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FORENSIC MEDICAL ASPECTS OF MANDIBULAR INJURIES

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Annotation

The article is devoted to the forensic medical examination of injuries of the lower jaw. According to the results, it was established that theperelomas of the mandibular body are divided into fractures of the chin region (within the range from canine to canine), lateral part (within the range from the canine to the second molar); angular area (the area between the second and third molar and the socket of the third molar). In the area of the angle, the fracture more often passes through the socket of the eighth tooth. Four variants of the mechanism of fracture of the lower jaw have been distinguished: bending, shifting, compression, tearing.

Key words

mandible, injuries, types, mechanism of formation, forensic medical examination.

Topicality. According to the WHO, the number of traumatic injuries is still increasing and in 2015 almost 5 million people suffered fatal injuries.

Most often, injuries of the maxillofacial region occur as a result of traffic accidents, street and domestic injuries and wounds in the zone of military conflicts [9,11].

A correct expert assessment of the severity of harm to health is currently a complex interdisciplinary problem [2].

Any injury to the jaws leads to combined damage to both the hard tissues of the tooth and the musculoskeletal apparatus [6,7].

Despite the fact that jaw trauma, at first glance, is a localized injury, it directly or indirectly affects the general state of health, which is determined by the nature of complications, such as changes in the appearance and integrity of the smile, difficulty pronouncing some sounds, deterioration of masticatory function [8,12].

Jaw trauma has numerous manifestations. Acute and chronic jaw trauma are distinguished according to the course. With a simultaneous strong impact on the jaws, an acute tooth injury occurs, which can result in cracks, dislocation, fracture

of the jaws. Chronic trauma of hard tissues occurs due to prolonged exposure to a weak irritant, both mechanical and chemical [3,10].

The clinical course of jaw injury is aggravated in the presence of combined injuries caused by dislocation and fracture of the jaws at the same time. Fractures of the alveolar process of the jaw, in which several teeth are damaged, are extremely difficult [4,5].

According to forensic medical practice, jaw injuries account for an average of 2.4% of maxillofacial trauma, and mandibular fractures account for 70 to 85% of all facial fractures of non-gunshot origin [1].

The aim of the study was to establish the types and assess the mechanisms of mandibular injuries.

Materials and methods of research. The materials for the study were the conclusions of forensic medical examinations regarding the examination of living persons conducted in the outpatient department of the Tashkent city branch of the Republican Scientific and Practical Center for Forensic Medical Examination of the Republic of Uzbekistan in the period from 2020 to 2023.

Using a special computer program using the questionnaire cards developed by us, including classification parameters (circumstances of the case, localization, nature, cause, mechanism, prescription and its impact on the outcome), 246 conclusions of forensic medical examinations were examined, including (88.9%) primary, (5.8%) additional and (5.2%) repeated (group I).

A retrospective analysis of 146 case histories and outpatient records of patients with jaw injuries who were on inpatient and outpatient treatment in the Department of Oral and Maxillofacial Surgery of the Clinic of the Tashkent Dental Medical Institute (group II) was also carried out.

In the comprehensive multivariate analysis of the data obtained, logical, dialectical, comparative methods were used, as well as the collection and study of single facts, monographic descriptions and statistical methods.

When examining patients who were treated in the hospital, clinical research methods were used (study of the history of the disease, life, examination, palpation, functional tests) and paraclinical methods (plain and targeted radiography, computed tomography of the jaws, hematological and biochemical tests of blood and urine).

Results of the study. Fractures of the body of the lower jaw are divided into fractures of the chin region (ranging from canine to canine); lateral region (within the range from the canine to the second molar); the area of the angle (the area between the second and third molar and the socket of the third molar). In the area of the angle, the fracture often passes through the socket of the eighth tooth. Four

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variants of the mechanism of mandibular fracture have been identified: bending, shifting, compression, tearing.

When establishing the mechanism of jaw injuries, there was a clear predominance of blow to the jaw area in both groups (94.7% in group I, 94.3% in group II). Although in some cases there was a separation of 8 (2.2%), a shear of 5 (1.4%), a compression of 4 (1.1%), and an inflection of 2 (0.6%) (Table 1).

Table 1.

