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COMPARATIVE ANALYSIS OF MAJOR JOINT INJURIES OF VARIOUS ROAD TRAFFIC ACCIDENT PARTICIPANTS

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ABSTRACT

An analysis of forensic medical examination materials was conducted in cases of injuries to large joints in traffic accidents. In 77.0% of cases, isolated joint injuries were present, more often in the lower extremities. Combined injuries to the joints of the upper limbs, more often to the left, were characteristic of car drivers, and combined injuries to the lower limbs were mainly observed in pedestrians. Cut wounds of the periarticular soft tissues were found only in drivers, while isolated dislocations were found in pedestrians. Ruptures and sprains of ligaments were mainly observed in pedestrians and car passengers. The features of the localization and nature of injuries to large joints can be used as an auxiliary feature for differentiating the status of road traffic accident participants.

Key words: major joint injuries, traffic accident participants, forensic medical examination.

INTRODUCTION

Transport injury cases occupy a special place in the structure of forensic medical examination of living persons and are characterized by the peculiarities of the organization, conduct of examinations, and the issues being resolved, as well as the significant polymorphism of injuries and various mechanisms of their formation. Road traffic accidents (DRs) in most cases are accompanied by the formation of multiple and combined injuries of the musculoskeletal system, including large joints (V.A. Klevno, N.V. Tarasova, 2017; It should be emphasized that to date, in forensic medical examinations in cases of non-fatal transport injuries, determining the status

of a traffic accident participant is a serious problem (V.A. Fetisov et al., 2016; A.V. Kovalev et al., 2020).

Numerous studies have been devoted to the issues of forensic medical assessment of injuries to large joints by V.A. Fetisov, K.Yu. Kulinkevich, 2017: I.G. Juraev, 2023. At the same time, a number of positions remain controversial. In particular, the opinions of researchers on the current medical criteria for determining the severity of these injuries do not coincide (Z.S. Khabova et al., 2012; S.N. Kulikov, 2015, 2023; S.Yu. Morozov et al., 2015).

RESEARCH OBJECTIVE

Forensic medical analysis of the characteristics of large joint injuries in various road traffic accident participants.

MATERIALS AND METHODS OF RESEARCH

Materials of forensic medical examinations of living individuals for injuries to large joints in various types of injuries conducted at the Tashkent City Branch of the Republican Scientific and Practical Center for Forensic Medical Examination in 2021 were studied.

During this period, a total of 350 examinations of living individuals were conducted for injuries to large joints, which constituted 3.3% of all mechanical injuries. In 279 (79.7%) cases, injuries were sustained as a result of accidents and were subjected to more detailed analysis. In each case, the circumstances of the incidents under the rulings on the appointment of an examination, the medical documents submitted to the disposal of the examination (outpatient records, medical histories, radiographs, etc.), the examination data of the forensic medical expert, various additional studies, and the results of specialist consultations conducted during the examination process were studied. Special attention was paid to the selection of medical criteria by experts in accordance with the "Rules for Forensic Medical Determination of the Severity of Bodily Injuries" (Order No. 153 of the Ministry of Health of the Republic of Uzbekistan dated June 1, 2012, Appendix 2).

Data for each observation are entered into a map containing 15 characteristics. The variants of the features were marked with digital codes, which were further processed according to a specially developed computer program.

RESEARCH RESULTS AND THEIR DISCUSSION.

Of the total number of victims, men constituted 60.6%, and individuals aged 18-49 (61.3%). In 271 cases, various types of vehicle injuries occurred, and in 8 cases, injuries were caused by cycling and motorcycle injuries. By types of auto-trauma, the impact of moving vehicle parts was 160 (59.1%) cases. In 109 (40.2%) cases, injuries in the car's interior and cabin were identified, the absolute majority (98.2%) of which occurred as a result of a collision of the car with another vehicle

or a stationary object (of which drivers - 78, passengers of the front seat (FSP) - 18, passengers of the rear seat (BSP) - 13). In 2 (0.7%) cases (one FSP and one BSP), injuries were sustained when falling from a moving vehicle. In cases of cycling and motorcycle injuries, damages were also caused by collisions with other vehicles or fixed objects.

When analyzing the localization of large joint injuries, it was established that, as a whole, isolated injuries were observed in 77.0% of cases, while the rest were combined injuries of large joints. In this case, injuries to the joints of the lower extremities significantly prevailed. Depending on the localization, isolated injuries of the knee, ankle, and elbow joints occurred more frequently (respectively 31.2%, 16.1%, and 13.6%).

Table 1.

