International Journal of Health Sciences and Research
[Indexed, Peer-Reviewed Journal]
Volume 16; Issue: 4; April 2026
Website: www.ijhsr.org
ISSN: 2249-9571

Original Research Article

Comparative Evaluation of Axial, Multiplanar and Three-Dimensional Reconstructed MDCT Images in Maxillofacial Fractures

Rajbir Singh[1], Arvinder Singh[2], Kunwarpal Singh[3]

[1]Resident, Department of Radiodiagnosis and Imaging, Sri Guru Ram Das Institute of Medical Sciences and Research, Sri Amritsar, Punjab, India
[2]Head and Professor, Department of Radiodiagnosis and Imaging, Sri Guru Ram Das Institute of Medical Sciences and Research, Sri Amritsar, Punjab, India
[3]Professor, Department of Radiodiagnosis and Imaging, Sri Guru Ram Das Institute of Medical Sciences and Research, Sri Amritsar, Punjab, India.

Corresponding author: Dr. Rajbir Singh

DOI: https://doi.org/10.52403/ijhsr.20260413

ABSTRACT

Background: Maxillofacial fractures involve complex anatomy and often require precise imaging for accurate diagnosis and treatment planning. Multidetector computed tomography (MDCT) allows axial, multiplanar, and three-dimensional image reconstruction, each of which may provide distinct diagnostic advantages.
Materials and Methods: This observational cross-sectional study included 81 patients with maxillofacial trauma evaluated using a 32-slice MDCT scanner. Axial, coronal, sagittal, and three-dimensional reconstructed images were assessed for fracture detection in the frontal bone, nasal bones, maxillary bone, zygomatic bone, mandible and orbit. The diagnostic performance of different reconstruction planes was compared statistically, with $p < 0.05$ considered significant.
Results: The mean age of patients was 33.3 ± 15.8 years, and 90.1% were males. Road traffic accidents were the commonest mode of injury. The most frequent fractures involved the maxillary lateral wall, zygomatic arch, maxillary anterior wall, and nasal bones. Sagittal images showed significantly lower detection of medial and lateral orbital wall fractures, mandibular body fractures, and some maxillary wall fractures. Three-dimensional images were most useful for zygomatic arch, zygomaticomaxillary complex, nasal bone, frontal bone, and anterior maxillary wall fractures, while coronal images showed better visualization of posterior maxillary wall fractures.
Conclusion: No single reconstruction plane was sufficient for complete assessment of maxillofacial trauma. Combined interpretation of axial, multiplanar, and three-dimensional CT images provides the most accurate evaluation of fracture extent and pattern.
Keywords: Maxillofacial trauma and fractures; MDCT; 3D reconstruction; Orbital fractures; Road traffic accidents; Trauma imaging.

INTRODUCTION

Maxillofacial trauma constitutes a significant proportion of emergency department visits and represents an important public health concern due to its functional, aesthetic, and socioeconomic impact. [1-3] The facial skeleton, owing to its exposed position and complex anatomy, is particularly susceptible to injury. Facial fractures frequently coexist with other traumatic injuries such as intracranial, cervical spine, thoracic, and abdominal trauma, especially following high-energy mechanisms including road traffic accidents, falls, interpersonal violence, and firearm-related injuries. [1,3–6] These injuries may impair vision, mastication, speech, and airway function, and if inadequately managed, can lead to complications such as malocclusion, diplopia, and temporomandibular dysfunction. [7-10]

Clinical examination alone is often insufficient in acute trauma settings due to pain, altered consciousness, and soft-tissue swelling, which may obscure fracture detection. [11-13] Conventional radiography has limited diagnostic accuracy because of overlapping structures. [5,9,14] Consequently, computed tomography (CT) has become the imaging modality of choice, providing high-resolution images and detailed evaluation of osseous structures. [15–21]

Multiplanar and three-dimensional reconstructions further enhance fracture detection and spatial understanding, improving surgical planning. However, each modality has limitations, necessitating combined evaluation. [3,9,22–30] The purpose of this study is to evaluate the role of multidetector CT in maxillofacial fracture and compare the diagnostic performance of different imaging planes.

Therefore, this study aims to assess the utility of multidetector CT, with objectives to analyze fracture distribution and evaluate axial, coronal, sagittal, and 3D reconstructions. This study is significant in improving diagnostic accuracy and optimizing imaging strategies, thereby aiding early management and better patient outcomes.

MATERIALS & METHODS

Study Design and Setting

This observational cross-sectional study was conducted in the Department of Radiodiagnosis and Imaging at our institute. The study was carried out over an 18-month period from 1 July 2024 to 31 December 2025. Ethical approval for the study was obtained from the Institutional Ethics Committee.

