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RESEARCH ARTICLE

# Characterization of Throwing Track and Field Injuries in Adolescent and Young Adult Participants Resulting in Emergency Department Visits: An Analysis of the National Electronic Injury Surveillance System

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## Abstract

**Introduction:** Track and field throwing event injuries in the United States has not been well characterized for the adolescent and young adult population. In a sport where athletes' bodies are subject to repetitive actions with substantial biomechanical demands, a more thorough understanding of common injuries is crucial. This information would allow coaches and parents to not only mitigate risk of injury, but also help to optimize performance. The aim of this epidemiologic review is to address the gap in our current understanding of track and field throwing injuries in the adolescent and young adult population.

**Methods:** The National Electronic Injury Surveillance System (NEISS) was queried for all track and field throwing event injuries presenting to the emergency department (ED) between 2002 and 2021. Chi-square and column proportion z-testing was used to analyze potential differences between injury diagnosis, body parts injured, mechanism of injury, patient age group, event type, and sex.

**Results:** From 2002 to 2021, an estimated total of 16,218 track and field throwing event injuries among track and field participants 10 to 22-years-old presented at emergency departments in the United States. Unique injury patterns were found between throwing events, with shotput participants having a higher proportion of upper extremity, trunk, and overuse injuries (z-test for proportions with Bonferroni correction $p < 0.05$), javelin participants having a higher proportion of lower extremity, falling, and abnormal positioning injuries (z-test for proportions with Bonferroni correction $p < 0.05$), and discus participants having a higher proportion of contact and head/neck injuries (z-test for proportions with Bonferroni correction $p < 0.05$). Younger track throwing participants (ages 10-13) had a higher proportion of injuries due to strains/sprains (z-test for proportions with Bonferroni correction $p < 0.05$).

**Conclusion:** There are unique injury differences between events and age groups in track and field. These findings may help to serve as a starting point for further research into targeted prevention strategies, regulations, and strength programs to decrease injury rates among track and field throwing participants.

## Keywords

Track and field, Throwing, Epidemiology, National electronic injury surveillance system, Injury mechanism of action

## Introduction

Track and field is among the most popular sports in the United States. It was the most popular high school girls' sport and second most popular boys' sport with 1,093,621 U.S. high school athletes participating in outdoor track and field during the 2018-2019 academic year [1]. Rates of injury have steadily paralleled the growing popularity of the sport, with the estimated incidence of adult track and field injuries increasing from 0.72 injuries per 100,000 U.S. population in 2004 to 2.09 injuries per 100,000 U.S. population in 2015 [2].

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Despite the popularity of track and field, limited research has investigated this population at large. Many studies have instead focused on National Collegiate Athletic Association (NCAA) or elite level athletes specifically [3-6]. Even less research has focused on throwing event injury patterns. One previous study examined running event differences in NEISS adolescent data, but contained no analyses on field events [7]. Another study included all track and field events in high school athletes, but was restricted to high schools with athletic trainers with National Athletic Trainers' Association membership and had little emphasis on throwing events [8].

Throwing athletes are particularly susceptible to rotator cuff injury due to repetitive periods of heavy stress on the glenohumeral joint. Maximum leg extensor forces can reach as high as 4,954 N in elite shot-putters [9]. Hyperextension and powerful rotation of the trunk leave athletes vulnerable to lumbar spine injury as well [10]. This unique combination of mechanisms is used in each throwing event, highlighting the need to further examine injury patterns between events in order to allow for targeted prevention and recommendations to reduce injury risk. The purpose of this study was to use comprehensive population data to determine the epidemiology of throwing track and field related injuries in adolescent and young adult participants presenting to EDs in the United States and to characterize throwing track and field injuries and trends with regard to event type, mechanism of injury, body region, and sex.

## Methods

A retrospective cross-sectional study of track and field injuries was conducted using the National Electronic Injury Surveillance System (NEISS). The NEISS is a publicly available, deidentified database not requiring IRB approval maintained by the United States Consumer Product Safety Commission (CPSC) [11-13]. This database is a nationally represented probability model constructed using all-injury data from emergency department visits at a stratified sample of 100 hospitals in the United States and its territories. Each year the CPSC creates a new 100 hospital sample, selected from both children's and adult hospitals, trauma centers and community hospitals from both rural and urban communities, to ensure year to year accuracy of the sample. Each documented case is assigned a weighted values based in the inverse probability of being selected to estimate the total number of cases throughout the United States each year. Data on pertinent demographics (age, sex, and race), injury information (diagnosis, disposition, injury location, and product(s) involved), and a short narrative describing the details surrounding the event are included in the database.

