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Original Research Article

SPECTRUM OF ORAL AND MAXILLOFACIAL SURGERY PATIENTS SEEN AT TRIAGE WITH SUBSEQUENT EMERGENCY TREATMENT PROVIDED – A CLINICAL STUDY AT SMBBIT

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Abstract: *Oral and maxillofacial injuries constitute a significant portion of trauma cases in emergency departments, often resulting in life-threatening complications and sometimes death. Effective triage is crucial for prioritizing care, especially in resource-limited settings. Despite the importance of standard protocols, many institutions lack uniform guidelines for managing these complex injuries, which can lead to adverse patient outcomes.* ***Objectives:*** *To explore the clinical presentation patterns of oral and maxillofacial trauma patients at triage, focusing on injury types and patient demographics while documenting initial emergency interventions administered.* ***Methods:*** *This descriptive cross-sectional study was conducted at SMBBIT over six months, involving patients presenting with OMFS Trauma sustained at Emergency Room. Data were collected using a pre-designed pro forma and analyzed using SPSS software for descriptive statistics.* ***Results:*** *A total of 73 patients were included, predominantly male (84.94%), with a mean age of 35.2 years. Road traffic accidents were the leading cause of injury (68.5%). Most patients were self-referred (37%), and 82.2% had no significant co-morbidities. Imaging revealed comminuted pan-facial fractures (37.5%) as the most common diagnosis. Following triage assessment, 80.8% required hospitalization, with 32.2% undergoing immediate surgical interventions, including open reduction internal fixation, closed reduction and soft tissue closure.* ***Conclusion:*** *This study underscores the importance of effective triage in managing oral and maxillofacial surgical patients, particularly in polytrauma cases, with a focus on a multidisciplinary team (MDT) approach. Our findings suggest that incorporating oral and maxillofacial surgical emergency care into triage protocols and resource allocation can improve care quality and reduce patients' complications. Inclusion of oral and maxillofacial surgeons in Emergency Trauma teams in Pakistan is essential for enhancing collaboration and improving patient survival outcomes.*

Keywords: Triage, ATLS, Oral & Maxillofacial Surgery (OMFS), Multidisciplinary team (MDT), Emergency Department (ED), SMBBIT (Shaheed Mohtarma Benazir Bhutto Institute of Trauma), Karachi, Pakistan.

Introduction

The term triage originates from the French word trier, meaning "to sort" or "organize." Historically, triage systems were developed for military field operations to prioritize care for the critically injured. Modern concept of triage was adapted for civilian use in the 1960s, particularly in emergency departments (EDs), to manage the influx of patients effectively (1). Emergency departments serve as the initial point of contact for patients experiencing acute medical, surgical and oral & maxillofacial issues, necessitating a systematic approach to prioritize treatment, based on the severity of their conditions. This is often guided by established protocols such as the Advanced Trauma Life Support (ATLS).(2)

The primary goal of triage is to deliver urgent care to patients needing priority especially, high-pressure environments where high patient volume can compromise the quality of care. Within this context, the role of the Oral & Maxillofacial Surgery (OMFS) team is also critical due to the complexities involved with bleeding and airway issues seen in patients sustaining trauma to the said anatomical body region, as these can pose heightened risk for life-threatening complications and need critical care (3).

Globally, road traffic accidents (RTAs) are a major public health concern, accounting for over 1.35 million deaths and up to 50 million injuries each year, with a disproportionately high burden on low- and middle-income countries causing 93% fatalities, including Pakistan. Maxillofacial emergencies represent a substantial portion of the caseload in both trauma and emergency departments, underscoring the importance of effective triage systems that can categorize patients based on the severity of injuries resulting from traumatic events, such as road traffic accidents, firearm injuries, assaults, sports etc. (5, 6)

RTAs are a leading cause of oral & maxillofacial trauma, globally and constitute a significant portion of emergency cases. The nature of these injuries being complex and life-threatening, demands immediate and structured intervention to prevent severe complications such as: airway obstruction, hemorrhage, infections and permanent facial deformities due to malunion etc. Despite the critical need for uniform triage protocols, many leading healthcare institutions, particularly in developing countries like Pakistan, lack standardized guidelines, thus variations in clinical practice can adversely affect patient outcomes (7, 8).

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Oral & Maxillofacial trauma from RTAs not only impacts individual patients but also places a substantial burden on our existing healthcare systems, including the families, needing specialized surgical care, prolonged recovery times with financial issues. Prompt medical and surgical intervention is vital for reducing mortality and morbidity, particularly in resource-limited settings present in underdeveloped and developing countries. In regions with limited healthcare resources, the absence of standardized triage and treatment protocols exacerbates these challenges, resulting in poor patient outcomes and higher mortality rates. (9,10). Addressing this global issue through improved emergency care strategies is therefore critical to reduce morbidity and mortality associated with such trauma in Pakistan.