Study Population

Patients presenting to the emergency department with a history of facial or head trauma and referred for multidetector computed tomography (MDCT) for suspected maxillofacial fractures were included. Written informed consent was obtained from all participants and patient confidentiality was maintained. Sample size was based on convenience sampling of all eligible patients during the study period.

Inclusion and Exclusion Criteria

Patients with clinically suspected maxillofacial fractures undergoing MDCT examination were included. Pregnant patients, those with underlying bone disorders, and patients in whom no fracture was detected on MDCT were excluded.

Clinical Assessment

All patients underwent initial clinical evaluation by the surgical team, including assessment of mechanism of injury, facial swelling, deformity, malocclusion, trismus, dental injury, and ocular or neurological symptoms. Palpation was performed to detect tenderness, crepitus, and step deformities. Because clinical assessment may be limited by pain, swelling, or associated polytrauma, CT imaging was performed for definitive evaluation.

CT Imaging Protocol

Imaging was performed using a 32-slice multidetector CT scanner (Siemens Somatom Scope) with patients in the supine position using a non-contrast protocol. Scanning parameters included automatic tube current modulation (150–220 mAs), tube voltage 110–130 kVp, and slice thickness of 0.6–1.25 mm. The scan range extended from the frontal sinuses to the mandibular symphysis. Images were reviewed in bone (window level ~600 HU;

width 2500–3000 HU) and soft-tissue windows (window level −40 HU; width 80–100 HU).

Image Reconstruction and Analysis

Axial images were reconstructed and reformatted into coronal and sagittal planes using multiplanar reconstruction (MPR). Three-dimensional volume-rendered images were also generated for better visualization of fracture patterns.

Fractures involving the frontal bone, nasal bones, maxilla, zygomatic bone, mandible, and orbital walls were recorded. Diagnostic performance of axial, MPR (coronal and sagittal), and 3D reconstructed images was compared.

Statistical Analysis:

The diagnostic yield of 2D axial images, MPR images and 3D reconstructed images in different maxillofacial fractures were compared using using IBM SPSS Statistics for Windows, version 26.0. Categorical variables such as age group, gender, fracture site, mode of trauma, and fracture detection across imaging planes were expressed as frequency and percentage. Continuous variables, where applicable, were presented as mean ± standard deviation with range. The association between age group and fracture distribution was assessed using the Chi-square test. Comparison of fracture detection between paired imaging modalities (axial, coronal, sagittal, and 3D reconstructed images) was performed using McNemar's test. A p-value of less than 0.05 was considered statistically significant.

RESULT

A total of 81 patients with maxillofacial fracture were included in the study. The mean age was 33.3 ± 15.8 years (range: 3–75 years). The most commonly affected age group was 21–30 years (27.2%), followed by 31–40 years (21.0%) as represented in Table 1. Males predominated, accounting for 73 patients (90.1%), whereas 8 patients (9.9%) were females.

Table 1. Age distribution of patients with maxillofacial trauma (n = 81)

Age group (years)	n	%
≤10	3	3.7
11–20	15	18.5
21–30	22	27.2
31–40	17	21.0
41–50	15	18.5
51–60	4	4.9
61–70	3	3.7
71–80	2	2.5
Total	81	100.0

Mode of Trauma

Table 2 shows road traffic accidents were the most frequent cause of injury. Bike accidents accounted for 29.6%, followed by car accidents (25.9%). Falls from height contributed 19.8%, heavy object trauma 12.3%, and assault 8.6%, while 3.7% of cases had an unknown mechanism of injury.

Table 2. Distribution of patients according to mode of trauma (n = 81)

Mode of trauma:	Value	%
Bike accident	24	29.6
Car accident	21	25.9
Fall from height	16	19.8
Assault	7	8.6
Heavy object trauma	10	12.3
Unknown	3	3.7

Distribution of Fractures:

The most frequently detected fractures involved the maxillary lateral wall (37.0%), followed by zygomatic arch fractures (35.8%), maxillary anterior wall fractures (32.1%), and nasal bone fractures (32.1%). Frontal bone fractures and orbital lateral wall fractures were each observed in 30.9% of patients. Other commonly identified fractures included orbital floor fractures (28.4%), orbital medial wall fractures (24.7%), and orbital roof fractures (24.7%). Mandibular fractures were less common and most frequently involved the mandibular body (14.8%) and parasymphysis (12.3%) summarized in Table 3.

