Gazi Med J 2026;37(1):23-30

DOI: http://dx.doi.org/10.12996/gmj.2025.4514

The Forensic Medical Significance of Nasal Bone Fractures: A Clinical and Medico-Legal Retrospective Analysis

Burun Kemiği Kırıklarının Adli Tıbbi Önemi: Klinik ve Medikolegal Retrospektif Bir Analiz

Emre Gürkan Bulutluöz[1], Burak Kaya[2]

[1]Clinic of Forensic Medicine, Çankırı State Hospital, Çankırı, Türkiye
[2]Council of Forensic Medicine, Artvin Branch Office, Artvin, Türkiye

ABSTRACT

Objective: This study aims to evaluate nasal bone fractures, the most frequently encountered injuries in maxillofacial trauma, from a forensic medicine perspective and to contribute to the objectivity of the medicolegal analysis of such cases.

Methods: A total of 205 patients with nasal bone fractures who presented to Çankırı State Hospital between 2022 and 2025 and were reported as forensic cases were retrospectively analyzed. Age, sex, etiology of trauma, fracture type, associated injuries, physical examination findings, and imaging methods used were evaluated. Data were analyzed using descriptive and comparative statistical methods.

Results: The prevalence of nasal fractures among forensic cases was 1.15%, and 82.9% of the patients were male. The most common etiological factor was assault (57.1%), followed by traffic accidents (33.7%). Of the fractures, 62% were displaced, 31.2% were linear, and 6.8% were comminuted/depressed; 92.2% were closed, and 7.8% were open. Open fractures were significantly more common during in-vehicle traffic accidents. Additional skeletal fractures were detected in 31.2% of cases. Computed tomography was the most frequently used imaging modality (63.4%).

Conclusion: Nasal fractures are more frequently observed in young adult males and are commonly associated with assault-related trauma. The presence of accompanying fractures reflects the severity of the trauma. These findings are expected to contribute to the standardization and objectivity of forensic medical evaluation processes.

Keywords: Nasal bone, forensic medicine, facial injuries, wounds and injuries, maxillofacial injuries, violence

ÖZ

Amaç: Bu çalışma maksillofasiyal travmalar içerisinde en sık karşılaşılan nazal kemik kırıklarını adli tıp açısından değerlendirmeyi ve bu olguların medikolegal analizini objektifleştirmeyi amaçlamaktadır.

Yöntemler: 2022-2025 yılları arasında Çankırı Devlet Hastanesi'ne başvuran, adli olgu bildirimi yapılan ve nazal kırık saptanan 205 olgu retrospektif olarak incelenmiştir. Olguların yaş, cinsiyet, travma etiyolojisi, kırık tipi, eşlik eden yaralanmalar, muayene bulguları ve kullanılan görüntüleme yöntemleri incelenmiştir. Veriler tanımlayıcı ve karşılaştırmalı istatistiklerle analiz edilmiştir.

Bulgular: Nazal fraktür görülme sıklığı %1,15 olarak saptanmış, olguların %82,9'unu erkekler oluşturmuştur. En sık etiyolojik nedenin darp (%57,1) olduğu belirlenmiş, bunu trafik kazaları (%33,7) takip etmiştir. Kırıkların %62'si deplase, %31,2'si lineer, %6,8'i parçalı/çökme tipi olup; %92,2'si kapalı, %7,8'i açık kırıklardan oluşmaktadır. Özellikle araç içi trafik kazalarında açık kırık oranı anlamlı düzeyde daha yüksek bulunmuştur. Olguların %31,2'sinde eşlik eden başka kemik kırıkları tespit edilmiştir. Bilgisayarlı tomografi en sık kullanılan görüntüleme yöntemi olarak saptanmıştır (%63,4).

Sonuç: Nazal kırıklar genç erişkin erkeklerde ve darp kaynaklı travmalarda daha sık görülmekte olup, eşlik eden kırıkların varlığı travma şiddetini yansıtmaktadır. Bulgular, adli tıbbi değerlendirme süreçlerinin objektifleştirilmesine katkı sunacaktır.

Anahtar Sözcükler: Burun kemiği, adli tıp, yüz yaralanmaları, yaralar ve travmalar, maksillofasiyal yaralanmalar, şiddet

Cite this article as: Bulutluöz EG, Kaya B. The forensic medical significance of nasal bone fractures: a clinical and medico-legal retrospective analysis. Gazi Med J. 2026;37(1):23-30

Address for Correspondence/Yazışma Adresi: Emre Gürkan Bulutluöz, Clinic of Forensic Medicine, Çankırı State Hospital, Çankırı, Türkiye
E-mail / E-posta: gbulutluoz@yahoo.com.tr
ORCID ID: orcid.org/0009-0001-5012-0591

Received/Geliş Tarihi: 31.07.2025
Accepted/Kabul Tarihi: 06.10.2025
Epub: 10.11.2025
Publication Date/Yayınlanma Tarihi: 19.01.2026

©Copyright 2026 The Author(s). Published by Galenos Publishing House on behalf of Gazi University Faculty of Medicine. Licensed under a Creative Commons Attribution-NonCommercial-NoDerivatives 4.0 (CC BY-NC-ND) International License.

©Telif Hakkı 2026 Yazar(lar). Gazi Üniversitesi Tıp Fakültesi adına Galenos Yayınevi tarafından yayımlanmaktadır. Creative Commons Atıf-GayriTicari-Türetilemez 4.0 (CC BY-NC-ND) Uluslararası Lisansı ile lisanslanmaktadır.

