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Article

Combined Injuries of the Facial Skeleton: Clinical Features and Epidemiological Analysis

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Abstract: Combined injuries of the facial skeleton represent an important and growing problem in contemporary traumatology, frequently associated with concomitant traumatic brain injury and a high rate of complications. This retrospective study analyzed the clinical and epidemiological features of combined maxillofacial trauma in 56 patients treated at the Department of Maxillofacial Surgery of the Tashkent State Medical University clinic between January 2023 and January 2026, with a control group of 20 practically healthy individuals used for comparison of laboratory parameters. Clinical evaluation included history taking, general and neurological examination, and radiographic and multislice computed tomography assessment of facial skeleton fractures. Men predominated (73.2%), with the 30–39-year age group being the largest (41.1%). Unilateral fractures, predominantly of the mandible, were the most common pattern (66.0%), followed by bilateral (26.8%) and multiple (10.7%) fractures. Street and domestic incidents were the leading cause of injury (62.8%). Loss of consciousness at the time of injury was recorded in 62.5% of patients, yet traumatic brain injury was diagnosed with a delay of several days in 30.4% of cases. These findings highlight the multifactorial nature of combined facial trauma and the clinical importance of mandatory, systematic neurological assessment in every patient presenting with facial skeleton injury, regardless of the apparent severity of the facial trauma itself.

Keywords: Combined Facial Trauma, Maxillofacial Fractures, Mandible Fracture, Traumatic Brain Injury, Epidemiology, Clinical Features.

Introduction

The growing level of traumatism associated with active urbanization and increasing transport load remains one of the pressing problems of contemporary medicine. Injuries to the bones of the maxillofacial region show a steady upward trend and account on average for 6–8% of all traumatic injuries [1]. Within this structure, fractures of the mandible play the leading role, with their frequency, according to various authors, reaching 70–85% of all injuries of the facial skeleton [2].

According to statistical observations, in peacetime the prevalence of facial trauma is approximately 0.3–0.5 cases per 1,000 population, while the proportion of facial bone fractures within the overall structure of traumatic injuries ranges from 3.2% to 16% [3]. Epidemiological data indicate that up to 45% of patients hospitalized after road traffic accidents present with injuries of the facial skeleton [4]. Moreover, the share of combined and multiple injuries of the maxillofacial region reaches 35–40% [5], [6].

Combined facial injuries are accompanied by an extremely high rate of complications: airway compromise, orbital and visual organ damage, intracranial trauma, deformities of the mid- and lower face, secondary fragment displacement, infectious complications, and impairment of masticatory and speech function [7]. As a result, persistent disability after such injuries reaches 15–25%, and up to 50% of patients fail to return to their previous occupation within the first year after injury [8].

The conventional clinical approach to the assessment of combined facial trauma does not always adequately explain the variability of clinical presentations, differences in the nature and severity of injuries with similar localization, or the causes of unsatisfactory treatment outcomes. This underlines the growing importance of studying the clinical and epidemiological structure of such injuries, as well as the biomechanical mechanisms of traumatic impact that determine load distribution, the formation of zones of maximal stress, and the pattern of damage to the bony structures of the facial skeleton [9].

Aim

To study the clinical and epidemiological features of the course of combined injuries of the facial skeleton in hospitalized patients.

Materials and Methods

A retrospective study was conducted on the medical records of 56 patients with combined injuries of the maxillofacial region who received treatment in the Department of Maxillofacial Surgery of the Tashkent State Medical University clinic between January 2023 and January 2026.

Inclusion criteria comprised patients aged 20–60 years with a confirmed diagnosis of combined facial skeleton injury. Exclusion criteria included severe somatic or hereditary pathology, mental illness, epilepsy and chronic neurological disorders, decompensated chronic disease, pregnancy and lactation, disorders of calcium–phosphorus metabolism, ongoing therapy with drugs affecting bone regeneration and fracture consolidation (bisphosphonates, denosumab, and agents with a similar mechanism of action), oncological disease, radio- or chemotherapy, and documented drug intolerance or allergy.

Clinical evaluation included comprehensive collection of complaints and history (life history, epidemiological and allergy history), assessment of general condition with referral to relevant specialists when concomitant internal organ pathology was suspected, clinical-neurological examination of all patients on admission with particular attention to signs of inferior alveolar nerve injury (pareses, paresthesia, hyper- and hypoesthesia) [10], and mandatory exclusion or confirmation of traumatic brain injury, with attention to episodes of loss of consciousness, nausea, and vomiting. Diagnosis of facial skeleton fractures was based on clinical examination and plain radiography, supplemented by multislice computed tomography (MSCT) to clarify the localization and nature of bone damage.

For comparison of laboratory parameters, a control group of 20 practically healthy individuals was formed, comprising equal numbers of men and women, with four representatives of each age category, which allowed comparison of the studied indicators with physiological reference values.

Results

Among the 56 patients studied, men predominated — 41 individuals (73.2%) — compared with 15 women (26.8%). Patient age ranged from 18 to 65 years, with the 30–39-year age group being the largest (41.1%).