LOCATION OF INJURIES TO LARGE JOINTS IN VICTIMS OF TRAFFIC ACCIDENTS

Localization	Shoulder joint	Elbow joint	Radiocarpal joint	2 or more joints of the upper limb	Hip joint	Knee joint	ankle joint	2 or more joints of the lower limb	2 or more joints of the upper and lower extremities
%	7.9	13.6	2.2	2.5.	6.1	31.2	16.1	2.9	17.6

At the same time, certain features of injury localization in various road traffic accident participants were noted (Table. Thus, in a car accident, combined injuries to the joints of the upper extremities (a total of 7 cases) were found mainly in drivers (6 cases - 7.7%), more often in the left shoulder and elbow joints, significantly less often in pedestrians (1 case - 0.6%). There were no such injuries among the passengers of the car. Combined injuries to the joints of the lower extremities (a total of 8 cases) were mainly observed in 7 injured pedestrians (4.4%) and only in 1 case in the car driver (1.3%).

In cycling and motorcycle injuries, isolated joint injuries were observed only in the lower extremities (pelvic, knee joints), and in cases of combined injuries of the arms and legs, knee joint injuries were present in all victims.

Table 2.

FEATURES OF THE LOCALIZATION OF INJURIES TO LARGE JOINTS IN VARIOUS ROAD TRAFFIC ACCIDENT PARTICIPANTS

Nature	Fracture with contusion or rupture of periarticular tissue	Dislocation	Haemarthrosis with contusion or rupture of soft tissue	Ruptures and sprains of ligaments	Fracture with hemarthrosis, contusion of soft tissue	Convulsions, ruptures of periarticular soft tissues	Fracture dislocation with rupture of ligaments	Hemarthrosis with rupture or sprain of ligaments	Cut wound of joint region
Pedestrian	**40.6**	**3.1**	**4.4**	**6.9**	**3.8**	**33.1**	**8.1**	**0**	**0**
Driver	**30.8**	**0**	**7.7**	**0**	**3.8**	**42.3**	**12.8**	**0**	**2.6**
FSP	**27.8**	**0**	**11.1**	**5.6**	**0**	**33.3**	**22.2**	**0**	**0**
BSP	**15.4**	**0**	**7.7**	**7.7**	**0**	**53.8**	**15.4**	**0**	**0**
Motorcyclist or Cyclist	**75.0**	**0**	**0**	**0**	**0**	**25.0**	**0**	**0**	**0**
Falling	**50.0**	**0**	**0**	**0**	**0**	**0**	**0**	**50.**	**0**

The highest rates of combined injuries to the joints of the upper and lower extremities were observed in cyclists and scooter drivers (62.5%), and in pedestrians, FSP, and BSP (respectively 20.0%; 16.7% and 15.4%). In a comparative analysis of the localization of injuries to large joints in drivers and paranasal sinuses, certain features were noted, which can be used as an additional, auxiliary feature in differentiating the status of victims of injuries in the car interior (Figure 1).

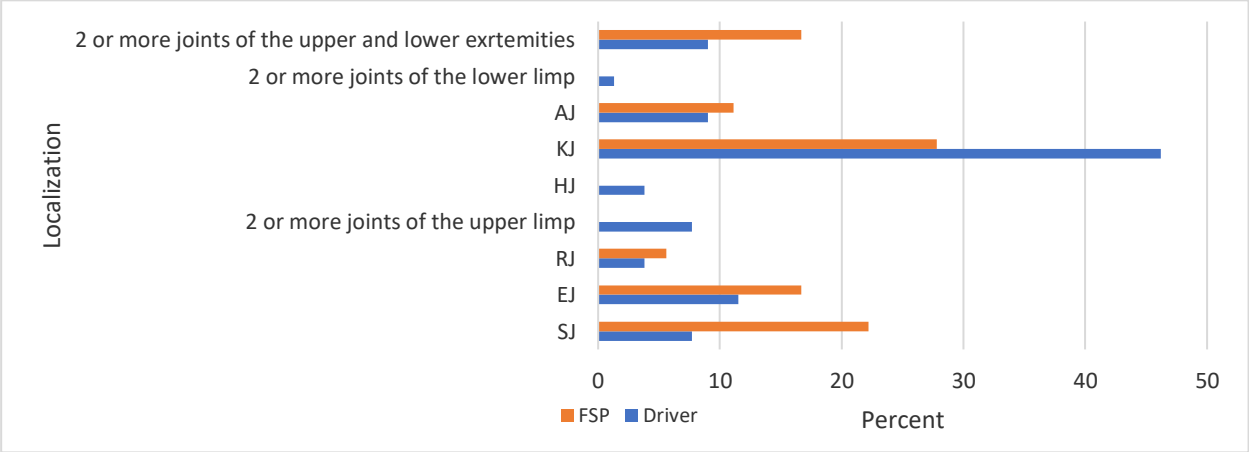

Fig.1. Peculiarities of the localization of injuries to large joints in car driver and FSP

The nature of injuries in traffic accident victims varied significantly. In general, fractures of the bones comprising the joint and contusions, ruptures of the periarticular soft tissues were more frequently observed. Bone dislocations in joints

were diagnosed in 34 cases (12.4%) and in most observations (29 cases), it was combined with bone fractures and ligament ruptures. In 26 cases (9.3%), hemarthrosis was observed, which was accompanied by contusion, rupture of periarticular soft tissues in 25 victims, and bone fractures in 9. Ruptures and stretching of ligaments were found in 43 cases (15.5%), of which 29 were combined with bone fractures and dislocations (Table 3).

