, treatment modalities and complications of maxillofacial fractures. Med Oral Patol Oral Cir Bucal Ed Inglesa. 2014;19(3):e261-9. 10.4317/medoral.19077

18. Bakardjiev A, Pechalova P. Maxillofacial fractures in Southern Bulgaria - a retrospective study of 1706 cases. J Craniomaxillofac Surg. 2007;35(3):147-50. 10.1016/j.jcms.2007.01.005

19. Mishra S R, Khanal P, Karki D K,Kallestrup P, Enemark U. National health insurance policy in Nepal: challenges for implementation. Glob Health. 2015; 8: 28763. 10.3402/gha.v8.28763

20. Pradhan L, Jaisani MR, Dulal S, Dongol A, Sagtani A. A stddy on pattern of maxillofacial injuries in patients reporting to a tertiary care hospital in eastern Nepal. Journal of Oral and Maxillofacial Surgery, Medicine, and Pathology 2015; 27; 656-661. 10.1016/j.ajoms.2015.01.012

21. Ramli R, Rahman RA, Rahman NA, Karim FA, Rajandram RK, Mohamad MSF,et al. Pattern of maxillofacial injuries in motorcyclists in Malaysia. J CraniofacSurg 2008;19(2):316–21. 10.1097/SCS.0b013e318163f94d

22. Kapoor P, Kalra N. A retrospective analysis of maxillofacial injuries in patientsreporting to a tertiary care hospital in East Delhi. Int J Crit Illn Inj Sci 2012;2(1):6–10. 10.4103/2229-5151.94872

23. Gassner R, Tuli T, Hachl O, Rudisch A, Ulmer H. Craniomaxillofacial trauma:a 10 year review of 9,543 cases with 21,067 injuries. Craniomaxillofac Surg 2003;31(1):51–61. 10.1016/s1010-5182(02)00168-3

24. Saddki N, Suhaimi AA, Daud R. Maxillofacial injuries associated with intimatepartner violence in women. BMC Public Health 2010;10:268–73. 10.1186/1471-2458-10-268

25. Okoje VN, Alonge TO, Oluteye OA, Denloye OO. Changing pattern of pediatricmaxillofacial injuries at the accident and emergency department of the University Teaching Hospital, Ibadan: a four-year experience. Prehosp Disaster Med2010;25(1):68–71. 10.1017/s1049023x0000769x

26. Gandhi S, Ranganathan LK, Solanki M, Mathew GC, Singh I, Bither S. Pattern ofmaxillofacial fractures at a tertiary hospital in northern India: a 4-year retro-spective study of 718 patients. Dent Traumatol 2011;27(4):257–62. 10.1111/j.1600-9657.2011.00996.x

27. Adebayo ET, Ajike OS, Adekeye EO. Analysis of the pattern of maxillofacialfractures in Kaduna, Nigeria. Br J Oral Maxillofac Surg 2003;41(6):396–400. 10.1016/s0266-4356(03)00165-7

28. Abbas I, Ali K. Management of mandibular fractures a prospective study. Pak Oral Dent.2002;22:151–2. [Download PDF]