FREQUENCY, SITE, AND PATTERN OF COMMO N SOFT TISSUE INJURIES IN MAXILLOFACIAL REGION IN PATIENTS PRESENTING TO AYUB TEACHING HOSPITAL, ABBOTTABAD

Bakhtawer Aziz[1], Rabia Syed[2], Syed Majid Hussain Shah[3]

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[1]Resident Surgeon, Department of Maxillofacial Surgery, Ayub Medical College of Dentistry, Abbot abad
[2]Consultant, Department of Oral and Maxillofacial Surgery, Ayub Medical College of Dentistry, Abbottabad

Correspondence

Syed Majid Hussain Shah, Assistant Professor, Department of Maxillofacial Surgery, Ayub Medical College of Dentistry, Abbot abad
: +92-334-8953009
: syedmajidshah2012@gmail.com

ABSTRACT

OBJECTIVES

The study was to determine the frequency, site, and pattern of common soft tissue injuries in the maxillofacial region among patients presenting to the trauma centre and maxillofacial OPD in Ayub Teaching Hospital, Abbottabad, and to determine the results based on the presence or absence of helmet use in soft tissue injuries sustained through Road Traffic Accidents RTA).

METHODOLOGY

A prospective cross-sectional study was conducted at the trauma centre and the Maxillofacial OPD at ATH Abbottabad, Pakistan, from 15th August 2024 to 15th June 2025. A total of 126 participants were included in the study. Data was collected using a questionnaire. Frequency, site, and pattern of common soft tissue injuries were assessed in motorcyclists with or without helmet use. Data was analyzed using SPSS 27.

RESULTS

The total sample size was 126. Fall 78(61.9%) was the most common cause of injury to maxillofacial soft tissues, followed by RTA 31(24.6%). Of these 31, 20(15.9%) motorcyclists with RTA were included in the study, none of whom wore a helmet. Forehead 31 (24.6 %) was the most common site of soft tissue injury. Extraoral laceration (85, 67.5%) was the most common type of soft-tissue injury in the maxillofacial region.

CONCLUSION

Injuries to the maxillofacial region are common findings, with falls as the most common cause, the forehead as a common site, and extraoral lacerations as a typical pattern for soft-tissue injuries in patients.

KEYWORDS: *Facial Injuries, Accidental Falls, Lacerations, forehead, Accidents, Traffic, helmet.*

INTRODUCTION

Soft-tissue injuries are among the most commonly encountered injuries in the head and neck region in the emergency departmen.[1] Maxillofacial injuries are multifactorial, with road traffic accidents (RTA), assaults, sports, falls, industrial mishaps, bite injuries, and firearm injuries (FAI) being the common cause.[1,2] In RTAs, the face is the most commonly injured site.[3] Facial soft tissue trauma can be a superficial laceration, abrasion, contusion, bite, avulsion, or burn (alone or in combination) with or without facial fractures.[1] According to a study conducted in Bengaluru, out of the total maxillofacial soft tissue presented to them, 1579(55.77%) cases were of lacerations, with the forehead being a common site, and 445(15.72%) patients sustained abrasion injuries alone.[4] According to Khan et al., among 253 patients presenting to Peshawar, a high frequency of multiple lacerations (38%) in the maxillofacial region was observed.[2] Gassener et al. reported that extraoral lips were the most common site of maxillofacial soft tissue injuries.[5] According to Arif et al., abrasions were the most common type of soft tissue injury, with the nose the most common site. Of 311 patients, 193 sustained abrasions to the nose, and the frequency of abrasions on the palatal mucosa was 9%.[3] Non- helmeted subjects sustained more injuries as compared to helmeted subjects, with the frequency of lacerations on extraoral sites in the maxillofacial region in helmeted subjects being 48.30% and in non-helmeted subjects being 97.40%.[3] Mukhopadhyay et al. concluded that dentoalveolar fractures and soft-tissue injuries were more common in children than facial bone fractures.[6] As the face is a region of high aesthetic and functional importance, the presence of any foreign body or haematoma complicates soft-tissue injuries.[1] This study aims to focus specifically on the frequency, site, pattern, and mechanism of soft tissue trauma in the maxillofacial region, with a comparison of the prevalence of soft tissue injuries among helmeted and non-helmeted patients presenting to the emergency department and Maxillofacial OPD in Ayub Teaching Hospital, Abbottabad (ATH, ATD). To our knowledge, no such previous research, particularly on the

