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PECULIARITIES OF BODILY INJURIES' FORENSIC DIAGNOSING, WHICH RECEIVED DRIVER AND PASSENGERS IN CAR ACCIDENTS

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Annotation. Determination of the injured person's place inside the car at the moment of accident is one of the most complex tasks during the forensic-medical examination. Applied today methodic takes to consideration predominantly the head-on collision of the cars or of the car with solid object and does not take other types of car accidents, accompanied with vehicle rollover and contact with rear part of the car. As a result, it determines the injuries, caused by steering wheel and other spare parts of car's interior from driver's side, as specific ones for car accidents. Analysis has shown that any complex forensic-medical and transport-trasological examination with aim to determine who occupied the driver's and passenger's seats at the moment of accident should contain several stages. At first it is necessary to determine the directions of shock-inertial displacement of the injured persons' bodies inside the car at the collision moment. The second stage determines the traumatic details of car interior (taking to consideration displacement of the bodies inside the car at the moment of accident). The character of bodily injuries, their localization and mechanism of development are detected on the third stage. The final stage shows which of the bodily injuries have formed after the contact with appropriate details of car interior. Consequently, it is necessary to consider the car's interior geometry change, what reflects on the free space for the driver or passenger of the car. Results of the research proved, that modern protective means of a car considerably change the morphology of passenger's and driver's bodily

injuries from one hand, and from another – they could cause much more considerable injuries and even death. Angle of the car contact with another car or with the barrier is a significant parameter, which plays an important role in determination of persons' interposition inside the vehicle at the moment of accident.

Key words: bodily injuries, car accident, shock-inertial displacement, algorithm of forensic-medical examination.

Introduction. Differential diagnosis of passenger's and driver's bodily injuries plays an especial role in modern practice of forensic-medical examination of vehicular injury, because it is necessary to determine the place of injured person inside car's saloon at the moment of accident.

Many research works of forensic-medical examiners and specialists, who investigate the car accidents, are devoted to these and adjacent questions [1-4]. They consider, that such forensic-medical examinations are especially complex [5].

Applied today methodic bases on the analysis of character and mechanism of bodily injuries' forming. Determination of "specific" and "characteristic" for driver and passenger bodily injuries provides the conclusion about interposition of injured persons inside the car at the moment of accident (who was on driver's and passenger's seats).

Solokhin A.A. describes abrasions with hemorrhage, which localize on the body according to some parts of steering wheel or steering column sleeve as specific ones for the driver [6]. Similar approach is applied during the determination of the injured person's position on the passenger's seat. Steschits V.K. and other authors use almost the similar approach to solve such tasks [7; 8].

Such approach of determination of injured persons interposition inside the car at the moment of accident could be advisable, however forensic-medical practice shows that it can be used not in all cases because:

1. Such method takes to consideration predominantly the head-on collision of the cars or of the car with solid object because of strike-innertion movement of the body to the front and as a result – appearing of specific injuries, resulted by steering wheel and other spare

parts of car's interior from driver's side. However, the car accident is not always related to head-on collision. Examiners often deal with other types of vehicles' contact (with rear part of the car, where the passengers sit) or accidents, accompanied with vehicle rollover and so on. In such cases there are no "classic" specific for driver and passengers injuries.

2. Practice shows, that even in the cases of head-on collisions, injuries specific only for driver or front seat passenger, appear not so often. More likely, the same injuries appear both for the driver and front seat passenger. On example, injuries, resulted by the steering wheel (if the injured person localized on the driver's seat) or by car's front panel from the passengers' side can be similar and less informative for solving the question of the injured person's localization inside the car at the moment of accident.

That's why application of "traditional" methods of this question solving is not enough.

Taking to consideration mentioned above, it has become necessary to develop modern principles of complex forensic-medical and transport-trasological examination, turned to solve the question "Who occupied the driver's and passenger's place at the moment of car accident?".

