

Dental damage in anaesthesia

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Abstract

Dental trauma is a frequently reported complication related to the administration of general anaesthesia and is the most common source of litigation against anaesthetists. General anaesthesia involving direct laryngoscopy, a difficult airway, pre-existing poor dentition and prosthetic dental restoration are major risk factors for dental trauma. Central maxillary incisors are the most frequently damaged teeth. It is good practice to perform a preoperative oral examination, document the findings and communicate the risk of dental trauma to the patient. In the event of dental damage appropriate timely management will minimize dental morbidity.

Keywords Anaesthesia; complications; dental trauma; laryngoscopy; risk

Royal College of Anaesthetists CPD Matrix: 1C01, 1C02, 1I05, 1F01, 3A01, 3A02

Incidence and pattern

The reported incidence of dental trauma from large retrospective studies is in the range of 0.02–0.07%.¹ However, prospective studies where dental damage was identified following examination by an experienced dentist, postoperatively, reported figures as high as 38%.² The methods by which dental trauma are diagnosed vary and this may account for the wide variation in reported figures. For a tooth injury requiring intervention, the Royal College of Anaesthetists publication on dental trauma during anaesthesia quotes an incidence of 0.02% or 1 in 4500.³

Although any teeth can be damaged during anaesthesia, the anteriorly placed maxillary incisors are the most frequently affected teeth. The left is damaged more often than the right reflecting the fact that a right-handed laryngoscope blade is most commonly used amongst anaesthetists. Most dental injuries are recognized at the time of injury by the anaesthetist and involve a single tooth. Minor inadvertent trauma may be missed and later identified by the recovery or ward staff or the patient themselves.

Ham et al. conducted a retrospective study of 290,415 patients and reported that the ear, nose and throat (ENT) surgical specialty had almost double the overall incidence of dental trauma

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Learning objectives

After reading this article, you should be able to:

- describe the incidence, pattern and medicolegal implications of dental trauma during anaesthesia
- identify the risk factors and outline the steps taken to prevent dental trauma during anaesthesia
- demonstrate a knowledge of safe and effective management of patients sustaining dental trauma following anaesthesia

compared to other surgical specialities.⁴ This is unsurprising given the frequent use of rigid oropharyngeal instrumentation in ENT surgery. Table 1 and Figure 1 show the classification and location of dental injury in their study respectively. The general pattern of damage is similar in various studies.

Medicolegal considerations

The incidence of dental trauma is around 0.02% but constituted 11.4% of all anaesthesia claims notified to the NHS litigation authority in England between 1995 and 2007.⁵ Although the median cost of claims was £77, considering the frequency of claims the cumulative cost can be significant. Also, dental trauma accounts for the majority of claims against the anaesthetist reported to the Medical Defence Union. With the advancement of dental technology, dental treatment is becoming more complex and expensive and the cost of claims is likely to rise.

Appropriate discussion with the patient and measures to minimize the risk of dental trauma reduce the risk of litigation. However, the anaesthetist could be found guilty of negligence if the consequences of dental damage are not managed appropriately, even if not deemed negligent for the initial dental trauma. Effective communication and documentation of the consent process is paramount to avoid litigation.