The literature search shows, a severe dearth of locally published studies on this neglected OMFS traumatology area in Pakistan, as we can hardly find any published references. Therefore, the purpose of this research is, to characterize the clinical presentation patterns of oral & maxillofacial trauma patients presenting at triage, focusing on injury types, patient demographics with surgical care provided. Additionally, our pioneer study shares the significance of maxillofacial trauma at a tertiary care setting as a valuable academic contribution to the literature.

The Shaheed Mohtarma Benazir Bhutto Institute of Trauma (SMBBIT) in Karachi serves as a leading premier public sector traumatology tertiary care and is becoming one of the largest referral centers in Sindh Province and adjacent major cities, to address multi-specialty surgical specialties contributions with addition of oral & maxillofacial surgical services limited to not only trauma, but oral cancer, odontogenic and fungal infections, tumors etc.

Thus the objective of the study is to explore the clinical presentations of oral & maxillofacial trauma patients at triage, injury types, patient demographics with initial emergency interventions and to augment locally published studies on this uncommon topic.

Methodology

This descriptive cross-sectional study was conducted at the Triage and Resus Bays, as well as the Oral & Maxillofacial Surgery (OMFS) Emergency Room, located at Shaheed Mohtarma Benazir Bhutto Institute of Trauma (SMBBIT) in Karachi, Pakistan. Study was done over six-month from January 1, 2023, to June 30, 2023.The sample size was calculated using the WHO online sample size calculator. Based on an estimated prevalence of 5% for the presenting patterns of oral and maxillofacial (OMF) injuries, a 95% confidence level, and a 5% margin of error, the required sample size was determined to be 73 patients.

A non-probability consecutive sampling technique was employed to select participants. Study Participants included: Patients of any gender, all age groups, presenting with isolated oral & maxillofacial trauma at the Emergency Room and Individuals requiring OMFS immediate first aid management. All study patients giving informed & written consent were included. Patients excluded from the study based consisted of: Pure Polytrauma cases without sustaining OMF Trauma, patients presenting with life-threatening spreading odontogenic- orofacial fungal infections, Oral Oncology cases and elective tumor and trauma cases, already been admitted. Patients refusing to give informed and written consent were also excluded.

Study approval was obtained from SMBBIT Research Ethics Committee (ERC-000056/SMBBIT/Approval/2022) dated (29-12-2022). Patients were seen in Triage department including Bay I and Bay II after receiving call for emergency from the triage department patients were managed in emergency care accordingly. Informed consent was taken by patient/Next of Kin. Clinical findings were recorded along with history of the event that caused the emergency. X-rays of face or CT scan plain of face with 3D reconstruction was carried in accordance with the clinical signs and symptoms, if needed, as part of the management plan. Data of each patient was recorded on a pre-designed pro forma.

The data was analyzed by SPSS software version 26 using descriptive statistics. The frequency and percentages were calculated for categorical variables like age, gender, status of co-morbidities, cause of emergency department visit, and presentation of OMF injury, as well as intervention instituted for cure of the problem. All information was presented in the form of tables and charts/graphs.

Results

A total of 73 patients were included in this study. The ages of the patients ranged from 1 to 60 years. The age distribution is presented in Chart 1. Majority of the patients were in age group 21-30 years: 24 patients (32.88%) followed by 31-40 years: 18 (24.66%),41-50 years: 17 (23.29%) respectively. Gender distribution consisted of 62 male patients (84.94%) and 11 female patients (15.06%), indicating a significant male predominance, as shown in Chart 2.

Table 1 demonstrates presentation of patients in triage department. Road traffic accidents (RTA) were the most common cause of injury, reported by 50 patients (68.50%). Other mechanisms included: Firearm injuries: 10 (13.69%) Cylinder blasts: 5 (6.84%) Assaults and animal bites: 6 (8.21%) Most of patients were self-referred (27 patients, 37.00%). The breakdown of referral sources is as follows: Private practitioners: 15 (20.54%) Ambulance services: 13 (17.80%) External hospitals: 10 (13.70%) Others: 8 patients (10.96%) A total of 60 patients (82.20%) were free from significant comorbidities, while 13 patients (17.80%) had underlying health conditions. All patients underwent appropriate imaging studies, including X-rays and CT scans with 3D reconstructions, to assess facial injuries based on clinical signs and symptoms.

Table 2 shows Pattern of Facial Fractures on basis of X-rays and CT scan among hospitalized patients is summarized as; Comminuted pan-facial fractures: 15 patients (37.5%) , Zygomatic maxillary complex fractures: 8 patients (20%) , Lefort I, II, and III fractures: 6 patients (15%), Comminuted mandible fractures: 6 patients (15%) , Symphysis + condyle fractures: 4 patients (10%) & Naso-orbital-ethmoid fractures: 1 patient (2.5%).

