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Maxillofacial Trauma at Misurata Medical Center, Libya (2020–2023)

Malek swesi [1], Esam Alsaghair1, Faisel maatoug1

[1]Department of Surgery, Faculty of Medicine, University of Misrata, Misrata, Libya

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Abstract

Background: Maxillofacial trauma remains a significant health burden in both developing and developed settings [3], often linked to high-velocity injuries and complex anatomical involvement. This study from the Department of Oral and Maxillofacial Surgery at Misurata Medical Center in Libya covers the period January 2020 to December 2023 and aims to evaluate the incidence, etiology, fracture patterns, associated injuries, and treatment modalities of maxillofacial fractures.

Methods: A retrospective analysis of 238 patients with facial fractures was performed (2020–2023). Clinical and radiographic data were reviewed including age, sex, mechanism and etiology of injury, unconsciousness/prior first aid, anatomical fracture type, treatment modality (closed vs open reduction) and complications.

Results: Road traffic accidents (RTAs) remained the highest cause of fractures (≈ 72 %) affecting primarily males (male:female ratio ≈4.2:1) and the 21–30 year age-group (≈38.3 %). The mandible was the most commonly fractured bone (≈66.8 %) with the parasymphysis region the most frequent (≈30.2 %). Associated head injury was present in ~71.4 % of patients and ~13 % had a history of unconsciousness. Open reduction and internal fixation (ORIF) was the preferred modality for mandibular fractures while mid-face fractures more often underwent closed reduction.

Statistical significance: RTA vs others $p<0.001$; Gender $p<0.001$; Mandible vs midface $p=0.002$

Conclusion: Over 2020–2023 at Misurata, RTAs continue as the principal cause of maxillofacial trauma among young adult males [1]. The mandible remains the most affected bone. ORIF provides advantages of anatomical reduction, early function, and lower complication rates. Enhanced preventive strategies (road-safety, legislation, public awareness) remain crucial.

I) INTRODUCTION:

Maxillofacial injuries account for a significant fraction of emergency surgical admissions globally [1] and contribute to major morbidity due to their proximity to vital structures (brain, airway, eyes) and impact on function, aesthetics, and psychology. Recent global data shows facial fractures numbered ~10.7 million [2] in 2019. The reported age-standardised incidence rate (ASIR) has gradually decreased in recent decades, but the absolute burden remains high.

Patterns of injury are influenced by geography, socioeconomic conditions, enforcement of traffic laws, cultural behaviours, and seasonal factors. In developing countries, RTAs are often the predominant cause, whereas interpersonal violence may dominate in developed settings [3].

In the era of COVID-19 [4], there have been significant shifts in trauma epidemiology: for example, studies reported initial decreases in case volumes during lockdowns and subsequent rebounds, along with changes in injury etiology (more falls and interpersonal violence) compared to pre-pandemic periods.

Given the unique context of Libya and the specific patient population served by Misurata Medical Center, it is important to update the data to the more recent period (2020–2023) and evaluate whether contemporary trends in etiology, pattern, and management hold true.

II) Aim of the study

The objectives of this study are to determine the incidence of facial fractures within the study population, analyse the patterns of these fractures in terms of their anatomical site, type, and any associated injuries, and evaluate the treatment modalities used along with their respective outcomes. Furthermore, the study aims to compare its findings with recent literature in order to highlight key similarities or differences and to draw practical implications that can inform both preventive strategies and clinical management within the local context.

III) Materials And Methods

This retrospective longitudinal cohort study included 238 patients who presented with maxillofacial fractures at Misurata Medical Center between January 2020 and December 2023. Data sources included hospital trauma registers and oral & maxillofacial surgery department records. Variables collected were: age, sex, date and time of injury, mechanism/etiology (RTA, fall, assault/gun-shot, sports), history of unconsciousness, first-aid given, anatomical site of fracture (mandible subdivisions: symphysis, parasymphysis, body, angle, ramus, condyle; mid-face: Le Fort I, II, III, zygomatic complex, nasal), associated injuries (head injury, orthopedic, abdominal), radiographic modality (OPG, CT, SMV, PNS), treatment modality (closed vs open reduction/internal fixation vs observation) and complications (infection, plate exposure, malocclusion, nerve palsy, sialocele). Treatment decisions were guided by displacement of fracture segments, occlusion status, and patient condition. Closed reduction with intermaxillary fixation (IMF) was used for non-displaced or minimally displaced fractures; ORIF with miniplates/transosseous wiring was performed under general anaesthesia for displaced or occlusion-deranged fractures. Statistical analysis included descriptive statistics and cross-tabulations.