Risk factors

Anaesthetic factors

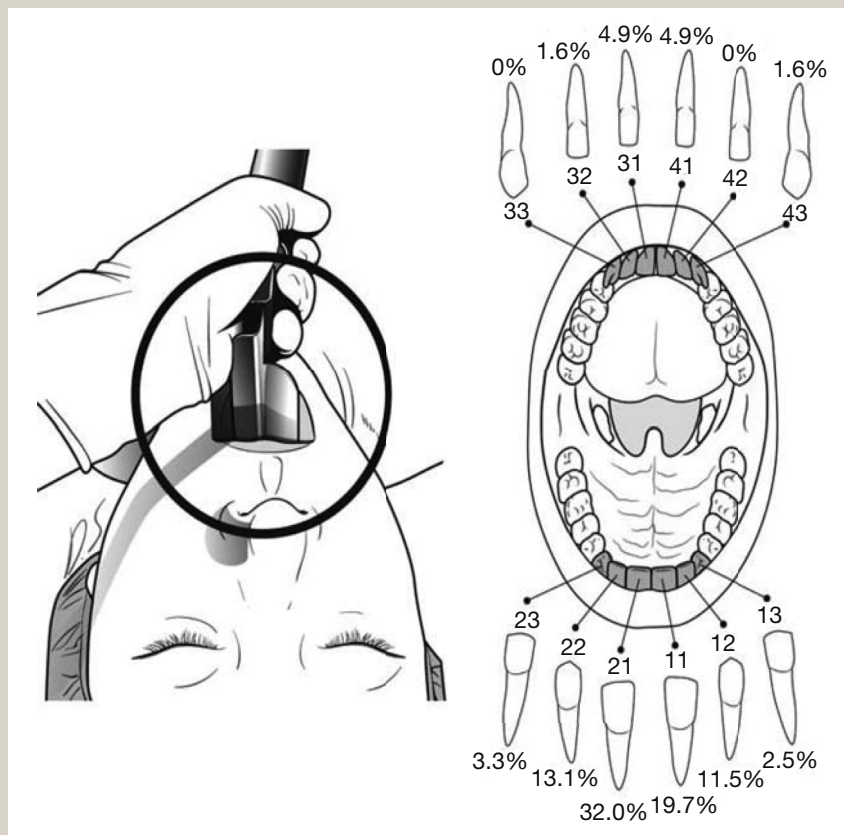
The majority of dental injuries during anaesthesia are reported during tracheal intubation and are most commonly associated with laryngoscopy. This relates to the inadvertent use of maxillary incisors as a fulcrum by the flange of laryngoscope

Classification of 94 cases of dental trauma⁴

Classification	Number (%)
Subluxation	33 (35%)
Crown fracture	18 (19%)
Missing teeth	11 (12%)
Avulsion	7 (7%)
Crown and root fracture	5 (5%)
Enamel fracture	5 (5%)
Other trauma	15 (16%)

Table 1

Locations of teeth commonly injured during tracheal intubation



Teeth are labelled with the two-digit World Dental Federation notation system. Reproduced from Ham *et al.*⁴ with permission.

Figure 1

blade during laryngoscopy, more so in case of difficult intubation where greater force is exerted in an attempt to visualize the larynx. Patients who are difficult to intubate are 20 times more likely to suffer dental trauma.⁶ The central incisors due to their anterior location are exposed to the forces of oral instrumentation including direct laryngoscopy. They are anchored to the bone usually by a single root and have a small cross-sectional area rendering them susceptible to damage by external forces.

However, around 1 in 4 dental trauma occur during emergence from anaesthesia related to biting or clenching of teeth on an oropharyngeal airway, laryngeal mask airway (LMA) or suction catheter.⁷ Perioperative dental damage usually occurs due to a combination of pre-existing dental pathology and an external force. Dental trauma can occur at the hands of both novice and experienced anaesthetists, as well as with difficult and easy intubations. Vigilance must be exercised.

Dental factors

The arch of incisors are able to generate biting forces in the range of 150–200 N⁸ along their axis and healthy teeth are robust and designed to withstand these forces.

Teeth are vulnerable to damage when their structural integrity is compromised by dental caries or periodontal disease and are restored or replaced by artificial material. Teeth are also vulnerable when excessive force is applied which the teeth and their roots are not designed to withstand. Patients with pre-existing dental pathology are five times more likely to suffer dental trauma.⁹ Primary teeth have shallow roots rendering them susceptible to avulsion. Many systemic diseases and drugs affect the structural integrity of teeth making them susceptible to damage. Table 2 summarizes the risk factors for dental trauma.

Prevention

Prevention of dental trauma begins with identifying the risk factors and modifying them if possible. A brief preoperative dental history and focused oral examination is helpful to identify dental pathology predisposing to dental trauma. Details of a recent visit to the dentist may provide valuable information about the health of the teeth.

Location and state of any dental restorations and prostheses, loose teeth and cracks should be noted. Evidence of dental caries and periodontal disease such as brown or black staining, holes or pits in teeth, red swollen gums, abscesses and sinuses should be

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