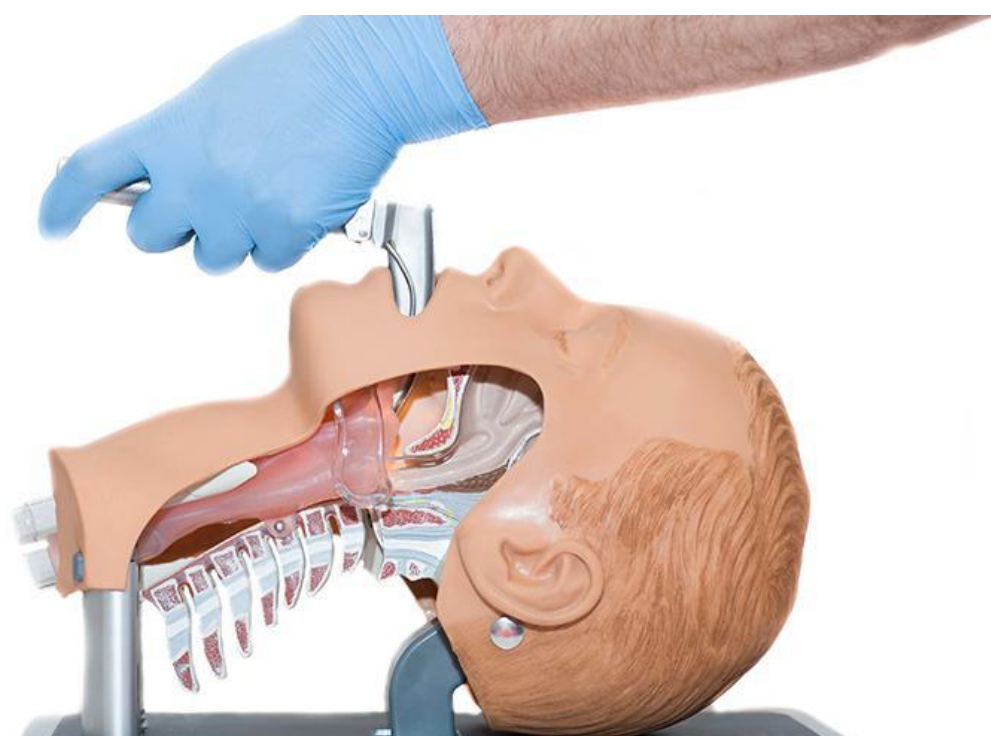


INTRODUCTION

Intraoperative dental injury is the most common of all medico-legal complaints related to general anesthesia, i.e., one third of all medico-legal claims against anesthesiologists (1).

A review of general anesthesia by anesthesia residents found the incidence of dental injury to be 0.1%. The same review found that the level of anesthesia resident training does not affect the risk of dental injuries (2). Most dental injuries are reported by the anesthesia provider (84-86% of the cases). But 14-16% of the cases are reported by the patient; hence, it was missed by the provider (3,4). Most dental injuries (50-75%) occur during tracheal

intubation. However, dental injury can also occur with other events, e.g., aggressive suctioning, forceful removal of an oral airway, and spasm of the muscles leading to biting down vigorously (5,6). This poster will review risk factors, the dental exam, management of dental trauma and recommendations.