Table 3. Distribution of maxillofacial fractures by site (n = 81)

Fracture site	n	%
Maxilla Lateral Wall	30	37.0
Zygomatic arch fracture	29	35.8
Maxilla Anterior Wall	26	32.1
Nasal Bone	26	32.1
Frontal Bone Fracture	25	30.9
Orbit Lateral Wall	25	30.9
Orbital Floor	23	28.4
Orbit Medial Wall	20	24.7
Orbital Roof	20	24.7
Maxilla Posterior Wall	18	22.2
Maxilla Medial Wall	17	21.0
Mandibular Body	12	14.8
ZMC Fracture	11	13.6
Mandibular Para-Sym	10	12.3
Maxilla Fracture	10	12.3
Mandibular Angle	6	7.4
Mandibular Condyle	6	7.4
Mandibular Ramus	6	7.4
Condyle Dislocation	5	6.2
Mandibular Symphysis	5	6.2
Coronoid Process	2	2.5

The diagnostic performance of different types of CT images in each type of the depicted facial fractures was as follows:
Orbital roof and orbital floor fractures showed similar detection rates across axial, coronal, sagittal, and 3D images. However, medial and lateral orbital wall fractures were detected significantly less frequently on sagittal images, with significant differences noted for comparisons involving sagittal reconstructions ($p < 0.05$) as represented in Table 4. Representative images are shown in Figures 1 and 2.

Table 4. Distribution of orbital fractures detected on axial, coronal, sagittal and 3D reconstructed images.

Fracture site	Axial	Sagittal	Coronal	3D
Orbital roof	18	18	18	20
Orbital floor	23	20	23	23
Medial wall	20	8	20	16
Lateral wall	24	13	25	24

Fracture site	p1	p2	p3	p4	p5	p6
Orbital roof	1.0	1.0	0.5	1.0	0.5	0.5
Orbital floor	0.25	1.0	1.0	0.25	0.25	1.0
Medial wall	<0.001	1.0	0.125	<0.001	0.057	0.125
Lateral wall	0.003	1.0	1.0	<0.001	0.003	1.0

p1: Axial vs Sagittal; p2: Axial vs Coronal; p3: Axial vs 3D; p4: Sagittal vs Coronal; p5: Sagittal vs 3D; p6: Coronal vs 3D. $p<0.05$ considered statistically significant.

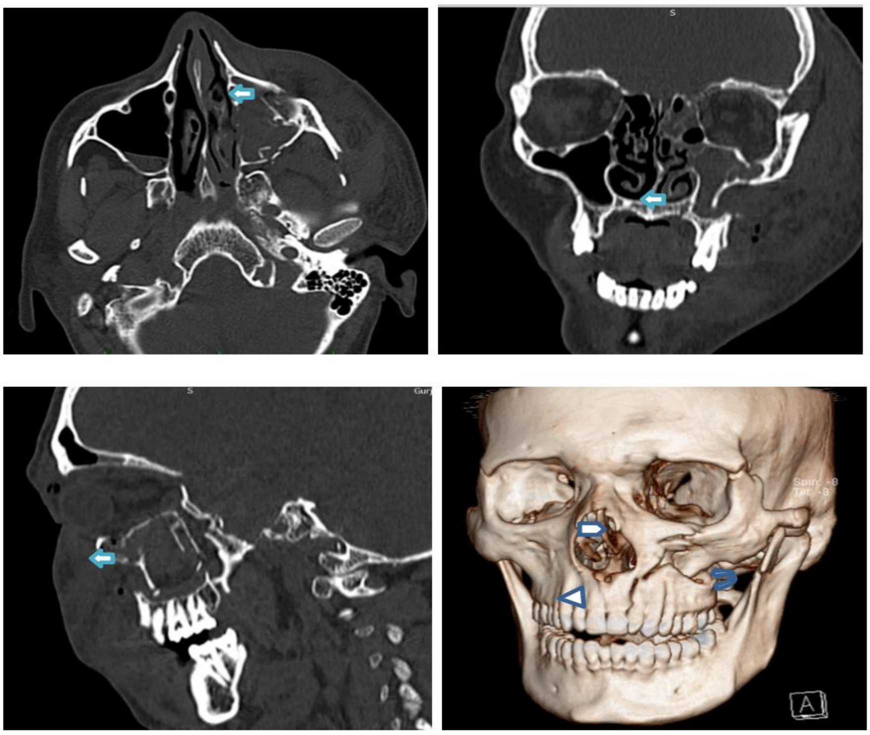

Figure 1: A 40 year old male presented with history of bike accident. MDCT (A) axial section of bone window shows comminuted fracture of the visualized anterior, posterior and medial wall of left maxillary sinus (solid arrow) with associated hemosinus. (B) coronal section of bone window shows lateral, medial and superior wall of left maxillary sinus (solid arrow). (C) sagittal section of bone window shows anterior, superior & posterior wall of the left maxillary sinus (solid arrow) and left pterygoid plate with associated hemosinus and premaxillary soft tissue edema. (D) 3D reformatted image showing fracture of the floor of left orbit (solid arrow) extending to involve anterior and lateral wall of left maxillary sinus with infero-lateral wall displaced inward, further fracture line is extending to involve superior alveolar process (arrow head) of maxilla on left side. Fracture of the ramus (curved arrow) of the mandible on left side is also seen.