Annual queries of track and field injuries (product code 5030) captured by NEISS from January 1, 2002 to December 31, 2021 were evaluated. The patient population was restricted to adolescents and young adults (ages 10 to 22). Narratives were further evaluated by one reviewer to include only track and field injuries involving throwing events, as defined by USA Track and Field (USATF) [14]. Fastidious efforts were made to exclude ED events with narratives describing injuries not specifically related to track and field participation as the primary cause of injury. All analyses were conducted on the final study sample of 434 ED visits and an estimated weighted total of 16,218 ED visits.

Injury incidence rates were determined based on annual U.S. census estimates by sex and age [15]. Variables of interest included age, sex, date of injury (by year), injury diagnosis, body region injured, mechanism of injury, and event. Age was stratified into 3 age groups: 10 to 13 years, 14 to 17 years, and 18 to 22 years, representing middle school, high school, and college aged participants, respectively. Injury diagnosis and body part injuries were categorized consistent with previous NEISS research methodology (Supplementary Table S1) [2]. Mechanism of Injury (MOI) was assessed using narratives in the NEISS data. Data was categorized and coded into 6 categories: 'Overuse' for injuries caused by body stressing or overuse; 'Falls' for injuries caused by falls, slips, or trips; 'Contact' for injuries caused by contact with self, other living entities, moving objects, or stationary objects; 'Abnormal Positioning' for injuries caused by abnormal body positioning, such as inversion or eversion of feet, hyperextension of limbs, or twisting of joints; 'Unspecified' for injuries listed without a MOI. Additionally, observations were categorized by event. Event categories were 'Shotput', 'Discus', 'Javelin', and 'Other' for unspecified or other throwing events, such as hammer throw.

Analysis of the distribution of injuries across age groups, sex, and event type was done using chi-squared analysis. Z-test column proportion post-hoc analysis with Bonferroni adjustments was used to analyze significant individual differences between groups. P-values less than 0.05 were considered statistically significant and incidence rates were calculated with 95% confidence intervals. Analysis was performed using Microsoft Excel (Microsoft Corporation), Stata (Version 16.1, StataCorp), and SPSS (Version 28, IBM).

## Results

Between January 1st, 2002 and December 31st, 2021, an estimated total of 16,218 track and field throwing event related injuries among track and field participants 10 to 22-years-old presented at emergency departments in the United States. The highest injury incidence rate was in 2002, with 2.27 injuries per 100,000 people (95% CI: 1.37-3.17), and the lowest injury incidence rate was in 2020, with 0.03 injuries per 100,000 people (95% CI: 0-0.09). Overall, females (8,294; 95% CI: 7,087-9,502)

and high school aged participants (14-17 years-old) (10,788; 95% CI: 9,517-12,058) had the most injuries (Table 1).

With regards to diagnosis differences, males had significantly higher proportions of lacerations (17.3%, z-test for proportions with Bonferroni correction p < 0.05) and fractures/dislocations (12.5%, z-test for proportions with Bonferroni correction p < 0.05), while females had significantly higher proportions of soft tissue injuries (23.2%, z-test for proportions with Bonferroni correction p < 0.05) and strains/sprains (33.0%, z-test for proportions with Bonferroni correction p < 0.05). Across body areas, men had a significantly higher proportion of head/neck injuries (29.2%, z-test for proportions with Bonferroni correction p < 0.05) and trunk injuries (14.3%, z-test for proportions with Bonferroni correction p < 0.05) while women had significantly higher proportion of upper extremity (30.8%, z-test for proportions with Bonferroni correction p < 0.05) and lower extremity injuries (32.4%, z-test for proportions with Bonferroni correction p < 0.05). Males also had a significantly higher proportion of injuries caused by falls (4.1%, z-test for proportions with Bonferroni correction p < 0.05) and abnormal positioning (16.9%, z-test for proportions with Bonferroni correction p < 0.05) while females had significantly higher proportion of overuse (19.0%, z-test for proportions with Bonferroni correction p < 0.05) and contact injuries (48.2%, z-test for proportions with Bonferroni correction p < 0.05).