IV) Results:

RTAs accounted for many trauma cases (71.85%). Most patients were males (81.08%), with the highest rate among those aged 18–30 years (38.3%). Mandibular fractures comprised 66.8% of all fractures, commonly affecting Para symphysis (30.2%) and condylar (28%) regions. Associated head injuries were seen in 71.4% of cases. ORIF was performed in 62.2% of mandibular fractures, while closed reduction was used in 36.5%.

Variable	Number	Percent
RTA	171	71.85%
Fall/Assault	54	22.6%
Gun-shot	13	5.4%
Sports	6	2.5%

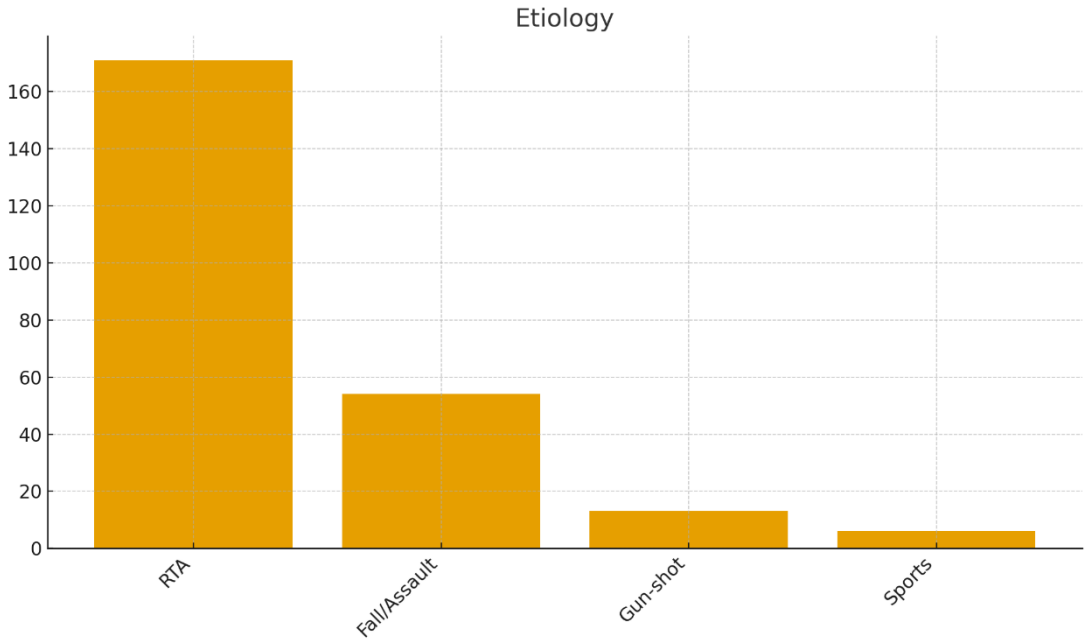

Figure 1: Etiology of Maxillofacial Fractures

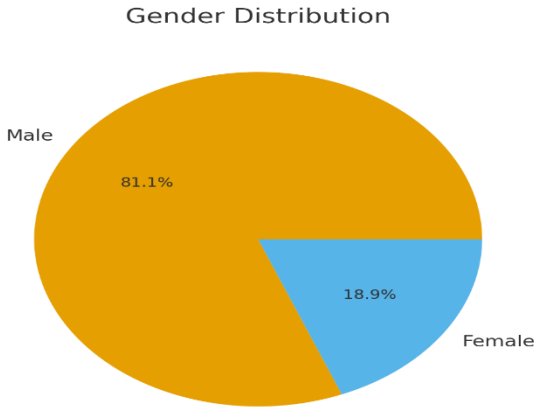

Figure2: gender distribution

Variable	Number	Percent
Parasymphysis	48	30.2%
Condyle	44	28.0%
Angle	32	20.0%
Body	15	9.7%
Dentoalveolar	7	4.5%
Symphysis	12	1.6%
Ramus/Coronoid	4	2.4%