Table 3 indicates types of treatment provided. Out of the 73 patients, 59 (80.8%) required hospitalization following their triage assessment. The majority (40 patients, 67.80%) were admitted due to facial fractures. The remaining 14 patients (19.2%) were managed on an outpatient basis, receiving

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initial first aid, medication, and counseling. Among the hospitalized patients, 19 (32.2%) required immediate surgical intervention under general anesthesia due to complex maxillofacial injuries. The remaining 40 patients were managed under local anesthesia.

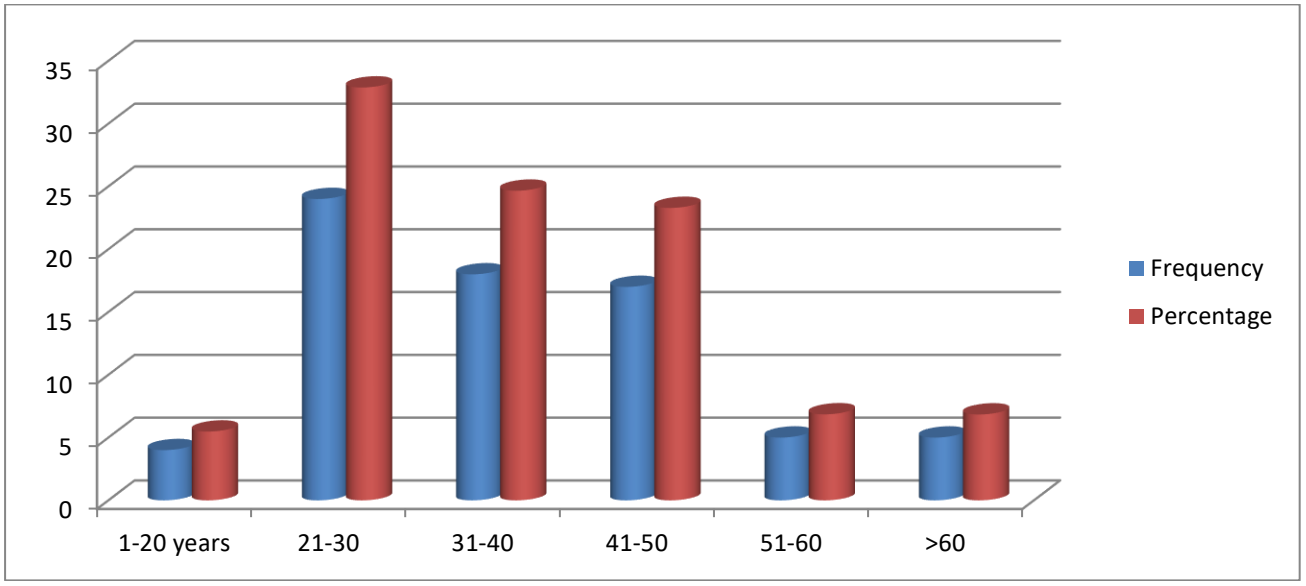

Chart 1: A bar chart showing the age distribution

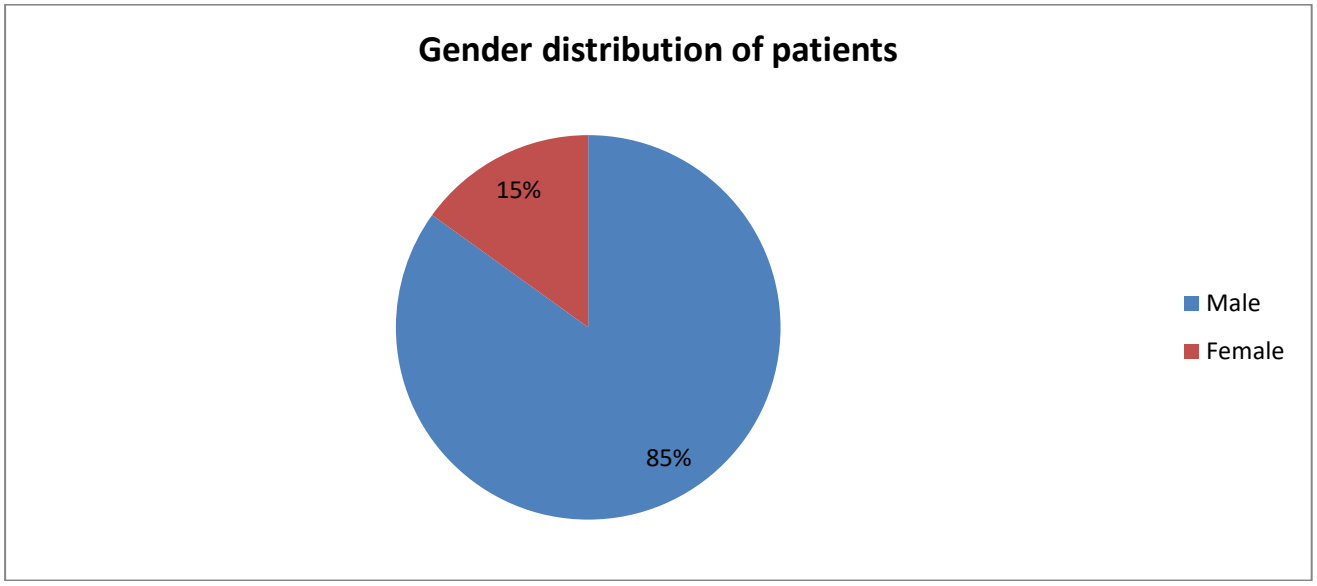

Chart 2: Pie chart representing the gender proportion

Table 1 Presentation of patients in triage department

Variable	Frequency	Percentage
1.Type of referral		
Self-referral	27	37.00
Private practitioner	15	20.54
Ambulance	13	17.80
External hospital	10	13.70
Others	8	10.96
2.Comorbidities		
Yes	13	17.80
No	60	82.20
3.Cause of injury		
RTA	50	68.50

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Fire arm injury	10	13.69
Cylinder blast	05	6.84
Tyre burst	02	2.73
Assault & Animal bite	06	8.21

Table 2 Pattern of fractures (n=40)

Diagnosis	Number	Percentage
Comminuted Panfacial fracture	15	37.5%
Zygomatic maxillary complex	08	20%
Lefort I,II,III fracture	06	15%
Comminuted Mandible fracture	06	15%
Symphysis + Condyle fracture	04	10%
Naso orbital ethmoid fracture	01	2.5%

Table 3 Types of OMFS treatment provided

Category	Number of Patients	Percentage	Management Details
Total Patients Seen at Triage	73	100%	-
Immediate Surgical Intervention	19	26.0%	Required immediate surgery under general anesthesia due to severe maxillofacial trauma.
			Types of Interventions:
			- Debridement, Complex soft tissue closure.
			- Open reduction internal fixation (ORIF)
			- Maxillomandibular fixation (MMF)
			- Foreign body retrieval.
Admitted to OMFS Ward	40	54.8%	Managed initially under local anesthesia.
