



Single institutional experience of geriatric maxillofacial trauma patients: a retrospective study

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Abstract (J Korean Assoc Oral Maxillofac Surg 2025;51:102-107)

Objectives: Geriatric maxillofacial trauma (GMT) is not an uncommon entity in maxillofacial surgery practice. The aim of the study was to document the experience with GMT cases in a single private dental college and hospital in an effort to uncover the etiology, prevalence, fracture sites, and various types of treatment in GMT.

Materials and Methods: This was a retrospective study conducted at Saveetha Dental College and Hospital in Chennai. Data from patients diagnosed with maxillofacial trauma between January 2019 and December 2023 were retrieved from hospital records, and those aged ≥ 60 years were included in the study. Patients' basic demographic details and the prevalence, etiology, fracture sites, and various treatments of GMT were recorded and analyzed. The collected data were entered into a structured database and analyzed using IBM SPSS Statistics ver. 23.0 (IBM).

Results: A total of 867 cases were screened, and 37 (4.04%) GMT patients were finally included in the study. The mean age of the study population was 65 ± 5 years, and there were six females and 31 males. A ground-level fall was the common etiology ($n=17$), and the most common site of fracture was the mandible ($n=15$). Open reduction and internal fixation (ORIF) was the most common treatment modality ($n=24$) among included cases.

Conclusion: Although the prevalence of GMT was low, ground-level falls were a common reason for trauma; hence, geriatric patients require comprehensive care in home and outdoor settings. Enhanced anesthetic and surgical techniques have made ORIF a suitable treatment approach in the present era.

Key words: Bone fracture, Maxillofacial injuries, Rehabilitation, Prevalence, Management

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I. Introduction

Maxillofacial trauma in the geriatric population is a growing concern in the field of maxillofacial surgery¹. As the world's population ages, understanding the intricacies of trauma in the elderly becomes more and more important². Older individuals are more likely to sustain facial injuries due to falls, osteoporotic bone fragility, and age-related vision and cognition problems³. Geriatric patients, i.e., individuals aged

≥ 60 years, often present with delayed recovery due to comorbidities, decreased bone density, and altered physiological responses to injury and treatment⁴.

The rising frequency of geriatric trauma requires a specialized approach to identify various fracture sites and select the best treatment approach for each site⁵. Previous research has identified a number of causes of maxillofacial injuries in the elderly population, including falls and road traffic accidents (RTAs), but detailed data on prevalence and fracture sites remain scarce. Furthermore, the effectiveness of various treatment protocols, particularly in terms of the recovery of the elderly population, requires an in-depth analysis⁶.

The aim of this study was to evaluate and analyze the etiology, prevalence, fracture sites, and management protocols for cases of geriatric maxillofacial trauma (GMT) treated at a single private tertiary dental institution. By analyzing the data of a specific institution over a specified period of time, the study aims to provide insights into the characteristics of GMT.

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II. Materials and Methods

1. Study design

This retrospective study was conducted to analyze the etiology, prevalence, fracture sites, and management of maxillofacial trauma in geriatric patients. Our analysis relied on patient records from Saveetha Dental College and Hospital in Chennai, focusing on cases reported between January 2019 and December 2023.

2. Participants

Patients ≥ 60 years old with maxillofacial trauma treated at Saveetha Dental College and Hospital between January 2019 and December 2023 were considered eligible for enrollment.

Meanwhile, patients with incomplete medical records or the presence of other systemic comorbidities that may influence the study results were excluded.

3. Data collection

Data were collected retrospectively from the hospital's medical records system. The variables of interest were recorded and analyzed to discern the etiology of trauma, which included falls, RTAs, assaults, and other causes. In our institute, medical insurance can be used for all cases of maxillofacial trauma, irrespective of the cause, i.e., either assault or an accident. Hence, there is no bias in the patient's statement about the etiology of the trauma. For study purposes, the prevalence of GMT was defined as the proportion of geriatric patients with maxillofacial fractures relative to the total number of patients treated for trauma within the specified period. Fracture sites included the maxilla, mandible, zygomatic bone, nasal bone, and coronoid process. Types of treatment included open reduction and internal fixation (ORIF), closed reduction, conservative management, and others.