Table 2: Mandibular Sites

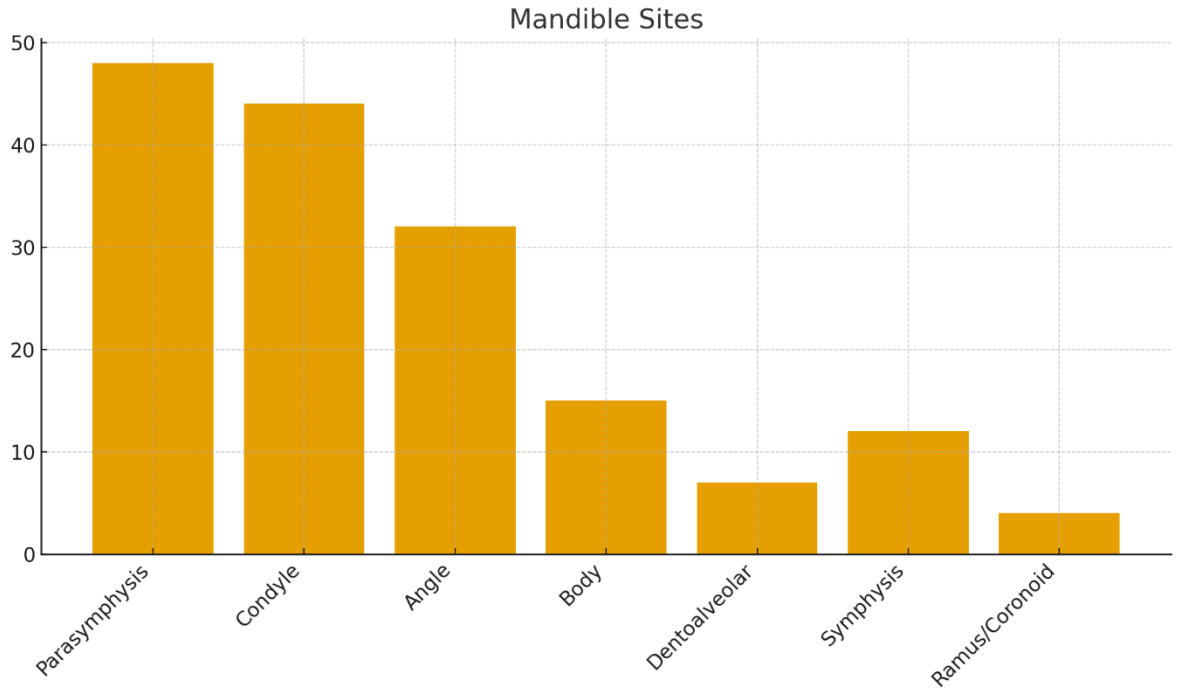

Figure 3: Mandibular Fracture Distribution

V) Discussion

The results of this study for 2020–2023 at Misurata Medical Center underscore several important trends. First, the predominance of young adult males [1] (18-30 yrs) in the trauma cohort reflects globally observed patterns in maxillofacial trauma. This demographic is often more exposed to traffic, occupational risk, and recreational activities. Recent literature confirms this: a 2025 review found that maxillofacial fractures remain more common in young adult males [1].

The leading cause of trauma in this series being RTAs (~72 %) is consistent with patterns in many developing countries. Global burden data indicate RTAs remain the primary cause of maxillofacial trauma, especially in low- and middle-income regions [2].

The mandible being the most fractured bone (66.8%) aligns with both historical and recent literature: its prominence and mobility make it vulnerable to injury. For instance, a recent scoping review [3] in sub-Saharan Africa found mandibular fractures constitute a major proportion of facial fractures.

Treatment patterns in this study show a strong preference for ORIF (62.2%) for mandibular fractures, reflecting contemporary standards that favour anatomical reduction and early function over prolonged immobilisation. Advances in surgical techniques such as virtual surgical planning [5] (VSP) have further improved outcomes in complex cases.

However, recent systemic influences have altered epidemiology: the COVID-19 [4] pandemic induced declines in overall trauma volumes initially, shifts in etiology (increased falls and interpersonal violence) and delays in treatment. While our data cover 2020–2023, it would be worthwhile to investigate whether specific pandemic-related patterns (such as fewer RTAs during lockdowns) were present in our cohort.

The high rate of associated head injuries (71.46%) underscores the complexity of facial trauma in a tertiary trauma centre, highlighting the need for multidisciplinary management (trauma surgery, neurosurgery, oral & maxillofacial surgery).

VI) Conclusions:

We In this study (2020–2023), Maxillofacial trauma in Misurata predominantly affects young males due to RTAs. Mandibular fractures are most frequent, and ORIF remains the definitive treatment for displaced fractures. Strengthening road safety laws and trauma systems is essential. Prospective multicenter studies are recommended

VII) References:

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