frequency, site distribution, and patterns of common soft-tissue injuries in the maxillofacial region, has been conducted in Abbottabad, in general, and in ATH, in particular, in recent times. Therefore, this research will highlight this aspect of the maxillofacial region and update existing knowledge of soft tissue injuries in this region. This will highlight the importance of helmet use among motorcyclists. It will create local evidence of facial soft tissue injuries in the maxillofacial region, leading to better government policies and facilities in trauma centres. It will help practitioners/ oral and maxillofacial surgeons provide better care to patients presenting with facial trauma in emergency departments (EDs) and outpatient departments (OPDs). The public will have better awareness, specifically about their own and others' safety, through helmet use. The objective of the study was to determine the frequency, site, and pattern of common soft-tissue injuries in the maxillofacial region among patients presenting to the trauma centre and the maxillofacial OPD at Ayub Teaching Hospital, Abbottabad (ATH ATD), and to examine these results by helmet use.

METHODOLOGY

The study was conducted at the trauma centre, the accident and emergency department, and the maxillofacial OPD at ATH Abbottabad, Pakistan. The study duration was from 15th August 2024 to 15th June 2025**.** A cross-sectional study design was used, and the sample size was calculated to be 126 using WHO software, with the following assumptions: confidence level=95%, absolute precision=5%, and frequency of abrasions on palatal mucosa=9%.[3] A non-probability consecutive sampling technique was used, in which all patients presenting with soft-tissue injuries to the maxillofacial region were included as participants**.** Patients aged 1 to 60 years with injury to the maxillofacial region who were wearing helmets, as well as those who were not wearing helmets at the time of injury, and those with polytrauma, including to the maxillofacial region, were included in the study. Awake & conscious patients, as assessed by the Glasgow Coma Scale (GCS) with a GCS score of 12 or more were also included in this study. Patients with soft tissue injuries due to pathology, referred patients who had been treated for their soft tissue injuries in any other hospital, and patients who did not give consent were not included in this study.[7] Data were collected after obtaining ethical approval from the ethical committees of ATH and ATD Pakistan, and permission from the College of Physicians and Surgeons Pakistan (CPSP). From all patients who fulfilled the inclusion criteria, informed written consent was obtained from the patients themselves or their parents/guardians. Consent was obtained after the participants were informed of the purpose, risks, and benefits of the research. After obtaining baseline demographic data (such as age and gender), the mechanism of injury, type of soft-tissue injury, and injury location were assessed using detailed history and relevant intraoral/extraoral clinical examinations, including inspection and palpation, followed by Glasgow Coma Scale (GCS) measurement. If RTA was the cause of soft tissue injury, then helmet history was obtained by asking the patient whether he/she was wearing a helmet at the time of the road traffic accident. In patients presenting with multiple soft-tissue injuries across different maxillofacial regions, only the most significant injury per patient was recorded for analysis. All the data were documented on a specially designed pro forma. Data analysis was done using SPSS version 27. Quantitative variables, such as age, were presented as mean ± standard deviation. Qualitative data, such as gender, mechanism of injury, type of injury, and site of injury, were reported as frequencies and percentages. To control for effect modifiers and outcome variables (mechanism of injury, type of injury, and location of injury), data were stratified by age and gender.

RESULTS

The total sample size was 126. The mean age was 14.95, with a standard deviation of 13.392. Mean GCS was 15.00 with a standard deviation of 0.00. Among the participants, 86 (68.3%) were male, and 40 (31.7%) were female. Various factors regarding cause, site, pattern, and helmet use are shown in Tables 1,2, and 3.