INTRODUCTION

The maxillofacial region is among the most frequently affected anatomical areas in traumatic incidents because of its location and exposure to the external environment (1). Among injuries involving this region, the nasal bone is one of the most commonly fractured structures, because it is the most prominent part of the face and has the weakest supporting tissue (2). The unprotected structure of the nasal bone makes it susceptible to fracture even under forces that may be insufficient to cause fractures of other facial bones (3).

Nasal bone fractures are frequently associated with forensic cases, such as assaultassaults, and with accidental causes, including falls, traffic accidents, and occupational or domestic injuries (4). Clinically and radiologically, they are typically classified as linear (non-displaced), displaced, or comminuted fractures. Moreover, depending on whether the integrity of the skin overlying the fracture line is compromised, they may also be classified as closed or open (5). Clinical findings commonly include nasal deviation, nasal depression, tenderness, edema, crepitus, and epistaxis (6). Imaging modalities such as plain radiography or computed tomography (CT) are used to confirm the diagnosis and guide treatment planning (7).

Nasal bone fractures require specialized evaluation not only from a medical perspective but also from forensic and legal perspectives (8). According to the Turkish Penal Code, injuries resulting in bone fractures are punishable by imprisonment for one to six years, depending on the extent to which the fracture affects vital bodily functions (9).

In this context, the Guide for the Forensic Medical Evaluation of Injuries Defined in the Turkish Penal Code (10) classifies bone fractures as mild (1), moderate (2-3), and severe (4-6) according to their impact on vital bodily functions. In the forensic assessment of nasal bone fractures, the fracture type serves as a primary parameter. A linear fracture or avulsion of the nasal bone is considered to have a mild (1) effect on vital functions, whereas more complex fractures, such as comminuted or depressed nasal fractures, are deemed to have a moderate (2) effect on vital functions.

Although nasal fractures may occur as isolated injuries, they are often accompanied by fractures of other facial bones or of bones in other regions of the body, particularly in high-energy trauma cases (11). The presence of multiple fractures is regarded as a significant indicator of increased trauma severity (12).

The aim of this study is to elucidate the role of nasal bone fractures in forensic medicine and to contribute to standardization of criteria and diagnostic methods used to evaluate such cases. Additionally, the study seeks to enhance the forensic medical assessment of nasal bone fractures and expand the body of knowledge in this area.

MATERIALS AND METHODS

Data from cases presenting to Çankırı State Hospital between 2022 and 2025 and reported as forensic incidents were retrospectively reviewed, and cases in which a nasal bone fracture was identified were included in the study. For each included case, general forensic examination reports, patient discharge summaries (epicrises), and radiological images were evaluated. The following variables were examined: age, sex, time of injury, cause of the incident, physical examination findings, type of fracture, presence of accompanying fractures, and diagnostic investigations performed to establish the clinical diagnosis.

This study was approved by the Ethics Committee of Health Sciences of Çankırı Karatekin University (meeting number: 22, date: 14.07.2025). The research was conducted in accordance with the principles of the Declaration of Helsinki.

Statistical Analysis

Statistical analyses were conducted using IBM SPSS Statistics version 26 (IBM Corp., Armonk, NY, USA). Descriptive statistics were presented as frequencies, percentages, means, standard deviations, minimum and maximum values. The differences between categorical variables were analyzed using the Pearson chi-square test. Additionally, a chi-square goodness-of-fit test was employed to assess whether a categorical variable was uniformly distributed across categories by comparing the observed distribution with the expected distribution under equal proportions. The expected frequencies in some cells were less than 5. A p-value of <0.05 was considered statistically significant.

RESULTS

A total of 17,810 cases reported as forensic incidents and assessed as involving medico-legal injuries were reviewed. Among these, 205 cases were identified as having nasal fractures and were included within the scope of the study. The prevalence of nasal fractures among all forensic cases was 1.15%.

Of the 205 cases included in our study, 82.9% (n = 170) were male and 17.1% (n = 35) were female. The number of male cases was significantly higher than that of female cases (χ^2=88.90, p <0.001).

The ages of the cases evaluated in the study ranged from 2 to 87 years, with a mean age of 35.51±16.42 years. The distribution of cases by age group is presented in Table 1. The highest number of cases was observed in the 26-40 age group (34.6%, n = 71), followed by the 18-25 age group (25.9%, n = 53) and the 41-64 age group (25.9%, n = 53). Additionally, 5.9% (n = 12) of the cases were in the 13-17 age group, 5.4% (n = 11) were aged 65 and above, 1.5% (n = 3) were in the 7-12 age group, and 1% (n = 2) were aged 0-6 years. Nasal bone fractures in forensic incidents were significantly concentrated in the 18-25 and 26-40 age groups (χ^2=168.46, p <0.001).

The monthly distribution of nasal fractures is presented in Figure 1. The highest number of cases was recorded in October (14.1%, n = 29), followed by January (10.2%; n = 21), May (9.8%; n = 20), and July (9.8%; n = 20). The lowest number of cases was observed in December (3.9%; n = 8).

Regarding seasonal distribution the highest number of cases occurred in autumn (32.2%; n = 66) followed by summer (25.4%; n = 52), spring (24.4%; n = 50), and winter (18.0%; n = 37). While the monthly distribution was not statistically significant (χ^2=18.43; p=0.072), the seasonal variation was found to be significant (χ^2=8.25; p=0.041). A notable increase in forensic nasal fractures was observed particularly during the autumn season.