4. Data analysis

The collected data were entered into a structured database and analyzed using IBM SPSS Statistics ver. 23.0 (IBM). Descriptive statistics were used to summarize the demographic data, etiology, prevalence, fracture sites, and types of treatment. Frequencies and percentages were calculated for categorical variables, while means and standard deviations were used for continuous variables.

5. Ethical considerations

The study protocol was reviewed and approved by the Institutional Ethics Committee of Saveetha Dental College and Hospital (IHEC No. IHEC/SDC/PERIO-2307/24/087). Given the retrospective nature of the study, the need to collect patient consent was waived, but confidentiality and privacy were strictly maintained throughout data collection and analysis.

III. Results

A total of 867 cases were screened, and 37 (4.04%) GMT patients were finally included in the study. The mean age of the study population was 65 ± 5 years, and there were six females (16.2%) and 31 males (83.8%) included in the study.

About 40.5% of included fractures occurred in the mandible, followed by 32.4% in the dentoalveolar structure. About 18.9% of fractures were seen in the zygomatico-maxillary complex (ZMC). Conversely, the maxilla and the ZMC along with mandibular fractures were the least affected sites. (Table 1, Fig. 1) Approximately 81.1% of fracture cases involved a single site and 18.9% involved more than one site. (Table 1, Fig. 2)

Considering etiology, 45.9% of fractures were due to a fall, excluding the consumption of alcohol, and 5.5% occurred after the consumption of alcohol, followed by 35.1% attributed

Table 1. Demographic variables of study participants (n=37)

	Value
Age (yr)	65 \pm 5
Sex	
Male	31 (83.8)
Female	6 (16.2)
Anatomical site	
Maxilla	2 (5.5)
Mandible	15 (40.5)
ZMC	7 (18.9)
Dentoalveolar	12 (32.4)
ZMC and mandible	1 (2.7)
No. of sites	
Single	30 (81.1)
More than one site	7 (18.9)
Etiology	
Fall	17 (45.9)
Fall (after drinking alcohol)	2 (5.5)
Assault	5 (13.5)
RTA	13 (35.1)
Management	
ORIF	24 (64.9)
CR	13 (35.1)

(ZMC: zygomatico-maxillary complex, RTA: road traffic accident, ORIF: open reduction and internal fixation, CR: closed reduction)
Values are presented as number (%) or mean \pm standard deviation.
Srishi Agarwal et al: Single institutional experience of geriatric maxillofacial trauma patients: a retrospective study. J Korean Assoc Oral Maxillofac Surg 2025

to RTAs, while about 13.5% of fractures were due to assault. (Table 1, Fig. 3) Table 2 and Fig. 4 shows the detailed distribution of fracture anatomical sites based on the etiology of trauma.

A total 64.9% of fractures were managed using ORIF, while 35.1% of fractures required closed reduction.(Table 1, Fig. 5) Among those fractures managed using ORIF, 25.0%

of fractures were ZMC fractures, 12.5% of fractures involved the mandible, and 8.4% of fractures were sub-condylar fractures. Conversely, among those fractures managed by closed reduction, 84.6% were dentoalveolar fractures, while ZMC fractures and right para-symphysis fractures constituted 7.7%, respectively. This distribution was statistically significant ($P=0.011$).

