

Management of Fractures of the Mandible in a District Hospital in Bangladesh

*Alam AKMS¹, Rahman MM², Taleb MA³

Article info

Received : 10-02-2026
Accepted : 27-03-2026
No. of Tables : 04
No. of Figure : 03
No. of References : 25

Cite the Article:

Alam AKMS, Rahman MM, Taleb MA. Management of Fractures of the Mandible in a District Hospital in Bangladesh. Pabna Med. Col. J. 2026; 5(1): 13-18.

DOI:

<https://doi.org/10.62469/pmj.v05i01.002>
www.pmjpmc.com

Keywords: Angle, Closed reduction, Facial fracture, Fixation, Mandibular fracture, Maxillofacial trauma'

Abstract:

Background: Mandibular fractures are common maxillofacial injuries causing functional, aesthetic, and psychosocial impact. In Bangladesh, district hospitals manage the majority of cases; however, data on fracture patterns and treatment outcomes are limited. Understanding local epidemiology is crucial for optimizing trauma care and allocating resources effectively. **Objectives:** To evaluate the patterns, management approaches, and clinical outcomes of mandibular fractures treated at a district hospital in Bangladesh. **Methods:** This retrospective cross-sectional study was conducted at Pabna Medical College & Hospital, Pabna, covering the period from January 2023 to December 2024. A total of 57 mandibular fracture patients were included via purposive sampling. Data on demographics, injury etiology, fracture sites, treatment, and outcomes were collected from hospital records and analyzed using SPSS version 23.0. **Results:** Total of 57 patients with mandibular fractures were analyzed, with males comprising 78.9% and females 21.1% ($p = 0.002$). The highest affected age group was 21–30 years (36.8%). Road traffic accidents accounted for 56.1% of cases ($p = 0.015$). The body (31.6%) and angle (24.6%) were the most common fracture sites ($p = 0.032$). Closed reduction was performed in 63.2%, open reduction in 36.8% ($p = 0.041$), and satisfactory outcomes were achieved in 86.0% ($p = 0.018$). **Conclusion:** Mandibular fractures in this district hospital predominantly affected young adult males and were mainly caused by road traffic accidents. Most involved the body and angle, and treatment-primarily closed reduction-resulted in favorable outcomes with minimal complications.

Introduction:

Mandibular fractures represent one of the most common forms of maxillofacial trauma and pose significant challenges due to their impact on mastication, speech, airway integrity, and facial aesthetics¹. The mandible is particularly vulnerable to injury because of its prominent position, mobility, and exposure to external forces during trauma². Globally, mandibular fractures account for a substantial proportion of facial bone injuries, with reported prevalence varying according to geographic location, socioeconomic conditions, and patterns of trauma^{3,4}. The etiology of mandibular fractures differs between developed and developing countries. In high-income settings, interpersonal violence and sports-

related injuries are frequently reported causes, whereas road traffic accidents (RTAs) remain the predominant cause in low- and middle-income countries⁵. Bangladesh, with rapid urbanization, increasing motorization, inadequate road safety measures, and inconsistent enforcement of traffic laws, experiences a high burden of RTA-related trauma, including maxillofacial injuries⁶. Young adult males are consistently identified as the most affected group, reflecting higher exposure to occupational hazards, outdoor activities, and high-risk behaviors⁷. The pattern of mandibular fractures is influenced by the direction and magnitude of traumatic force, as well as anatomical factors such as bone density and areas of structural weakness.

1. *Dr. A K M Serajul Alam, Associate Professor, Oral & Maxillofacial Surgery, Pabna Medical College, Pabna

2. Dr. Md. Masudur Rahman MBBS, Associate Professor (Ortho Surgery), Pabna Medical College, Pabna

3. Dr. Md. Abu Taleb, Assistant Professor (Orthopaedic Surgery) In Situ, 250 Bedded General Hospital, Pabna

4. Dr. A K M Serajul Alam, Associate Professor, Oral & Maxillofacial Surgery, Pabna Medical College, Pabna

Correspondent: *Dr. AKM Serajul Alam, Associate Professor, Oral & Maxillofacial Surgery, Pabna Medical College, Pabna, E-mail: serajul.alam@gmail.com, +880 1711538995

Common fracture sites include the symphysis, parasymphysis, body, angle, condyle, and ramus, with many patients presenting with multiple fracture locations⁸. Accurate identification of fracture patterns is essential for selecting appropriate treatment strategies and predicting outcomes. Management of mandibular fractures aims to restore pre-injury occlusion, ensure stable bone union, and preserve mandibular function while minimizing complications⁹.