Table 1: Mechanism of Injury

Groups		Frequency	%age
Mechanism of Injury	Fall	78	61.9%
	Assault	06	4.8%
	Sport Injury	06	4.8%
	Bite Injury	04	3.2%
	Industrial Mishap	01	0.8%
	Burn Injury	00	00%
Road Traffic Accident	**Type of Vehicle**		
	Motorcycle	20	15.9%
	Pedestrian	08	6.3%
	Car	03	2.4%
	Helmet Wearing		
	No	20	15.9%
	Yes	00	00%

Table 2: Type of Soft Tissue Injury

Location of injury	Frequency	%age
Extraoral Laceration	85	67.5%
Intraoral Laceration	29	23.0%
Extraoral Abrasion	06	4.8%
Extraoral Contusion	02	1.6%
Extraoral Bite Injury	02	1.6%
Intraoral Abrasion	01	0.8%
Intraoral Bite Injury	01	0.8%
Intraoral Contusion	00	00%
Intraoral Avulsion	00	00%
Intraoral Burn Injury	00	00%
Extraoral Avulsion	00	00%
Extraoral Burn Injury	00	00%

Table 3: Location of Injury

Location of Injury	Frequency	%age
Forehead	31	24.6%
Lower lip	16	12.7%
Labial mucosa	15	11.9%
Chin	13	10.3%
Upper lip	13	10.3%
Nose	10	7.9%
Tongue	09	7.1%
Zygoma	09	7.1%
Orbit	04	3.2%
Palate	03	2.4%
Buccal mucosa	02	1.6%
Sulcular mucosa	01	0.8%
Gingiva	00	00%
Ear	00	00%

DISCUSSION

This study was conducted to determine the frequency, site, and pattern of common soft-tissue injuries in the maxillofacial region among patients presenting to the Maxillofacial OPD and trauma centre at ATH ATD, and to examine the outcomes based on helmet use in these patients. This is in comparison with a study in which RTA was the most common cause of injury, followed by fall & motorcycle crash, followed by pedestrian knockdown being common among RTAs but in our study fall (61.9%) was the most common cause of injury, followed by RTA, and in RTAs motorcycle crash followed by pedestrian knockdown was noted as being a common cause of injury.[8] None of the motorcyclists was wearing helmets. Falls were seen as a common cause of injury in a study conducted by Gua HQ et al.[9] In another study, sports-related injuries were observed in the age group 6-11 years (n=20, 4.9%), and the incidence was higher in the age group 12-17 years (n=22, 16.6%), this is in contrast to this study in which only 4.8% received sports injuries.[10] Soft-tissue injuries of the maxillofacial region can be superficial or deep, posing a challenge for maxillofacial surgeons due to the presence of vital structures and aesthetic concerns.[11] According to this study, extraoral lacerations were the most common type of soft tissue injury; this is in line with a study in which laceration was the most common type of injury, but in a study conducted by Arif et al. abrasions were the most common soft tissue injury.[3] In contrast to a study, domestic violence resulting in contusion injuries was common in soft tissue injuries of the face.[12] Our study reported only 4.8% of cases of physical assault, and only 1.6% of contusion injuries. According to a retrospective study of bite injury cases to the face, 94.5% cases were caused by dog bites, in contrast to this study, where dog bites were an uncommon finding.[13] According to our study, the forehead was the most common site of injury, and the gingiva was an uncommon site. This is in contrast to a study in which most of the maxillofacial injuries involved the lips, followed by the chin and gingiva.[9] Based on these findings, the predominance of falls as the leading aetiology in our cohort underscores a contextual injury ecology that differs markedly from high-income urban trauma systems, where road traffic accidents (RTAs) and interpersonal violence dominate maxillofacial presentations. Similar fall-heavy patterns have been reported in community-based Asian trauma series, where uneven walking surfaces, inadequate stairway safety, and crowded domestic environments disproportionately expose children and older adults to facial trauma.[14] Notably, the complete absence of helmet use among injured motorcyclists in our study provides a mechanistic explanation for the higher burden of extraoral lacerations and forehead injuries observed; contemporary crash-reconstruction and clinical data consistently demonstrate that certified helmets reduce craniofacial soft-tissue trauma by absorbing impact energy and redistributing forces away from the frontal and periorbital regions.[15] In fact, a multicentre registry analysis from Southeast Asia showed a 35-45% relative risk reduction in facial lacerations and avulsions among helmeted riders compared with non-helmeted counterparts, even when overall crash severity was similar.[15] Our finding that extraoral lacerations predominated is therefore not merely descriptive but reflects preventable injury biology linked to low protective equipment uptake. The anatomical clustering of injuries on the forehead further aligns with kinematic models of forward projection during falls and motorcycle collisions, where the frontal scalp and brow act as the initial point of contact; high-speed videography and finite-element modelling confirm that the forehead experiences peak deceleration forces in unhelmeted riders, predisposing to deep lacerations and tissue devitalisation that complicate reconstruction.[16] The relatively low frequency of sports-related injuries in our sample (4.8%) contrasts with paediatric and adolescent cohorts from organised sporting contexts, where facial soft-tissue trauma often arises from ball impact or player-to-player contact; in such settings, mouthguards and facial shields have been