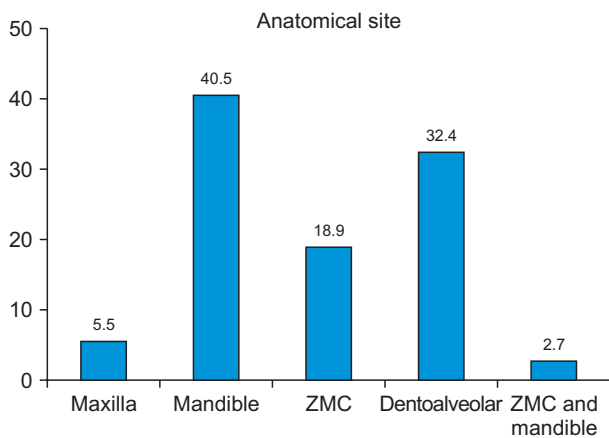


Fig. 1. Distribution of fractures according to anatomical site. (ZMC: zygomatico-maxillary complex)
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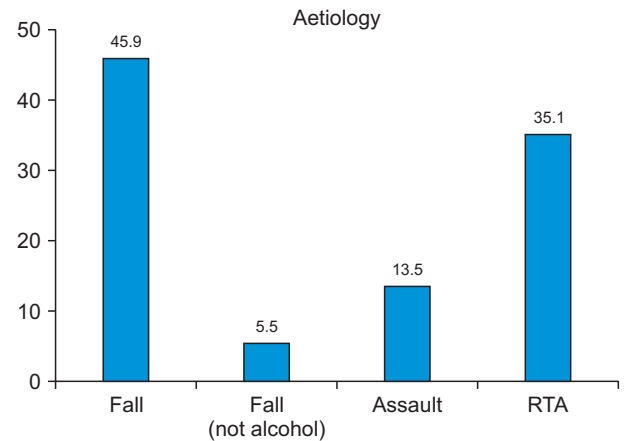


Fig. 3. Fracture distribution according to etiology. (RTA: road traffic accidents)
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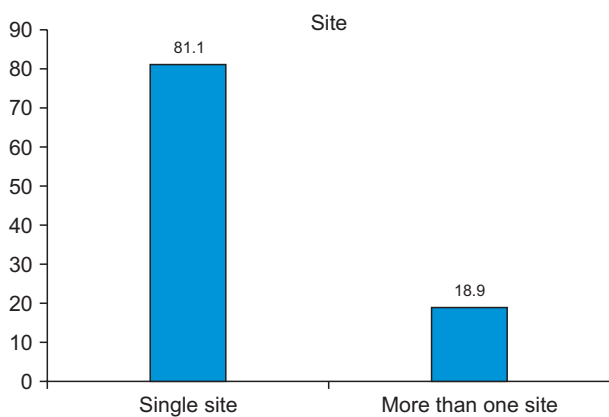


Fig. 2. Number of fracture sites.
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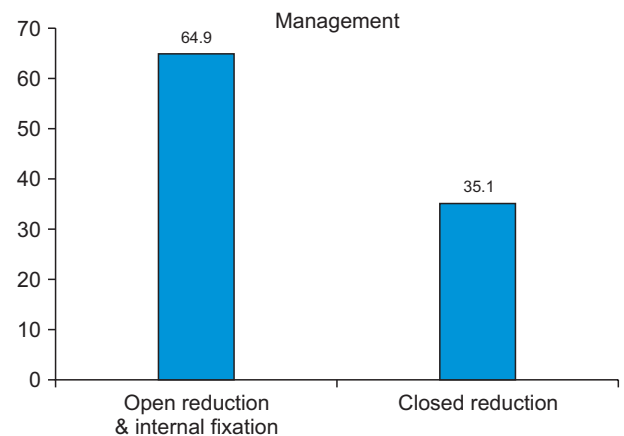


Fig. 4. Distribution of fractures according to management.
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Table 2. Distribution of fractures according to etiology and anatomical site

	Maxilla	Mandible	ZMC	Dento-alveolar	ZMC and mandible	Total	P-value
Fall	1 (5.9)	6 (35.2)	1 (5.9)	8 (47.1)	1 (5.9)	17 (100.0)	0.6 NS ¹
Fall (after drinking alcohol)	0 (0.0)	1 (50.0)	0 (0.0)	1 (50.0)	0 (0.0)	2 (100.0)	
Assault	0 (0.0)	2 (40.0)	2 (40.0)	1 (20.0)	0 (0.0)	5 (100.0)	
RTA	1 (7.7)	6 (46.2)	4 (30.7)	2 (15.4)	0 (0.0)	13 (100.0)	
Total	2 (5.4)	15 (40.5)	7 (18.9)	12 (32.4)	1 (2.8)	37 (100.0)	

(RTA: road traffic accident, ZMC: zygomatico-maxillary complex, NS: not significant)

¹Chi-squared test.

