

Original Article

**Evaluation of forensic reports in cases
under 18 years of age between 2023 and 2025****Erkal Gumusboga, Mesut Yilmaz, Abdulkerim Yayla, Ceren Pektekin, Nisanur Gecici***İnönü University, Faculty of Medicine, Department of Forensic Medicine, Malatya, Türkiye*

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**Abstract****Aim:** The aim of this study is to retrospectively describe the demographic characteristics, types of incidents, injury patterns, and forensic evaluation outcomes of pediatric forensic cases assessed at a single center between 2023 and 2025.**Materials and Methods:** In this retrospective descriptive study, finalized forensic reports issued for individuals under 18 years of age at a single center between 2023 and 2025 were reviewed retrospectively. The cases were evaluated in terms of age, sex, type of incident, injury site, presence of bone fracture, life-threatening condition, and forensic evaluation outcomes. The data were analyzed using descriptive statistics.**Results:** A total of 179 pediatric forensic cases were included in the study. Of the cases, 66.5% were male and 33.5% were female. Traffic accidents were identified as the most common type of incident. Injuries were most frequently observed in the head and neck region, and the number of cases was found to increase during the summer months.**Conclusion:** This study reveals that traffic accidents are the most common type of incident in pediatric forensic cases and that injuries predominantly occur in the head and neck region. The study findings indicate a possible association between male sex and increased risk. It also indicates that the frequency of cases increases during the summer months.**Keywords:** Child, forensic report, traffic accident, injury**INTRODUCTION**

According to the laws of our country, individuals who have not reached the age of 18 are classified as children and, except for cases in which they are legally recognized as adults under certain conditions, they are legally evaluated within this scope. As awareness of children's rights has increased globally, the importance of these rights has been recognized; therefore, the Convention on the Rights of the Child, adopted by the United Nations General Assembly on November 20, 1989, was published in the Official Gazette in our country on January 27, 1995, and entered into force [1]. According to the provisions of the Convention, the state should aim to protect children against all forms of maltreatment that may come from caregivers, prevent

child abuse, and organize social programs for the rehabilitation of children exposed to such treatment [2].

Currently, human rights are protected under Article 17 of the Constitution of our country, which states that everyone has the right to life and the right to protect and develop their material and spiritual existence, and clearly emphasizes that, except in certain legally defined circumstances, the bodily integrity of the individual is inviolable [3]. Therefore, any incident constituting an assault on bodily integrity is considered a forensic case, and any injury that may contain an element of crime, even in the absence of intent, falls within the scope of a forensic case and must be reported. Although forensic reports may be prepared by physicians as a form of notification to judicial authorities when

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encountering a situation that may involve suspicion of a crime, detailed forensic reports are generally prepared upon request by judicial authorities [4].

Accidents are among the leading causes of injury in children; however, it should also be taken into consideration that injuries resulting from violence and penetrating or sharp object trauma are quite common. Among accidents, home accidents, falls, impacts/collisions, and traffic accidents can be listed [5]. Although accidents may primarily be considered non-forensic in nature, forensic case notification is made due to possibilities such as the incident having occurred differently from the reported history or having resulted from negligence, and judicial authorities evaluate whether the incident contains any criminal elements.

The aim of our study was to retrospectively examine the finalized forensic reports issued by the Department of Forensic Medicine at İnönü University Turgut Özal Medical Center for individuals under 18 years of age at the time of the incident between 2023 and 2025, in terms of incident types and injury characteristics.

MATERIALS AND METHODS

Our study was retrospective and descriptive in nature and was conducted at the Department of Forensic Medicine, İnönü University Faculty of Medicine. Of the 206 cases under 18 years of age who were referred between January 1, 2023, and July 31, 2025, a total of 179 were included in the study. Cases for which a finalized report could not be issued, preliminary reports, and cases for which additional information was requested were excluded from the study. In addition, repeated admissions were not included, as they were merged with previous reports.

In our evaluation, the Guideline for the Forensic Medical Evaluation of Injury Crimes Defined in the Turkish Penal Code was used as the basis in order to establish a common opinion regarding the characteristics of injuries that may affect the judicial process and the decisions rendered, as defined under Turkish law as “injuries minor enough to be treated by simple medical intervention, injuries resulting in a life-threatening condition, the effect of fracture or dislocation on vital functions, permanent weakening/loss of the function of one of the senses or organs, and permanent scar on the face” [6]. The cases were evaluated in terms of age, sex, injury site, whether the injury was minor enough to be treated by simple medical intervention, the presence of bone fracture or dislocation, the effect of fracture or dislocation on vital functions, permanent weakening or loss of sensory or organ function, and the presence of a permanent scar on the face.