The distribution of injury mechanisms is presented in Table 1. The most common cause of nasal fractures was physical assault (57.1%; n = 117). This was followed by in-vehicle traffic accidents (21.5%; n = 44), out-of-vehicle traffic accidents (12.2%; n = 25), falls from height

(7.3%; n = 15), and other types of accidents (e.g., occupational or domestic/environmental incidents) (2%; n = 4). The notably high proportion of assault-related cases was found to be statistically significant (χ^2=197.22; p <0.001).

The distribution of injury mechanisms by sex is presented in Table 2. Among males the most common cause of injury was physical assault (62.4%; n = 106), followed by in-vehicle traffic accidents (17.6%; n = 30), out-of-vehicle traffic accidents (11.2%; n = 19), falls from height (7.6%; n = 13), and other accidents (1.2%; n = 2). In female cases the leading causes were in-vehicle traffic accidents (40.0%; n = 14) and physical assault (31.4%; n = 11), followed by out-of-vehicle traffic accidents (17.1%; n = 6), falls from height (5.7%; n = 2), and other accidents (5.7%; n = 2). The distribution of injury mechanisms differed significantly between sexes (χ^2=15.68; p=0.003).

The distribution of fracture types among the cases is presented in Table 3. The most frequently observed fracture type was displaced fractures (62.0%; n = 127) followed by linear fractures (31.2%; n = 64) and comminuted/depressed fractures (6.8%; n = 14). Bilateral nasal bone fractures were identified in 67.3% of cases (n = 138) while unilateral fractures were observed in 32.7% (n = 67). A total of 92.2% (n = 189) of the fractures were classified as closed and 7.8% (n = 16) as open fractures. The proportion of open fractures was significantly higher in in-vehicle traffic accidents compared to other causes (χ^2=26.91; p <0.001).

Upon examination of clinical findings, crepitation over the nasal dorsum was detected in 35.6% of the cases (n = 73) whereas no such finding was observed in 64.4% (n = 132). Additionally active epistaxis was present in 48.3% of the cases (n = 99) in the remaining 51.7% (n = 106) either no nasal bleeding was observed or active epistaxis was absent.

Regarding imaging modalities 63.4% of the cases (n = 130) were evaluated using only CT, 26.3% (n = 54) underwent both CT and plain radiography and 10.2% (n = 21) were assessed with plain radiography solely.

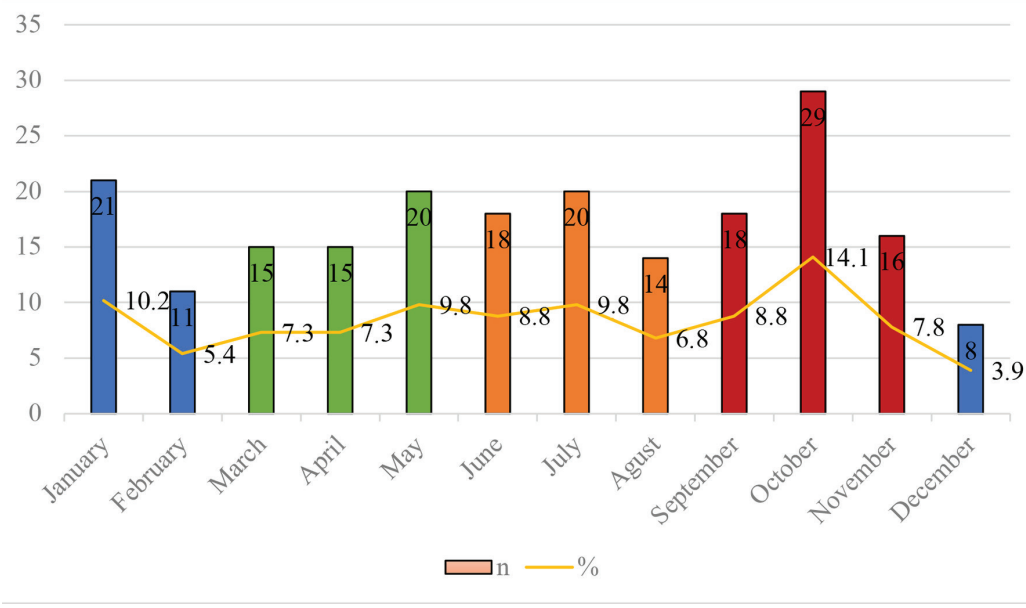

Figure 1. The monthly and seasonal distribution of nasal fractures.

Table 1. Distribution of injury mechanisms by age group.

Age group	Injury mechanisms					Total, n (%)	χ^2	p
	Physical assault	IVTA	OVTA	Falls	Other accidents			
	n (%)	n (%)	n (%)	n (%)	n (%)			
0-6	-	-	1 (50%)	1 (50%)	-	2 (1%)	168.46	<0.001
7-12	2 (66.7%)	-	1 (33.3%)	-	-	3 (1.5%)		
13-17	7 (58.3%)	3 (25%)	2 (16.7%)	-	-	12 (5.9%)		
18-25	34 (64.2%)	9 (17%)	4 (7.5%)	1 (1.9%)	5 (9.4%)	53 (25.9%)		
26-40	46 (64.8%)	12 (16.9%)	7 (9.9%)	1 (1.4%)	5 (7%)	71 (34.6%)		
41-64	25 (47.2%)	15 (28.3%)	8 (15.1%)	2 (3.8%)	3 (5.7%)	53 (25.9%)		
65+	3 (27.3%)	5 (45.5%)	2 (18.2%)	-	1 (9.1%)	11 (5.4%)		
Total	117 (57.1%)	44 (21.5%)	25 (12.2%)	4 (2%)	15 (7.3%)	205 (100%)		

IVTA: in-Vehicle traffic accidents, OVTA: Out-of-vehicle traffic accidents, Falls: Falls from height, Other accidents: Occupational or domestic/environmental incidents.

