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# Characteristics of Dental Damage

***Islamov Shavkat Erjigitovich [1], DSc, Associate Professor***
***Nazirov Sirojiddin Nazirovich [2], PhD, Associate Professor***
***Karimov Nodirbek Bakhtiyorovich [1]***
***Khazratov Bekmurod Sherboevich [1]***
*[1] Samarkand state medical university, Samarkand, Uzbekistan*
*[2] State Educational Institution "Institute of Postgraduate Education in Healthcare" of the Republic of Tajikistan, Dushanbe, Tajikistan*

**Annotation:** The article is devoted to the problem of tooth dislocations, which are more common in people of working age, mainly in men. The displacement of a dislocated tooth depends on the location of the active force. When a blow is applied to the front surface of a tooth, the crown of the tooth moves back and the apex of the root moves forward. A blow to the lateral surface of the tooth changes the direction of the crown in the direction of the impact, and the root in the opposite direction. Most often, dislocations occur in the incisors of the upper jaw, the roots of which are softer than those of other teeth. Fracture of the alveolar wall often occurs with dislocations of teeth located on the lower jaw. For dislocations of chewing teeth, a significant external force is required, the higher the serial number of the tooth in the row.

**Keywords:** teeth, dislocations, types, localization, mechanism of formation.

**Introduction**. Oral health is one of the main indicators of overall health, well-being and quality of life. WHO defines oral health as “a condition characterized by the absence of chronic oral and facial pain, oral and throat cancer, oral infections and ulcers, periodontal (gum) disease, dental caries, tooth loss and other diseases and conditions that limit a person’s ability to bite, chew, smile and speak and their psychosocial well-being” (WHO, 2018) [9].

Oral and dental trauma is an impact-related injury to the teeth and/or other hard or soft tissues in and around the mouth and oral cavity [6]. The global prevalence of trauma to all teeth (primary and permanent) is approximately 20% [7]. Causes of oral and dental trauma may include oral health conditions (malocclusion, in which the upper jaw significantly overlaps the lower jaw); environmental factors (e.g. unsafe playgrounds and schools); high-risk behavior; and violence [3,4,5]. Treatment of such injuries is expensive and lengthy and may sometimes result in tooth loss with consequences for facial development, psychological development, and quality of life [1,2].

According to forensic medical practice, dental damage accounts for an average of 2.4% of maxillofacial trauma, and fractures of the lower jaw account for 70 to 85% of all non-gunshot facial fractures [8].

**The aim of the research** was to establish the type and nature of dental fractures.

**Material and methods of the study**. The object of the study was the materials of the forensic medical examination of cases of dental damage carried out 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 2022. Using a special computer program using the questionnaire cards developed by us, including classifying parameters (circumstances of the case, localization, nature, cause, mechanism, duration and its influence on the outcome), 237 forensic medical examination reports were examined, including 225 (94.9%) primary, 8 (3.37%) additional and 4 (1.68%) repeated (Group I).

A retrospective analysis of 152 medical records and outpatient cards of patients with jaw injuries who were treated in the inpatient and outpatient department of maxillofacial surgery of the Tashkent Dental Medical Institute (Group II) was also conducted. T

The following research methods were used: follow-up, clinical, macroscopic, stereomicroscopic, radiological, statistical.

**Results of the study and their discussion.** The obtained results indicate that in the absolute majority of cases the injury was received as a result of a fight 177 (45.5%), a car accident 80 (20.56%) and a fall 54 (13.88%). There were also cases of injury during sports, tooth extraction, etc. When analyzing by groups, the number of hospitalized patients with dental injuries due to falls and tooth extraction was 15 (9.86) and 10 (6.57%), respectively, than those who underwent examination 19 (8.02%) and 14 (5.9%). Although the number of those examined due to dental injuries in a car accident was also higher 54 (22.78%) than among persons of group II 26 (17.1%). Both groups had a similar picture in terms of the circumstances of the injury.