Injuries considered minor enough to be treated by simple medical intervention can be described as injuries that are easy to manage and generally do not require further examination or treatment, such as abrasions limited to the skin, ecchymoses, and small lacerations. Injuries resulting in a life-threatening condition include skull fractures, intracranial hemorrhage, brain tissue destruction, and injuries to any internal organ or major vessel.

Fractures are classified according to their effect on vital functions as mild (1), moderate (2–3), and severe (4–5–6). When multiple fractures occur in the same bone, the highest fracture score among them is taken into consideration. In cases of fractures in more than one bone, the square of each fracture score is calculated and summed, and the square root of this sum is taken and rounded to the nearest whole number to determine the total fracture score.

A permanent facial scar is defined as a scar that is clearly noticeable at first glance from conversational distance (1–2 meters). Organ-specific approaches are followed in determining permanent weakening or loss of the function of sensory organs or other organs.

Ages were classified according to developmental stages, aiming to achieve as balanced groups as possible and to reflect periods in which personality characteristics change. The age groups were determined as 0–2, 3–6, 7–11, 12–14, and 15–17 years, representing early childhood, preschool period, school age, early adolescence, and late adolescence, respectively [7].

Ethical approval for the study was obtained from the Non-Interventional Clinical Research Ethics Committee of İnönü University Faculty of Medicine on October 14, 2025, with decision number 2025/8332. Statistical analyses were performed using IBM SPSS Statistics 22 software. Percentage distributions were calculated in the analyses.

Due to the length of the names of the criteria evaluated in our study, certain abbreviations will be used. The term “minor enough to be treated by simple medical intervention” will be abbreviated as simple medical intervention, while the term “not minor enough to be treated by simple medical intervention” will be abbreviated as non-simple medical intervention. The term “injuries resulting in a life-threatening condition” will be abbreviated as life-threatening condition, whereas “Injuries not resulting in a life-threatening condition” will be abbreviated as non-life-threatening condition.

RESULTS

Of the 179 cases examined, 60 (33.5%) were female and 119 (66.5%) were male.

It was found that 171 cases (95.5%) were citizens of the Republic of Türkiye.

It was observed that male admissions were higher in all age groups; however, from the age of 3 onward, this difference was approximately twofold (Figure 1).

When grouped according to seasons, injuries were found to occur most frequently during the summer season (Figure 2).

When the injuries were examined in terms of whether they caused bone fractures, bone fractures were identified in 54 cases (30.2%). When fractures were classified according to their effect on vital functions as mild (1), moderate (2–3), and severe (4–5–6), it was found that 14 cases (7.8%) had fractures that severely affected vital functions (grade 6) (Figure 3).

