# DETERMINATION OF BODILY INJURY IN TRAUMATIC INTRUSION OF PRIMARY TEETH - PRESENTATION OF A CLINICAL CASE

**Alexandar Alexandrov[1], Iva Dimcheva[2], Teodora Kiryakova[3]**

*[1] Department of Forensic Medicine and Deontology, MF-MU Sofia, Bulgaria*

*[2] Dentist in „IVADENT – DR. IVA DIMCHEVA“ EOOD*

*[3] Medical Institute of the Ministry of Interior – Sofia, Bulgaria*

*Corresponding author: Alexandar E. Alexandrov, MD, Phd Medical University, Sofia-1431, Bulgaria Department of Forensic Medicine and Deontology 2 Zdrave str. Tel: +359+29230666 Fax: 359+29230412 E-mail: sashko_forensic@yahoo.com*

## Abstract

Determining the medico-biological characteristics of a bodily injury is an extremely important issue for both forensic medicine and criminal justice. We present a clinical case of a two-year-old child brought by a parent for examination in the living people examination office in the Department of Forensic Medicine and Deontology, Medical faculty, Medical University-Sofia, Bulgaria. During the examination, it was found that the upper incisors on the left are not present. Proper diagnosis is achieved when the injury of the primary dentition is examined both clinically and radiographically. Tooth injuries can have serious medical, aesthetic and psychological consequences for the victim.

***Keywords:*** *blunt trauma, traumatic intrusion of primary teeth, bodily injury, clinical forensic medicine*

## Introduction

Determining the medical and biological characteristics of a bodily injury is an extremely important issue in the field of forensic medicine, respectively it is of great importance for the criminal justice. Trauma to the maxillofacial area is a problem that can have serious medical, aesthetic, and psychological consequences for both children and their parents [1, 2, 3]. Studies show that approximately 30% of all children under the age of 7 suffer injuries to one of their primary incisors [4, 5] and that the most serious injuries to primary teeth occur between the ages of 1 and 3. [2]. Most injuries occur as a result of accidents involving falling at home or on playgrounds [6, 7, 8]. In Bulgaria, 31-40% of boys and 16-30% of girls have injuries to temporary teeth. The upper central and lateral incisors are most commonly affected.

Temporary teeth play an important role in the growth and development of children, being important for their not only aesthetics, speech and nutrition, but also for maintaining the place of permanent teeth until their eruption, proper development of dental arches and occlusion [9]. Traumatic tooth damage is most often the result of a direct impact to the tooth and in 90% of cases affects the incisors and/or canines. Because of the trauma, the affected teeth may be injured, dislocated, fractured or expelled. In each case, the dentist should be able to assess quickly the extent of the traumatic injury. For the correct diagnosis, on one hand, it is necessary to conduct a clinical examination by taking a thorough anamnesis regarding the incident and making a detailed examination of the maxillofacial area, and on the other, to conduct an X-ray examination as well.

## Clinical case presentation

We present a case of a 2-year-old child, brought by the mother to the living people examination room in the Department of Forensic Medicine and Deontology, Medical University - Sofia, Bulgaria, after falling from a swing in the kindergarden about three weeks earlier. During the

clinical examination it was found that the upper central and lateral left primary incisors were not present (Photo 1).

According to the mother, the incisors were not found at the scene of the accident. She presented to the forensic doctors a medical document from the hospital where the child was examined after the incident, with the following diagnosis: fractures of the crowns of 61 and 62 (upper left teeth), without additional examinations, based only on the findings of the review conducted. The next day, the child's mother consulted a dentist with a focus on pediatric dentistry, who found the following morphological features: "Upper lip with bruises in the area of 61 and 62 teeth, with swelling and bleeding in the same area." Given the nature of the trauma and the stress of the child from the examination, it was decided to postpone the X-ray examination for a few days in order for the soft tissue injuries to subside. The small intraoral X-ray taken afterwards (Photos 2 and 3) revealed that teeth 61 and 62 were present but strongly intruded in the palatal direction, i.e the teeth have penetrated into the upper jaw and have not been broken or avulsed.

Based on the overall morphological picture of the injury in the maxillofacial area of the child and the divergent data on the diagnoses, to accurately determine the medicobiological sign of the bodily injury, an additional medical examination was performed by a dental specialist with a forensic focus, to clarify the condition of the teeth.

**Discussion**

Luxation injuries to the teeth are common in childhood. An injury from this group is the intrusion of a tooth, characterized by its displacement in the axial direction to the alveolus, most often affecting the teeth of the upper jaw [3]. The cause of this injury is usually an impact from a bottom-up direction along the longitudinal axis of the tooth. A high frequency of intrusions is observed due to the high elasticity and relative immaturity of the bone structures. A distinction is made between partial and complete intrusion. In the latter case, the tooth is completely covered by the surrounding soft tissues, which creates diagnostic errors if the diagnosis relies solely on the clinical examination of the injured person [3, 6].