			Types of Interventions:
			- Soft tissue closure
			- Temporary stabilization and splinting of facial fractures
			- Incision and drainage of hematomas
			- Superficial debridement of infected wounds
			- Tongue-tie
			- Wound dressing
Outpatient Management	14	19.2%	Managed with first aid, medication, and counseling; scheduled for follow-up care.

Outcomes and Patient Follow-up

Of the 73 patients included in this study, 80.8% required hospitalization following triage assessment, with (26%) needing immediate surgical intervention. These surgeries, which included soft tissue closure, open reduction internal fixation (ORIF), and closed reduction- maxillomandibular fixation (MMF), yielded favorable short-term results. The rapid surgical response helped stabilize patients with complex maxillofacial injuries, reducing risks such as infection, hemorrhage, and airway obstruction. For those treated under local anesthesia, the focus was on stabilizing facial fractures and managing soft tissue injuries, ensuring functional and aesthetic preservation.

For the 19.2% of patients managed on an outpatient basis, primary care involved first aid, medication, and scheduled follow-ups. Follow-up appointments played a crucial role in monitoring recovery, detecting any delayed complications (such as infection or wound healing issues), and facilitating further treatment if necessary. Remarkably, the patients in this group experienced fewer complications, highlighting the effectiveness of early, conservative intervention.

This study underscores the importance of timely and targeted emergency interventions in improving patient outcomes, particularly for trauma cases involving road traffic accidents (RTAs) and firearm injuries. While short-term outcomes such as infection control and stabilization were well-documented.

Amongst the patients, following 03 clinical cases, managed at SMBB Trauma Centre, Karachi are shared with informed consents from patients and their guardians.

