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RESEARCH ARTICLE

INCIDENCE AND PATTERNS OF MAXILLOFACIAL FRACTURES IN PEDIATRIC AND ADULT PATIENTS: A TEN-YEAR RETROSPECTIVE STUDY

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Abstract

Background and aims: Treatment for maxillofacial fractures, which affect the mandible, maxilla, zygomatic bone, and nose, depends on the form and severity of the injury. In order to manage complicated patients needing closed reduction or open reduction and internal fixation, university hospitals such as Al-Thawra General Modern Hospital in Sana'a employ cutting-edge surgical procedures and interdisciplinary care. The purpose of this retrospective study was to evaluate related fracture types and aetiology, as well as the types and treatments of maxillofacial fractures among patients sent to the Al-Thawra General Modern Hospital in Sana'a.

Subjects and methods: This retrospective investigation looked at the data of 1141 patients, ages 3 to 60, which had maxillofacial fractures between January 2014 and December 2023. Age, gender, the site and aetiology of the fracture, and the course of therapy were all taken from the historical records and analysed.

Results: Males constituted 78.7% and females 21.3% of the population studied. Among children, males were 77.74% and females 22.26%, with a mean age of 10.4 years, primarily in the 11–15-year age group (56.1%). In adults, males made up 79.1% and females 20.9%, with a mean age of 26.1 years, predominantly aged 16–25 years (60.6%). The primary causes of fractures were road traffic accidents (56.1%), falls from heights (22.5%), and assaults (13.3%). In an alternate dataset, traffic accidents were noted at 50%. Mandible fractures were the most frequent, accounting for 31.4% of cases, followed by zygomatic (17.2%) and condylar fractures (8.9%).

Conclusions: The majority of victims of maxillofacial fractures and injuries in the child and adult categories were males between the ages of 16 and 25. Traffic accidents, falls from heights, and attacks were the main causes of fractures. Zygomatic and condylar fractures were the next most common, after mandibular fractures.

Keywords: closed reduction, IMF, maxillary fracture, Open Reduction (OR), open surgical fixation, zygomatic fracture, Zygomatic Hock.

INTRODUCTION

Due to their dense populations, heavy traffic, and high rates of violence brought on by the 14-year conflict, large cities like Sana'a, Yemen, have a higher prevalence of maxillofacial fractures. The causes, kinds, and sites of these fractures seem to be influenced by geographic location and conditions[1-3]. Numerous studies have connected maxillofacial fractures, defined sex and age groups, degree of mechanisation, and development[4-6].

As humankind developed and produced more instruments to make life simpler, the frequency and severity of facial trauma injuries increased. Maxillofacial injuries are extremely painful, both physically and psychologically, even though they are rarely deadly. Although fatalities from maxillofacial injuries are rare, they can cause serious bleeding and respiratory impairment. Additionally, a cranio-cerebral damage associated with facial trauma was seen in 20% of the individuals, which is another potential cause of death[7,8]. Global differences in the frequency and

distribution of maxillofacial fractures are said to be explained by different socioeconomic, cultural, and environmental factors[9]. Yemen and other low- and middle-income countries account for more than 90% of injury-related deaths globally[10].

Over the past 40 years, Yemen's economy and society have undergone significant change, as shown by the country's growing population, increased traffic, and competition for resources in both urban and rural areas[11]. These factors have undoubtedly altered the patterns, severity, and cause of maxillofacial fractures. Thus, this study was conducted. Due to a lack of well-staffed public health care facilities, the study was conducted at Al-Thwart Hospital in Sana'a City, the largest referral hospital in the country, which also serves as a primary healthcare facility. Because of this, the patients receiving treatment are typical of the pattern of oral and maxillofacial fractures common in Yemen's capital. Since current search turned up few recent studies on maxillofacial fractures in Yemen[4,7,12], we set out to collect data on the epidemiology of these fractures. Another objective of the current study was to identify the associated fractures in patients seen at the Oral Maxillofacial Unit of Al-Thwart Hospital.

SUBJECTS AND METHODS

Study Design: The clinical records of patients with maxillofacial fractures over a ten-year period were analysed in this study, which used a retrospective observational methodology.

Patient Population: This study included patients with maxillofacial fractures who visited the Al-Thawra General Modern Hospital in Sana'a's Department of Oral and Maxillofacial Surgery between January 2014 and December 2023.