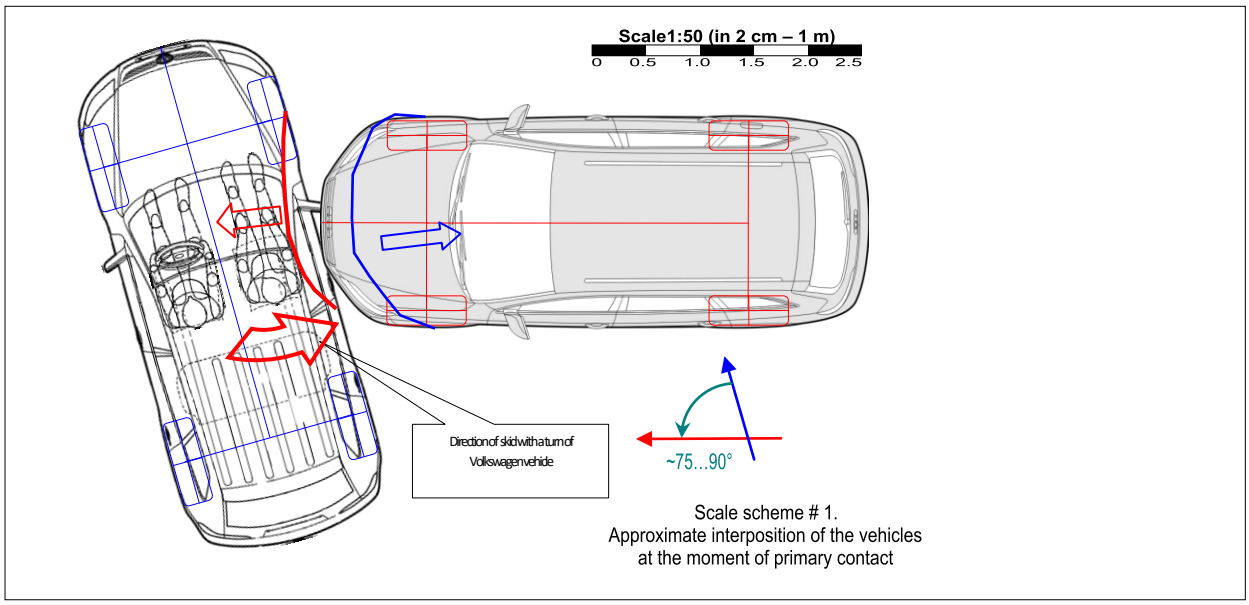
Materials and methods. Generalized forensic practice (conclusions of complex forensic-medical and transport-trasological examinations and researches) was the base of such researches; analysis of interconnection and correlation of forensic-medical and transport-trasological signs to determine the main question – who has driven the car at the moment of car accident, was the method of research.

Results and discussion. Considerable forensic practice (102 complex forensic-medical and transport-trasological examinations, in which it was necessary to determine, who from injured persons occupied the driver's place), gave a possibility to develop new approaches to solve the following question.

Conducted work shows, that any complex forensic-medical and transport-trasological examination with aim to determine who occupied the driver's and passenger's seats at the moment of accident, should be divided on successive stages, among which estimation of the bodily injuries' morphology should be not on the first place.

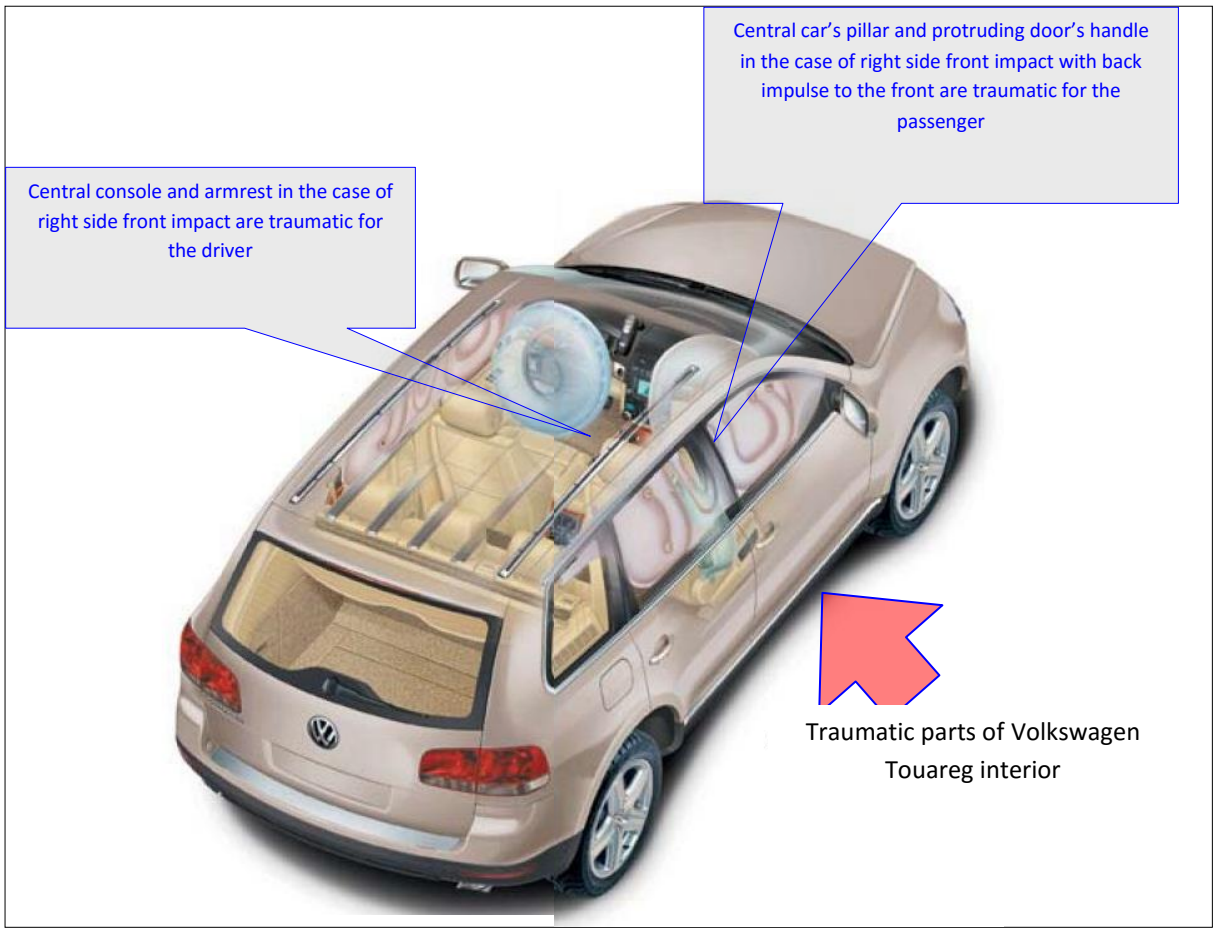
On the first stage it is necessary to determine the directions of shock-inertial displacement of the injured persons' bodies inside the car at the collision moment with another vehicle or barrier. Solving this task requires involvement of forensic- examiners – transport trasologists, who previously perform transport-trasological examination, which determines the angle of car contact, in which the injured persons localized, with another vehicle or barrier. Method of determination of this parameter was developed in details.