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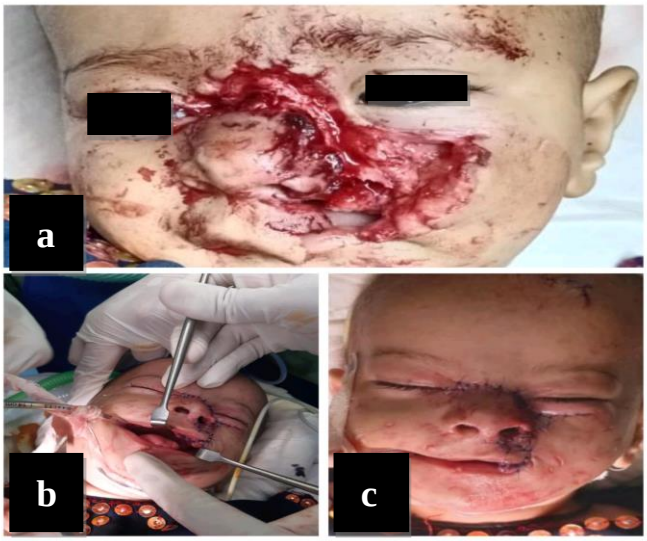
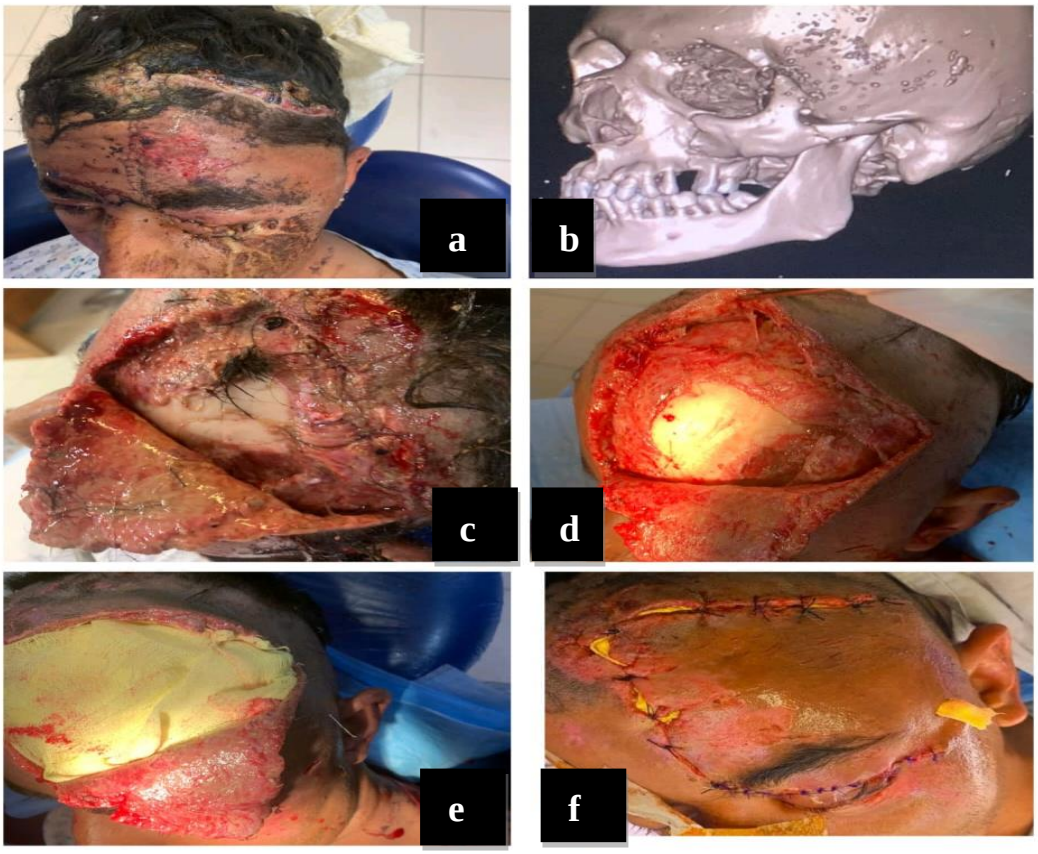


Case# 1 ; A 2-year-old girl presented with intra and extraoral lacerations due to a dog bite (Image A). Under general anesthesia, debridement was performed, followed by closure of both the intraoral (Image B) and extraoral (Image C) lacerations. A post-procedure follow-up was arranged to monitor healing.



Case# 2: A 35-year-old male presented following a bus rollover accident with an infected degloving scalp laceration extending; left temporoparietal region to the left eyelid (Image A). A 3D CT scan confirmed a left zygomaticomaxillary complex (ZMC) fracture with embedded foreign bodies (Image B). Under local anesthesia, the wound was carefully debrided, foreign bodies were removed, and a Bismuth Iodine Paraffin Paste (BIPP) dressing was applied and secured with tag sutures (Image C-F). The patient was subsequently admitted for further definitive care
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Case# 3: A 55-year-old male presented with a firearm injury to face, resulting in comminuted panfacial fracture (Image A & B). Initial management under local anesthesia done to remove loose bone fragments, necrotic tissues & devitalized teeth along with thorough debridement to clear airway obstructions (Image C). Bismuth Iodine Paraffin Paste (BIPP) dressing placed intraorally and wound approximated with tag sutures (Image D). The patient was stabilized and subsequently admitted for definitive surgical intervention