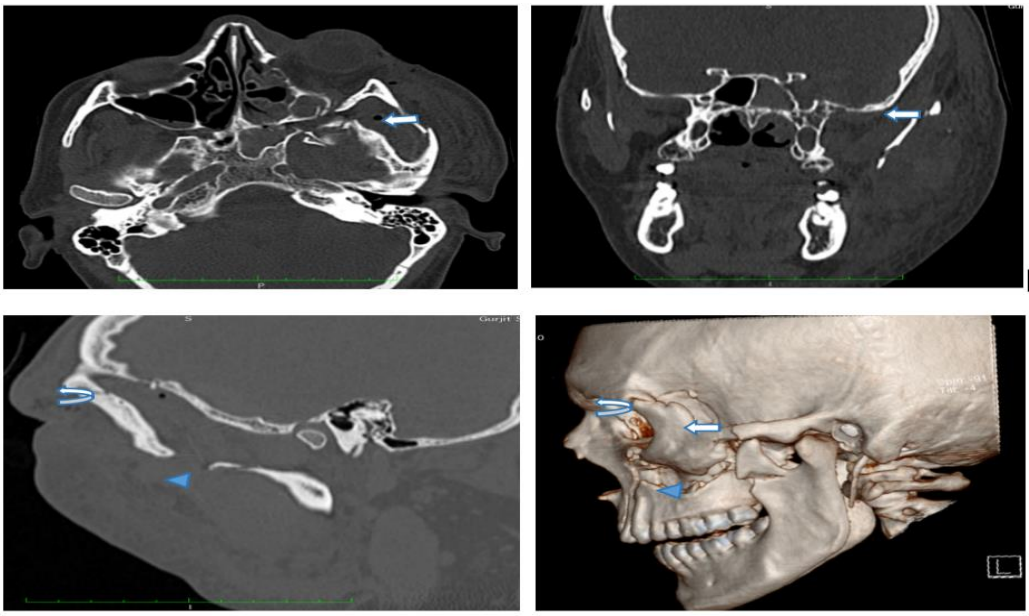

Figure 2 : A 29 year old female presented with history of hit by heavy object. MDCT (A) axial section of bone window shows slightly displaced fracture of the zygomatic arch (solid arrow) on left side, fracture of the anterior, posterior and medial wall of the left maxillary sinus. (B) Coronal section of bone window shows fracture of the left sided zygomatic arch (solid arrow). (C) sagittal section of bone window shows fracture of the lateral wall of the left orbit (curved arrow) and fracture of the coronoid process(arrow head) of the mandible on left side. (D) 3D reformatted image showing displaced fracture of the zygomatic arch (solid arrow) on right side, fracture of lateral wall of left orbit (curved arrow) and slightly displaced fracture of the coronoid process (arrow head) of mandible on left side.

Zygomatic arch fractures were detected most frequently on axial and 3D images, while sagittal images demonstrated lower detection rates, showing statistically significant differences when compared with axial and 3D images ($p < 0.05$). For zygomaticomaxillary complex fractures, detection was highest on 3D images, with a significant difference observed between sagittal and 3D reconstructions ($p = 0.031$).

Detection of maxillary fractures was generally comparable across imaging planes. Sagittal images showed reduced detection for medial and lateral wall fractures, while 3D images demonstrated the highest detection for anterior wall fractures. In contrast, posterior wall fractures were most accurately detected on coronal images, with statistically significant differences between imaging planes ($p < 0.05$).

Most mandibular fracture sites showed similar detection across imaging planes. However, mandibular body fractures were significantly under detected on sagittal images compared with axial and 3D images ($p < 0.05$) (Figure 3 & 4).

