Forensic medical evaluation of dental-jaw injuries in cases of traffic accidents

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Introduction

Traffic injuries are one of the most pressing problems of today, because, according to official statistics of the SAI of the Ministry of Internal Affairs of Ukraine, every day there are an average of 477 traffic accidents in which about 12 people die and about 100 people are injured. The number of people killed in road accidents in Ukraine fluctuated annually within 4 thousand people [13]. Accident statistics remain at about the same level today.

The main causes of traffic accidents are disregard for traffic rules, including collisions due to speeding, non-compliance with the distance, violation of maneuvering rules, collision with standing vehicles or various obstacles,
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The aim of the study was to increase the objectivity of forensic examinations by determining the criteria for assessing damage to the dental system in cases of the most common types of accidents: collision of moving vehicle with man; run over the body with a wheels or the bottom of vehicle; injury inside the vehicle on the basis of the analysis of morphological features and the mechanism of the specified damages.

Materials and methods

The objects of the study were archival materials of the municipal institution "Odessa Regional Bureau of Forensic Medical Examination" for 2015-2020, namely: 1) 30 "Expert Conclusions" on traffic accidents that were accompanied by injuries and deaths; 2) 73 "Expert conclusions" on traffic accidents that were accompanied by injuries to survivors; 3) 20 "Expert conclusions" (complex forensic medical and transport-trasological examinations on the facts of traffic accidents, which were accompanied by death and injury).

All 130 victims had injuries to the dental apparatus. The distribution of the number of all victims studied by us as a result of traffic accidents with injuries of the dental apparatus for different types of injuries is shown in table 1.

It should be noted that during forensic examinations of corpses conducted research and analysis:

- a - a description of the damage to the dental apparatus in the victims (corpses), which was made by an expert directly "at the section table";
- b - photographic images of the relevant damage;
- c - schematic images of injuries of the dental apparatus in the victims (corpses), which were made by an expert who performed a forensic autopsy;
- d - the results made by the expert who carried out autopsy of the corpse of the victim in traffic accident.

In the study of forensic examinations of victims, accused and other persons conducted research and analysis:

- a - a description of the damage to the dental apparatus in the victims, which was made by an expert who examined the victim in the accident;
- b - schematic images of injuries of the dental apparatus in the victims, which was made by an expert who examined the victim;
- c - the results of radiological examinations of the bones of the facial skeleton in the victims;
- d - dental cards of victims and other medical documentation;
- e - the results made by the expert who conducted the examination of the victim.

In the study of complex forensic and transport-trasological examinations on the facts of the accident studied and analyzed:

- a - a description of the injuries of the victims, which was made by an expert directly "at the section table", or during the examination of the surviving victim by an expert;
- b - photographic images of bodily injuries in the victims;
- c - schematic images of bodily injuries in the victims, which were made by an expert who performed a forensic autopsy or examined a living person;
- d - the results of forensic examination of objects that were seized during a forensic autopsy;
- e - results of X-ray examinations of victims (radiography, CT and MRI examinations) - during the examination of living persons;
- f - results of the commission of experts.

The research results are processed by standard methods of variation statistics. Anthropometric, morphometric, photographic, radiological and statistical research methods are used in the work.

Results

During the forensic analysis of injuries of the dental system in cases of various types of traffic accidents, the following was established. In cases of collision moving

| № | Type of injury | Number of victims |
|---|---------------|------------------|
| 1 | collision of moving vehicle with man | 40 |
| 2 | inside the vehicle | 62 |
| 3 | run over the body with a wheels or the bottom of vehicle | 21 |
| Total | | 123 |

Table 1. Distribution of the number of victims who received injuries of the dental apparatus for different types of injuries.