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Discussion

The role of oral & maxillofacial surgeons in managing maxillofacial emergencies is globally established and is critical for effective patient care, especially in polytrauma cases which is somehow greatly undermined by the majority of health care providers in Pakistan. (11) This study aims to review the maxillofacial emergency practices at our institution, highlighting the patterns of clinical conditions requiring oral & maxillofacial specialty emergency services. Our findings underscore the importance of emergency care (EC) as a crucial platform for delivering time-sensitive healthcare services and advancing universal health coverage. Emergency departments (EDs) utilize triage systems to prioritize patients with urgent needs, particularly in situations where care demands exceed available resources. (12)

The significance of multidisciplinary teamwork (MDT) in treating patients under general anesthesia should not be overlooked, rather promoted and is a major gap being also highlighted, esp. the OMFS Specialty gets neglected. Such collaborations among major surgical specialties in Pakistan with OMFS trauma care can reduce pharmacological comorbidities with other potential side effects, optimizing treatment plans, save time that minimize risks and improve patient outcomes. (13, 16) This aligns with the findings of several studies indicating that coordinated care, enhances treatment efficacy in emergency settings (17-20). Our study reveals that, frontline oral & maxillofacial specialists in Accident & Emergency (A&E) departments are uniquely qualified and trained to detect acute simple to complex orofacial trauma including intraoral, extra oral and dental

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trauma with and without oral prosthesis by virtue of dental profession academic background, which amongst all other health care Professions is a separate predominant skill oriented oral health care Profession. (23) Attention to signs such as bruising, burns, and bite marks is another vital assessment factor for timely intervention, closely linked with our specialty (18).

Our findings resonate with few local trauma studies done by Katpar S et al. (4), Khursheed M et al (15) & Ali MQ et al (22) which highlight the prevalence of maxillofacial trauma among young males. This correlation provides valuable insights that enhance our understanding of demographic trends in oral & maxillofacial emergencies and informs to take targeted preventive measures. However, it is crucial to acknowledge the limitations of our study, including its restriction to a single institution, which may limit the generalizability of our findings. Future research should include more research on maxillofacial triage trauma, MDT and multi-center studies to capture a broader range of data.

In our research, road traffic accidents (RTA) emerged as the most common referral reason. This contrasts with Patel A et al. (14), who identified bone loss and difficulty accessing teeth as primary reasons for emergency visits. An international study by Loutroukis T et al. (19) noted that trauma accounted for 72.1% of emergency visits, reinforcing the notion that maxillofacial injuries are predominantly trauma-related. While our study reported 68.5% of referrals due to RTA, other studies document a higher incidence (82.1%). This discrepancy may stem from the varying injury risks faced by different populations, particularly males. Furthermore, while males are more prone to maxillofacial injuries, females with such injuries are 4.5 times more likely to be victims of domestic violence also prevalent in our society as compared to those with trauma in other areas, as highlighted by Devakumari et al (21).

These findings highlight the need for targeted public health interventions and preventive measures tailored to these demographic trends. In light of this, we advocate, expanding more trauma centers and increasing the availability of oral & maxillofacial specialists in every ER team and also at all provincial medical institutes and district level hospital throughout Pakistan (23), leading to improved emergency management of maxillofacial injuries. This will also Strengthen patient referral systems and improve public awareness of triage care.

The implications of our findings are critical for improving the emergency management of oral & maxillofacial injuries. Patients presenting after RTAs typically undergo initial stabilization, debridement, and suturing of wounds as per ATLS protocols before being transferred for definitive facial fracture management. Procedures such as debridement and suturing under local anesthesia were common, highlighting the prevalence of open soft tissue wounds and lacerations. A large number of our study patients received BIPP (Bismuth Iodoform Paraffin Paste) as a dressing material for its supportive roles: controls bleeding, prevents infection and this can be left inside maxillofacial tissues for a long period as a dressing material (24, 25). Furthermore, BIPP usage is a standard practice at our OMF Surgical Ward and is also widely used for other maxillofacial patients with; infections, oncology, fungal infections, cysts etc.

Adhering to Advanced Trauma Life Support (ATLS) guidelines is crucial for early recognition and treatment. Our study identifies a critical gap in triage research in Pakistan, emphasizing the need for improved protocols to facilitate timely and effective emergency care. Additionally, ambulances and paramedics should also be trained to provide oral & maxillofacial surgery emergency care to significantly improve patient outcomes in transfer to triage. To enhance the management of Oral & Maxillofacial emergencies and improve health outcomes in our communities, it is crucial to address existing gaps in emergency care protocols in Pakistan. By implementing our recommendations shared via this study we can facilitate timely and effective emergency interventions.