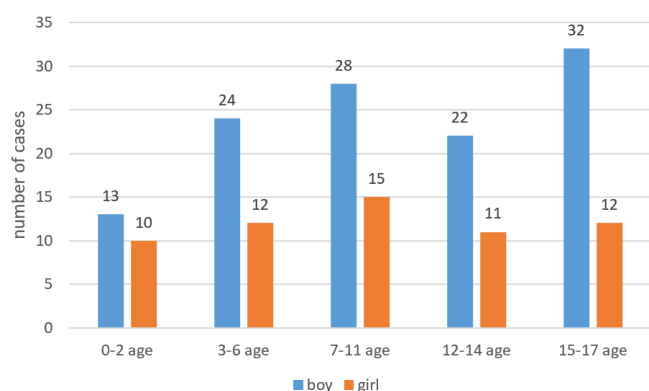


Figure 1. Distribution of cases by age group and sex

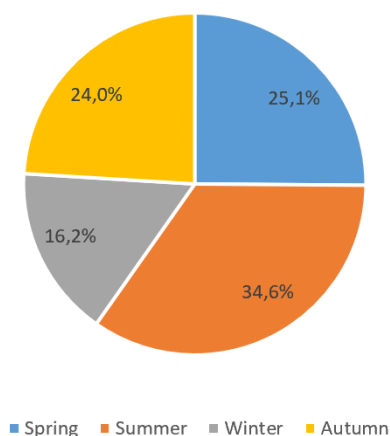


Figure 2. Seasonal distribution of cases

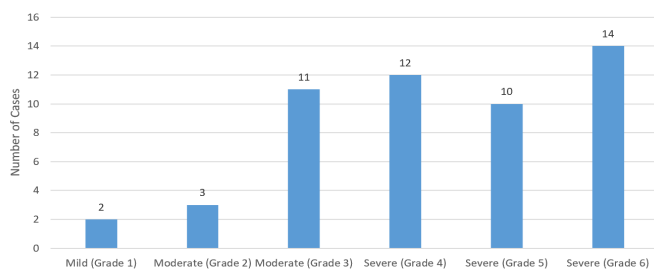


Figure 3. Distribution of cases according to bone fracture severity grades

It was found that in 79 cases (44.1%), the injuries were not minor enough to be treated by simple medical intervention, and in 49 cases (27.4%), the injuries caused a life-threatening condition.

Among the 64 cases (35.7%) with injuries within the boundaries of the face who were evaluated for permanent facial scarring, it was found that the injuries in 2 cases (1.1%) were considered to constitute a permanent facial scar or permanent facial disfigurement, while the injuries in 7 cases (3.9%) were determined not to constitute a permanent facial scar or permanent facial disfigurement. In 54 cases (25.1%), the healing period had not yet been completed, and in 1 case (0.55%), evaluation could not be performed because the patient did not return for follow-up.

When evaluated in terms of permanent weakening or loss of sensory or organ functions, it was found that there was no

weakening or loss in 121 cases (67.6%), weakening was identified in 3 cases (1.7%), and evaluation could not be performed in 55 cases (30.7%) due to the healing period not being completed or failure to attend follow-up.

When the types of incidents were examined, traffic accidents constituted the largest proportion with 92 cases (51.4%), followed by falls with 21 cases (11.7%) and assault with 19 cases (10.6%).

It was found that 38 cases (21.2%) were concluded following physical examination, whereas 141 cases (78.8%) were finalized based on the available documents.

In both sexes, the head and neck region was the most frequently injured area, and bone fractures were also most commonly observed in this region. This was followed by lower extremity injuries (Table 1).

It was observed that the most common mechanism of injury was, by a clear margin, traffic accidents, and accordingly, injuries causing life-threatening conditions were most frequently associated with traffic accidents among the cases in this study. Non life-threatening condition was identified in cases of suicide attempt, assault, poisoning, or firearm injury (Table 2).

Although injuries most frequently occurred in the head and neck region, the correlation between injuries in this region and life-threatening conditions was found to be relatively low. In contrast, it was determined that nearly half of the cases involving pelvic and thoracic injuries were associated with life-threatening conditions (Table 3).

In traffic accidents, the most commonly affected body region was the head and neck (27.8%), followed by the lower extremities (18.4%) and cases with no detected injury (16.5%). Head and neck injuries were also the most frequent in assault cases (38.9%), while they were particularly prominent in fall-related cases (64.0%). In burn cases, injuries were more homogeneously distributed across body regions, whereas in poisoning cases, injuries were predominantly concentrated in the abdominal region (83.3%). In sharp object injuries, upper extremity injuries were the most common (45.5%), while thoracic injuries were the most prominent in firearm injuries (33.3%). Abdominal injuries were identified in all suicide attempt cases (100%). Overall, the head and neck region stood out as the most frequently affected anatomical area across many trauma mechanisms (Table 4).

Table 1. Distribution of bone fracture regions among cases

Fracture region	n	%
Skull	23	42.6
Face-neck	13	24.1
Thorax	6	11.1
Pelvis	6	11.1
Spine	6	11.1
Upper extremity	11	20.4
Lower extremity	22	40.7

Table 2. Distribution of injuries requiring simple medical intervention according to mechanism of injury