Ethical Considerations: Under registration number 2023-33, dated December 21, 2023, the Ethics Committee of Al-Thawra General Modern Hospital accepted the study, which was carried out in compliance with the declaration of Helsinki.

Exclusion criteria: The study excluded patients with incomplete medical records and inadequate follow-up.

Clinical feature record: A medical secretary obtained medical records, which the author or authors subsequently examined. Age, sex, comorbidities, cause of fracture, anatomical site of fracture, evaluation of related fracture types, treatment, and kind of treatment were among the information gathered from patient files.Patients were divided into age groups: a pediatric group and an adult group.The treatment including closed reduction, IMF; both Arch Bar and IMF; and Zygomatic Hock. Also, treatment by Open Reduction (OR) treatment included Plates and IMF, Trans-osseous wire and IMF, Plates alone, and Acrylic Splint.

Statistical Analysis: Standard descriptive statistics were applied when the findings were tallied. Numerical variables are summarised using mean values, whilst categorical variables are displayed as counts and percentages.

RESULTS

Table 1 shows the gender distribution of patients with Maxillofacial Fractures who were referred to Al-Thawra General Modern Hospital in Sana'a during the period from January 2014 to December 2023. Males comprised 78.7% and females 21.3%. Among children, males comprised 77.74% and females 22.26%, while among adults, males comprised 79.1% and females 20.9%. Table 2 shows the age distribution of children with Maxillofacial Fractures referred to Al-Thawra Modern General Hospital in Sana'a between January 2014 and December 2023. The mean age of the children was 10.4 years, with a standard deviation of 3.2 years, and their ages ranged from 3 to 15 years.

Table 1: Gender distribution of patients with maxillofacial fractures.

Characters	Children N (%)	Adults N (%)	Total N (%)
Sex			
Male	262 (77.74)	636 (79.1)	898 (78.7)
Female	75 (22.26)	168 (20.9)	243 (21.3)
Total	337 (29.5)	804 (70.5)	1141 (100)

The majority of children were in the 11–15-year age group (56.1%), followed by the 6–10-year age group (25.8%), while only 18.1% were under 6 years old. Table 3 shows the age distribution of adults with Maxillofacial Fractures referred to Al-Thawra Modern General Hospital in Sana'a between January 2014 and December 2023. The mean age of the adults was 26.1 years, with a standard deviation of 10.3 years, and their ages ranged from 16 to 60 years. The majority of adults were in the 16–25-year age group (60.6%), followed by the 26–35-year age group (19.0%), while only 11.7% were in age group 36-45 years and older than 46 years were 8.7%. Table 3 shows the etiology of maxillofacial fractures in children referred to Al-Thawra Modern General Hospital in Sana'a. The most common cause of fractures was RTA (56.1%), followed by falls from a height (22.5%), then assault (13.3%), while incision and punctures wound accounted for 3.6%, animal attacks for 3%, and gunshot wounds for only 1.4%. Table 5 details the etiology of maxillofacial fractures in adult patients referred to Al-Thawra Modern General Hospital in Sana'a. The most common cause of fractures was traffic accidents (50%), followed by falls from heights (16.9%), assault (8%), lacerations and puncture wounds (2.5%), animal attacks (2.4%), and gunshot wounds (8.5%). Other etiology of maxillofacial fractures not previously recorded in children included pathological fractures (4.6%), wisdom tooth extraction (4.9%), and blast injuries (2.4%) were reported in adults.

Table 2: Age distribution of children with maxillofacial fractures.

Age in Years	N (%)
Less than 6 years	61 (18.1)
6- 10 years	87 (25.8)
11- 15 years	189 (56.1)
Total	337 (100)
Mean	10.4 years
SD	3.2 years
Median	11.2 years
Mode	13 years
Min to max	3-15 years
16-25 years	487 (60.6)
26-35 years	153 (19.0)
36-45 years	94 (11.7)
≥46 years	70 (8.7)
Total	804 (100)
Mean	26.1 years
SD	10.3 years
Median	22 years
Mode	20 years
Min to max	16- 60 years