Mechanism of damage

	Group I		Group II		Altogether
Type of mechanism	Mandible	Both jaws	Mandible	Both jaws	
Blow	196	9	132	4	341
Shift	2		3		5
bend	1		1		2
compression	2		2		4
breakaway	5	1	2		8
Total	206	10	140	4	360

The study of the types of mandibular fractures revealed that in unilateral fractures, the picture was as follows: fracture in the lateral part of the mandibular body 28.8%(61), fracture in the area of the angle 40.1%(85), fracture in the chin region 7.1%(15), fractures of the branch proper 24.1%(51). By group, the following was noted: in group I, a fracture in the lateral part of the body of the mandible was 28.3% (34), a fracture in the area of the angle was 37.5% (45), a fracture in the chin region was 8.3% (10), fractures of the branch proper 25.8% (31); in group II, a fracture in the lateral part of the mandibular body was 29.3%(27), a fracture in the area of the angle was 43.5%(40), a fracture in the chin region was 5.4%(5), and fractures of the branch proper were 21.7%(20). Consequently, fractures in the area of the angle and in the lateral part of the mandibular body prevailed in both groups (Table 2).

Table 2.

Types of mandibular fractures

Type of fracture	Group I	Group II	Altogether
A) Fracture in the lateral part of the mandibular body	34	27	61
B) Fracture in the area of the angle of the	45	40	85

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lower jaw			
C) Fracture of the lower jaw in the chin region	10	5	15
E) Fractures of the mandibular branch itself	31	20	51
D) Double, bilateral, multiple fractures of the lower jaw	96	52	148
G1) Fracture of the condylar process on one side and the body of the jaw on the opposite side	32	8	40
G2) Bilateral fracture in the chin region	4	6	10
G3) Bilateral fracture of the lateral part of the body of the lower jaw	38	18	56
G4) Double fracture of the lateral part of the body of the lower jaw on one side	22	20	42

In case of bilateral fracture of the mandible, the types are distributed according to the following: fracture of the condylar process on one side and fracture of the jaw body on the opposite side 27.0%(40), bilateral fracture in the chin region 6.8%(10), bilateral fracture of the lateral part of the mandibular body 37.8%(56), double fracture of the lateral part of the body of the lower jaw on one side 30.4%(42). condylar process on one side and jaw body on the opposite side 33.3%(32), bilateral fracture in the chin region 4.2%(4), bilateral fracture of the lateral part of the mandibular body 39.6%(38), double fracture of the lateral part of the mandible body on one side 22.9%(22); Group II - fracture of the condylar process on one side and the jaw body on the opposite side 15.4%(8), bilateral fracture in the chin region 11.5%(6), bilateral fracture of the lateral part of the mandibular body 34.6%(18), double fracture of the lateral part of the mandible body on one side 38.4%(20). Thus, in group I, bilateral fracture of the lateral part of the mandibular body and fracture of the condylar process on one side and the jaw body on the opposite side prevailed, and in group II, a double fracture of the lateral part of the mandibular body on one side and a bilateral fracture of the lateral part of the mandibular body prevailed.

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Discussion of the results. Thus, the lower jaw, having an arcuate shape, under mechanical stress, experiences tension of bone tissue in its most curved or thinnest parts. Such within the lower jaw are the base and neck of the condylar process, the angle, the area of the chin foramen and canine, and the chin region. It is in these most "weak" places that the lower jaw breaks due to its bending.

Fracture in the lateral part of the mandibular body, while fractures often occur at the site of force application, i.e. they are direct. The clinical manifestation of a unilateral fracture of the mandible of any localization, including the lateral part of the jaw body, is largely predetermined by the direction of the fracture plane and its location in relation to the median line: the farther the fracture plane is located from it, the more significant the displacement of fragments (Fig. 1).

Rice. 1. Fracture in the lateral part of the lower jaw body.

Fractures of the lower jaw were most often observed in the area of its angle. Here the fracture was more often direct, less often indirect. For the displacement of fragments, the localization of the fracture gap is of no small importance. If it passes anteriorly from the masseter and medial pterygoid muscles, the displacement of the fragments is most often significant. If the fracture gap is located inside the tendon sheath formed at the attachment site of these muscles, the displacement of the fragments is less pronounced or absent. In the area of the angle, the fracture passes either between the second and third molars, or through the socket of the eighth tooth, which is located more often on a small fragment, or behind the third molar (Fig. 2).

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Rice. 2. Fracture of the angle of the lower jaw.

When the fracture line passes between the central incisors vertically down to the lower edge of the chin region, fragments of almost the same size are formed, on which the same number of muscles are attached. These fragments are in a state of dynamic equilibrium, and no gross displacement is observed. However, due to the power predominance of the masticatory muscles over the medial pterygoid muscles, in the presence of one movable point of support in the area of each fragment (articular head), there is a slight displacement of the lower edge of the jaw body outward. Therefore, at the lower edge of the chin, the fragments diverge somewhat (Fig. 3).

Rice. 3. Fracture of the lower jaw in the chin region.