Mechanism of injury	Simple medical intervention n (%)	Non simple medical intervention n (%)	Total n (%)
Traffic accident	51 (55.4)	41 (44.6)	92 (100)
Fall	9 (42.9)	12 (57.1)	21 (100)
Assault	15 (78.9)	4 (21.1)	19 (100)
Penetrating injury	5 (45.5)	6 (54.5)	11 (100)
Poisoning	10 (100.0)	0 (0.0)	10 (100)
Burn	4 (50.0)	4 (50.0)	8 (100)
Natural disaster	2 (25.0)	6 (75.0)	8 (100)
Firearm injury	0 (0.0)	4 (100.0)	4 (100)
Home accident	2 (66.7)	1 (33.3)	3 (100)
Suicide attempt	2 (100.0)	0 (0.0)	2 (100)
Other	0 (0.0)	1 (100.0)	1 (100)
Total	100 (55.9)	79 (44.1)	179 (100)

Table 3. Life-threatening condition status by injury region

Injury region	Life-threatening n (%)	Non-life-threatening n (%)	Total n(%)
Head-neck	33 (38.4)	53 (61.6)	86(100)
Lower extremity	18 (39.1)	28 (60.9)	46(100)
Upper extremity	15 (37.5)	25 (62.5)	40(100)
Thorax	22 (57.9)	16 (42.1)	38(100)
No injury	0 (0.0)	31 (100.0)	31(100)
Abdomen	9 (34.6)	17 (65.4)	26(100)
Pelvis	10 (52.6)	9 (47.4)	19(100)
Lumbar	2 (40.0)	3 (60.0)	5(100)
Total*	108 (37.1)	183 (62.9)	291(100)

* The total number of cases was 179; however, since some cases involved more than one injury site, the injury locations were classified separately, and a total of 291 injury sites were identified

Table 4. Relationship between mechanism of injury and injury regions

Type of injury/injury region	Head-neck	Thorax	Abdomen	Lumbar	Pelvis	Lower extremity	Upper extremity	No injury	Total
Traffic accident	44 (27.8%)	21 (13.3%)	10 (6.3%)	1 (0.6%)	10 (6.3%)	29 (18.4%)	17 (10.8%)	26 (16.5%)	158
Assault	14 (38.9%)	5 (13.9%)	1 (2.8%)	2 (5.6%)	2 (5.6%)	5 (13.9%)	5 (13.9%)	2 (5.6%)	36
Fall	16 (64.0%)	1 (4.0%)	0	0	0	3 (12.0%)	4 (16.0%)	1 (4.0%)	25
Burn	4 (20.0%)	4 (20.0%)	1 (5.0%)	0	3 (15.0%)	4 (20.0%)	4 (20.0%)	0	20
Poisoning	0	2 (16.7%)	10 (83.3%)	0	0	0	0	0	12
Home accident	1 (50.0%)	1 (50.0%)	0	0	0	0	0	0	2
Natural disaster	1 (9.1%)	0	0	0	2 (18.2%)	4 (36.4%)	2 (18.2%)	2 (18.2%)	11
Firearm injury	1 (16.7%)	2 (33.3%)	0	0	1 (16.7%)	1 (16.7%)	1 (16.7%)	0	6
Sharp or penetrating object injury	0	2 (18.2%)	1 (9.1%)	2 (18.2%)	1 (9.1%)	0	5 (45.5%)	0	11
Suicide attempt	0	0	2 (100%)	0	0	0	0	0	2

* The total number of cases was lower than that presented in the table; however, as some cases involved multiple injury sites, the injury locations were classified separately

DISCUSSION

In this study, finalized forensic reports issued for individuals under 18 years of age at Turgut Özal Medical Center between 2023 and 2025 were retrospectively reviewed. It was determined that 66.5% of the cases were male and 33.5% were female. The higher proportion of male children being involved in forensic cases was found to be consistent with the 75.2% rate reported in the study conducted in Samsun by Karaarslan et al. and with the predominance of males in the retrospective review conducted in Erzurum by Baydemir Kılınç et al. [8,9]. According to the findings obtained, the marked increase in the difference in case numbers from the age of 3 onward, when personality traits begin to become more apparent, suggests that male sex may be associated with involvement in forensic incidents [5]. This situation may be explained by boys spending more time outdoors and having a relatively greater tendency toward culturally and psychologically risky behaviors.

It was determined that injuries occurred most frequently during the summer season (34.6%). This finding is consistent with the study conducted by Göçeoğlu et al., which showed that young cases in Muğla were exposed to trauma more frequently during the summer months [10]. The increased opportunities for children to spend time outdoors during the summer and the fact that most cases consisted of traffic accidents support this result.