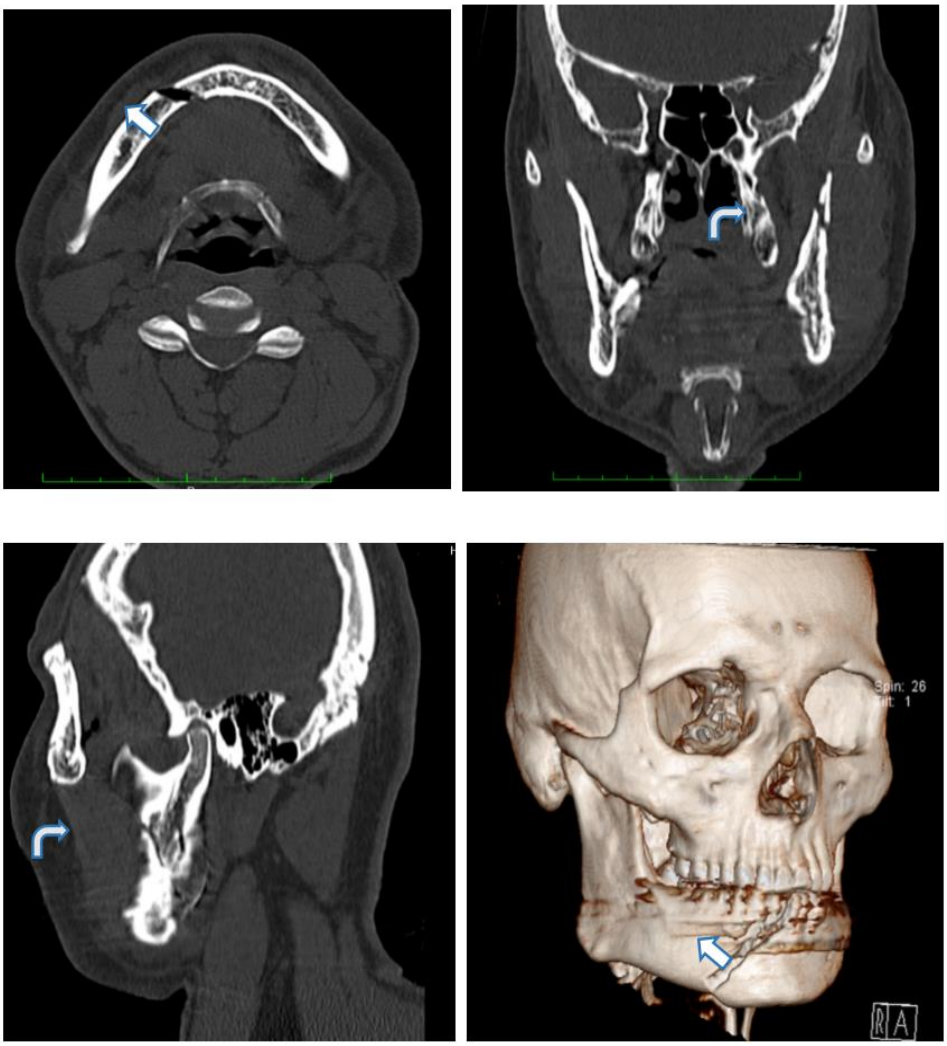

Figure 3: A case of 35 year old male presented with history of bike accident. MDCT (A) axial section of bone window shows slightly displaced fracture of body of mandible (solid arrow) on right side (B) Coronal section of bone window shows fracture of ramus of mandible on left side (curved arrow). (C) sagittal section of bone window shows comminuted fracture of the ramus of mandible (curved arrow) on left side. (D) 3D reformatted image showing fracture of the body of mandible (solid arrow) extending to involve right sided alveolar arch and parasymphysis.