During the forensic evaluation process clinical management approaches revealed that 37.6% of the cases (n = 77) were referred for consultation with an otorhinolaryngology (Ear, Nose, and Throat; ENT) specialist while 62.4% (n = 128) were directed to outpatient follow-up. When consultation rates were examined according to fracture type it was found that 21.9% (n = 14) of cases with linear fractures, 40.9% (n = 52) of those with displaced fractures, and 78.6% (n = 11) of those with comminuted fractures were referred for specialist consultation. It was determined that Consultation rates increased significantly with the severity of the fracture (χ^2=17.37, p <0.001).

In accordance with our hospital's protocol for forensic cases blood ethanol levels are routinely assessed in all presenting patients. Ethanol was detected in blood samples in only 10.2% of the cases (n = 21).

In 31.2% (n = 64) of cases with nasal bone fractures additional fractures in other parts of the body were also identified. The distribution of these accompanying fractures is detailed in Table 4. The most frequently additional fractures involved facial bones (20.0%; n = 41) followed by extremity fractures (14.1%; n = 29), vertebral fractures (5.4%; n = 11), rib fractures (4.9%; n = 10), and cranial fractures (4.9%; n = 10). Fractures of the facial bones were found to be significantly more common than other types of accompanying fractures (χ^2=39.74, p <0.001). Furthermore the rate of accompanying fractures was significantly higher in both in-vehicle and out-of-vehicle traffic accidents compared to other types of incidents (χ^2=41.05; p < 0.001).

DISCUSSION

Maxillofacial injuries are among the most common types of physical trauma (1). The nose, the most prominent part of the face, accounts for approximately half of all maxillofacial fractures resulting from trauma (5). To determine the legal penalty for the perpetrator of an assault, it is essential to assess, from a forensic-medical perspective, the severity of these injuries and the conditions they cause.

In our study, the mean age of cases with nasal fractures was 35.51 years. The age group most frequently affected was 26-40 years (34.6%), followed by the 18-25 age group (25.9%). According to our findings, approximately 60.5% of nasal fractures occurred during young adulthood, indicating that individuals in this age range are at higher risk of nasal trauma-related fractures. The data obtained in this study are largely consistent with findings reported in the literature. Previous studies have documented that the mean age of patients with nasal bone fractures ranges from 25.9 to 34 years, and the majority of nasal fractures occur between the ages of 18 and 40 (2,11,13-16). Young adults are more frequently exposed to traumatic circumstances because of lifestyle factors. In particular, sports-related injuries, incidents of physical assault, and occupational and traffic accidents are more common in this age group (17). Moreover, factors such as increased social activity, participation in nightlife, presence in crowded environments, and a tendency toward risk-taking behaviors may further elevate the likelihood of trauma in this population.

Regarding the sex distribution of nasal fractures, the literature consistently reports that nasal fractures occur significantly more frequently in males than in females. Numerous studies have indicated that 72.5% to 88% of nasal fracture cases occur in males (2,15,16,18-21). In a study conducted by Karbeyaz et al. (18), the prevalence of nasal fractures was also found to be significantly higher in males than in females. Similarly, in our study, the vast majority of cases of nasal bone fractures (82.9%) were male, which is consistent with the existing literature. The higher incidence of nasal fractures in males is thought to be primarily due to increased exposure to physical trauma (such as traffic accidents and acts of violence), greater activity levels among younger males, influenced by sociocultural factors, and more frequent presence in outdoor or high-risk environments (1).

In our study, physical assault was identified as the most common cause of nasal fractures, accounting for 57.1% of cases. Assault was followed by in-vehicle traffic accidents (21.5%) and out-of-vehicle traffic accidents (12.2%). Overall, traffic accidents accounted for 33.7% of all nasal fractures. These findings are largely consistent with data reported in the literature. Previous studies have indicated that nasal fractures most frequently result from assault, with rates ranging from 32% to 90%, followed by traffic accidents reported at rates ranging from 7% to 38.4% (4,8,19,22,23). The high prevalence of assault-related nasal fractures may be attributed to the anatomical vulnerability of the nose, which is the most prominent and exposed part of the face, making it particularly susceptible to trauma (24). Attacks targeting the facial region often result in a direct impact to the nasal bone. In cases of interpersonal violence, physical aggression frequently begins with blows to the face, which may explain the predominance of assault as a mechanism of injury in nasal fractures. That traffic accidents rank second may be related to the direct exposure of the head and neck region to trauma during both in-vehicle and out-of-vehicle collisions.

The etiology of nasal fractures demonstrates a marked difference according to sex, a finding supported by various studies in the literature. Karbeyaz et al. (18) reported that physical assault was the most common cause of nasal fractures among males, whereas traffic accidents were the most common cause among females. The study also noted that this difference was statistically significant.

Table 2. Sex-based distribution of injury mechanisms.