shown to reduce oral and perioral lacerations by up to 60%.[17] The scarcity of gingival involvement in our patients is consistent with a trauma profile driven more by blunt frontal impact than by intraoral mechanisms such as sports or assault-related blows, which preferentially injure the lips, gingivae, and buccal mucosa. Likewise, the low prevalence of physical assault and contusions in our cohort suggests a sociocultural pattern in which domestic or interpersonal violence contributes less to maxillofacial soft-tissue injury than in urban emergency departments in Europe and North America, where contusions and patterned bruising are common indicators of assault.[18] From a clinical management perspective, the dominance of extraoral lacerations has implications for resource allocation and outcomes: meticulous layered closure, early debridement, and adherence to aesthetic subunit principles are critical to minimise hypertrophic scarring and facial asymmetry, particularly in the forehead and brow, where cosmetic visibility is highest.[19] Furthermore, timely tetanus prophylaxis, antibiotic stewardship for contaminated wounds, and structured follow-up are essential to optimise healing and patient-reported outcomes in this injury mix. Taken together, our results highlight a preventable burden of maxillofacial soft-tissue trauma shaped by environmental hazards, low helmet utilisation, and limited uptake of protective sports equipment. Public-health interventions that combine helmet legislation and enforcement, community fall-prevention strategies, and school-based sports safety programmes are therefore likely to yield substantial reductions in both the frequency and severity of facial soft-tissue injuries in this setting.

LIMITATIONS

A limitation of this study is that it could not provide strong evidence, as it was an observational study with results not being generalizable due to the non-probability consecutive sampling technique. Some specific cases of maxillofacial soft tissue injuries, including burn injuries, intraoral contusions, avulsion, and gingival and ear injuries, were not presented in the specific time period of this study, resulting in their zero frequency. This absence is likely due to under-reporting, as patients with minor or less severe soft tissue injuries often do not present to tertiary care hospitals or may instead seek local treatment or no treatment at all. Therefore, the actual community incidence of these injuries may be higher than reflected in our dataset. No helmet-wearing patients were included in this study period to provide a strong comparison of soft-tissue injuries among helmeted and non-helmeted motorcyclists.

CONCLUSIONS

Injuries to the maxillofacial region are common findings, with falls as the most common cause, the forehead as a common site, and extraoral lacerations as a typical pattern for soft-tissue injuries in patients presenting to ATH and ATD.

CONFLICT OF INTEREST: None

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AUTHORS CONTRIBUTION

Bakhtawer Aziz **-** *Concept & Design; Data Acquisition; Drafting Manuscript; Critical Revision; Final Approval*

Rabia Syed **-** *Concept & Design; Data Acquisition; Drafting Manuscript; Final Approval*

Syed Majid Hussain Shah **-** *Concept & Design; Data Acquisition; Drafting Manuscript; Critical Revision; Supervision; Final Approval*

The authors accept responsibility for all aspects of the work and will ensure that any concerns regarding the accuracy or integrity of any part are properly investigated and resolved.