Comparing across age groups, middle school aged patients had the significantly highest proportion of strains/sprains (38.1%, p < 0.05), head/neck (31.2%, z-test for proportions with Bonferroni correction p < 0.05), and upper extremity injuries (25.6%, z-test for proportions with Bonferroni correction p < 0.05). High school aged patients had the significantly highest proportion of soft tissue (22.1%, z-test for proportions with Bonferroni correction p < 0.05) and abnormal positioning caused injuries (17.2%, z-test for proportions with Bonferroni correction p < 0.05), while college aged patients had the significantly highest proportion of lacerations (21.8%, z-test for proportions with Bonferroni correction p < 0.05), overuse (29.5%, z-test for proportions with Bonferroni correction p < 0.05), and fall-related injuries (7.3%, z-test for proportions with Bonferroni correction p < 0.05).

**Table 1:** Estimated counts of patient demographics.

| Variable | N[a] | (95% CI)[a] | %[b] |
|---|---|---|---|
| **Total** | 16218 | | |
| **Sex** | | | |
| Male | 7924 | (6760-9087) | 48.9 |
| Female | 8294 | (7087-9502) | 51.1 |
| **Age** | | | |
| 10-13 | 3275 | (2438-4111) | 20.2 |
| 14-17 | 10788 | (9517-12058) | 66.5 |
| 18-22 | 2156 | (1451-2861) | 13.3 |
| **Event** | | | |
| Shotput | 8473 | (7279-9667) | 52.2 |
| Discus | 5586 | (4529-6644) | 34.4 |
| Javelin | 1749 | (1122-2376) | 10.8 |
| Other | 410 | (91-729) | 2.5 |

[a]Data reported as national estimates, which were calculated by applying statistical weights provided by the US Consumer Product Safety Commission's National Electronic Injury Surveillance System to actual case counts; [b]Some categories are not equal to 100%, due to rounding.

CI: Confidence interval

Among events, shotput, discus, javelin, and unspecified throwing injuries represented 52.2%, 34.4%, 10.8%, and 2.5% of throwing injuries respectively (Table 2). Comparing across events, shot-put participants had the significantly highest proportion of soft tissue (22.4%, z-test for proportions with Bonferroni correction p < 0.05), upper extremity (36.0%, z-test for proportions with Bonferroni correction p < 0.05), trunk (16.1%, z-test for proportions with Bonferroni correction p < 0.05), and overuse injuries (25.4%, p < 0.05). Moreover, discus participants had the significantly highest proportion of head/neck (45.3%, z-test for proportions with Bonferroni correction p < 0.05) and contact (59.9%, z-test for proportions with Bonferroni correction p < 0.05) injuries. Javelin participants had the significantly highest proportion of lacerations (44.9%, z-test for proportions with Bonferroni correction p < 0.05), lower extremity injuries (55.6%, z-test for proportions with Bonferroni correction p < 0.05), and injuries due to falls (4.9%, z-test for proportions with Bonferroni correction p < 0.05) and abnormal positioning (19.5%, z-test for proportions with Bonferroni correction p < 0.05).

Regarding the upper extremity body area, there were differences between events. The top 3 most common upper extremity injuries for each event were shoulder (11.4%), wrist (10.5%), finger (8.7%), for shotput, shoulder (7.1%), wrist (3.2%), and finger (2.8%) for discus, and shoulder (10.0%), elbow (7.4%), and finger (3.7%) for javelin.