Locally published studies from, Dr. Junaid Razzak (26,27,29), highlight the importance of comprehensive trauma data collection for improving patient outcomes as these studies primarily focus on general trauma data. The OMFS data included to make National Registry process is appreciated but absence to take its Senior Stake holders on board must be supported by all concerned in future so that, robust and comprehensive Multi Surgical Specialty National policy is formed and OMFS leadership is also included. (28)

We recommend that, similar to other surgical specialities (29, 30), the OMFS National Registry be formed and all leading public sector Medical Universities in each Province of Pakistan should collect data from other major maxillofacial centres at respective provinces. That, Dow University of health sciences & Shaheed Mohtarma Benazir Bhutto Institute of trauma as leading public sector Institutes in Sindh Province should take national lead and contribute in establishing National Oral & maxillofacial Surgery Registry in Pakistan with support from leaderships.

Conclusion

This study highlights the critical role of effective triage in managing oral & maxillofacial surgical patients, especially in polytrauma cases with an emphasis on a multidisciplinary team (MDT) approach to improve patient care and save time. The oral & maxillofacial surgeons must also become a part of Emergency Trauma and disaster management national teams in Pakistan at all related Institutes and that, the Emergency Ambulance staff be also trained to provide OMFS Emergency care. This is all possible with support from Government of Pakistan lead Stake holders, leading to improved Emergency trauma Care in Pakistan as a positive step towards globalization.

Declarations

Data Availability statement

All data generated or analyzed during the study are included in the manuscript.

Ethics approval and consent to participate

Approved by the department concerned. (ERC-000056/SMBBIT/Approval/2022)

Consent for publication

Approved

Funding

Not applicable

Conflict of interest

The authors declared the absence of a conflict of interest.

Author Contribution

SUNNY KUMAR (Resident Oral & Maxillofacial Surgery)
Collecting data, establishing connections amongst authors, contributed in Review of Literatures, corresponding with the Journal.
SHAHJAHAN KATPAR (Professor & Head of Department)
Over all Conception of entire Study & final approval of manuscript draft.
DEVIKA LUHANA (Senior Medical officer)
Study Design, compiled Results & contributed in Review of Literatures.
AMNA AMAN (Resident Oral & Maxillofacial)
Contributed in manuscript writing and collecting References.
MONAISH KUMAR (Resident Oral & Maxillofacial)
Contributed data Entry.
SURKSHA KESWANI (Resident Oral & Maxillofacial)
Contributed in reference collection.