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Table 2. Distribution of the nature of injuries of the dental system depending on the types of injuries in the number of cases.

| №  | The nature of the damage | Injury due to collision of moving vehicle with man | Injury inside the vehicle | Injury due to run over the body with a wheels or the bottom of vehicle |
|----|--------------------------|-----------------------------------------------|--------------------------|-------------------------------------------------------------|
| 1  | Fractures of tooth crowns | 11                                            | 38                       | Massive destruction                                         |
| 2  | Traumatic dislocations of teeth | 14                                         | 8                        | Massive destruction                                         |
| 3  | Fractures of the lower jaw | 10                                           | 7                        | Massive destruction                                         |
| 4  | Fractures of the upper jaw | 5                                            | 9                        | Massive destruction                                         |
| Total |                        | 40                                           | 62                       |                                                             |

In the case of injuries to the victim by run over the body with a wheels or the bottom of vehicle, all cases concerned the rolling of the wheel (or injury to the bottom of the car) of the victim's head. In these cases, we encountered only gross damage to the dental apparatus in the form of mult fractures of the jaws, the destruction of the dentition, which was always accompanied by the same gross damage to the bones of the skull and brain.

The distribution of the nature of the damage depending on the conditions of injury is shown in table 2.

Discussion

Thus, the analysis of archival material of the municipal institution "Odessa Regional Bureau of Forensic Medical Examination", including materials of the departments: forensic medical examination of corpses, forensic medical examination of victims, accused and others, as well as forensic medical examinations of injuries of the dental apparatus in automobile injury to 130 people, indicates that in the most common types of traffic accidents (collision of moving vehicle with man, injury inside the vehicle, run over the body with a wheels or the bottom of vehicle) damage to the dental system is quite common.

Of the 130 cases, these injuries were most common in victims of the first two types of traffic accidents and are fractures of dental crowns (49 people), traumatic dislocations of the teeth (usually 1st - 2nd) (22 people), closed and open fractures of the mandible (usually in the area of the body or corners of the jaw) (17 people), closed fractures of the upper jaw bones LeFort (LeFort, 1901) type II and III (14 people) and various soft tissue injuries of the face.

We believe that damage to the dental system when the...
car comes into contact with a pedestrian could be formed either by throwing the body on the car, or by falling the body on the road surface, which coincides with the results of research P.V. Plevinskis [11, 21, 22, 23].

Damage to the dental system due to injury in the car could occur when the person comes into contact with parts of the car, usually in frontal collisions, namely with the steering wheel, front panel, front windshield. This assumption of the mechanism of damage is consistent with the results of other similar studies [1, 5, 12, 14, 20, 24, 25].

The use of modern methods of control and diagnosis of changes in dental status and maxillofacial area in general helps to increase the level of objectification of the consequences and disorders arising from traffic accidents [3, 4, 5, 8, 12, 24]. The relevant task is to develop criteria for assessing the state of the dental system (level of dental health) before the direct impact of traumatic factors on the victim’s body, and after completion of all necessary iatrogenic manipulations during rehabilitation after a traffic accident - thus, it will be possible to achieve proper stratification of the parameters of loss of dental health, differentiating them into those associated with previous violations of dental status, those that are directly related to the fact of injury, those associated with the residual compensation available at the time of injury range, and those that depend on the effectiveness of the chosen method of treatment [10, 20, 25, 27].

Specific forensic dental criteria can be used as reference points for assessing changes in dental status as a result of traffic accidents, the design of which provides unambiguous interpretation and clear identification orientation [2, 3, 5, 6, 7, 9, 10, 28].

Based on specific forensic dental criteria, it is possible to develop clear protocols for assessing the loss of dental health in the future, which can be used as additional parameters to verify the severity of the injury and the predicted effectiveness of dental rehabilitation.

Conclusions

1. Analysis of morphological features and mechanism of damage to the dental system of victims in cases of the most common types of traffic accidents (collision of moving vehicle with man; run over the body with a wheels or the bottom of vehicle; at an injury inside the vehicle) and determination criteria by which it is advisable to assess these injuries, increase the objectivity and accuracy of forensic examinations and increase the provability of expert results.

