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Official Publication of the Brazilian Society of Anesthesiology  
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## REVIEW ARTICLE

# Tooth injury in anaesthesiology

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Received 14 March 2013; accepted 15 April 2013  
Available online 6 April 2014

### KEYWORDS

Dental trauma;  
Dental  
injury/anaesthesiology;  
General anaesthesia/complications

### Abstract

*Background and objectives:* Dental injury is the most common complication of general anaesthesia and has significant physical, economic and forensic consequences. The aim of this study is to review on the characteristics of dental injury associated with anaesthesiology and existing methods of prevention.

*Contents:* In this review, the time of anaesthesia in which the dental injury occurs, the affected teeth, the most frequent type of injury, established risk factors, prevention strategies, protection devices and medico-legal implications inherent to its occurrence are approached.

*Conclusions:* Before initiating any medical procedure that requires the use of classic laryngoscopy, a thorough and detailed pre-aesthetic evaluation of the dental status of the patient is imperative, in order to identify teeth at risk, analyze the presence of factors associated with difficult intubation and outline a prevention strategy that is tailored to the risk of dental injury of each patient.

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### PALAVRAS-CHAVE

Traumatismo  
dentário;  
Anestesia geral;  
Medição de risco;  
Diagnóstico bucal

### Lesão dentária na anestesiologia

#### Resumo

*Justificativa e objetivos:* A lesão dentária é a complicação mais comum da anestesia geral e apresenta importantes consequências físicas, econômicas e médico-legais. O objetivo deste estudo é fazer uma revisão sobre as características da lesão dentária associada a anestesiologia e os métodos de prevenção existentes.

*Conteúdo:* Nesta revisão são abordados o momento da anestesia em que a lesão dentária ocorre, os dentes acometidos, o tipo de lesão mais frequente, os fatores de risco estabelecidos, as estratégias de prevenção, os dispositivos de proteção e as implicações médico-legais inerentes à sua ocorrência.

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**Conclusões:** Antes de iniciar qualquer procedimento médico que exija o recurso à laringoscopia clássica é imperativa uma avaliação pré-anestésica minuciosa e detalhada do estado dentário do doente, de forma a identificar os dentes em risco, analisar a presença de fatores associados a dificuldades de intubação e delinear uma estratégia de prevenção que seja adaptada ao risco de lesão dentária de cada doente.

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## Introduction

Dental injury has been associated with general anaesthesia since many years,<sup>1</sup> especially to endotracheal intubation using classic laryngoscopy.<sup>2</sup> This is the most common complication.<sup>1-11</sup> The overall incidence of dental injury is estimated to be between 0.06% and 12%,<sup>3,11-17</sup> and these values can be underestimated.<sup>2</sup> Therefore, this is a frequent injury in anaesthesiology, in which the aesthetic and functional consequences and the social impact are important factors.<sup>4,6,7,10,11,18</sup>

Dental injury is also the most common of all forensic claims related to anaesthesia,<sup>1,5,19-22</sup> the event being responsible for the largest number of complaints for medical malpractice against anesthesiologists.<sup>2,4-7,23</sup> Its correction has relevant costs, which have become increasingly significant with the evolution and sophistication of technology.<sup>6,7,24</sup>

Considering the magnitude of the problem and the physical, economic and legal consequences of dental injury in anaesthesiology, it is important to correspond to the need for education and training of anaesthesiologists about the anatomy of the teeth, the supporting structures, the dental pathology and techniques used in dental rehabilitation.<sup>9</sup> It is also necessary to establish standardized strategies of documentation and prevention, since the knowledge and understanding of risk factors are essential to prevent future injuries.<sup>1,2,4,7,24</sup>

## Anaesthesia and tooth injury

Healthy teeth are very strong and designed to withstand the enormous pressures generated during mastication. However, the insertion, manipulation, or removal of any airway or suction device may cause lesions in the oral cavity.

## Occurrence of tooth injury

Dental injuries occur mainly during laryngoscopy,<sup>2,5,12</sup> but can occur less frequently during anaesthetic maintenance or in the emergence phase of anaesthesia.<sup>2,18</sup> Although the risk of dental injury could be present also during the extubation,<sup>19,25</sup> it is less important and significant than the risk during intubation.<sup>2</sup>

Most studies show that a lot of injuries occur during intubation for elective surgery and only a minority occurs in an emergency context,<sup>2,11,16</sup> indicating that the care to

intubate will be the same when the patient's dental state cannot be established. Rather, some studies indicate that emergency surgical procedures are associated with an increased risk of dental lesions.<sup>5,12,17,26</sup>

Adolphs et al.<sup>11</sup> report that perioperative tooth injuries occur mainly in the general surgery and trauma services, most likely because these are the services that perform the largest number of surgical procedures using endotracheal intubation with laryngoscope.

## Affected teeth

Generally, only one tooth is subjected to injury,<sup>5,6,11</sup> but the simultaneous trauma to two, three or even four teeth was already described.<sup>5,6,27</sup> The upper (maxillary) incisors are at greatest risk of injury,<sup>3-7,10-12,16,28-32</sup> particularly the upper left central incisor,<sup>6,11-13,19,28,33</sup> but the lower<sup>31</sup> and posterior<sup>31</sup> teeth can also be injured.

## Type of tooth injury

The most frequent type of dental injury is not constant across studies, and this may be due to the adoption of different methodologies for the detection and classification of lesions. However, the explanation of these criteria is not covered by these studies. The lesions most reported in the literature are: fracture, avulsion and dislocation of natural teeth or prosthetic restorations.<sup>3-6,10,11,16,34-36</sup>

## Risk factors

The main risk factors of dental trauma associated with laryngoscopy are difficult intubation<sup>3,12,15,37</sup> and poor preexisting dental status.<sup>1,4-7,11,16-18,26,31,32,38,39</sup>

Chen et al.<sup>28</sup> report that in teeth with preexisting pathology, an injury is about five times more likely,<sup>12</sup> and Newland et al.<sup>15</sup> reported that patients who are difficult to intubate have a 20 times higher risk of dental lesions.

Bucx et al.<sup>29</sup> demonstrated that dental injury is more likely in situations of difficult intubation, possibly because anaesthesiologists use the upper teeth as a fulcrum when they cannot get a satisfactory view of the glottis. During laryngoscopy, the support on the upper jaw and consequently on maxillary incisors improves the line of sight and facilitates the insertion of the endotracheal tube, which explains the high incidence of dental injury during difficult

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