Gender	Injury mechanisms					Total n (%)	χ^2	p
	Physical assault	IVTA	OVTA	Falls	Other accidents			
	n (%)	n (%)	n (%)	n (%)	n (%)			
Male	106 (62.4%)	30 (17.6%)	19 (11.2%)	13 (7.6%)	2 (1.2%)	170 (82.9%)	15.68	0.003
Famale	11 (31.4%)	14 (40%)	6 (17.1%)	2 (5.7%)	2 (5.7%)	35 (17.1%)		
Total	117 (57.1%)	44 (21.5%)	25 (12.2%)	15 (7.3%)	4 (2%)	205 (100%)		

IVTA: in-Vehicle traffic accidents, OVTA: Out-of-vehicle traffic accidents, Falls: Falls from height, Other accidents: Occupational or domestic/environmental incidents.

Table 3. Fracture typing and distribution.

Fracture type	**n**	**%**
Linear	64	31.2
Displaced	127	62
Comminuted	14	6.8
Broken side		
Unilateral	67	32.7
Bilateral	138	67.3
Skin integrity		
Open fractures	16	7.8
Closed fractures	189	92.2

Similarly, Hwang et al. (4) found that the most frequent cause of nasal fractures among male patients was assault (66.7%), whereas among female patients, accidents (52.7%) were the most common; this difference was also reported to be statistically significant. In our study, consistent with the aforementioned literature, similar results were observed. When all cases were analyzed collectively, regardless of sex, assault emerged as the most common etiological factor. However, a more detailed examination by sex revealed that among female cases, in-vehicle traffic accidents were the leading cause of nasal fractures (40%), followed by assault (31.4%). In contrast, among male cases, assault was the most frequent cause (62.4%), followed by in-vehicle traffic accidents (17.6%) and out-of-vehicle traffic accidents (11.2%). This difference was statistically significant (χ^2=15.68, p=0.003). This variation is likely attributable to differences between genders in societal roles, behavioral patterns, and exposure to violence. Although social structure, gender roles, and the prevalence of violence may vary across countries and regions (25), the findings of our study are consistent with previously reported data in the literature.

In our study, the evaluation of nasal bone fracture types revealed that displaced fractures were the most common type (62%). This was followed by linear fractures (31.2%) and comminuted/depressed fractures (6.8%). Our findings are consistent with those of several studies in the literature. Hosukler et al. (15) reported that 56.5% of nasal fractures were displaced; Bütün et al. (19) also identified displaced fractures as the most prevalent type (45.8%). The high proportion of displaced fractures may be associated with the severity of the trauma. Although the majority of our cases were assault-related, high-energy trauma mechanisms such as traffic accidents also constituted a substantial proportion and may have contributed to the increased rate of displaced fractures. While linear fractures are more commonly observed in low-energy injuries, high-energy injuries are more likely to result in displaced fractures that are severe enough to cause deformity. Some studies, however, have reported a higher frequency of linear fractures. For example, Balandız et al. (1) found linear nasal fractures in 77.9% of cases, and Toygar et al. (8) reported a rate of 95%. These discrepancies may be attributed to differences in the characteristics of the study populations, the diversity and severity of trauma mechanisms, the diagnostic methods employed, and the criteria used for fracture classification.

The vast majority of nasal fractures were closed (92.2%), while the proportion of open fractures was 7.8%. Moreover, the rate of open fractures was significantly higher in in-vehicle traffic accidents than in other types of incidents (χ^2=26.91, p <0.001). These findings are largely consistent with the existing literature. Sayın et al. (14) reported that 92.9% of nasal bone fractures were closed, whereas only 7.1% were open. Similarly, Hosukler et al. (15) noted that the rate of open nasal fractures was 11.4%. These data suggest that most fractures tend to be closed due to the anatomical structure of the nasal region; however, as trauma severity increases, soft-tissue integrity may also be compromised. The higher frequency of open fractures during in-vehicle traffic accidents may be associated with the high kinetic energy involved in such incidents. In these cases, the force generated by the impact velocity is often transmitted directly to the facial region, typically causing collisions with hard surfaces such as the steering wheel or windshield, or with the airbag. This mechanism may result in skin lacerations, leading to open fractures (26). In contrast, in cases of assault or low-energy trauma, soft tissue often serves as a buffer overlying the bone, helping to preserve skin integrity and resulting in a closed fracture.

Evaluation of clinical symptoms associated with nasal fractures revealed that crepitation was present in 35.6% of cases, while epistaxis was observed in 48.3% of cases. When compared with findings reported in the literature, these rates show some variation. Gupta et al. (22) reported crepitation in 80% and active epistaxis in 76.8% of nasal fracture cases. Similarly, Akdag et al. (3) reported

Table 4. Distribution of fractures accompanying nasal bone fractures according to injury mechanisms.