Bodily injury is a medical and legal term. According to the legislation of the Republic of Bulgaria, three degrees of bodily injury are established - severe, moderate and mild. Traumatic tooth injuries can result in moderate or mild bodily injury, depending on its nature. According to Art. 129 of the Criminal Code of the Republic of Bulgaria, the loss of teeth, without which it is difficult to chew and speak, is considered a medium bodily injury, and the law does not make a difference whether it refers to primary or permanent teeth. The loss of incisors is associated on the one hand with difficulty in chewing in the bite phase (part of the chewing process), and on the other hand with some difficulty in speech, expressed by hissing or wheezing. In addition, the eruption of front teeth leads to an aesthetic defect. According to the plenum of the Supreme Judicial Council, item 11 of the decree reflects that teeth expulsion should be considered not only in cases of their complete loss, but also when they are fractured up to the level of the gums or are displaced to such an extent that their loss is inevitable. In turn, the fracture of the crown of a tooth, located at a certain distance from the gum, realizes the medico-biological qualifier Non-life-threatening temporary health disorder, which is a minor injury. Such is the bodily injury in cases of slight luxations of the teeth in the vestubuloaral and/or mediodistal direction [10].

It can be seen from the above mentioned that a condition such as displacement of a tooth into its alveoli does not appear as a separate medico-biological sign of bodily injury. The injury will depend on the type of intrusion - partial or complete, according to the above considerations. In a

partial intrusion, part of the dental crown is displaced in the axial direction, and the rest is visible when examining the oral cavity, as the tooth apears visibly shorter than the adjacent ones, which is a mild bodily injury. The case is more complicated in the presence of complete tooth intrusion.

In the case presented, the X-ray showed the presence of the two primary incisors - their crowns and roots - fully intruded and superimposed with the images of permanent teeth that will replace them after the physiological shift - teeth 21 and 22 (upper left central and lateral permanent incisors). However, the two-dimensional image does not make it possible to understand whether the incisors affect the germinal follicles in which the permanent incisors develop. To clarify the anterior-posterior spatial relationships between inserted primary incisors and developing permanent incisors, the use of a three-dimensional scanner in such young patients is strongly discouraged, therefore until the permanent incisors erupt (about 6-7 years of age) there will be no information on whether the incident damaged their crowns. The X-ray, however, suggests a vestibular position (more anterior) of the primary incisors relative to the developing permanent ones, in which a spontaneous eruption of the incisors is expected. From a forensic point of view, if this does not happen, the trauma would lead to PERMANENT IMPAIRMENT of the chewing function in the bite phase, and speech function, as well as disrupted aesthetics. If the incisors do not germinate, this impaired function may continue for a period of 4 to 5 years until the permanent incisors erupt. Cases in which tooth extraction is required lead to the same characteristic. If the teeth return to their normal position, this can happen within the next at least three to four months (i.e. the period is longer than 30 days), as the disruption of chewing and speech function for this period again would lead to PERMANENT IMPAREMENT. Based on the above, it can be reasonably concluded that the described trauma of the incisors in the child should be equated to the medico-biological qualifying feature EXPULSION OF TEETH, WITHOUT WHICH DIFFICULTIES IN CHEWING AND SPEAKING OCCUR, given the lack of self-recognition of this medical condition. The described soft tissue injuries received at the time of the accident caused the child PAIN AND SUFFERING.

In the future, a recommendation is given to monitor the child every 2 weeks during the first 4 months, as well as examinations around the time of the expected eruption of permanent teeth (6-7.5 years of age) to assess the condition of their structure. Possible complications would be damage to the enamel surface or combined damage to the enamel and dentin tissue, which would require restorative treatment [1, 4, 11, 12].

## Conclusions

When applying the primary dentition, it is mandatory to conduct a combined clinical and radiological examination of the child to clarify the nature of the traumatic injuries. The involvement of a dentist in determining the nature and extent of the bodily injury present in a maxillofacial injury, and in particular the teeth, together with the relevant clinical forensic examinatior, should be a constant practice.

Statement for potential conflicts of interest: The authors declare that they have no conflict of interest.

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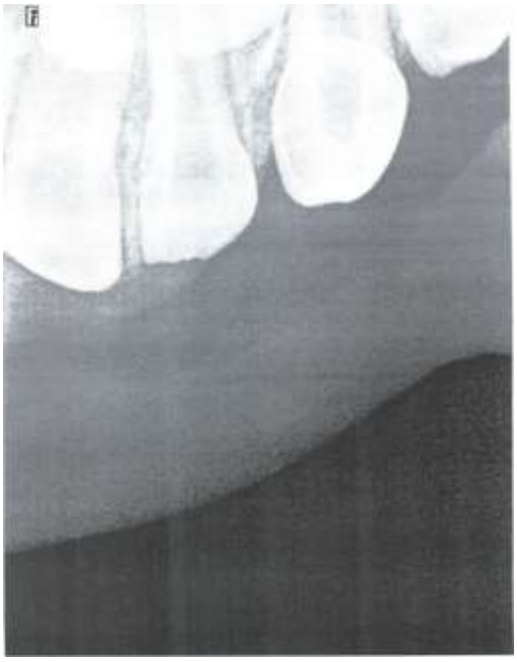
Photo 1. The child's condition 3 weeks after the injury.

Picture 2. X-ray examination



Picture 3. X-ray examination