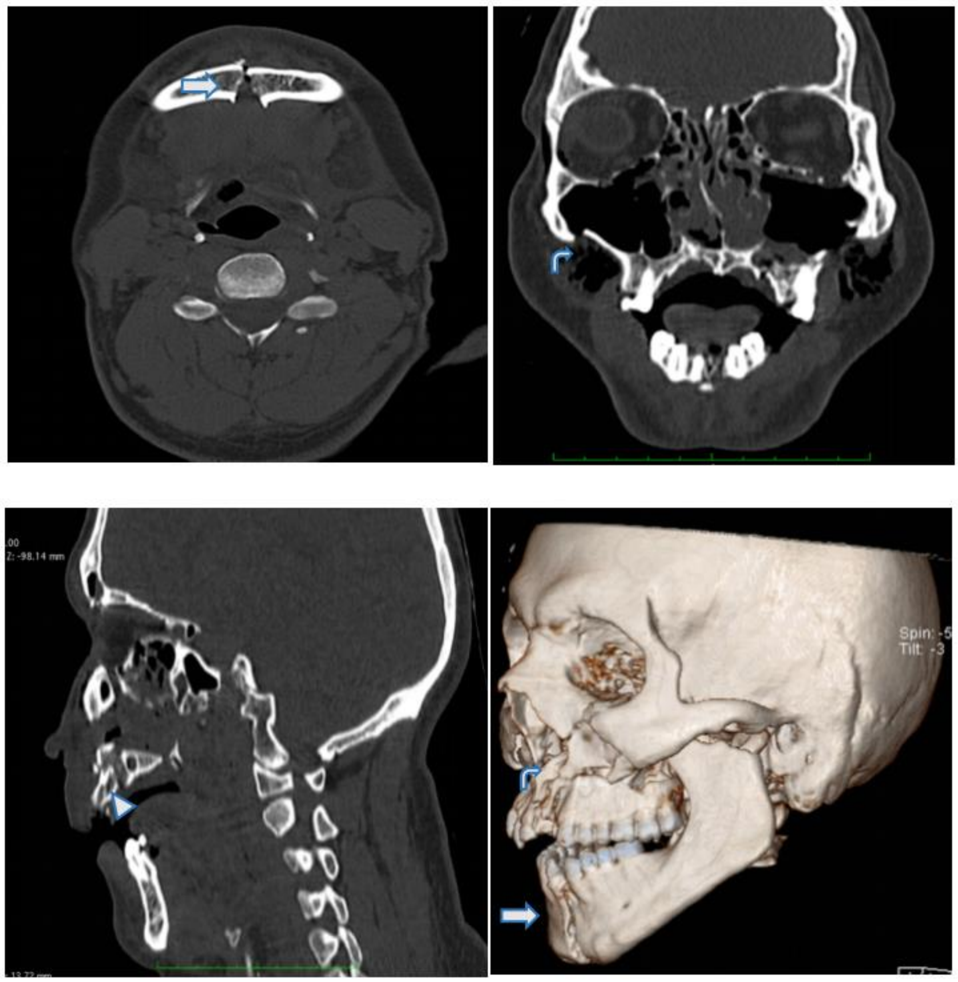

Figure 4: A 22 year old male, victim of assault. MDCT (A) axial section of bone window shows slightly displaced fracture of the body of mandible at symphysis (solid arrow) . (B) coronal section of bone window shows fracture of bilateral maxillary sinus (curved arrow) and fracture of the hard palate (arrow head). (C) sagittal section of bone window shows fracture of the hard palate (arrow head). (D) 3D reformatted image showing fracture of body of mandible at symphysis (solid arrow) & displaced fracture of left condyle and anterior wall of bilateral maxillary sinus (curved arrow).

Nasal bone fractures were detected most frequently on 3D images, with a significant difference between coronal and 3D reconstructions ($p = 0.031$). Frontal bone fractures were detected most frequently on axial and 3D images, whereas coronal images detected significantly fewer fractures ($p = 0.012$).

DISCUSSION

Maxillofacial trauma remains a significant clinical concern due to its functional and aesthetic implications. In the present study, the mean age was 33.3 ± 15.8 years, with the 21–30 years age group being most affected. This is consistent with Avery LL et al. [1] and Wang P et al. [7], who also reported a higher incidence among young adults. The marked male predominance (90.1%) aligns with Reddy BS et al. [6] and Yadav D et al. [8], reflecting greater exposure of males to high-risk activities.

Road traffic accidents were the leading cause of injury, particularly bike and car accidents, in agreement with Salvolini U [2] and Ragheb S et al. [20], highlighting the ongoing impact of inadequate road safety measures.

The predominance of midfacial fractures, especially involving the maxillary lateral wall and zygomatic arch, is consistent with Ellis III E et al. [16] and Winegar BA et al. [14], emphasizing the vulnerability of these structures. Orbital fractures involving the lateral wall, floor, and medial wall were also commonly observed, in line with Fox LA et al. [9] and Basavaraju UK et al. [10]

A key finding was the variation in fracture detection across imaging planes. Orbital roof and floor fractures showed comparable detection across all planes, supporting Reuben AD et al. [11] However, medial and lateral orbital wall fractures were significantly under-detected on sagittal images, consistent with Dreizin D et al. [12] and Panicker P et al. [13]

Zygomatic arch fractures were best detected on axial and 3D images, while sagittal images showed reduced detection, similar to Saigal K et al. [15] Additionally, zygomaticomaxillary complex fractures were most accurately identified on 3D imaging, as reported by Shah S et al. [26]

Maxillary fractures were generally well visualized; however, coronal images were superior for posterior wall fractures, while sagittal images showed reduced detection for medial and lateral wall fractures, consistent with Rhea JT et al. [3] and Frame JW et al. [4]

Mandibular fractures were less frequent, with the body and parasymphysis most commonly involved, similar to Manson PN et al. [22]. The under-detection of mandibular body fractures on sagittal images aligns with Iqbal A et al. [29]

Nasal bone fractures were most frequently detected on 3D imaging, consistent with Raju NS et al. [28], while frontal bone fractures were better visualized on axial and 3D images, with reduced detection on coronal images, as noted by Shakera J et al. [30]

Most fracture patterns showed no significant association with age, suggesting that distribution is primarily influenced by trauma mechanism, as also reported by Madkour NA [18] However, the significant association for maxillary anterior wall fractures indicates possible age-related variation.