References

1. Yancey CC, O'Rourke MC. Emergency department triage. InStatPearls [Internet] 2021 Jul 30. StatPearls Publishing.
2. Christian MD. Triage. Critical care clinics. 2019 Oct 1;35(4):575-89.
3. 3. Fonseca RJ, Walker RV, Betts NJ, Barber HD. Oral and maxillofacial trauma. 4th ed. Elsevier Health Sciences; 2012.
4. Katpar S, Khan M, Shah SA, Rajput F. Maxillofacial Trauma Spectrum At Civil Hospital Karachi: A Report From Largest Tertiary Care Public Sector Teaching Hospital In Sindh Province. Journal of Khyber College of Dentistry. 2015 Jun 30;5(02):7-11.
5. Global Status Report on Road Safety 2018. Geneva: World Health Organization; 2018.
6. Maxillofacial fractures in Southern Bulgaria—a retrospective study of 1706 cases."Journal of Cranio-Maxillofacial Surgery. 2007;35(3):147-150.
7. Ellis E III, Zide MF. Surgical approaches to the facial skeleton. J Oral Maxillofac Surg. 1995;53(11):1370-6.
8. Haug RH, Nabili S, Shaddox L. Trauma management in oral and maxillofacial surgery: the role of triage in emergency care. J Oral Maxillofac Surg. 2009;67(12):2643-7
9. World Health Organization. Global status report on road safety 2018. Geneva: World Health Organization; 2018. Available from: https://www.who.int/publications/i/item/9789241565684
10. Figueiredo R, Ribeiro A, Martins M. Oral and maxillofacial trauma: A global public health issue. J Cranio-Maxillofac Surg. 2015;43(4):390-3. doi: 10.1016/j.jcms.2014.11.016 .
11. Almutairi EA, Algahtani NS, Alshammari NJ, Al Enazi NA, Al Anazi NA, Almalki SD, et al. Interdisciplinary management of polytrauma patients: A collaborative approach to optimizing care in a tertiary hospital. Int J Innov Res Eng Multidiscip Phys Sci. 2020;8(1):1–11
12. Triage & the Emergency Severity Index - Tools for Emergency Care. HealthEdu TTUHSC. Available at: https://healthedu.ttuhsc.edu
13. Tiwari, R. et al. (2016). Multidisciplinary approach to management of complex maxillofacial trauma. Journal of Cranio-Maxillofacial Surgery. 44(6): 905-910. DOI: 10.1016/j.jcms.2016.02.022.
14. Patel A, Stagnell S, Eaton K. The appropriateness of oral surgery referrals and treatment in contracted intermediate minor oral surgery practices in East Kent. British Dental Journal. 2019 Aug;227(3):211-6.
15. Khursheed M, Fayyaz J, Jamil A. Setting up triage services in the emergency department: Experience from a tertiary care institute of Pakistan. A journey toward excellence. Journal of Ayub Medical College Abbottabad. 2015 Sep 30;27(3):737-40.
16. Baker, S. R., and Perks, H. P. (2017). The role of the multidisciplinary team in the management of polytrauma patients. Emergency Medicine Journal. 34(8): 490-496. DOI: 10.1136/emermed-2016-206349.
17. Okechi UC, Obi DI, Aniagor CJ. Trends in Emergency Room Visits of Oral and Maxillofacial Surgery Patients in a Tertiary Hospital in South-East Nigeria. International Journal of Medicine and Health Development. 2023 Jul 1;28(3):251-5.
18. Park SY, Song JM, Lee JH, Lee JY, Hwang DS, Kim YD, Shin SH, Kim UK. A retrospective analysis of emergency room visits of oral and maxillofacial surgery patients in a tertiary care hospital. Oral Biology Research. 2019 Mar 31;43(1):74-82.
19. Loutroukis T, Loutrouki E, Klukowska-Rötzler J, Koba S, Schlittler F, Schaller B, Exadaktylos AK, Doulberis M, Srivastava DS, Papoutsi S, Burkhard JP. Violence as the Most Frequent Cause of Oral and Maxillofacial Injuries among the Patients from Low-and Middle-Income Countries—A Retrospective Study at a Level I Trauma University Emergency Department in Switzerland. International journal of environmental research and public health. 2020 Jul;17(13):4906.
20. Sun X, Tong S, Yang S, Guo S. Application of Multidisciplinary Team (MDT) in The Treatment of Severe Maxillofacial Trauma: A Retrospective Study.DOI: https://doi.org/10.21203/rs.3.rs-400538/v1
21. Devakumari, S., Thanasekar, V., Biradar, N., & Dominic, N. (2021). Patterns of maxillofacial fractures treated in a tertiary care government hospital of Puducherry – A descriptive cross-sectional study. Asian Journal of Medical Sciences, 12(4), 92–97. https://doi.org/10.3126/AJMS.V12I4.33983.
22. Ali MQ, Muzzammil M, Batool Z, Minhas MS. Triage in Mass Casualty Incidents: Our Preparedness and Response – A Cross-sectional Study from a Tertiary Care Hospital, Karachi, Pakistan. Trauma International, Sep-Dec 2018; 4(2):6-10.
23. Katpar S, Shaikh NA, Yasmin R. National road map to promote dental education via ten commandment recommendations for Pakistan–our perspective. Pak Armed Forces Med J. 2016;66(1):1-4.

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24. Randhawa GK, Graham RM, Matharu KS. Bismuth Iodoform Paraffin Paste: History, Uses and Alternatives in Oral and Maxillofacial Surgery. Dental Update. 2024;48(3):207-211.
25. Ayub T, Katpar S, Shafique S, Mirza T. En bloc resection of huge cemento-ossifying fibroma of mandible: avoiding lower lip split incision. J Coll Physicians Surg Pak. 2011 May;21(5):306-8. PMID: 21575543.
26. Mehmood A, Razzak JA. Trauma registry—Needs and challenges in developing countries. J Emerg Trauma Shock. 2019;12(3):123-30. Available from: https://core.ac.uk/download/pdf/84856538.pdf
27. Razzak JA, Mehmood A. Development and pilot implementation of a locally developed trauma registry: Lessons learnt in a low-income country. BMC Emerg Med. 2013;13(1):4. Available from: https://doi.org/10.1186/1471-227X-13-4
28. Memon MS, Ismail MH, Baqi S, Mannan MA, Murtaza MG, Rahujo MN, Zeeshan S, Ahmed MT, Bhatti MN. Establishment and evaluation of Pakistan's trauma registry: Insights from a public sector trauma institute.
29. Tanoli, O., Ahmad, H., Khan, H., Khattak, F. A., Khan, A., Mikhail, A., Deckelbaum, D., & Razek, T. (2020). A pilot trauma registry in Peshawar, Pakistan – A roadmap to decreasing the burden of injury – Quality improvement study. Journal of Global Surgery. McGill University Health Centre, Centre for Global Surgery, Montreal, Qc, Canada
30. Ahmad, T., Abdul Muhammad, Z., Noordin, S., Humayun, A. (2019). Analysing outcomes through orthopaedic trauma registry: A prospective cohort study. Journal of the Pakistan Medical Association, 69(Supplement 1), S-7-S-11.