Table 1. Age and gender distribution of patients (n = 56).

Age group	Male	Female	Total	%
Under 20 years	4	0	4	7.1

21–29 years	12	3	15	26.8
30–39 years	15	8	23	41.1
40–49 years	7	3	10	17.9
50 years and older	3	1	4	7.1
Total	41 (73.2%)	15 (26.8%)	56	100

Analysis of the timing of hospital admission showed that 21 patients (37.5%) were admitted within the first 24 hours after injury, 23 (41.7%) on the second day, 7 (12.5%) on the third day, 3 (5.4%) on the fourth day, and 2 (3.6%) five or more days after injury. In all cases hospitalization was performed on an emergency basis. Distribution of admission timing by fracture type is presented in Table 2.

Table 2. Timing of admission by fracture type (n = 56).

Fracture type	Day 1	Day 2	Day 3	Day 4	≥ 5 days	Total
Unilateral	11	15	5	3	2	36 (64.3%)
Bilateral	6	5	2	–	–	13 (23.2%)
Multiple	4	3	–	–	–	7 (12.5%)
Total	21 (37.5%)	23 (41.7%)	7 (12.5%)	3 (5.4%)	2 (3.6%)	56 (100%)

A separate clinical-radiological analysis of fracture structure across the full cohort showed that unilateral fractures were diagnosed in 37 patients (66.0%), bilateral fractures in 15 (26.8%), and multiple fractures of the facial skeleton in 6 (10.7%).

Analysis of the causes of injury showed that the majority of cases were related to street incidents and domestic conflicts — 35 observations (62.8%); sports-related activities were the cause of injury in 16 individuals (27.4%); other circumstances accounted for 9 cases (14.5%).

Loss of consciousness at the time of injury or shortly thereafter was recorded in 35 patients (62.5%). Notably, in 17 cases (30.4%) the diagnosis of traumatic brain injury was not established at the time of admission but only several days later, reflecting a clinically significant diagnostic delay. Only 13 patients (21.6%) had a confirmed diagnosis of mild cerebral contusion. Objective neurological symptoms in patients with concussion were observed less frequently and predominantly within the first 24 hours after injury; mild and poorly expressed neurological symptoms required additional neurological consultation to establish an accurate diagnosis.

The leading clinical manifestations in the projection of the fracture were pronounced pain syndrome, restricted mandibular mobility with difficulty in mouth opening, speech impairment, and dysphagia during food intake. Headache and dizziness were reported less frequently. The distribution of symptoms of central origin associated with traumatic brain injury is presented in Table 3.

Table 3. Symptoms of central origin (traumatic brain injury).

Symptom	Number of patients	%
Headache	21	35.8
Dizziness	27	45.9
Nausea and vomiting	18	30.4
Loss of consciousness at injury	35	62.5
Confirmed mild cerebral contusion	13	21.6

Discussion

The demographic profile observed in this cohort — a clear predominance of men of working age, with the 30–39-year subgroup being the largest — is consistent with the generally recognized epidemiological pattern of maxillofacial trauma, in which young and middle-aged men engaged in active social, occupational, and recreational activities represent the population at greatest risk. The predominance of street and domestic incidents as the leading cause of injury, together with a substantial contribution from sports-related trauma, reflects the multifactorial nature of combined facial injuries and underscores the limited utility of addressing prevention through a single intervention channel [11].

A particularly notable finding is the high frequency of delayed diagnosis of concomitant traumatic brain injury. Nearly one-third of patients with loss of consciousness at the time of injury did not receive a timely diagnosis of traumatic brain injury, which carries the risk of underestimating the severity of the combined injury and of delaying appropriate neurological observation and treatment [12]. This finding reinforces the clinical principle that every patient presenting with facial skeleton trauma, especially in the presence of any history of loss of consciousness, headache, dizziness, nausea, or vomiting, should undergo mandatory neurological assessment as part of the initial diagnostic algorithm, regardless of the apparent severity of the facial injury itself [13].

The predominance of unilateral mandibular fractures over bilateral and multiple fracture patterns is consistent with the biomechanical characteristics of the mandible as the most exposed and mobile bone of the facial skeleton, and aligns with previously reported high relative frequencies of mandibular fractures among facial skeleton injuries in general. The concentration of admissions within the first two to three days after injury (91.1% of all cases) indicates that, despite the emergency nature of hospitalization, a substantial proportion of patients present beyond the optimal early treatment window, which may influence the timing of surgical intervention and the subsequent course of consolidation [14]. In this respect, the choice of osteosynthesis technique, including bioresorbable fixation systems, together with adjunct measures to stimulate osteogenesis, may warrant further comparative evaluation in this patient population [15].

Limitations

This analysis has the inherent limitations of a retrospective single-center study based on medical record review, including the possibility of incomplete documentation of minor or non-specific neurological symptoms, reliance on the accuracy and completeness of admission-time clinical notes, and a sample size that, while sufficient for descriptive epidemiological characterization, limits the precision of subgroup comparisons.