2. According to the degree of severity of damage to the dental apparatus in traffic accidents, it is advisable to investigate only in cases of isolated injuries. In this case, fractures of the jaws, regardless of their nature, should be assessed as moderate injuries according to the criterion of long-term health disorders; crown fractures, traumatic tooth dislocations, and soft tissue contused wound should be considered minor injuries that have caused short-term health problems. Abrasions, bruises should be classified as minor injuries.

3. It is impractical to separately determine the injury of the dental system in cases of run over the body with a wheels or the bottom of vehicle by its severity - in these cases we always deal with gross, massive destruction of bones of the victim’s skull, which automatically qualifies as serious injuries.

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підвищення об'єктивності виконання судово-медичних експертиз шляхом визначення критеріїв оцінювання ушкоджень зубощелепного апарату у випадках найбільш розповсюджених видів ДТП

Відомостей щодо диференційної діагностики тілесних ушкоджень людини (наприклад, відомостей про ушкодження залежно від виду травми) недостатньо.

При цьому, для підвищення об'єктивності у виконанні судово-медичних експертиз шляхом визначення критеріїв оцінювання ушкоджень зубощелепного апарату, є необхідною постановка власного дослідження ретроспективно-експериментального типу, яке може включати такі етапи:

1. Визначення критеріїв оцінювання ушкоджень зубощелепного апарату у випадках найбільш розповсюджених видів ДТП.
2. Ретроспективний аналіз умов, умовного-систематичного аналізу та становлення умов у процесі відповідності ушкоджень зубощелепного апарату, а також методик визначення критеріїв ушкоджень зубощелепного апарату у випадках найбільш розповсюджених видів ДТП.
3. Підготовка та обробка матеріалів дослідження, включно з архівними даними.
4. Відомості про різні види і тягарі травм, що викликають ушкодження зубощелепного апарату у випадках найбільш розповсюджених видів ДТП.
5. Методичні рекомендації з метою підвищення об'єктивності виконання судово-медичних експертиз шляхом визначення критеріїв оцінювання ушкоджень зубощелепного апарату у випадках найбільш розповсюджених видів ДТП.

У процесі виконання дослідження виявлено, що наявність ушкоджень зубощелепного апарату у випадках дорожньо-транспортних подій є необхідним фактором для визначення критеріїв оцінювання ушкоджень зубощелепного апарату у випадках найбільш розповсюджених видів ДТП.

У результаті дослідження було визначено, що у випадках дорожньо-транспортних подій, що призводять до ушкоджень зубощелепного апарату, наявність ушкоджень зубощелепного апарату є визначальним фактором для підвищення об'єктивності виконання судово-медичних експертиз шляхом визначення критеріїв оцінювання ушкоджень зубощелепного апарату у випадках найбільш розповсюджених видів ДТП.

При цьому, використання методичних рекомендацій з метою підвищення об'єктивності виконання судово-медичних експертиз шляхом визначення критеріїв оцінювання ушкоджень зубощелепного апарату у випадках найбільш розповсюджених видів ДТП, є необхідним фактором для підвищення об'єктивності виконання судово-медичних експертиз шляхом визначення критеріїв оцінювання ушкоджень зубощелепного апарату у випадках найбільш розповсюджених видів ДТП.
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оцінювати як тілесні ушкодження середнього ступеня тяжкості за критерієм тривалого розладу здоров’я: переломи коронок, травматичні вивихи зубів, забійні рані м’яких тканин слід оцінювати як легкі тілесні ушкодження, що спричинили короткочасний розлад здоров’я. Садна і синця слід відносити до легких тілесних ушкоджень. Таким чином, недоцільно окремо визначати за ступенем тяжкості травму зубощелепної системи у випадках перекочування через голову колеса автомобіля або травмування днищевою частиною - у цих випадках ми завжди маємо справу із грубими, масивними руйнуваннями кісток усього черепа потерпілого.

Ключові слова: тілесні ушкодження, зубощелепний апарат, дорожньо-транспортна подія, автомобільна травма, судово-медична експертиза.