A study was conducted to establish dental damage in both groups. It was revealed that the prevalence of fracture of only tooth enamel (enamel chipping) was 45.76% (178) and fracture of the tooth crown without damage to the pulp was 20.3% (79), respectively, in both study groups.

The most frequently detected were tooth crown fractures without pulp damage, as well as tooth root fractures (9.77%, 38), tooth luxation (5.4%, 21), tooth crown fractures with pulp damage (4.11%, 16), complete tooth luxation (3.86%, 15), multiple tooth fractures (3.34%, 13), tooth root and crown fractures (2.83%, 11), tooth intrusion or extrusion (2.31%, 9), and unspecified tooth fracture (1.8%, 7). Although the percentage of damage in Group I was clearly dominated by the following types: enamel fracture only, crown fracture without pulp damage, and root fracture.

When establishing the mechanism of tooth damage, a clear predominance of impacts to the teeth in both groups was noted, 58.5% (in the 1st group - 66.24%, in the 2nd group 46.05%). Although bending was noted in general 38.04% (in the 1st group - 29.95%, in the 2nd group 50.65%), and in some cases a shift of 3.59% (in the 1st group - 3.79%, in the 2nd group 3.28%).

Data on establishing the mechanism of impact were clarified only in both groups. In particular, it was found that in the absolute majority of cases the impact was inflicted on the upper jaw, less on the lower jaw.

The most common types of blows were punches 48.59% (189) (in group 1 - 57.8%, in group 2 - 34.21%), less common were blows with a stick, reinforcement bars 10.54% (41) (in group 1 - 10.12%, in group 2 - 11.18%) and other objects 32.39% (126) (in group 1 - 24.47%, in group 2 - 44.74%). Also found were blows with brass knuckles 3.34% (13) (in group 1 - 2.95%, in group 2 - 3.95%), and blows with a bat 5.14% (1) (in group 1 - 4.64%, in group 2 - 5.92%). As can be seen, in group 1 there is a clear predominance of punches over the others.

**Fracture of only tooth enamel**. This damage occurs in two variants: in the form of cracks that do not lead to a violation of the anatomical integrity of the tooth, and in the form of enamel chips that lead to it. A fracture of only tooth enamel can be combined with a bruise (concussion) of the tooth.

When part of the enamel is chipped, the patient usually does not experience pain in the tooth, but in some cases, a quickly passing pain from cold or sweet may occur.

During examination, half of the victims have enamel cracks, most often localized at the cutting edge, mainly in the superficial layers of the enamel. However, the main force of the impact during a bruise and fracture of the enamel is transmitted to the periodontium in the area of the root apex, which may result in a rupture of part of the periodontal fibers or its ischemia due to tissue edema or compression of the periodontal tissue by a hematoma.

**Fracture of the crown of the tooth without damage to the pulp**. With this type of damage, the fracture line passes through the dentin.

Most often, this is an oblique fracture of the medial angle of the crown, less often of the distal angle, and very rarely the fracture line runs parallel to the cutting edge or along the axis of the tooth. Enamel usually breaks off along the enamel-dentin border. Depending on the size of the broken part of the tooth crown, the pulp is at different distances from the fracture line. Sometimes, after a tooth injury, patients consult a dentist due to darkening of the tooth crown, the appearance of a fistula on the gum, that is, due to inflammation of the periodontal tissues of the injured tooth. Pulp necrosis due to a rupture of the vascular-nerve bundle in the area of the apical opening with a crown fracture within the dentin is rare, since the breakage of a part of the tooth crown dampens the force of the impact that could be transmitted to the root and periodontium.

**Fracture of the crown of the tooth with exposure of the pulp**. Fracture of the crown with exposure of the pulp is quite common. According to various sources, it is the fourth most common type of dental injury. As a rule, patients seek help on the day of the injury or the next day. Exposure of the pulp can be pinpoint or complete.