Treatment modalities broadly include closed reduction with intermaxillary fixation (IMF) and open reduction with internal fixation (ORIF). While ORIF has become increasingly popular due to earlier mobilization and improved functional outcomes, closed reduction remains widely practiced in resource-limited settings because of its cost-effectiveness and reduced requirement for specialized equipment¹⁰. The choice of treatment is influenced by fracture type, displacement, patient factors, surgeon expertise, and institutional facilities. Despite advances in maxillofacial trauma care, complications such as infection, malocclusion, nonunion, and restricted mouth opening continue to be reported, particularly in delayed presentations and in settings with limited resources¹¹. Evaluating treatment outcomes is therefore crucial to assess the effectiveness of existing management protocols and identify areas for improvement. Most published studies on mandibular fractures originate from tertiary care centers, which may not reflect the realities of district-level hospitals where a large proportion of trauma patients are initially managed¹². District hospitals in Bangladesh serve as primary referral centers for trauma care for vast rural and semi-urban populations. However, there is a paucity of data regarding the patterns and outcomes of mandibular fractures managed at this level of healthcare. Local epidemiological evidence is essential to guide clinical decision-making, optimize resource allocation, and inform preventive strategies tailored to regional needs¹³. Against this background, the present study was designed to evaluate the patterns, management approaches, and clinical outcomes of mandibular fractures treated in a district hospital of Bangladesh.

Methods:

This retrospective cross-sectional study was conducted at Pabna Medical College & Hospital, Pabna. The study population comprised patients

diagnosed with mandibular fractures who were admitted to or treated in the Department of Oral and Maxillofacial Surgery during the study period from January 2023 to December 2024. A total of 57 patients were included based on the availability of complete medical records.

Inclusion criteria: Patients of all age groups and both sexes with a confirmed diagnosis of mandibular fracture were included in the study. Only cases managed at the study hospital with documented clinical findings, radiological evidence, treatment details, and outcome records were considered eligible for analysis.

Exclusion criteria: Patients with incomplete or missing medical records were excluded from the study. Cases with associated midface fractures requiring referral to higher centers, pathological fractures, and patients who left against medical advice or were lost to follow-up were also excluded.

Study procedure: Data were retrieved retrospectively from hospital case records using a structured data collection sheet. Variables included demographic characteristics, etiology of injury, fracture site and pattern, management modality, duration of hospitalization, and postoperative outcomes. Diagnosis was based on clinical examination and radiographic evaluation, including orthopantomogram and plain radiographs.

Data analysis: Collected data were entered and analyzed using SPSS version 23.0. Descriptive statistics such as frequencies, percentages, means, and standard deviations were used to summarize variables. Results were presented in tables and figures where appropriate. Statistical significance was considered at a 95% confidence level.

Results:

Total of 57 patients with mandibular fractures were analyzed. The mean age of the patients was 29.8 ± 11.6 years. The highest proportion of cases was observed in the 21–30-year age group (36.8%), followed by the 31–40-year group (24.6%). Males constituted a significantly larger proportion of the study population (78.9%) compared to females (21.1%), and this difference was statistically significant ($p = 0.002$). Road traffic accidents were the predominant cause of mandibular fractures, accounting for 56.1% of cases, followed by physical assault (24.6%) and falls (14.0%). Other causes, including sports- and work-related injuries, comprised 5.3% of cases. The distribution of etiology showed a statistically significant variation among