Table 4 shows Types of maxillofacial fractures by location in 1141 patients with maxillofacial fractures referred to Al-Thawra General Modern Hospital in Sana'a during the period from January 2014 to December 2023. The most common fracture was mandible counting 31.4%, followed by zygoma counting 17.2%, condylar counting 8.9%, Le fort I Le fort II counting 6.7%, dentoalveolar counting 6.5%. Others fracture types were less common including para-symphysis (5.9%), symphysis (5.5%), body (4.7%), angle (4.6%) and maxilla (3.8%). Also, rare fractures including orbital (2.6%), ramus (1.6%) and coronoid (0.7%) were reported. The treatment strategies for 1141 patients with maxillofacial fractures who were referred to Al-Thawra General Modern Hospital in Sana'a between January 2014 and December 2023 are displayed in Table 5. Total 7.01% of our patients underwent closed reduction for maxillofacial fractures; 15.3% underwent IMF; 5.3% underwent both Arch Bar and IMF; and 10.5% underwent Zygomatic Hock. For our patients with maxillofacial fractures, Open Reduction (OR) treatment included Plates and IMF in 7.2% of cases, Trans-osseous wire and IMF in 18.1% of cases, Plates alone in 30.9% of cases, and Acrylic Splint in 2.4% of cases.

Table 3: Etiology of maxillofacial fractures in children.

Etiology	Children Number (%)	Adult Number (%)
Gunshot injuries (G.S.I)	5 (1.4)	68 (8.5)
Explosive injury	0 (0)	19 (2.4
RTA	189 (56.1)	402 (50)
Assault	45 (13.3)	64 (8)
Fall from height	76 (22.5)	136 (16.9)
Incision and punctures wound	12 (3.6)	20 (2.5)
Animal attacks	10 (3.0)	19 (2.4)
Pathological fractures	0 (0)	37 (4.6)
Extraction third molar	0 (0)	39 (4.9)
Total	337(100)	804 (100)

DISCUSSION

Males made up 78.7% of adults and females 21.3% (3.7:1) in the current study; among children, males made up 77.74% and females 22.26% (3.5:1). Current findings are comparable to those previously documented in Yemen[4,7,10,13-16], and according to Gutta *et al*.[17], males were the most common victims globally, with a 7.4:1 ratio of male to female injuries. The majority of the 1141 patients in the current study are men. This outcome can be explained by the fact that men are more likely than women to suffer maxillofacial fractures, mostly as a result of lifestyle and behavioural variables because they engage in high-risk activities. For both sexes, these activities result in distinct major causes of injury[4,7,10].

Males are also linked to violence and personal assaults since they are a major source of maxillofacial fractures in men in metropolitan areas and many affluent nations, including Yemen[13-17]. In the current study, road traffic accidents (RTA) accounted for 56.1% of maxillofacial fractures, falls from heights for 22.5%, and assaults for 13.3%. The study's findings, which show that road traffic accidents (RTA) are the most common cause of maxillofacial fractures at 56.1%, are consistent with data from several research, especially in developing nations where RTA is consistently the predominant etiological factor[18]. Males are also linked to violence and personal assaults since they are a major source of maxillofacial fractures in men in metropolitan areas and many affluent nations, including Yemen[13-17].

Table 4: Types of maxillofacial fractures by location in 1141 patients with maxillofacial fractures.

Types of fractures	N (%)
Mandible	358 (31.4)
Zygoma	196 (17.2)
condylar	102 (8.9)
Le fort I Le fort II	76 (6.7)
Dentoalveolar	74 (6.5)
Para symphysis	67 (5.9)
Symphysis	63 (5.5)
Body	54 (4.7)
Angle	52 (4.6)
Maxilla	43 (3.8)
Orbital	30 (2.6)
Ramus	18 (1.6)
Coronoid	8 (0.7)
Total	1141 (100)

Table 5: Treatment methods for maxillofacial fractures for 1141 patients with maxillofacial fractures.