The color of the injured pulp depends on the time of the patient's visit. Immediately after the injury, it is bright red, and a few days after the injury, it acquires a grayish tint. When probing, the pulp is sharply painful and may bleed. Percussion is painful due to the injury of the periodontal tissues, the pain may go away over time if the periodontal tissue does not become infected. The tooth is immobile. An X-ray examination allows you to clarify the degree of root development and excludes its fracture.

If timely assistance is not provided, morphological signs of inflammation are detected in the pulp within one hour, acute pulpitis may develop within 3 days, and chronic pulpitis may develop within 7 days or more.

Criteria for assessing the healing of a damaged tooth:

- clinical (absence of pain, the tooth is stable, percussion is painless, the mucous membrane in the projection of the tooth roots is without pathological changes).
- radiological (formation of a dentinal bridge during pulp amputation, root growth in length, narrowing of the root canal, closure of the root apex, reduction in the volume of the tooth cavity during indirect and direct pulpotherapy).

A complete fracture (break) of the tooth crown is possible.

When the crown of a permanent formed tooth breaks off without disruption of the gingival attachment, the presence of a broken tooth crown is noted. If the tooth crown fracture occurs at the level of the tooth neck with disruption of the gingival attachment, then a mandatory consultation with a dentist is necessary to determine the development of complications.

**Tooth root fracture.** The prevalence of root fracture is 0.2-7% of traumatic dental injuries. The fracture can be independent or in combination with damage to the hard tissues of the tooth and exposure of the pulp. Root fracture can be combined with a fracture of the alveolar process. Root fracture can occur at different levels of the anatomical length of the tooth root: apical, middle or cervical.

There are different types of tooth root fractures: transverse, longitudinal, oblique, combined. They can be with or without displacement of tooth root fragments.

In the early stages after the injury, the victim complains of aching pain and/or pain when biting the tooth. The intensity of pain varies among patients. Sometimes he is concerned about tooth mobility, a change in the position of the tooth crown in the dental row when the fragments are displaced. In case of a root fracture, the location of the fracture line, its direction, displacement of fragments, the condition of the periodontium and alveolar process are determined radiologically.

Root fractures are rare and severe consequences of dental injuries. Such injuries affect the cementum, root dentin, pulp and periodontium. More often, such an injury occurs after adolescence, when the

roots of the incisors are formed, since at an earlier age the alveolar bone is more elastic and this cushions the impact.

In case of root fracture in the apical third, provided that there is no rupture of the pulp at the fracture site, normal indicators of pulp viability, no displacement of fragments and tooth mobility, splints are applied with the block capture of 2 adjacent teeth on the right and left. It is necessary to control the viability of the pulp after 1, 6, 12 months. If the root fracture occurs in the apical part of the root and a rupture of the pulp is detected, the coronal fragment is usually filled, and the apical fragment is removed. In case of root fracture in the middle third, moderate tooth mobility, its sensitivity to percussion and biting are noted.

**Fracture of the crown and root of the tooth**. This type of damage is characterized by complaints about the mobility of part of the tooth, a painful reaction to various types of irritants. During examination, mobility of part of the tooth is revealed, the crown of the tooth is sometimes colored pink, the cavity of the tooth is open.

The X-ray shows a fracture line that passes through the crown to the root of the tooth at different depths. If the fracture line of the root is determined only in the cervical third of the root, then the crown fragment is removed and endodontic treatment of the tooth is performed.

**Conclusion.** Thus, cases of tooth fractures were mainly observed in people of working age, more often in males. Tooth fractures can occur in the crown and neck area, as well as in the root area. The strength properties of teeth increase depending on the order of their arrangement, as a result, fractures of large chewing teeth are relatively rare and occur mainly with fractures of the jaw or its alveolar process. Tooth fractures can be transverse, oblique and vertical relative to the axis of the tooth. The neck of the tooth is the weakest part of the crown in terms of strength, and fractures that occur here are usually complete.

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