patients ($p = 0.015$), with road traffic accidents being more frequent among male patients (62.2%) than females (33.3%). Analysis of fracture characteristics revealed that the body of the mandible was the most commonly affected site (31.6%), followed by the angle (24.6%) and para-symphysis (21.1%). Condylar fractures accounted for 15.8% of cases, while 7.0% of patients presented with multiple fracture sites. The variation in fracture-site distribution was statistically significant ($p = 0.032$). Regarding management, closed reduction with intermaxillary fixation was employed in 63.2% of patients, whereas open reduction and internal fixation were performed in 36.8%. Closed reduction was more frequently used in single-site fractures (72.2%), while open reduction was significantly associated with multiple or displaced fractures ($p = 0.041$). Clinical outcomes were predominantly favorable. Satisfactory outcomes were achieved in 86.0% of patients, characterized by stable occlusion and adequate mouth opening. Minor complications occurred in 10.5% of cases, mainly superficial infection and transient malocclusion, while major complications were observed in 3.5% of patients. Complication rates were significantly higher in patients treated with open reduction and internal fixation compared to closed reduction ($p = 0.018$). Overall, the results indicate effective management of mandibular fractures at the district hospital level with acceptable outcome and complication rates.

Table 1: Distribution of patients by age group and sex (n=57)

Age group	n/ (%)	Male: Female
≤20yrs	9 (15.8)	6:3
21–30yrs	21 (36.8)	18:3
31–40yrs	14 (24.6)	11:3
>40yrs	13 (22.8)	10:3

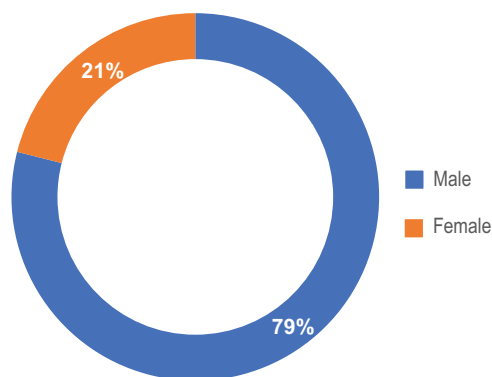


Figure 1: Sex distribution of study participants

Table II: Etiology of mandibular fractures

Etiology	n	%
Road traffic accident	32	56.1
Physical assault	14	24.6
Fall	8	14.0
Others	3	5.3

p -value = 0.015, Data analysis test: Chi-square test

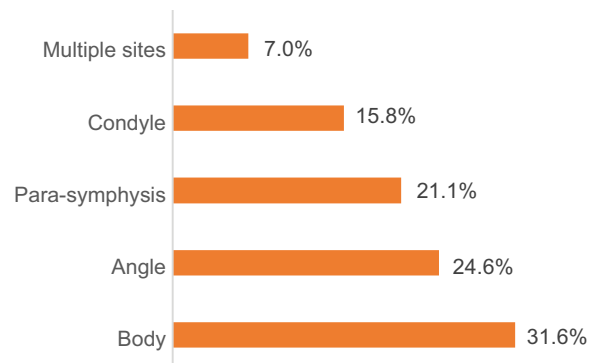


Figure 2: Distribution of fracture sites

Table III: Treatment modalities

Treatment modality	n	%
Closed reduction with IMF	36	63.2
ORIF	21	36.8
Total	57	100.0

p -value = 0.041, Data analysis test: Chi-square test, ORIF=Open reduction and internal fixation

Table IV: Treatment outcomes and complications

Outcome	n	%
Satisfactory	49	86.0
Minor complications	6	10.5
Major complications	2	3.5

p -value = 0.018, Data analysis test: Fisher's exact test

Discussion:

The present study provides insight into the patterns, management strategies, and outcomes of mandibular fractures treated at a district-level hospital in Bangladesh. The findings highlight important epidemiological and clinical trends that are broadly consistent with reports from other low- and middle-income countries, while also reflecting the realities of

care delivery in resource-constrained settings. In this study, mandibular fractures predominantly affected young adult males, with males comprising nearly four-fifths of the study population. This male predominance has been consistently reported in recent literature and is commonly attributed to greater exposure to outdoor activities, occupational hazards, and high-risk behaviors such as reckless driving and interpersonal violence^{14,15}.

The peak incidence in the third decade of life observed in this study aligns with findings from studies conducted in South Asia and other developing regions, where economically productive age groups are disproportionately affected by trauma¹⁶. Road traffic accidents were identified as the leading cause of mandibular fractures, accounting for more than half of the cases. This observation is in agreement with several contemporary studies from developing countries, where inadequate road safety measures, poor enforcement of traffic laws, and increasing vehicular density contribute significantly to maxillofacial injuries^{17,18}. In contrast, studies from high-income countries often report interpersonal violence as the primary etiology, underscoring the influence of socioeconomic and cultural factors on injury patterns¹⁹. The continued predominance of RTA-related mandibular fractures in Bangladesh emphasizes the urgent need for strengthened road safety policies and public awareness programs.