## Discussion

Despite the popularity of track and field, there is currently a paucity of data on throwing track and field injuries. This study sought to characterize the throwing track and field related injury patterns in adolescent and young adult aged participants. Our analysis found unique injury patterns between age groups. The youngest age cohort, middle school aged patients, had the significantly highest proportion of strains/sprains. Through long-term systemic training and higher load resistance exercises, experienced throwers have previously been found to have a higher bone mineral density, which allows for the

**Table 2:** Estimated counts of injury characteristics by diagnosis, body area, and MOI by event.

| | Shotput | | | Discus | | | Javelin | | |
|---|---|---|---|---|---|---|---|---|---|
| Variable | N[a] | (95% CI)[a] | %[b] | N[a] | (95% CI)[a] | %[b] | N[a] | (95% CI)[a] | %[b] |
| **Injury Diagnosis** | | | | | | | | | |
| Laceration | 486 | (149-823) | 5.7 | 980 | (507-1452) | 17.5 | 785 | (321-1248) | 44.9 |
| Soft Tissue | 1899 | (1230-2568) | 22.4 | 1044 | (552-1536) | 18.7 | 91 | (50-232) | 5.2 |
| Fracture or Dislocation | 896 | (458-1334) | 10.6 | 636 | (258-1013) | 11.4 | 43 | (4-90) | 2.5 |
| Strain or Sprain | 2992 | (2187-3796) | 35.3 | 1457 | (852-2063) | 26.1 | 603 | (254-952) | 34.5 |
| Other | 2200 | (1496-2905) | 26.0 | 1471 | (870-2071) | 26.3 | 227 | (2-457) | 13.0 |
| **Injured Body Region** | | | | | | | | | |
| Head or Neck | 1540 | (932-2148) | 18.2 | 2532 | (1785-3279) | 45.3 | 98 | (45-241) | 5.6 |
| Upper Extremity | 3051 | (2246-3855) | 36.0 | 928 | (444-1412) | 16.6 | 518 | (183-853) | 29.6 |
| Trunk | 1360 | (810-1911) | 16.1 | 650 | (246-1054) | 11.6 | 161 | (0-352) | 9.2 |
| Lower Extremity | 2522 | (1771-3273) | 29.8 | 1476 | (885-2068) | 26.4 | 972 | (482-1463) | 55.6 |
| **Mechanism of Injury (MOI)** | | | | | | | | | |
| Body Stressing or Overuse | 2155 | (1446-2863) | 25.4 | 549 | (188-911) | 9.8 | 141 | (47-328) | 8.0 |
| Falls, Slips, or Trips | 225 | (13-437) | 2.7 | 172 | (0-376) | 3.1 | 86 | (0-228) | 4.9 |
| Contact | 3226 | (2397-4055) | 38.1 | 3344 | (2501-4188) | 59.9 | 836 | (370-1301) | 47.8 |
| Abnormal Body Positioning | 1183 | (640-1727) | 14.0 | 740 | (295-1184) | 13.2 | 341 | (86-596) | 19.5 |
| Unspecified | 1684 | (1084-2284) | 19.9 | 781 | (335-1227) | 14.0 | 345 | (71-619) | 19.7 |

[a]Data reported as national estimates, which were calculated by applying statistical weights provided by the US Consumer Product Safety Commission's National Electronic Injury Surveillance System to actual case counts; [b]Some categories are not equal to 100%, due to rounding.

MOI: Mechanism of Injury; CI: Confidence Interval

ability to resist and generate larger forces [16]. The lack of experience and strength development of younger participants might explain the larger proportion of such injuries.

Shotput participants had the significantly highest proportion of strains/sprains and upper extremity injuries. Broken down to specific upper extremity diagnoses, shotput participants also had the most wrist, hand, and finger injuries (21.0% of shotput injuries). The shotput is the heaviest implement used in track and field, ranging from approximately 6 to 16 pounds. Previous literature has hypothesized that shot-putters might be at increased risk for wrist injuries, since the sport requires rapid transition from wrist extension to flexion against the weight of the shot put [10]. This exertion against resistance in combination with the repetitive demands of practice and competition likely explains the higher proportion of overuse injuries in shotput participants. These findings highlight the need for better strengthening and injury prevention exercises specific to the distal upper extremities for shotput participants.