Accompanying fractures	**Injury mechanisms**					**Total n (%)**	**x^2**	**p**
	Physical assault	**IVTA**	**OVTA**	**Falls**	**Other accidents**			
	n (%)	**n (%)**	**n (%)**	**n (%)**	**n (%)**			
Facial fractures	13 (11.1%)	14 (31.8%)	9 (36%)	4 (26.7%)	1 (25%)	41 (20%)	41.05	<0.001
Cranial fractures	-	5 (11.4%)	2 (8%)	3 (20%)	-	10 (4.9%)		
Extremity fractures	3 (2.6%)	13 (29.5%)	7 (28%)	5 (33.3%)	1 (25%)	29 (14.1%)		
Vertebral fractures	1 (0.9%)	8 (18.2%)	2 (8%)	-	-	11 (5.4%)		
Rib fractures	-	8 (18.2%)	-	-	2 (13.3%)	10 (4.9%)		

IVTA: in-Vehicle traffic accidents, OVTA: Out-of-vehicle traffic accidents, Falls: falls from height, Other accidents: Occupational or domestic/environmental incidents.

a crepitation rate of 75.3%. In contrast, Ersoy et al. (27) identified epistaxis in 45% and crepitation in 27.5% of cases, whereas Hosukler et al. (15), in their study based on medical record review, reported these rates as 19.4% and 11.7%, respectively. This variability suggests that the identification and documentation of symptoms of nasal fractures are influenced by several factors, including the severity of the trauma, the time elapsed since the incident, the patient's condition at the time of presentation, and variations in clinical practice. Additionally, during the retrospective review of medical records, the extent to which symptoms were thoroughly documented by the physician may affect the reported rates. Crepitation, in particular, is a clinical finding that can vary depending on the examiner's level of experience and examination technique; it is not always assessed in a standardized manner.

CT is currently regarded as the gold-standard imaging modality for diagnosing facial trauma (5). CT provides high-resolution cross-sectional images, offering significant advantages in evaluating the fracture line, the degree of displacement, and any concomitant facial bone injuries. However, plain radiographs (direct X-rays) are still used in some centers, with factors such as cost, accessibility, and radiation exposure influencing this preference. The literature reveals considerable variability in imaging methods used to diagnose nasal fractures. For instance, Hosukler et al. (15) reported using both CT and direct radiography in 76.5% of cases and direct radiography alone in 14.6% of cases. Similarly, Akdag et al. (3) used CT in 46.8% of cases and direct radiography in 53.2% of cases for fracture detection. In our study, nasal bone fractures were evaluated using CT alone in 63.4% of cases, both CT and direct radiography in 26.3% of cases, and direct radiography alone in only 10.2% of cases. These findings suggest a markedly greater reliance on CT. One likely explanation for this trend is the increased accessibility of CT in modern clinical practice. Furthermore, the limited sensitivity of plain radiographs—particularly in detecting minimally displaced fractures—has led clinicians to favor CT as a more reliable diagnostic tool. The use of both CT and plain radiography may reflect cases in which initial evaluation with plain radiography was followed by CT to confirm the diagnosis. The low proportion of cases evaluated solely with direct radiography further supports the view that this modality is no longer considered sufficient as a standalone diagnostic tool in the assessment of nasal fractures.

In the preparation of medico-legal reports for forensic cases the expert opinion of a specialist physician in the relevant field becomes increasingly important to provide detailed scientific data. Karakuş et al. (28) reported that nasal fractures were observed in 23.2% of forensic cases referred to the Department of ENT. In our study, an ENT specialist consultation was requested in 37.6% of cases, and the consultation rate also increased significantly with fracture severity (χ^2=17.37, p <0.001). (χ^2=17.37, p <0.001). In more severe cases in which both forensic reporting and therapeutic management become more complex, the involvement of ENT specialists is both expected and necessary to ensure a valid and objective evaluation.

Alcohol consumption is known to be a significant risk factor for trauma-related injuries (29). Maxillofacial trauma, in particular, occurs more frequently as a result of risk-taking behavior associated with alcohol intake. This association increases susceptibility not only to accidents but also to violence-related incidents. In a previous study (29), ethanol was detected in the blood of 36.5% of patients with trauma-related maxillofacial injuries. In contrast, in our study, blood ethanol positivity was detected in 10.2% of forensic nasal fracture cases. This rate appears to be lower than those reported in studies of facial trauma in general. One likely explanation is that our study was limited to nasal fractures . Maxillofacial trauma involves a broad anatomical region and is often associated with more severe mechanisms of injury. Therefore, behavioral risk factors such as alcohol use may be reported at higher rates in studies including a wider range of facial injuries.

Nasal bone fractures are among the most frequently encountered in maxillofacial trauma. Although they are often considered isolated injuries, they are frequently accompanied by additional damage to adjacent anatomical structures. The literature reports that fractures of other facial bones, such as the maxilla, nasal septum, and orbital walls, coexist with nasal fractures in 10%-35.6% of cases (30-32). This variation is influenced by the mechanism and severity of the trauma (24). In our study, consistent with the literature, 31.2% of cases of nasal bone fractures also had fractures in other body regions. This finding supports the notion that nasal fractures frequently occur as part of broader, more complex trauma patterns. The likelihood of such associations is particularly high in high-energy trauma. Upon examining the accompanying fractures in our study, extremity fractures were identified in 14.1% of cases, vertebral fractures in 5.4%, rib fractures in 4.9%, and cranial fractures in 4.9%. These data indicate that nasal fractures, especially those resulting from high-energy mechanisms, may be part of multisystem injury patterns. Similar findings have been reported in the literature. Kim et al. (33) emphasized that in high-energy trauma, such as traffic accidents, nasal fractures are often observed in conjunction with injuries to the head, spine, and extremities. This underscores the importance of identifying associated injuries during forensic reporting, as they play a critical role in determining the nature of the incident and assessing the severity of the trauma.