Regarding fracture patterns, the body and angle of the mandible were the most commonly involved sites in this study. Similar distributions have been reported in recent studies, which suggest that these regions are structurally vulnerable to direct lateral and oblique forces during trauma²⁰. Although condylar fractures are frequently reported in the literature, their relatively lower prevalence in this study may reflect underdiagnosis or selective referral of more complex cases to tertiary care centers. The presence of multiple fracture sites in a subset of patients further highlights the severity of trauma encountered at the district hospital level. Treatment modalities in the present study were influenced by fracture characteristics and available resources. Closed reduction with intermaxillary fixation was the most commonly used approach, particularly for single-site and minimally displaced fractures. This finding is consistent with reports from similar healthcare settings, where closed reduction remains a practical and cost-effective option²¹.

Although open reduction and internal fixation are increasingly regarded as the standard of care for displaced mandibular fractures, their utilization in district hospitals may be limited by factors such as availability of equipment, surgical expertise, and financial constraints²². Clinical outcomes in this study were generally favorable, with more than four-fifths of patients achieving satisfactory functional recovery. Comparable outcome rates have been reported in recent studies, indicating that acceptable results can be achieved even in non-tertiary settings when appropriate case selection and management protocols are followed²³. The overall complication rate was low, with minor complications such as superficial infection and transient malocclusion being the most common. As observed in other studies, complications were more frequent among patients undergoing open reduction and internal fixation, possibly due to greater injury severity and surgical exposure²⁴. The findings of this study underscore the capacity of district hospitals to effectively manage a substantial proportion of mandibular fracture cases.

However, the results also point to the need for standardized treatment guidelines, improved diagnostic facilities, and targeted training of healthcare providers to further optimize outcomes. Moreover, preventive strategies focusing on road traffic injury reduction could substantially decrease the burden of mandibular fractures in Bangladesh. Despite its contributions, this study should be interpreted in light of existing evidence. When compared with similar studies from tertiary care centers, variations in etiology, fracture patterns, and management approaches are evident, reflecting differences in referral patterns and resource availability²⁵. Nonetheless, the present study adds valuable local data and helps bridge the existing knowledge gap regarding mandibular fracture management at the district level in Bangladesh.

Limitations

This study was limited by its retrospective design, small sample size, and reliance on hospital records, which may have resulted in missing data. Being a single-center district hospital study, the findings may not be generalizable to all healthcare settings in Bangladesh.

Conclusion

This study demonstrates that mandibular fractures in a district hospital of Bangladesh predominantly

affect young adult males and are mainly caused by road traffic accidents. The body and angle of the mandible were the most commonly involved sites. Closed reduction remained the preferred treatment modality, and overall clinical outcomes were favorable with low complication rates, indicating effective management at the district hospital level.

Recommendation:

Strengthening road safety measures and public awareness programs is essential to reducing mandibular fractures. Upgrading diagnostic facilities, ensuring the availability of fixation materials, and providing regular training for healthcare professionals at district hospitals may further improve management outcomes.

References:

1. Brucoli, Matteo, et al. The 'European zygomatic fracture' research project: the epidemiological results from a multicenter European collaboration. *Journal of Cranio-Maxillofacial Surgery* 47.4 (2019): 616-621.
2. Jang, Seong-Baek, et al. Concomitant injuries and complications according to categories of pan-facial fracture: a retrospective study. *Journal of Cranio-Maxillofacial Surgery* 48.4 (2020): 427-434.
3. Juncar, Mihai, et al. An epidemiological analysis of maxillofacial fractures: a 10-year cross-sectional cohort retrospective study of 1007 patients. *BMC oral health* 21.1 (2021): 128.
4. Almasri, Mazen, et al. Maxillofacial fractures in Makka City in Saudi Arabia; an 8-year review of practice. *Am J Public Health Res* 3.2 (2015): 56-59.
5. Zhou, Hai-Hua, et al. Maxillofacial injuries in pediatric patients. *Journal of Craniofacial Surgery* 32.4 (2021): 1476-1479.
6. Hossain, Saddam. Identification and Empirical investigation of the risk factors involved in road accidents in Bangladesh. (2021).
7. Oginni, FadekemiOlufunmilayo, et al. Facial bone fractures in Ile-Ife, Nigeria: An update on pattern of presentation and care. *Journal of maxillofacial and oral surgery* 15.2 (2016): 184-190.
8. Motamedi, Mohammad Hosein Kalantar, et al. Pattern of maxillofacial fractures: a 5-year analysis of 8,818 patients. *Journal of trauma and acute care surgery* 77.4 (2014): 630-634.
9. Rughubar, Vivesh, et al. Combination of rigid and nonrigid fixation versus nonrigid fixation for bilateral mandibular fractures: a multicenter randomized controlled trial. *Journal of Oral and Maxillofacial Surgery* 78.10 (2020): 1781-1794.
10. Kumar, Manoj, et al. Open vs Closed Management of Condylar Fracture: Our Experience of 100 Cases in a Suburban Tertiary Care Hospital. *Cranio-maxillofacial Trauma & Reconstruction* 17.1 (2024): 4-12.
11. Choi, Min Hyub, et al. Long-term postoperative satisfaction and complications in nasal bone fracture patients according to fracture type, site, and severity. *Archives of Craniofacial Surgery* 21.1 (2020): 7.
12. Bede, Salwan. Mandibular fractures in Iraq: an epidemiological study. *Cranio-maxillofacial Trauma & Reconstruction* 8.1 (2015): 59-63.
13. Islam, BushraZarin, et al. Trauma care scenarios following road traffic crashes in Bangladesh: a scoping review. *Global Health: Science and Practice* 11.2 (2023).
14. Lee, Hyeok, et al. Trauma severity and mandibular fracture patterns in a regional trauma center. *Archives of craniofacial surgery* 21.5 (2020): 294.
15. Shahzad, Muhammad Asif, MominAyubMarath, and Daud Mirza. Etiology, Patterns, And Treatment Modalities for Mandibular Fractures. *Journal of Bahria University Medical and Dental College* 8.2 (2018): 97-102.
16. Kokko, Linda-Lotta, et al. Are the elderly with maxillofacial injuries at increased risk of associated injuries? *Journal of Oral and Maxillofacial Surgery* 80.8 (2022): 1354-1360.
17. Gurung, Utsav Singh, et al. Maxillofacial injuries related to road traffic accidents: A five-year multi-center analysis. *Cranio-maxillofacial Trauma & Reconstruction Open* 3.1 (2019): s-0039.
18. Abedin, MdZahir, et al. Associated Injuries in Patients with Maxillofacial Trauma at Dhaka Dental College Hospital by Motorcycle Accident. *Update Dental College Journal* 13.2 (2023): 30-33.
19. Afrooz, Paul N., et al. The epidemiology of mandibular fractures in the United States, part 1: a review of 13,142 cases from the US National Trauma Data Bank. *Journal of Oral and Maxillofacial Surgery* 73.12 (2015): 2361-2366.

20. Elavenil, P., et al. Isolated bilateral mandibular angle fractures: an extensive literature review of the rare clinical phenomenon with presentation of a classical clinical model. *Craniofacial Trauma & Reconstruction* 8.2 (2015): 153-158.
21. Chrcanovic, Bruno Ramos. Open versus closed reduction: comminuted mandibular fractures. *Oral and maxillofacial surgery* 17.2 (2013): 95-104.
22. Singh, Virendra, et al. A comparative evaluation of closed and open treatment in the management of unilateral displaced mandibular subcondylar fractures: A prospective randomized study. *Craniofacial Trauma & Reconstruction* 11.3 (2018): 205-210.
23. Kim, M-Y., et al. A comparison of three treatment methods for fractures of the mandibular angle. *International Journal of Oral and Maxillofacial Surgery* 45.7 (2016): 878-883.
24. Cillo Jr, Joseph E., and Edward Ellis III. Management of bilateral mandibular angle fractures with combined rigid and nonrigid fixation. *Journal of oral and maxillofacial surgery* 72.1 (2014): 106-111.
25. Wu, Shannon S., et al. Surgical simulation course for facial fracture education. *Plastic and Reconstructive Surgery-Global Open* 9.1 (2021): e3353.