Overall, these findings emphasize the importance of multidetector CT with multiplanar and 3D reconstruction in accurately evaluating maxillofacial trauma, consistent with Reddy BS et al. [6] and Shunmugavelu K et al. [21]

CONCLUSION

Multidetector computed tomography (MDCT) plays a crucial role in the evaluation of maxillofacial trauma due to its high spatial resolution and ability to generate multiplanar and three-dimensional reconstructions. The present study demonstrates that no single imaging plane is sufficient for comprehensive fracture assessment. Axial images provide the primary evaluation of fracture lines, while multiplanar reformatted images improve anatomical localization and characterization, particularly for orbital and midfacial fractures. Three-dimensional reconstructed images are especially valuable for demonstrating fracture displacement, comminution, and overall fracture patterns, thereby facilitating better understanding of complex injuries and aiding surgical planning.

Therefore, an integrated approach combining axial images, multiplanar reformations, and 3D reconstructions provides the most accurate evaluation of maxillofacial fractures and enhances diagnostic confidence in trauma imaging.

Declaration by Authors

Ethical Approval: Approved

Acknowledgement: None

Source of Funding: None

Conflict of Interest: The authors declare no conflict of interest.

REFERENCES

1. Avery LL, Susarla SM, Novelline RA. Multidetector and three-dimensional CT evaluation of the patient with maxillofacial injury. Radiol Clin North Am. 2011 Jan;49(1):183-203. doi: 10.1016/j.rcl.2010.07.014.
2. Salvolini U. Traumatic injuries: imaging of facial injuries. Eur Radiol. 2002 Jun;12(6):1253-61. doi: 10.1007/s00330-002-1445-8.

3. Rhea JT, Rao PM, Novelline RA. Helical CT and three-dimensional CT of facial and orbital injury. Radiol Clin North Am. 1999 May;37(3):489-513. doi: 10.1016/s0033-8389(05)70108-1.
4. Frame JW, Wake MJ. Evaluation of maxillofacial injuries by use of computerized tomography. J Oral Maxillofac Surg. 1982 Aug;40(8):482-6. doi: 10.1016/0278-2391(82)90008-8.
5. Singh S, Singh A, Gauba N, Deshmukh J. Journal of Maxillofacial Trauma 2014 April; 3 (1): 9-16. Journal of Maxillofacial Trauma. 2014 Apr;3(1):9-16.
6. Sandeep Reddy B, Naik D, Kenkere D. Role of Multidetector Computed Tomography in the Evaluation of Maxillofacial Trauma. Cureus. 2023 Feb 15;15(2):e35008. doi: 10.7759/cureus.35008.
7. Wang P, Yu Q, Shi H. [Comparison of 2D-CT and 3D-CT in diagnosing mid-facial fractures]. Zhonghua Kou Qiang Yi Xue Za Zhi. 2001 Jul;36(4):256-8. Chinese.
8. Yadav D, Jha A, Mukhi S, Tripathi S, Mishra R, Kandel L. Role of computed tomography in the evaluation of patients with maxillofacial trauma. Mod App Dent Oral Health. 4(1)-2019. Doi: 10.32474/MADOHC.2019.04.000176
9. Fox LA, Vannier MW, West OC, Wilson AJ, Baran GA, Pilgram TK. Diagnostic performance of CT, MPR and 3DCT imaging in maxillofacial trauma. Comput Med Imaging Graph. 1995 Sep-Oct;19(5):385-95. doi: 10.1016/0895-6111(95)00022-4.
10. Basavaraju UK, Shaji S, Puttaraj NC, Lingaiah RK, Moorthy S, Billal S. Role of MDCT with multiplanar and 3-D Reconstruction in evaluation of maxillofacial fractures. International Journal of Contemporary Medicine Surgery and Radiology. 2021;6(2):B25-31.
11. Reuben AD, Watt-Smith SR, Dobson D, Golding SJ. A comparative study of evaluation of radiographs, CT and 3D reformatted CT in facial trauma: what is the role of 3D? Br J Radiol. 2005 Mar;78(927):198-201. doi: 10.1259/bjr/26977910.
12. Dreizin D, Nam AJ, Hirsch J, Bernstein MP. New and emerging patient-centered CT imaging and image-guided treatment paradigms for maxillofacial trauma. Emerg Radiol. 2018 Oct;25(5):533-545. doi: 10.1007/s10140-018-1616-9.
13. Panicker P, George AL, Kumar RM, Srujan Kumar M, Francis F, Peter D. Efficiency of 2D versus 3D CT scans in maxillofacial trauma: A retrospective study. Bioinformation. 2025 May 31;21(5):985-989. doi: 10.6026/973206300210985.
14. Winegar BA, Murillo H, Tantiwongkosi B. Spectrum of critical imaging findings in complex facial skeletal trauma. Radiographics. 2013 Jan-Feb;33(1):3-19. doi: 10.1148/rg.331125080.
15. Saigal K, Winokur RS, Finden S, Taub D, Pribitkin E. Use of three-dimensional computerized tomography reconstruction in complex facial trauma. Facial Plast Surg. 2005 Aug;21(3):214-20. doi: 10.1055/s-2005-922862.
16. Ellis E 3rd, el-Attar A, Moos KF. An analysis of 2,067 cases of zygomatico-orbital fracture. J Oral Maxillofac Surg. 1985 Jun;43(6):417-28. doi: 10.1016/s0278-2391(85)80049-5.
17. Moustafa A. Kader A. Wahab, Mohamed A. Ibraheim, Naser Mohamed Osman. The role of multi detector computerized tomography in evaluation of maxillofacial fractures. The Egyptian Journal of Radiology and Nuclear Medicine, Volume 45, Issue 1, 2014, Pages 97-104, https://doi.org/10.1016/j.ejrnm.2013.11.003.
18. Ahmed Madkour, Noha Abdelfattah. Reliability of multidetector computed tomography in rational analysis of midface fractures. Journal of Oral and Maxillofacial Radiology 6(2):p 21-25, May–Aug 2018. | DOI: 10.4103/jomr.jomr_12_18
19. M.G.P Cavalcanti, J Panella, D.T Santos, M.W Vannier, A.P.A Costa e Silva. Interpretation of craniofacial fractures using multislice CT: establishing a protocol, International Congress Series, Volume 1268, 2004, Pages 1215-1219, https://doi.org/10.1016/j.ics.2004.03.018.
20. Ragheb S, Solyman M, Gafar A. The Added Value of Multislice Computerized Tomography in Evaluation of Maxillofacial Fractures. Sohag Medical Journal. 2019 Jul 1;23(3):63-76. Doi: 10.21608/smj.2019.14925.1028.
21. Shunmugavelu K, Kannapan H, Vaishnavi P, Dhinakaran EC, Lavanya S, Kumar B. Applications Of Three Dimensional Facial