Among the upper extremity injuries, discus and shotput had similar injury patterns, with wrist and shoulder being the most common while javelin had a more unique injury pattern with shoulder and elbow being the most common. This may be explained by the more similar mechanisms used for discus and shotput, with both requiring the transfer of rotational kinetic energy from the lower limbs and trunk to the upper limbs for release of the implement while the javelin throw more mimics an overhead baseball pitching motion [10]. Similar to baseball pitchers, javelin throwers have also been found to have increased risk for shoulder and elbow/UCL injuries [17,18]. Javelin was found to have a significantly higher proportion of lacerations, likely due to the risk of impalement by the implement. The proportion of lower extremity, falling, and abnormal body positioning injuries were also significantly higher in javelin participants compared to discus and shotput. These findings may be explained by the longer sprint and exertion in the approaching phase. A study by Schleichardt, et al. examined force-velocity profiles in track and field throwing athletes, finding female javelin throwers to generate the highest leg extensor velocities of all throwers (1.47 m/s) [9]. Taken together, these findings suggest more targeted lower extremity

strengthening exercises with an emphasis on core and lower extremity structural balance would be highly beneficial for javelin participants. Furthermore, discus was found to have a significantly higher proportion of soft tissue and head/neck injuries related to contact. Future prevention could focus on education and better netting and safety barriers.

Given the unique injury patterns across track and field throwing event types, further research into targeted prevention programs and increased barriers to injury is necessary. Previous initiatives have been proven to reduce severe injury risk in the past. A targeted 8 week physical therapy routine in javelin throwers found improvements in rotator cuff strength, flexibility, and core stability [19]. In France, the Athletics Injury Prevention Programme (AIPP), which included 8 exercises for core stability, hamstring, leg and pelvic muscle stretching, and balance strengthening, was found to significantly reduce risk of injury in the short term for inter-regional and national level track and field athletes [20]. Another example to improve injury prevention was rule changes made in pole vault in 2003 mandated by the NCAA, National Federation of State High Schools (NFHS), and USA Track and Field which included increasing the minimum dimensions of the landing pad behind the vault box. These regulation changes markedly reduced catastrophic and fatal injuries caused by pole vault [21]. Similar regulation changes for throwing caging and netting might minimize risk for contact injuries.

The one major limitation of this study is that the NEISS database is limited to emergency department data. Injuries presenting at other settings, such as urgent care, primary care providers, or outpatient care, are not included, likely underestimating the true incidence of track and field-related injuries. In addition, due to the NEISS dataset's publicly available design and deidentified nature, does not provide a way to identify patients who present to the ED more than once nor follow patients after an initial injury to observe if there is an increased chance of secondary injury. With the heavy forces exerted on track and field athletes, it's likely that injury rates are higher on those who have already experiences an injury. Furthermore, analyses were limited by the narratives provided with this dataset. Although most narratives provided enough information to identify the event type and MOI, an estimated 410 (2.5%) of ED visits either could not be further specified into a distinct event type or included multiple event types and 2,815 (17.3%) of ED visits were categorized with an 'unspecified' MOI. Despite these limitations, the NEISS database is a nationally representative database that reflects the American population, allowing this study to be uniquely comprehensive within the existing literature. In addition, this study provides more detailed examinations of throwing track and field event-based and age-based differences in injury risk and mechanisms of injury.

## Conclusion

In this study, we have demonstrated that there are significant differences in the injury mechanisms and types of injuries across events in adolescent and young adult throwing track and field participants. Among these differences, shotput participants had a higher proportion of injuries related to the higher forces necessary for the event, with significantly higher overuse, upper extremity, and truncal injuries. Javelin participants had the highest proportion of lower extremity, falling, and abnormal positioning injuries, unique to the longer approach phase and higher running velocities of javelin participants. Discus participants had a higher proportion of contact and head/neck injuries. Moreover, younger track throwing participants had a higher proportion of strains/sprains. These results can hopefully serve as an initial study for further research into more targeted care recommendations and prevention techniques to better guide providers, coaches, and athletes in reducing adolescent and young adult throwing track and field related injuries.