Study Limitations

Due to the retrospective design of this study, data were evaluated solely on the basis of existing medical records and forensic documents. Incomplete or non-standardized documentation may have affected the accuracy of certain findings. The study was conducted at a single center and included only cases that had been officially reported as forensic incidents. This limits the generalizability of the results and excludes milder or unreported cases within the broader population. Furthermore, the absence of data on the treatment process and long-term outcomes of the fractures limited the ability to thoroughly assess the relationship between clinical management and forensic implications.

CONCLUSION

This study aimed to contribute to both the anatomical and clinical understanding of nasal fractures and their systematic evaluation in forensic medicine. Our findings revealed that nasal fractures most commonly occur in young adult males and are predominantly associated with forensic incidents, such as physical assault. The majority of fractures were identified as displaced and closed, suggesting that the trauma often involved direct but moderate-intensity force.

However, the presence of accompanying fractures of the facial bones, extremities, vertebrae, and cranium indicates that nasal fractures are frequently associated with high-energy trauma rather than occurring as isolated injuries. Regarding diagnostic imaging, the predominant use of CT reinforces its role as the standard modality in current clinical practice, highlighting its advantages in providing a detailed evaluation.

The findings of this study emphasize the necessity of evaluating nasal fractures in forensic medicine based not solely on the presence of a fracture but also on the fracture type, associated injuries, etiology of the incident, and clinical findings. Moreover, it was concluded that forensic reporting of nasal fractures should be grounded in objective criteria that reflect the extent of the injury.

Future large-scale, multicenter studies conducted across different geographical regions and sociocultural contexts may significantly contribute to the development of standardized guidelines and the revision of existing protocols for the forensic assessment of nasal fractures. Furthermore, collaboration between clinical and forensic experts will enhance both patient management and the accuracy of legal processes. The results obtained in this study serve as a valuable reference for both healthcare professionals and forensic authorities, supporting the development of more reliable and scientifically grounded forensic reports.

Ethics

Ethics Committee Approval: This study was approved by the Ethics Committee of Health Sciences of Çankırı Karatekin University (meeting number: 22, date: 14.07.2025). The research was conducted in accordance with the principles of the Declaration of Helsinki.

Informed Consent: Retrospective study.

Footnotes

Authorship Contributions

Surgical and Medical Practices: E.G.B., B.K., Concept: E.G.B., B.K., Design: E.G.B., B.K., Data Collection or Processing: E.G.B., B.K., Analysis or Interpretation: E.G.B., B.K., Literature Search: E.G.B., B.K., Writing: E.G.B., B.K.

Conflict of Interest: No conflict of interest was declared by the authors.

Financial Disclosure: The authors declared that this study received no financial support.