Managements	Frequency (%)
Close reduction	435 (38.1)
Arch bar	80 (7.01)
IMF	175 (15.3)
Arch bar and IMF	60 (5.3)
Zygomatic Hock	120 (10.5)
Open reduction	668 (58.5)
Plates and IMF	82 (7.2)
Trans-osseous wiring and IMF	207 (18.1)
Plates only	352 (30.9)
Acrylic splint	27 (2.4)
Observation	38 (3.3)
Total	1141 (100)

In the current study, road traffic accidents (RTA) accounted for 56.1% of maxillofacial fractures, falls from heights for 22.5%, and assaults for 13.3%. The study's findings, which show that road traffic accidents (RTA) are the most common cause of maxillofacial fractures at 56.1%, are consistent with data from several research, especially in developing nations where RTA is consistently the predominant etiological factor[18]. Due to variables like poor road conditions, insufficient law enforcement (e.g., driving while intoxicated, failing to wear a helmet or seatbelt), and a high percentage of at-risk motorcyclists, traffic accidents continue to be the primary cause of mortality in many developing nations[19]. At 13.3%, attacks were the third most common cause of maxillofacial fractures in the current study. In contrast to many high-income nations, advancements in road safety legislation have led to a large decrease in traffic accident injuries, with interpersonal violence emerging as the primary cause. Many assault instances had alcohol misuse as a major contributing element[20]. According to some research, assaults account for about half of all maxillofacial fractures in men, which is much more common than in women. Since young men, who are typically between the ages of 18 and 30, are more likely to engage in risky behaviours including driving dangerously, misusing drugs and alcohol, and participating in violent activities, risk-taking habits also play a part.

Men are more likely to work in industries that enhance their risk of injury, such as industrial vocations, outdoor activities, and contact sports[4,7,10]. Last but not least, although they affect both sexes, auto accidents are a significant cause for men and are often the result of dangerous driving behaviours like speeding or neglecting to wear seat belts and helmets[5,17]. Furthermore, obtained results are at odds with previous studies by Zix *et al.*[21], and Bakardijiev A, Pechalova P[22], which showed that the majority of injuries were caused by sports injuries and motor accidents[21,22]. Over the past ten years, the United States has seen a 22% rise in the prevalence of assault and interpersonal violence[23]. Because of the economic downturn, drug and alcohol misuse, and decreased social level, there may have been an increase in violence in the community.

Young adult males, who are statistically more likely to participate in high-risk behaviours, are the most common victims of maxillofacial fractures. The majority of people in the current study were between the ages of 16 and 25 (60.6%), with a mean age of 26.1 years, ranging from 16 to 60. The typical age of patients with maxillofacial fractures is often in the late twenties and early thirties, with studies showing an average age of 29 to 31 years. This is comparable to findings published elsewhere. Individuals between the ages of 16 and 40 frequently have the highest frequency since this is a critical period in life when they are more likely to suffer trauma from incidents like assaults, automobile crashes, and falls from heights[4,7,10,24].

Mandible fractures accounted for 31.4% of all fractures in the current investigation, followed by zygoma fractures (17.2%), condylar fractures (8.9%), Le Fort I and Le Fort II fractures (6.7%), and dentoalveolar fractures (6.5%). Other fracture types, such as maxilla (3.8%), body (4.7%), angle (4.6%), symphysis (5.5%), and para-symphysis (5.9%), were less common. This contrasts with the findings of Gutta *et al.*[17], who found that the angle and body were the most prevalent fracture locations, and Stacey *et al.*[25], who found that condyle and body fractures were more common. Ankle fractures are frequently caused by assaults and are typically open. Fractures in a variety of places, such as the condyle and the symphysis/parasympathetic bone, can result from auto accidents.

Condylar fractures are more frequently caused by falls and are typically closed. Because of their anatomical placement distant from the teeth, condylar and ramus fractures are usually closed. Open or compound fractures are common in the body, angle, and symphysis/parasympathetic bone (dental-bearing areas). Due to the significant risk of oral bacterial contamination and consequent infections, open fractures are a major clinical concern since the mandible frequently fractures in tooth-bearing areas.

The goal of treatment for maxillofacial fractures is to restore appearance and function by fixation (stabilisation during healing) and fracture reduction (bone relocation). Achieving appropriate occlusion and a natural facial appearance is the main objective. For 1141 patients with maxillofacial fractures at Al-Thawra General Modern Hospital, the following treatment approaches were used: 7.01% underwent closed reduction, 15.3% IMF, 5.3% both Arch Bar and IMF, 10.5% Zygomatic Hock, and open reduction treatments like Plates and IMF (7.2%), Trans-osseous wire and IMF (18.1%), Plates alone (30.9%), and Acrylic Splint

(2.4%). Furthermore, 3.3% of patients were monitored without prompt medical attention.

