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FEATURES OF DAMAGE TO LIMBS IN COLLISION WITH MOVING VEHICLES

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Abstract: Road traffic injuries (RTI) are a global problem. In terms of the number of injury victims in all civilized countries, car injuries are in first place, the number of which is constantly growing. The mortality rate from road traffic accidents (RTAs) is 12 times higher than for people injured in other circumstances. Victims of road accidents are 7 times more likely to need hospitalization and 6 times more likely to become disabled, including children.
Keywords:RTI, RTA, injury, transport, method, treatment.

INTRODUCTION: The severity of the problem of road transport safety in our country is associated with a significant increase and diversity of the vehicle fleet, changes constantly being made to the design of vehicles, and the huge public need for it with a relatively unsatisfactory road infrastructure. In this regard, the relevance of the problem of studying bodily injuries during RTA, including forensic research, is increasing.

MATERIALS AND METHODS: The purpose of the work was to study in detail the features of the mechanisms of damage to limbs in a collision with a moving vehicle, as well as to identify specific changes in the nature of bodily injuries, primarily associated with the design features of new types of cars.

According to literature data, limb injuries are detected in 60.6% of cases when a pedestrian collides with a moving vehicle [1]. We have identified limb injuries in 95% of cases of such automobile trauma. All of them are primarily related to the mechanism of influence of the vehicle on the victim.

Limb fractures are among the most common injuries in this type of auto injury, and they are often indirect in nature: there are fractures of the ulna and radius in typical places, the surgical neck of the humerus and femur, dislocations and subluxations of the heads of these bones, etc. [2]. The most common types of fractures in car injuries from a collision between a pedestrian and a moving vehicle are comminuted, oblique, oblique-transverse and comminuted fractures. Much less common are cases of amputation of limbs - unilateral or bilateral, complete or partial. Amputation can be a consequence of a combined injury: collision + moving, falling out of a moving vehicle + moving. Also characteristic of this type of injury are numerous soft tissue injuries: bruises, abrasions, crushes, wounds, bruises and hematomas. Hemarthrosis is observed on the extremities, both lower and upper. Hematomas can be local or diffuse; this mostly depends on damage to the injured muscles and fascial sheaths. Ligamentous ruptures of varying degrees of severity often occur.

RESULTS AND DISCUSSION: When analyzing the examinations, we found that the majority of injuries in a collision with a moving vehicle occur in the lower extremities - 73.8%. The upper extremities are injured in 26.2% of cases, with isolated left- or right-sided injuries predominating, while injuries to the lower extremities are most often bilateral.

In the structure of injuries to the upper extremities, fractures predominate (47.05% of the total), of which almost half (46.8%) are fractures of the humerus. Fractures of the bones of the forearm accounted for 31.2%, of the hand - 21.8% of the total number of fractures of the upper extremities. There were no complete or partial amputations of the upper limb. Isolated injuries of the humerus account for 55.5% of the total number of injuries to the upper limb, with the predominant localization of damage in the upper 1/3 of the bone and in the area of the shoulder joint (more often, fractures along the line of the surgical neck). Isolated injuries to the bones of the forearm are much less common than combined ones - 7.9% of the total number for isolated ones and 17.4% for

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combined ones. Interestingly, not a single isolated injury to the radius was detected. Injuries to the bones of the wrist and hand account for 19% of the total number of injuries to the upper limb. Each case of bone damage is usually accompanied by ruptures of muscles and ligaments. Therefore, simultaneous injuries to soft tissues and bones of both upper and lower extremities occur in almost 95% of cases. Among soft tissue injuries of the upper limb, abrasions predominate (61.5%).

In injuries of the lower extremities, more than half of the fractures occur in the lower leg area (60% of the total), while fractures of the femur occur in 34.7% of cases, and in the ankle and foot areas - in only 5.8% . It is interesting to note that, according to the literature, the percentage of fractures of the tibia and femur bones is different - 63.2% were fractures of the femur, and in 32% of cases fractures of the tibia were detected [1]. We identified isolated fractures of the femur in 32.4% of the total number of injuries to the lower extremities, with a predominant localization in the lower 1/3 of the femur, often extending to the knee joint area. The frequency of isolated injuries to the tibia and fibula is at approximately equal levels (25.2% and 23.2%, respectively), and they are located mainly in their middle third (50.8% - tibia, 50% - fibula). Isolated injuries to the leg bones are 2.5 times more common than combined injuries. The percentage of injuries to the bones of the foot is small (1.6% of the total).

Damage to the soft tissues of the lower extremities mainly consists of abrasions (49%) and wounds (31.3%). Among the wounds, bruised wounds predominate - 54%, bruised ones - 31%. Complete amputation of both limbs was recorded in 1 case, unilateral amputation in 3 cases, partial amputation in 2 cases.

It is known that the “classical” bumper fracture is an oblique transverse comminuted fracture. It is characterized by the presence of a wedge-shaped fragment, the base of which indicates the location of the impact, and the apex indicates the direction of the impact [1]. However, in the cases we studied, the predominant types of fractures of the lower extremities in car trauma from a collision were comminuted (in 62% of cases) and oblique fractures (20.7%), with or without displacement of fragments. These types were established as a result of X-ray examination in 46% of cases among victims delivered to health care institutions from the scene of the incident. According to the results of the analysis of expert opinions, the frequency of bumper fractures in the materials studied was 94.7%, which allows us to speak of it as the main type of damage caused by the mechanical impact of car parts.

CONCLUSION: Thus, we can conclude that as the design features of modern vehicles change, the nature of the damage also changes. Even 30 years ago, a typical “bumper” fracture was caused by the presence of a large number of protruding parts of the car - a metal bumper, its all-plastic or rubber “fangs”, radiator grilles, etc. During this period, the design of the bumper has undergone significant changes: bumpers are no longer play an independent role in the design of the car; they are rather a continuation of its body panels [2]. The number of protruding parts of the car is currently noticeably reduced, therefore, the area of the traumatic surface increases. This is precisely the main reason for the change in the nature of damage: the larger the area of contact, the higher the degree of bone fragmentation over a larger area.

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