REFERENCES

1. Balandız H, Aydogan HC, Kaya B, Özsever S, Özsoy S. Comprehensive examination of etiological factors and clinical manifestations of maxillofacial traumas in forensic cases: a five-year retrospective study. Ulus Travma Acil Cerrahi Derg. 2024; 30: 677–84.
2. Gökgöz MC, Ersoy Mirici M. Density mapping of nasal fracture: a new epidemiological perspective of nasal fractures in a pilot city. J Ear Nose Throat Head Neck Surg. 2022; 30: 31–7.
3. Akdag M, Dursun R, Gül A, Hattapoglu S, Meriç F, Topcu I. Retrospective analysis of nasal fractures in the emergency clinic. Eurasian J Emerg Med. 2014; 13: 139–42.
4. Hwang K, Ki SJ, Ko SH. Etiology of nasal bone fractures. J Craniofac Surg. 2017; 28: 785–8.
5. Epstein S, Ettinger RE. Nasal and naso-orbito-ethmoid fractures. Semin Plast Surg. 2021; 35: 263–8.
6. Atan Y, Akbaba M, Tataroğlu Z, Daş V, Yuluğ E. What approach should be taken towards maxillofacial trauma in terms of The Turkish Penal Code 87/1-2.? A Case Report. Ankara Med J. June 2019; 19: 434–8.
7. İzci A, Acar K, Çakmak V, Arslanergül M, Kurtuluş Dereli A. An example of multidisciplinary approach in the medicolegal evaluation of cases applying to the forensic medicine polyclinic: forensic medicine and radiology joint study model. Bull Leg Med. 2025; 30: 38–44.
8. Toygar M, Şenol E, Can İÖ, Karahatay S, Durmaz A, Tuğcu H, et al. Evaluation of nasal fractures in the aspect of forensic medicine. Turkiye Klinikleri J Foren Med. 2007; 4: 17-22. Available from: https://www.turkiyeklinikleri.com/journal/journal-of-forensic-medicine-and-forensic-sciences/15/issue/2007/4/1-0/en-index.html.
9. Çelik C, Ata U. About medicolegal evaluation of the effects of bone fracture/dislocation on life functions. Bull Leg Med. 2022; 27: 93–101.
10. Balcı Y, Çolak B, Gürpınar K, Anolay NN. Türk Ceza Kanunu'nda tanımlanan yaralama suçlarının adli tıp açısından değerlendirilmesi rehberi. İstanbul: Adli Tıp Uzmanları Derneği; Adli Tıp Kurumu Başkanlığı; Adli Tıp Derneği; 2019. Available from: https://www.atk.gov.tr/tckyaralama24-06-19.pdf
11. Jin KS, Lee H, Sohn JB, Han YS, Jung DU, Sim HY, et al. Fracture patterns and causes in the craniofacial region: an 8-year review of 2076 patients. Maxillofac Plast Reconstr Surg. 2018; 40: 29.
12. Canverenler S, Ünüvar Göçeoğlu Ü, Balcı Y. Evaluation of bone fractures in patients admitted to the forensic medicine outpatient clinic: descriptive research. Turkiye Klinikleri J Foren Sci Leg Med. 2022; 19: 20–9.
13. El Shehaby DM, Ragaey MA, Omeran GA. Medico-legal aspects of otorhinolaryngeal, face and neck injuries in Upper Egypt: a prospective analysis and retrospective evaluation of claimed disabilities. Egypt J Forensic Sci Appl Toxicol. 2019 Sep 1; 19: 103-20. Available from: https://doi.org/10.21608/ejfsat.2019.14358.1082.
14. Sayın İ, Ekizoğlu O, Erdim İ, Kayhan FT. Evaluation of nasal fractures and forensic medicine approach. Bull Leg Med. 2010; 15: 99-103.
15. Hosukler E, Erkol Z, Er G. Forensic medical evaluation of nasal trauma cases. Ann Med Res. 2022; 29: 639–43.
16. Kafadar H, Kafadar S. Investigation of nasale bone fractures in the framework of the Turkish penal code. Bull Leg Med. 2013; 18: 20–4.
17. Kowalczewska J, Rzepczyk S, Okła M, Nijakowski K, Słowik Ł, Makuch A, et al. Characteristics of e-scooter-related maxillofacial injuries over 2019-2022-retrospective study from Poznan, Poland. J Clin Med. 2023; 12: 3690.
18. Karbeyaz K, Düzer S, Düzer S, Balcı Y. The Evaluation of judicial report process of 1306 patients with nasal fracture. Bull Leg Med. 2015; 20: 99–103.
19. Bütün C, Altuntaş E, Beyaztaş F, Özen B, Durmuş K. Analysis of forensic reports prepared by the collaboration of forensic medicine and ear nose and throat departments. Cumhuriyet Med. J. 2011; 33: 189-94. Available from: https://dergipark.org.tr/tr/download/article-file/47797
20. Sener MT, Kok AN, Kara C, Anci Y, Sahingoz S, Emet M. Diagnosing isolated nasal fractures in the emergency department: are they missed or overdiagnosed? Ten years experience of 535 forensic cases. Eur J Trauma Emerg Surg. 2014; 40: 715–9.
21. El Shehaby DM, Farahat AMA, Shahine MS, Mohammed HM. Medico-legal evaluation and trend of the different patterns of maxillofacial fractures concomitant with closed head injury in Upper Egypt: retrospective study. Egypt J Forensic Sci. 2020; 10: 11.
22. Gupta A, Mahajan V, Jamwal PS. A clinical study of nasal bone fractures: a retrospective study. Int J Sci Study. 2019; 7: 122–5.
23. Basheeth N, Donnelly M, David S, Munish S. Acute nasal fracture management: A prospective study and literature review. Laryngoscope. 2015; 125: 2677–84.

24. Li L, Zang H, Han D, Yang B, Desai SC, London NR. Nasal Bone Fractures: Analysis of 1193 cases with an emphasis on coincident adjacent fractures. Facial Plast Surg Aesthet Med. 2020; 22: 249–54.
25. Koposov R, Isaksson J, Vermeiren R, Schwab-Stone M, Stickley A, Ruchkin V. Community violence exposure and school functioning in youth: cross-country and gender perspectives. Front Public Health. 2021; 9: 692402.
26. Giuvara CR, Costan VV, Boisteanu O, Armencia A, Ciofu M, Cernei ER, Balcos C, Iliescu B, Calin G, Hurjui LL. An Observational study on the management of medico-legal maxillofacial trauma cases by general practitioners. Healthcare (Basel). 2024; 12: 1803.
27. Ersoy S, Tursem Tokmak T, Dadalı Y, Çalışkan HM, Avcu M. Use of bedside ultrasonography for diagnosis of nasal fractures in emergency service. Eurasian J. Emerg. Med. 2021; 20: 236–40.
28. Karakuş MF, Yaşar Teke H. Analysis of forensic medicine consultations evaluated by the tertiary otorhinolaryngology Clinic. J Ear Nose Throat Head Neck Surg. 2024; 32: 111–7.
29. Yadav SK, Mandal BK, Karn A, Sah AK. Maxillofacial trauma with head injuries at a tertiary care hospital in Chitwan, Nepal: clinical, medico-legal, and critical care concerns. Turk J Med Sci. 2012; 52: 1505–12.
30. Park WY, Kim YH. A clinical study of the nasal bone fracture according to stranc classification. J. Korean Soc. Plast. Reconstr. Surg. 2008; 35: 289–94.
31. Pandher M, Mukherjee TJ, Halsey JN, Luthringer MM, Povolotskiy R, Hoppe IC, et al. A single center review of pediatric nasal bone fractures - an analysis of concomitant injuries, management, and outcomes. Eplasty. 2021; 21: e4.
32. Kitaya S, Ohta N, Saito Y, Tateda Y, Noguchi N, Yamazaki M, et al. Clinical analysis of nasal bone fracture. Nippon J. Ear Nose Throat Soc. 2020;123(11):1283-9. Available from: https://doi.org/10.3950/jibiinkoka.123.1283.
33. Kim KS, Lee HG, Shin JH, Hwang JH, Lee SY. Trend analysis of nasal bone fracture. Arch Craniofac Surg. 2018; 19: 270–4.