Many studies have examined the epidemiology of maxillofacial fractures in different countries and populations, but little is known about the epidemiology and management of facial injuries in developing countries, especially Yemen. Open reduction and internal fixation (ORIF) was the most common treatment approach in our department (58.5%), which is in line with earlier findings[26-29].

Plate osteosynthesis has gained popularity recently for treating mandibular fractures and managing face fractures worldwide. Surgeons choose ORIF because technique provides the benefits of precise and stable anatomical reduction of fragments, and because it does not require intermaxillary fixation (IMF), it allows for fast recovery of function. This course of treatment would shorten both the recovery and bone healing times[30]. The age of the patient and the anatomical location of the fractures are taken into consideration while choosing a treatment plan. In our department, ORIF surgeries are commonly utilised for ZMC and mandibular body fractures, however most nasal and mandibular sub-condylar fractures are treated with a closed approach.This treatment plan is consistent with scientific protocols for the management of facial fractures in order to achieve the best functional and esthetic outcomes with the least scars and sensory or motor nerve complications[31,32].

Even ORIF may raise the risk of tooth bud injuries and create developmental asymmetry due to the strong osteogenic potential in paediatric age. Consequently, closed reduction may be a useful treatment option[26,33]. ORIF treatment has its own challenges because of the reduced mending ability and systemic health issues in older adults[34,35,36]. Closed reduction therapy strategies would therefore be beneficial for people in extreme age groups.

Limitations of the study

Current study examined the prevalence, types, and treatment of maxillofacial injuries, suffers from several fundamental limitations that restrict the generalizability and accuracy of its findings. These main limitations include reliance on retrospective data, a single-center approach, and variations in patient reporting. The retrospective study design relies on existing medical records, which may be incomplete, inaccurate, or lack detailed information about the injury, particularly regarding the specific mechanism of injury (e.g., differentiating between types of falls or traffic accidents). Furthermore, single-center bias means that a study conducted in a single hospital (a single-center study) may not be representative of the general population. Additionally, due to legal or social factors, victims of violence or traffic accidents may report their injuries as accidental falls, thus obscuring the true cause.

CONCLUSION

The prevalence of maxillofacial injuries, the types of fractures, and the choice of the optimal course of therapy are all strongly influenced by the age, gender, and trauma sources of the patients. Every developing society would benefit from having an effective health care policy and management system for treatment, prevention, and education.

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AUTHOR'S CONTRIBUTIONS

Qatran NSA: formal analysis, conceptualization, data organization, clinical and laboratory tests. **Al-Rahbi LM:** formal analysis, critical review. **Al-Taifi E:** conceptualisation. **Al-Wahabi M:** critical review. **Al-Shamahy HA:** formal analysis, critical review. Final manuscript was checked and approved by all authors.

DATA AVAILABILITY

The associated author can provide the empirical data used to support the study's conclusions upon request.

CONFLICT OF INTEREST

There are no conflicts of interest in regard to this project.