Conclusion

This study demonstrates that combined injuries of the facial skeleton occur predominantly in men of working age, particularly within the 30–39-year age group, which accounted for the largest proportion of cases in the cohort studied, and that the leading cause of such trauma was street and domestic incidents (62.8%) followed by sports-related injury (27.4%), reflecting the multifactorial and largely preventable nature of this pathology. Unilateral fractures, predominantly of the mandible, represented the most frequent pattern of facial skeleton injury (66.0%), while bilateral (26.8%) and multiple (10.7%) fractures were considerably less common. Concomitant traumatic brain injury was present in the majority of patients with combined facial trauma but was frequently diagnosed with a delay of several days (30.4% of cases), highlighting an important gap in initial diagnostic practice; accordingly, mandatory neurological evaluation, including careful assessment of loss of consciousness, headache, dizziness, and nausea or vomiting, should be incorporated as a routine component of the initial examination of every patient with combined facial skeleton trauma.

REFERENCES

[1] B. R. Chrchanovic, "Factors influencing the incidence of maxillofacial fractures," *Oral Maxillofac. Surg.*, vol. 16, pp. 3–17, 2012.

[2] V. I. Kutsevlyak and V. N. Panchenko, "Anatomical classification of injuries of the facial skeleton bones," *Bull. Dent.*, no. 4, pp. 95–98, 2010.

[3] E. D. Arslan, A. G. Solakoglu, E. Komut, C. Kavalci, F. Yilmaz, E. Karakilic, T. Durdu, and M. Sonmez, "Assessment of maxillofacial trauma in emergency department," *World J. Emerg. Surg.*, vol. 9, art. 13, 2014.

[4] S. AlGhamdi, F. S. Alasmari, M. B. Alarjani, H. S. Alamri, A. A. Aldamkh, I. A. Alanazi, M. B. Alarjani, A. I. Moafa, and N. S. Alrusayyis, "Association between maxillofacial fractures and brain injuries in trauma patients: a cross-sectional study in the Kingdom of Saudi Arabia," *Pan Afr. Med. J.*, vol. 43, art. 193, 2022.

[5] A. Othman, F. Al-Mofreh Al-Qahtani, H. Al-Qahtani, M. Jaber, K. Bishawi, A. H. Khamis, and A. Al-Shanably, "Traumatic brain injuries and maxillofacial fractures: a systematic review and meta-analysis," *Oral Maxillofac. Surg.*, vol. 27, no. 3, pp. 373–385, 2023.

[6] J. Mao, J. Xue, Y. Li, Q. Zhou, S. Zhou, and Z. Zhou, "Factors influencing traumatic brain injuries in maxillofacial fractures: a 12-year retrospective analysis of 2841 patients," *Dent. Traumatol.*, vol. 40, pp. 435–443, 2024.

[7] M. Brucoli, P. Boffano, I. Romeo, C. Corio, A. Benech, M. Ruslin, *et al.*, "Epidemiology of maxillofacial trauma in the elderly: a European multicenter study," *J. Stomatol. Oral Maxillofac. Surg.*, vol. 121, pp. 330–338, 2020.

[8] A. A. Kulakov and A. S. Khanzdratsyan, "Surgical methods of treatment of mandibular fractures in persons abusing alcohol," *Dentistry*, no. 36, pp. 29–31, 2014.

[9] B. Pappachan and M. Alexander, "Biomechanics of cranio-maxillofacial trauma," *J. Maxillofac. Oral Surg.*, vol. 11, pp. 224–230, 2012.

[10] V. L. Lesnukhin, "Features of diagnosis, treatment and prevention of mandibular fractures accompanied by injury of the inferior alveolar nerve," Abstract of Cand. Med. Sci. thesis, spec. 14.01.22, Kyiv, Ukraine, 2015.

[11] T. U. Khan, S. Rahat, Z. A. Khan, L. Shahid, S. S. Banouri, and N. Muhammad, "Etiology and pattern of maxillofacial trauma," *PLoS ONE*, vol. 17, no. 9, art. e0275515, 2022.

[12] Y. C. Hung, A. Montazem, and M. A. Costello, "The correlation between mandible fractures and loss of consciousness," *J. Oral Maxillofac. Surg.*, vol. 62, pp. 938–942, 2004.

[13] F. AlMofreh, S. AlOtaibi, M. Jaber, K. Bishawi, A. AlShanably, and F. AlMutairi, "Cervical spine injuries and maxillofacial trauma: a systematic review," *Saudi Dent. J.*, vol. 33, no. 8, pp. 805–812, 2021.

[14] V. A. Malanchuk and E. A. Astapenko, "On the expediency of using bioresorbable fixators for osteosynthesis in mandibular fractures," *Bull. Probl. Biol. Med.*, no. 2 (101), pp. 168–171, 2013.

[15] Sh. A. Boymuradov and U. A. Khatamov, *Methodology of Complex Stimulation of Osteogenesis in the Treatment of Combined Facial Trauma*, methodical recommendations. Tashkent, Uzbekistan, 2026.