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## References

1. 2018-19 High School Athletics Participation Survey (2023) The national federation of state high school associations.
2. Mintz JJ, Jones CMC, Seplaki CL, Rizzone KH, Thevenet-Morrison K, et al. (2021) Track and field injuries resulting in emergency department visits from 2004 to 2015: An analysis of the national electronic injury surveillance system, Phys Sportsmed 1: 74-80.
3. Boltz AJ, Roby PR, Robison HJ, Morris SN, Collins CL, et al. (2021) Epidemiology of injuries in national collegiate athletic association men's track and field: 2014-2015 through 2018-2019. J Athl Train 7: 788-794.
4. Alonso JM, Edouard P, Fischetto G, Adams B, Depiesse F, et al. (2012) Determination of future prevention strategies in elite track and field: Analysis of Daegu 2011 IAAF Championships injuries and illnesses surveillance. Br J Sports Med 7: 505-514.
5. Jacobsson J, Timpka T, Kowalski J, Nilsson S, Ekberg J, et al. (2012) Prevalence of musculoskeletal injuries in Swedish elite track and field athletes.Am J Sports Med 1: 163-169.
6. Hopkins C, Williams J, Rauh MJ, Zhang L (2022) Epidemiology of NCAA track and field injuries from 2010 to 2014. Orthop J Sports Med 10: 23259671211068079.
7. Reid JP, Nelson NG, Roberts KJ, McKenzie LB (2012) Track-related injuries in children and adolescents treated in US emergency departments from 1991 through 2008. Phys Sportsmed 2: 56-63.

8. Pierpoint LA, Williams CM, Fields SK, Comstock RD (2016) Epidemiology of injuries in United States high school track and field: 2008-2009 through 2013-2014. Am J Sports Med 6: 1463-1468.

9. Schleichardt A, Badura M, Lehmann F, Ueberschar O (2021) Comparison of force-velocity profiles of the leg-extensors for elite athletes in the throwing events relating to gender, age and event. Sports Biomech 6: 720-736.

10. Meron A, Saint-Phard D (2017) Track and Field Throwing Sports: Injuries and Prevention. Curr Sports Med Rep 6: 391-396.

11. (2023) National electronic injury surveillance system (NEISS) United States consumer product safety commission.

12. (2023) NEISS coding manual. US consumer product safety commission: division of hazard and injury data systems. Published online 2019.

13. (2023) The national electronic injury surveillance system a tool for researchers. US consumer product safety commission: Division of hazard and injury data systems. Published online 2000.

14. (2023) USA Track & Field.

15. (2023) Census.gov.

16. Zaras N, Stasinaki AN, Terzis G (2021) Biological determinants of track and field throwing performance. J Funct Morphol Kinesiol 2: 40.

17. Schmitt H, Hansmann HJ, Brocai DRC, Loew M (2001) Long term changes of the throwing arm of former elite javelin throwers. Int J Sports Med 4: 275-279.

18. Dugas J, Chronister J, Cain EL, Andrews JR (2014) Ulnar collateral ligament in the overhead athlete: A current review. Sports Med Arthrosc Rev 3: 169-182.

19. Kim H, Lee Y, Shin I, Kim K, Moon J (2014) Effects of 8 weeks' specific physical training on the rotator cuff muscle strength and technique of javelin throwers. J Phys Ther Sci 10: 1553.

20. Boden BP, Boden MG, Peter RG, Mueller FO, Johnson JE, et al. (2020) The athletics injury prevention programme can help to reduce the occurrence at short term of participation restriction injury complaints in athletics: A prospective cohort study. Sports 6: 84.

21. Boden BP, Boden MG, Peter RG, Mueller FO, Johnson JE (2021) Catastrophic injuries in pole vaulters: A prospective 9-year follow-up study. American Journal of Sports Medicine 7: 1488-1494.

**Supplemental Table S1:** Description of body region, diagnosis, and mechanism of injury categories.

| **Body Region** | **Description** |
|---|---|
| Head/Neck | Head, face, eyes, mouth, neck, ears |
| Upper Extremity | Elbow, lower arm, wrist, upper arm, hands, fingers, shoulder |
| Trunk | Upper trunk, pelvic region, lower trunk |
| Lower Extremity | Knee, lower leg, ankle, upper leg, foot, toe |
| Other | Other body part |
| | |
| **Diagnosis Group** | **Description** |
| Lacerations | Lacerations, avulsions, punctures |
| Soft Tissue | Contusions/abrasion, hematoma, hemorrhage, |
| Fracture/Dislocation | Fractures, dislocations |
| Strain/Sprain | Strains, sprains |
| | |
| **Mechanism of Injury (MOI)** | **Description** |
| Overuse | Body stressing, overuse |
| Falls | Falls, slips, trips |
| Contact | Contact with self, other living entities, stationary objects, moving objects |
| Abnormal Positioning | Inversion, eversion, hyperextension, twisting of body parts |
| Unspecified | Injury cause not specified |