Determination of this contact angle reveals the direction of shock-inertial displacement of the bodies inside the car (scale scheme # 1).



Scale scheme # 1.
Approximate interposition of the vehicles at the moment of primary contact

On the second stage it is analyzed, which details of car's interior (taking to consideration determined displacement of the bodies inside the car at the moment of accident) are traumatic (details of car's interior, the contact with which could cause bodily injuries). It is obvious, that, theoretically, the same details of car's interior in one direction of body displacement inside the car could be traumatic, in another – does not contribute to the body injuries forming. Besides, it is a fact, that for the damaged car driver and passengers the traumatic details of car interior will differ (scale scheme # 2).



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On the third stage the character of bodily injuries, their localization and mechanism of development are analyzed.

On the fourth stage it is determined which of the bodily injuries (or groups of injuries) have formed after contact with appropriate details of car's interior.

Solving this question finishes the forensic research process: the person, whose bodily injuries formed after contact with corresponding to driver's seat traumatic details of car interior, is the person, who drove the car.

It has become possible to classify the conditions of bodily injuries forming in injured persons inside the car on two main types:

- situation, in which after collision of two cars, car collision with the barrier or car rollover in the result of car's interior geometry change the free space for the driver or passenger of the car considerably decreases;

- situation, in which after the car accident in the result of car's interior geometry change the free space for the persons, who were inside the car does not change considerably.

In the first situation, when the injuries on the body of suffered persons, specific for the compression of the body between the parts of the car, have formed, determination of its place inside car is no difficult – injured person localized at the place of the most considerable interior's geometry change, which has been accompanied with considerable decrease of car's interior free space.

In the second situation determination of the defined person position is more difficult and is turned to detail analysis of the directions of bodies' shock-inertial displacement, character of traumatic elements of car interior and bodily injuries of suffered persons.

All mentioned above can evidently tell us about, that solving the question, who occupied the driver's and passenger's seats at the moment of car accident, only taking to consideration the bodily injuries character of injured persons, is not always possible.

Complexity of studied mechanisms of driver's and passenger's injuring inside the car made us develop special algorithms of the forensic examiner work in the case of such type of vehicular injury, which is as follows:

a) determination the directions of shock-inertial displacement of suffered persons' bodies inside the car at the collision moment;

b) determination of traumatic details of car's interior for driver and passenger;

c) analysis of morphology and mechanism of suffered persons' bodily injuries forming;

d) determination, which of the bodily injuries of suffered persons have formed after contact with appropriate details of car's interior (what finishes the forensic research process, because answers on the question, where inside the car located appropriate injured person).

With no doubt, all discussed above does not fulfill the majority of the questions, related with injuring of suffered persons inside the car in the result of car accident, but we can hope, that mentioned recommendations can help to find the decision of many complicated situations.

From all mentioned above we can make the following **conclusions**:

1. Injury inside the modern car significantly differs from the one in the cars of older construction because of application of special passengers and driver safety means (improved seat belts, airbags, injury-preventing steering column, special sheathing and so on). Application of such protective means considerably changed the morphology of passenger's and driver's bodily injuries in the modern car

2. However, modern driver's and passenger's protective means of the car still remain as traumatic objects, which could cause considerable injuries, and in some cases – even death.

3. Solving forensic tasks, related with determination of the bodily injuries' forming and position of suffered persons inside the car, it is necessary to take to consideration not only the character and morphology of persons' bodily injuries, but the determined angle of cars contact or angle of car contact with the barrier. This angle plays a significant influence on character and mechanism of persons' bodily injuries forming, who located inside the car.

4. Except traditional, there are reliable, not studied yet, mechanisms of determination of injured persons localization inside the car: determination of the geometry inside space car change at the moment of the car accident.

5. There are mechanisms of driver's and front seat passenger's injuring, which were not described and were not studied (on example, injury in the result of car contact with the pedestrian).

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