Srishti Agarwal et al: Single institutional experience of geriatric maxillofacial trauma patients: a retrospective study. J Korean Assoc Oral Maxillofac Surg 2025

Table 3. Distribution of etiology according to sex

	Male	Female	Total	P-value
	n (%)	n (%)		
Fall	14 (45.2)	3 (50.0)	17	0.8 NS ¹
Fall (after drinking alcohol)	2 (6.5)	0 (0.0)	2	
Assault	5 (16.1)	0 (0.0)	5	
RTA	10 (32.2)	3 (50.0)	13	
Total	31 (100.0)	6 (100.0)	37	

(RTA: road traffic accident, NS: not significant)

¹Chi-squared test.

Srishti Agarwal et al: Single institutional experience of geriatric maxillofacial trauma patients: a retrospective study. *J Korean Assoc Oral Maxillofac Surg* 2025

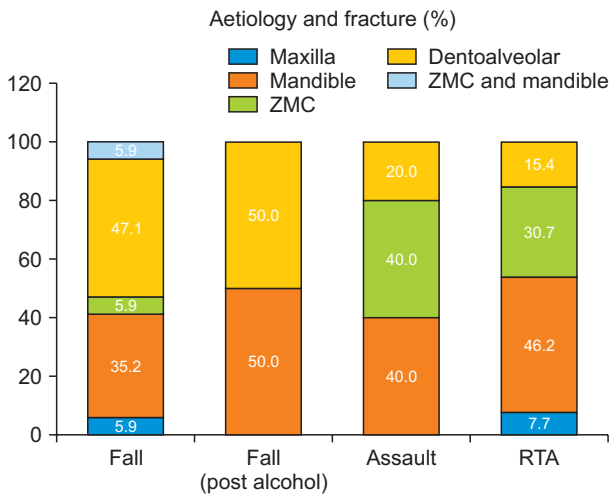


Fig. 5. Fracture etiology and anatomical sites. (RTA: road traffic accidents, ZMC: zygomatico-maxillary complex)

Srishti Agarwal et al: Single institutional experience of geriatric maxillofacial trauma patients: a retrospective study. *J Korean Assoc Oral Maxillofac Surg* 2025

IV. Discussion

GMT is becoming increasingly notable in maxillofacial surgery as the population ages⁷. Maxillofacial injury is a serious incident with a variety of implications, including superficial lacerations, facial nerve damage, and fractures⁸. However, various clinical scenarios may be encountered depending on the magnitude and intensity of trauma, as well as the patient's age and comorbidities⁴. The distinct characteristics and challenges associated with trauma in this age range require a full understanding of the etiology, prevalence, fracture locations, and treatment options³.

1. Etiology

The study discovered that falls were the most common cause of facial injuries in older individuals, accounting for 50% of cases in female. (Table 3, Fig. 6) This is consistent with results of previous studies, which showed that poor bal-

Sex and aetiology

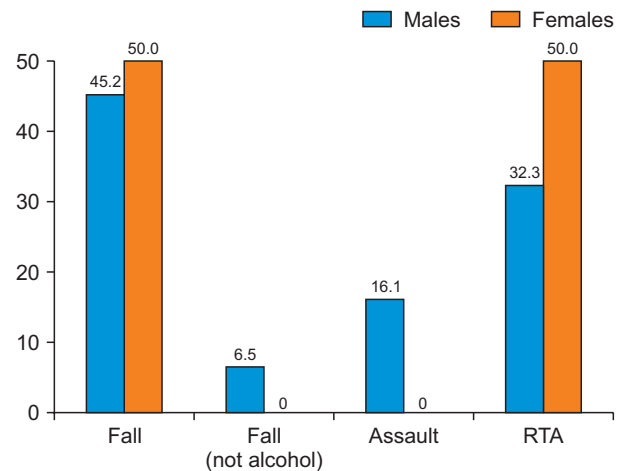


Fig. 6. Distribution of fractures according to sex and etiology. (RTA: road traffic accidents)

Srishti Agarwal et al: Single institutional experience of geriatric maxillofacial trauma patients: a retrospective study. *J Korean Assoc Oral Maxillofac Surg* 2025

ance, vision impairment, and overall frailty increase the likelihood of falls in elderly people⁹. Singaram et al.¹⁰ did report in their study that RTAs are the most common etiology, but they included patients ranging in age from 5-75 years.