The most common type of incident in this study was traffic accidents (51.4%). This finding is consistent with the study conducted by Baydemir Kılınç et al., which reported that approximately half of pediatric trauma cases were due to traffic accidents [9]. In the study conducted by Karaarslan et al. in Samsun, intentional injury ranked first, whereas the predominance of traffic accidents in this study suggests that there may be regional differences and indicates the need for further multicenter research on this issue [8]. Falls (11.7%) and assault (10.6%) ranked second and third, respectively, while in the study conducted by Özdeş et al. in Kastamonu, assault and sexually related incidents were reported to be more common than traffic accidents [11]. These findings indicate that preventive measures and stricter supervision targeting preventable causes such as traffic accidents and falls should be increased in the region where the study was conducted. Measures aimed at preventing traffic accidents may include increasing the use of child car seats, stricter speed enforcement in school zones, and enhanced traffic safety education.

The head and neck region was identified as the most common site of injury (48.3%). This finding is consistent with the results of the pediatric trauma study conducted by Baydemir Kılınç et al. at Atatürk University, in which head-neck and extremity injuries were prominent [9]. On the other hand, the low frequency of pelvic injuries and the fact that nearly half of these cases were associated with life-threatening injuries suggest that the pelvis, due to its relatively small volume and surface area, is a comparatively protected region in trauma and is less likely to be injured in low-energy trauma [12]. The rate of bone fractures was

30.2%, and severe functional impairment was identified in 7.8% of cases. This rate is consistent with the rates of serious fractures reported in the literature on pediatric trauma [13,14]. According to the data presented in Figure 3, the relatively low frequency of grade 1 and grade 2 fractures may be attributed to the fact that most cases consisted of injuries such as traffic accidents and falls, which cause generalized bodily trauma, and such trauma is less likely to result in fractures limited to small bones. The fact that fracture grading was performed in accordance with the national forensic medicine guideline based on the Turkish Penal Code also supports methodological consistency.

A life-threatening condition was present in 27.4% of cases and was most frequently associated with traffic accidents. This once again highlights the importance of traffic accidents in forensic trauma during childhood. The rate of permanent facial scarring was found to be low at 1.1%; however, 30.2% of cases could not be evaluated because the healing period had not been completed or because the patients did not attend follow-up. This finding is similar to the study by Karaarslan et al., in which a significant proportion of reports were concluded based on file review rather than direct examination [8].

The highest frequency of injuries was observed in the 15–17 age group, and an increase in causes of injury other than traffic accidents was noted in this group. In this age range, the most common cause of injury following traffic accidents was assault, followed by sharp or penetrating object injuries; it was noteworthy that the rates of exposure to intentional injury increased. The 7–11 age group ranked second in frequency, with only one case fewer. This finding is similar to studies analyzing pediatric forensic cases presenting to the emergency department, which have shown that school-age children are more frequently exposed to trauma [15].

The main limitations of this study include its retrospective design; the fact that 78.8% of the cases were concluded based on file review; the limited variety and number of cases referred due to the location of our center; the possibility that being a tertiary referral center may have affected case characteristics; and the high proportion of cases that could not be evaluated for parameters such as permanent facial scarring and sensory or organ function.

CONCLUSION

This study demonstrates that pediatric forensic cases evaluated at a single center were predominantly associated with traffic accidents, that male cases were represented at a higher rate, and that the number of cases increased markedly during the summer months. Although head and neck injuries were the most common injury pattern, thoracic and pelvic injuries were found to correlate with cases assessed as life-threatening.

The findings obtained highlight the importance of strategies and preventive measures aimed at reducing traffic accidents, particularly for children and adolescents in high-risk age groups. In addition, it is emphasized that injury patterns with the potential

to result in severe outcomes should be carefully considered during the forensic evaluation process.

Considering the retrospective design and single-center nature of this study, there is a need for multicenter and prospective studies with greater case diversity that may contribute to the development of preventive policies and forensic practices in the pediatric population.

Conflict of Interests

The authors declare that there is no conflict of interest in the study.

Financial Disclosure

The authors declare that they have received no financial support for the study.

Ethical Approval

Ethical approval for the study was obtained from the Non-Interventional Clinical Research Ethics Committee of İnönü University Faculty of Medicine on October 14, 2025, with decision number 2025/8332.

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