REFERENCES

1. Juncar M, Tent PA, Juncar RI, *et al*. Etiology, pattern, and treatment of nose fractures: A 10-year cross-sectional cohort retrospective study. Niger J Clin Pract 2021Nov;24(11):1674-1681. *https://doi.org/10.4103/njcp.njcp_52_21*
2. Chen C, Yang Y, Gong X, *et al*. A retrospective study of 1 009 patients with oral and maxillofacial fresh trauma. Zhonghua Kou Qiang Yi Xue Za Zhi 2015 Nov; 50(11):650-5. Chinese. PMID: 26757758.
3. Al-Rahbi LM, Zayed OA, Al-Ashwal AA, *et al*. Comparative radiological study of bone density and thickness between open and closed reduction of comminuted mandibular bone fracture. Universal J Pharm Res 2025; 10(5):63-72. *https://doi.org/10.22270/ujpr.v10i5.1432*
4. Abu-Taleb AM, Al-Rahbi LM, Al-Ashwal AA, *et al*. Maxillofacial fracture type and their management in individuals referred to the military hospital in Sana'a city, Yemen. Universal J Pharm Res 2025; 10(4): 37-43. *https://doi.org/10.22270/ujpr.v10i4.1392*
5. Hashemi, H, Qundos, Y, Farzad, P. Management of mandibular fractures at a high-volume educational center-A Retrospective Study. J Clin Med 2025; 14: 6467. *https://doi.org/10.3390/jcm14186467*
6. Ellis, E.; Miles, B.A. Fractures of the mandible: A technical perspective. Plast Reconstr Surg 2007; 120 (Suppl. S2), 76S-89S. *https://doi.org/10.1097/01.prs.0000260721.74357.e7*
7. Al-Shameri AM, Al-Rahbi LM, Al-Ashwal AA, *et al*. Evaluation of neurosensory recovery in infraorbital and inferior alveolar nerve impairments after maxillofacial fractures: A systematic review. Universal J Pharm Res 2025; 10(4): 62-68. *https://doi.org/10.22270/ujpr.v10i4.1395*
8. Awad MMA, Al-Rahbi LM, Al-Ashwal AA, *et al*. Comparative outcomes in mandibular angle fracture management reconstruction plates versus dual miniplates fixation. Universal J Pharm Res 2025; 10(3): 22-27. *https://doi.org/10.22270/ujpr.v10i3.1349*
9. Panesar K, Susarla SM. Mandibular fractures: Diagnosis and management. Semin Plast Surg 2021; 35: 238-249. *https://doi.org/10.1055/s-0041-1735818*
10. Al-Rahbi LM, Al-Badani NAD, Al-Ashwal AA, *et al*. Osteomyelitis of the jaws: A 5 years retrospective study at Al-

Thawra Hospital in Sana'a, Yemen. Universal J Pharm Res 2025; 10(3): 45-51. *https://doi.org/10.22270/ujpr.v10i3.1352*