In the present study, RTA and assaults were more common among men, accounting for 42% of injuries. This figure implies that older men may remain more active and mobile, possibly engaging in driving and other activities that expose them to increased rates of trauma¹¹.

2. Prevalence

The prevalence of geriatric facial fractures in this study was 4.09%, which is low when compared to figures in younger groups but substantial given the accompanying morbidity in older individuals. This lower incidence could be related to the trend of older people engaging less in high-risk activities and being more aware of their safety. However, the severity of injuries in this age range might be compounded by comorbidities and slower healing processes, emphasizing the need for specialized care¹².

3. Fracture sites

The most common fracture site found in the present study was the mandible, accounting for 15 cases. This discovery emphasizes the force of impact on the lower one-third of facial structures during falls and other trauma episodes. The high incidence of mandibular fractures could be attributed to

facial profile, anatomy, and other age-related changes in bone density and structure¹³. Although nasal bone fractures are the most commonly reported type of fracture¹⁴ in the literature, the present study was performed at a dental institute, not a trauma center; hence, the incidence of nasal bone fractures was minimal.

4. Management

The most common management strategy in this study—ORIF—was employed to treat 64.9% of patients. This preference for ORIF is consistent with earlier research, which has confirmed stable fixation and speedier recovery are attained using this approach¹⁵. ORIF is specifically useful in geriatric patients because it facilitates immediate stability and early mobilization, which are critical for lowering the risk of complications, which may include pneumonia and deep vein thrombosis¹⁶.

However, conservative treatments were also used, particularly in patients with major comorbidities or those at high surgical risk. To enhance outcomes, a multidisciplinary approach to elderly trauma management should be favored, involving maxillofacial surgeons, geriatricians, and physical therapists². This study lends credence to the idea that tailored approaches to treatment, taking into account the patient's general health and specific requirements, are necessary for effective management.

5. Clinical implications

The findings of this study have several important clinical implications. First, the high incidence of falls as a cause of maxillofacial trauma in geriatric patients highlights the need for preventive measures, such as balance training, home safety assessments, and visual aids. Second, the preference for ORIF in managing fractures suggests that surgical interventions should be tailored to the specific anatomical and physiological characteristics of elderly patients. Finally, the importance of a multidisciplinary approach in the management of GMT cannot be overstated, as it ensures comprehensive care and addresses the unique challenges posed by this population.

6. Limitations

The study's limitations include its retrospective methodology, which may have introduced selection bias while also limiting the amount of data accessible due to the small

sample size of a single private hospital. Our study's reliance on a single site limits its applicability to larger populations. Further research with larger sample numbers and multi-center partnerships is needed to confirm our findings and draw more reliable conclusions.

7. Future research directions

Future research should include prospective studies to validate findings, as well as multi-center collaborations to improve data robustness. The effect of various fall-prevention methods on the incidence of GMT could be assessed. The role of minimally invasive procedures and modern imaging modalities in the treatment of elderly maxillofacial injuries could be evaluated.

V. Conclusion

In conclusion, this study sheds light on the epidemiology, fracture characteristics, and treatment options for maxillofacial trauma in older individuals. Ground-level falls appear to be the leading cause of cases, highlighting the necessity of preventative measures in geriatric care. The study supports ORIF's efficacy in producing positive outcomes and emphasizes the importance of personalized treatments in controlling maxillofacial trauma in the elderly population. Further research is needed to identify potential risk factors for elderly maxillofacial injuries and to compare the long-term effects of various treatment options.

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Authors' Contributions

S.A. and S.L. substantially contributed to conception or design. M.K. and S.L. contributed to acquisition, analysis, or interpretation of data. S.A. and S.L. drafted the manuscript. G.A. and M.K. critically revised the manuscript for important intellectual content. M.K. and G.A. gave final approval. S.A. and S.L. agree to be accountable for all aspects of the work

in ensuring that questions relating to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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Ethics Approval and Consent to Participate

The study protocol was reviewed and approved by the Institutional Ethics Committee of Saveetha Dental College and Hospital (IHEC No. IHEC/SDC/PERIO-2307/24/087). Given the retrospective nature of our study, the need for patient consent was waived, but confidentiality and privacy were strictly maintained throughout data collection and analysis.

Conflict of Interest

No potential conflict of interest relevant to this article was reported.

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