Computed Tomography In Head And Neck Region - A Review. Probl Radiac Med Radiobiol. 2023 Dec; 28:544-548. English, Ukrainian. doi: 10.33145/2304-8336-2023-28-544-548.
22. Manson PN, Clark N, Robertson B, Crawley WA. Comprehensive management of pan-facial fractures. J Craniomaxillofac Trauma. 1995 Spring;1(1):43-56.
23. Schulze D, Metzger MC. Intraoperative three-dimensional imaging in craniomaxillofacial surgery—no need for navigation? International Journal of Oral and Maxillofacial Surgery. 2009 May 1;38(5):482-3.
24. Manson PN, Hoopes JE, Su CT. Structural pillars of the facial skeleton: an approach to the management of Le Fort fractures. Plast Reconstr Surg. 1980 Jul;66(1):54-62. doi: 10.1097/00006534-198007000-00010.
25. Kv A, Kc S. Comparative Study of Computerized Tomography Imaging of Facial Trauma Using 2D and 3D Reconstruction Scans. Cureus. 2024 Jul 23;16(7):e65217. doi: 10.7759/cureus.65217.
26. Shah S, Uppal SK, Mittal RK, Garg R, Saggar K, Dhawan R. Diagnostic tools in maxillofacial fractures: Is there really a need of three-dimensional computed tomography? Indian J Plast Surg. 2016 May-Aug;49(2):225-233. doi: 10.4103/0970-0358.191320.
27. Prasad VN, Khanal A. Computed Tomography evaluation of maxillofacial injuries. JCMS Nepal. 2016;12(4):131-6. DOI: http://dx.doi.org/10.3126/jcmsn.v12i4.16372
28. Raju, N. Sreenivasa; Ishwar, Prashanth; Banerjee, Rumpa. Role of multislice computed tomography and three-dimensional rendering in the evaluation of maxillofacial injuries. Journal of Oral and Maxillofacial Radiology 5(3):p 67-73, Sep–Dec 2017. | DOI: 10.4103/jomr.jomr_25_17
29. Iqbal A, Yasin A, Javeed M, Rana T, Khan B, Yasin A. Role of MDCT and 3D computed tomography in the assessment of maxillofacial fractures and their types: a tertiary care hospital experience. J Fatima Jinnah Med Univ. 2020; 14(3); 119-123. DOI: https://doi.org/10.37018/dvdu4414
30. Shakera J, Seifeldeina G. The diagnostic efficacy of multiplanar and 3-dimensional MDCT in Evaluation of Traumatic Maxillofacial Injuries. Egyptian Journal of Oral and Maxillofacial Surgery. 2021 Apr 1;12(2):110-20. Doi: 10.21608/omx.2021.86992.1127.

How to cite this article: Rajbir Singh, Arvinder Singh, Kunwarpal Singh. Comparative evaluation of axial, multiplanar and three-dimensional reconstructed MDCT images in maxillofacial fractures. *Int J Health Sci Res.* 2026; 16(4):96-105. DOI: *https://doi.org/10.52403/ijhsr.20260413*

******