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## Research Article

# FORENSIC ASSESSMENT OF THE NATURE OF DENTAL INJURIES

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## ABSTRACT

According to the analysis of the conclusions of forensic medical examinations of the teeth injuries, it has been established that the trauma of the teeth was caused by a strong blow of a blunt solid object on the tooth crown. The frontal teeth of the upper jaw and, less frequently, the lower jaw were affected. Tooth fractures were localised to the crown, neck and root of the tooth. Injuries to the maxillary central incisors were the most common.

## KEYWORDS

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

## INTRODUCTION

The current global prevalence of injuries to all teeth (deciduous and permanent) is around 20% (Petti S, Glendor U, Andersson L., 2018) [10]. Causes of oral and dental injuries can include oral conditions

(malocclusion in which the upper jaw significantly overlaps the lower jaw); environmental factors (e.g. unsafe playgrounds and schools); high-risk behaviour; and violence (Glendor U., 2009) [6,7].

Tooth injuries represent an average of 2.4 % of maxillofacial trauma, according to forensic medical practice, and mandibular fractures represent 70-85% of all non-facial fractures (Moiseychuk S.N., 2004) [4]. Tooth damage can occur due to various pathological conditions, both in the oral cavity [1,8] and as a result of associated pathologies [5,9].

At the same time, the introduction into clinical practice of modern methods of diagnosis and treatment of injured patients with dental injuries significantly affects the time of temporary disability of patients and the outcomes of rehabilitation [2,4]. This necessitates the development of new approaches to the evaluation of forensic criteria for the severity of dental injuries, taking into account both the immediate and long-term results of their outcomes.

**The aim of the study** was to identify the types and nature of dental lesions.

#### **MATERIALS AND METHODS OF INVESTIGATION**

A retrospective analysis of 30 forensic medical examination reports conducted in the outpatient department of the Tashkent city branch of the Republican Scientific and Practical Center of Forensic Medicine in 2019-2022 was conducted as material. Generally accepted research methods were used - macroscopic, radiological, statistical research methods.

#### **STUDY RESULTS**

Blunt trauma to the teeth was identified in all the cases studied. There were 24 males (80.0%) aged 12 to 62 years and 6 females (20.0%) aged 18 to 45 years. From the anamnesis they occurred as a result of a strong blow of a blunt, hard object against the crown of the tooth. Frontal group of upper jaw teeth was damaged more often (76,67%) and less often lower jaw teeth

(23,33%). Tooth fractures were localised to the crown, neck and root of the tooth. Crown-root fractures of the teeth were very rare. Also, in addition to tooth fractures, cracks of the teeth were found in 2 cases, i.e., fracture of the crown of the tooth without tearing off part of it.

It was found that injuries mainly occurred to the central incisors on the upper jaw (93.33%). Also depending on the size of the broken off part of the crown of the tooth, we distinguish: - Fracture of tooth crown within enamel (21.5%); Fracture of tooth crown within dentin (with and without opening of tooth cavity) (24.7%); Fracture of tooth crown (54.8%).

The examination revealed that the crown fracture most often occurred along an oblique line, i.e. at an angle to its incisal edge. It should be noted that in some cases (13.33%) crown fractures were caused by anomalies in tooth position and bite, as well as some dental hard tissue malformations (fluorosis, enamel hypoplasia, etc.).

In the case of crown fractures in particular, the victims complained about tooth pain caused by thermal stimuli or when eating. The most common complaints, however, are aesthetic defects or trauma to the soft tissues caused by the sharp edge of the crown defect. Examination reveals a change in the shape of the crown of the tooth, there is often damage to the mucosa of the lip, and the tooth is relatively stable. In 66.67% of cases there are signs of acute traumatic periodontitis. On radiological examination, a combination of crown fracture and root fracture was observed in 16.67%.

And with crown fractures within the dentin without opening the tooth cavity, the examinees complain of pain in the tooth from mechanical and thermal stimuli. Examination reveals a defect in the crown of the tooth

and changes in its shape. In some cases (13.33%), when the crown is fractured, the pulp is seen as a pink spot through a thin layer of preserved dentin. When scraping the fracture surface with a probe, pain is noted. The tooth is stable and painful on percussion (traumatic periodontitis). A combination of crown fracture and root fracture was observed on x-ray in 6.67% of cases.

It was noted that when the crown of a tooth was fractured within the dentin with the opening of the patient's tooth cavity, after consultation with the dentist, signs of acute traumatic pulpitis were revealed.

A complete breakage of the crown of the tooth was diagnosed both by examination of the victim and by radiological examination. As with X-rays it is possible to assess the condition of the root of the tooth and exclude its fracture.

Depending on the direction of the tooth root fracture line, oblique, longitudinal, transverse and splintering were distinguished. Root fractures in the lower (closer to the neck), middle and upper (closer to the apex) thirds were also distinguished according to their localisation. Root fractures, like all fractures, were either non-displaced or displaced. In the latter case, the root fracture was sometimes combined with an incomplete dislocation of the tooth.

The damage (fracture) to the root of the tooth was determined on the basis of the examiner's examination and radiological data. Most often after injury, the victim complains of pain in the tooth when biting, and percussion of the tooth is painful. At the same time, tooth mobility depended on the location of the fracture - the closer the root fracture to the neck of the tooth, the greater the degree of mobility of the crown of the tooth. Radiological examination revealed the

disturbance of the root integrity, the localisation and direction of the fracture, the presence of fragment displacement, etc. In this case the root fracture line is more clearly defined on repeated X-ray examination one week after injury.

Almost a quarter of the cases involved combined trauma, i.e. a combination of two or more types of dental trauma. The most common types of combined dental trauma were: incomplete tooth dislocation with crown fracture; incomplete tooth dislocation with root fracture; incisional tooth dislocation with crown fracture; incisional tooth dislocation with root fracture; crown and root fracture; complete tooth dislocation with crown fracture, etc.

And in one-third of the cases, fractures of the alveolar process of the jaw were detected, which were mainly caused by direct impact of a blunt, hard object on a group of teeth. The alveolar process of the upper jaw is damaged most frequently (93.33%), because the upper teeth are located in front of the lower teeth in the sagittal plane. Examination reveals a malformation of the dental arch in the anterior region or a bite disorder. Macroscopically, the oral cavity shows bleeding wounds in the mucosa of the upper lip and gingiva, as well as wounds or haemorrhages in the area of the transitional fold. The alveolar process along with the teeth is pathologically movable and painful to the touch. In some cases, dislocations and fractures of the teeth located in the mobile fragment of the alveolar process (16.67%) were detected. In most cases, the fracture was retained by the soft tissues and periosteum on the palatine (oral) side, although it could be completely detached. Radiological examination can clarify the localisation of the fracture in relation to the roots of the teeth, the condition and integrity of the tooth roots, and the condition of the permanent tooth buds. It should be noted that

radiographically, the fracture line runs more often in a horizontal direction at or above the roots of the teeth.

## CONCLUSIONS

Consequently, the findings indicate that men of working age predominated among the forensic medical examiners. Injuries to the teeth occurred as a result of a strong blow to the crown of the tooth by a blunt, hard object. The frontal group of the upper jaw and, less frequently, the lower jaw were affected. Tooth fractures were localised to the crown, neck and root of the tooth. Injuries to the maxillary central incisors were the most common. Depending on the size of the broken off crown, we also distinguish between crown fractures in the enamel region, crown fractures in the dentine region (with or without opening the dental cavity), and crown fractures.

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