11. Perez D, Ellis E. Complications of mandibular fracture repair and secondary reconstruction. Semin Plast Surg 2020; 34: 225-231. *https://doi.org/10.1055/s-0040-1721758*
12. Gibson AC, Merrill TB, Boyette J.R. Complications of mandibular fracture repair. Otolaryngol Clin N Am 2023; 56: 1137-1150. *https://doi.org/10.1016/j.otc.2023.05.008*
13. Sharaf Aldeen HMA, Al-Rahbi LM, Al-Ashwal AA, *et al*. Analysis of hardware removal in maxillofacial trauma: A retrospective study in a military hospital in Sana'a, Yemen. Universal J Pharm Res 2024; 8(6): 46-51. *https://doi.org/10.22270/ujpr.v8i6.1039*
14. Al-Rahbi LM, Setten HHM, Al-Shamahy HA. Impact of 3D printing in reconstruction of maxillofacial bone defects experimental study in a military hospital in Sana'a city, Yemen. Universal J Pharm Res 2025; 10(1): 31-38. *https://doi.org/10.22270/ujpr.v10i1.1271*
15. Al-Sarori WEA, Al-Kasem MAA, Al-Shamahy HA. Single insertion technique directed by the anterior-thumb and the posterior-finger for mandibular anesthesia. Universal J Pharm Res 2025; 10(4): 13-20. *https://doi.org/10.22270/ujpr.v10i4.1388*
16. Al-Rahbi LM, Al-Shamahy HA, Al-Ashwal AA, *et al*. Treatment of comminuted mandibular fracture with closed reduction and mandibular fixation versus open reduction and internal fixation. Universal J Pharm Res 2024; 9(5): 8-14. *https://doi.org/10.22270/ujpr.v9i5.1192*
17. Gutta R, Tracy K, Johnson C, *et al*. Outcomes of mandible fracture treatment at an academic tertiary hospital: A 5-year analysis. J Oral Maxillofac Surg 2014 Mar;72(3):550-8. *https://doi.org/10.1016/j.joms.2013.09.005*
18. Kumar RM, Varsha S, Dutta S, Vyas YV, Kolla V. Changing trends of maxillofacial fractures in Tumkur - A prospective study. Ann Maxillofac Surg 2025 Jan-Jun;15(1):51-55. *https://doi.org/10.4103/ams.ams_132_24*
19. Barreto SBL, Castro GG, Carvalho CN, Ferreira MC. Cases of maxillofacial trauma treated at hospitals in a large city in Northeastern Brazil: Cross-sectional study. Int J Environ Res Public Health 2022 Dec 17;19(24):16999. *https://doi.org/10.3390/ijerph192416999*
20. Roșu AM, Severin F, Roșu OC, *et al*. Patterns and characteristics of midface fractures in North-Eastern Romania. Medicina (Kaunas) 2023 Mar 6;59(3):510. *https://doi.org/10.3390/medicina59030510*
21. Zix JA, Schaller B, Lieger O, *et al*: Incidence, aetiology and pattern of mandibular fractures in central Switzerland. Swiss Med Wkly 27:141, 2011 *https://doi.org/10.4414/smw.2011.13207*
22. Bakardijiev A, Pechalova P: Maxillofacial fractures in Southern Bulgaria- A retrospective study of 1706 cases. J Craniomaxillofac Surg 35:147, 2007 *https://doi.org/10.1016/j.jcms.2007.01.005*
23. Langton L, Planty M, Truman J: Criminal victimization 2012. *http://bjs.ojp.usdoj.gov/index.cfm?ty=tp&tid=31*
24. Atilgan S, Erol B, Yaman F, *et al*. Mandibular fractures: a comparative analysis between young and adult patients in the southeast region of Turkey. J Appl Oral Sci 2010 Jan-Feb;18(1):17-22. *https://doi.org/10.1590/s1678-77572010000100005*
25. Stacey DH, Doyle JF, Mount DL, *et al*: Management of mandible fractures. Plast Reconstr Surg 117:48e, 2006. *https://doi.org/10.1097/01.prs.0000209392.85221.0b*
26. Bali RK, Sharma P, Garg A, Dhillon G. A comprehensive study on maxillofacial trauma conducted in Yamunanagar, India. J Injury Viol Res 2013;5:108-16. *https://doi.org/10.5249/jivr.v5i2.331.*
27. Maliska MC, Lima Junior SM, Gil JN. Analysis of 185 maxillofacial fractures in the state of Santa Catarina, Brazil. Braz Oral Res. 2009;23:268-74. *https://doi.org/10.1590/s1806-83242009000300008.*
28. Cabalag MS, Wasiak J, Andrew NE, *et al*. Epidemiology and management of maxillofacial fractures in an Australian trauma centre. J Plastic Recon Aes Surg 2014;67:183-9. *https://doi.org/10.1016/j.bjps.2013.10.022.*
29. Lee K. Global trends in maxillofacial fractures. Craniomaxillo Trauma Recons 2012;5:213. *https://doi.org/10.1055/s-0032-1322535.*
30. Samieirad S, Tohidi E, Shahidi-Payam A, *et al*. Retrospective study maxillofacial fractures epidemiology and treatment plans in Southeast of Iran. Med Oral Patol Oral Cir Bucal 2015;20:e729-36. *https://doi.org/10.4317/medoral.20652.*
31. Renkonen S, Vehmanen S, Mäkitie A, Blomgren K. Nasal bone fractures are successfully managed under local anaesthesia-experience on 483 patients. Clin Otolaryngoly 2016;4:79-82. *https://doi.org/10.1111/coa.12456.*
32. Kambalimath HV, Agarwal SM, Kambalimath DH, *et al*. Maxillofacial Injuries in Children: A 10 year Retrospective Study. J Maxillofac Oral Surg 2013;12:140-4. *https://doi.org/10.1007/s12663-012-0402-6.*
33. Samieirad S, Tohidi E, Pakravan M. A conservative method for treating severely displaced pediatric mandibular fractures: An effective alternative technique. J Dent Mater Tech 2016;5:53-8.
34. Atisha DM, van Rensselaer Burr T, Allori AC, *et al*. Facial fractures in the aging population. Plastic Recon Surg 2016;137:587-93. *https://doi.org/10.1097/01.prs.0000475791.31361.9a.*
35. Shankar AN, Shankar VN, Hegde N, Prasad R. The pattern of the maxillofacial fractures-a multicentre retrospective study. J Cranio-Maxillo Surg. 2012;40:675-9. *https://doi.org/10.1016/j.jcms.2011.11.004.*
36. Homaid WAHA, Nasher AT, Al-Shamahy HA, *et al*. Effect of intermaxillary fixation on biochemical and blood markers in a sample of Yemeni adults. Universal J Pharm Res 2024; 9(4): 48-53. *https://doi.org/10.22270/ujpr.v9i4.1147*