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Injuries of the condylar process occupy the second place in the structure of fractures of the lower jaw. This is due to the fact that when the chin is hit from front to back, the neck of the condylar process of the lower jaw breaks, and in the case of force applied to the lateral part of the body, branch or chin, the base of the condylar process along with the angle of the lower jaw is the most vulnerable. The mechanism of fracture in both cases is an inflection. In case of a fracture of the condylar process, the force of the impact, the direction of the acting force, the inclination of the fracture plane (from outside to inside or from inside to outside) and the position of the lower jaw at the time of exposure to the traumatic force play a significant role in the displacement of the fragments. The displacement of the smaller fragment occurs due to the contraction of the external pterygoid muscle (Fig. 4).

Rice. 4. Fracture of the condylar process.

A bilateral fracture of the lower jaw means two fractures on different halves of it. A double fracture of the lower jaw is two fractures on one half of the jaw. Multiple fracture of the lower jaw is a combination of bilateral and double fractures.

In bilateral fracture of the lateral part of the mandibular body, the nature of the displacement of the fragments is largely determined by the location of the fracture plane and the direction of its bevel, which depends on the direction and force of the blow (Fig. 5). If the fracture line between the premolars passes vertically in relation to the sagittal axis, the central fragment can significantly descend and shift posteriorly, tilt the alveolar part forward, and the lateral fragments can rise up. Their alveolar part turns inward, and the base of the jaw body turns outward. The fragments are mobile, ruptures of the mucous membrane of the alveolar

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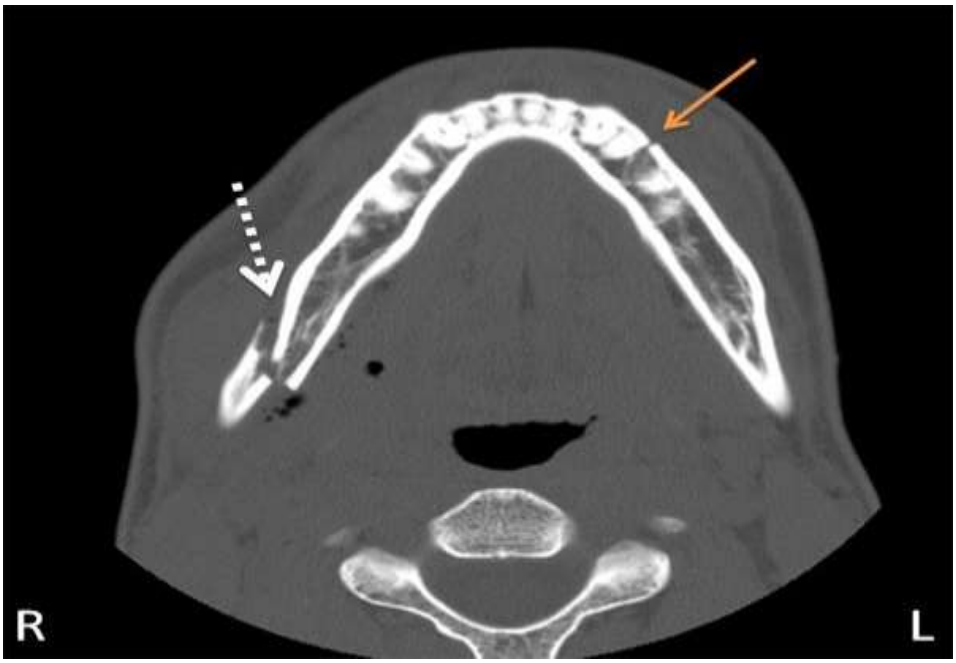
process are noted. If the fracture plane has an oblique direction from front to inside and back (on the outer compact plate, the fracture line is located closer to the midline than on the inner one), it is possible to displace the fragments in the horizontal plane, i.e. the fragments crawl on top of each other along the surface of the bone fracture. The posterior displacement of the middle fragment will be more pronounced, and the inward rotation of the lateral fragments of the alveolar part will be more significant.



Rice. 5. Bilateral fracture of the lateral part of the body of the lower jaw

Conclusion. Fractures of the mandibular body are divided into fractures of the chin region (within the range from canine to canine); lateral part (within the range from the canine to the second molar); the area of the angle (the area between the second and third molar and the socket of the third molar). In the area of the angle, the fracture more often passes through the socket of the eighth tooth. Four variants of the mechanism of fracture of the lower jaw have been distinguished: bending, shifting, compression, tearing.

Therefore, when examining injuries to the lower jaw, it is necessary to take into account its anatomical and topographic features. Such within the lower jaw are the base and neck of the condylar process, the angle, the area of the chin foramen and canine, and the chin region. It is in these "weakest" places that the lower jaw breaks due to its bending. At the same time, there are various options for a fracture of the lower jaw, which must be taken into account when conducting forensic medical examinations.

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