Table 3.

NATURE OF INJURIES TO LARGE JOINTS IN VICTIMS OF TRAFFIC ACCIDENTS

Nature	Fracture with contusion or rupture of periarticular tissue	Dislocation	Haemarthrosis with contusion or rupture of soft tissue	Ruptures and sprains of ligaments	Fracture with hemarthrosis, contusion of soft tissue	Convulsions, ruptures of periarticular soft tissues	Fracture dislocation with rupture of ligaments	Hemarthrosis with rupture or sprain of ligaments	Cut wound of joint region
%	36.9	1.8	5.7	4.7	3.2	36.2	10.4	0.4	0.7

When comparatively studying the nature of injuries to various road traffic accident participants, some peculiarities were noted. Thus, in all 8 victims of cycling and motor trauma, contusions and ruptures of the periarticular soft tissues were observed, of which in 6 cases, they were combined with bone fractures. Cut wounds of the periarticular tissues were found only in drivers, while isolated dislocations were found in pedestrians. Ruptures and sprains of ligaments were mainly observed in pedestrians and car passengers (Figure 2).

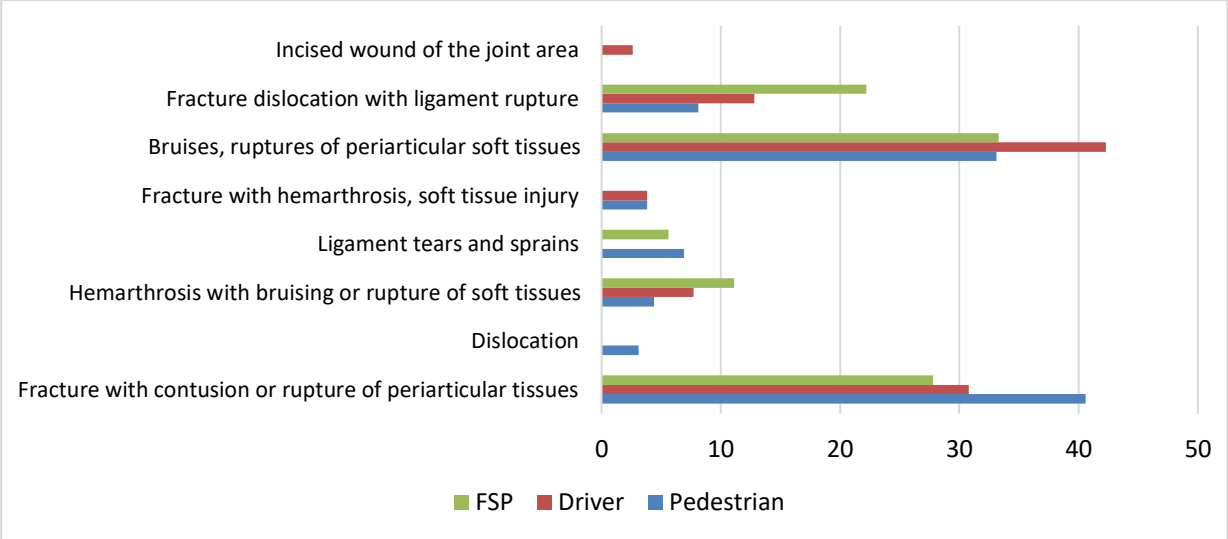

Fig.2. Nature of injuries to some accident participants

One of the important tasks of forensic medical examination is to determine the severity of bodily injuries. In 70 (25.1%) cases, the injuries were assessed as severe. At the same time, this indicator was high for pedestrians and car drivers. In 13 cases, life-threatening criteria were used due to combined brain and internal organ injuries (10 observations), as well as pelvic bone fractures with discontinuity (3 observations (pedestrians - 2, driver - 1). In the remaining 57 cases, injuries were classified as severe according to the criterion of the degree of permanent loss of general work capacity (Clause 24 of the Rules). In 105 cases (37.6%), injuries were assessed as moderate severity, mainly based on the duration of the health disorder.

CONCLUSION

Based on the results of a comparative analysis of the characteristics of injuries to the large joints of various road accident participants, the following conclusions can be drawn:

1. In 77.0% of cases, isolated joint injuries were present, more often in the lower extremities. Combined injuries to the joints of the upper extremities, more often to the left, were characteristic of car drivers, and combined injuries to the lower extremities were mainly observed in pedestrians.
2. In the victims, fractures of the bones that make up the joint and contusions, ruptures of the periarticular soft tissues occurred more often. Cut wounds of the periarticular tissues were found only in drivers, while isolated dislocations were found in pedestrians. Ruptures and sprains of ligaments were mainly observed in pedestrians and car passengers.
3. The features of the localization and nature of injuries to large joints can be used as an auxiliary feature for differentiating the status of road traffic accident participants.

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