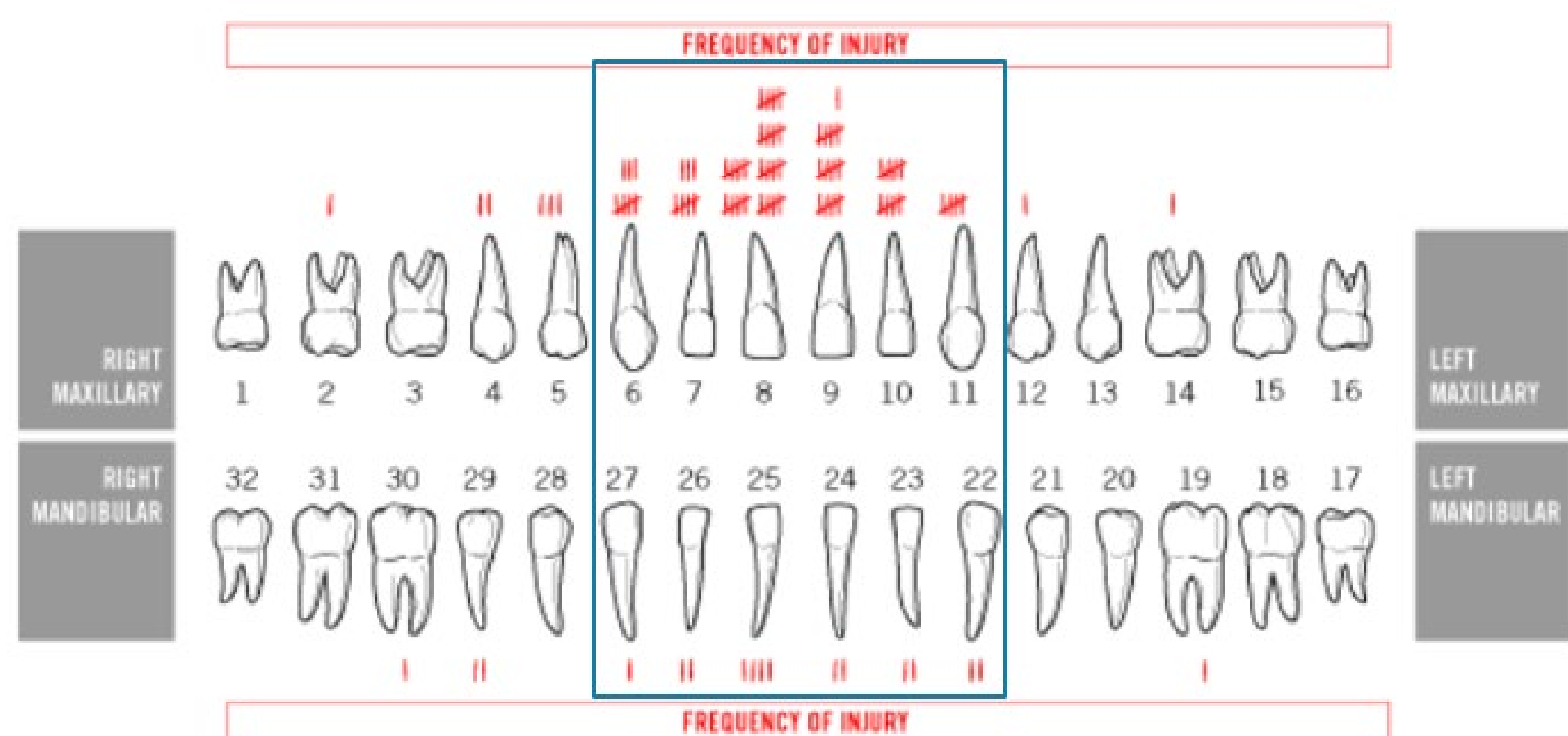
RISK FACTORS

There are many factors associated with dental injury during anesthesia. Dental injury mostly results from the coupling of a pre-existing dental condition with a physical event, such as pressure or forces applied to a tooth. Patients with poor teeth or reconstructive work are 3.4 times more likely to have dental injuries related to anesthesia (4). 72% of the incidents occurs in patients aged 50-70 years, likely due to higher incidence of periodontal disease in that group of patients (1). Periodontal disease clinical findings include inflammation of the gums, gum recession, reduced boney support, which can result in tooth mobility. Another group at high risk includes patients with mixed dentition (5-12 years). Primary teeth with resorbing roots and permanent teeth with incompletely formed roots can be easily fractured. The table below includes a comprehensive list of dental factors for trauma susceptibility and what to expect (7).

Dental Factors	What to Expect
Mixed dentition (5-12 years old)	Primary teeth (resorbing roots) and permanent teeth (incompletely formed roots) can be easily avulsed
Periodontal Disease	Loss of tooth attachment predisposes to mobility and ease of avulsion
Caries	Undermining of tooth structure- ease of fracturing
Proclination of maxillary central incisors	Higher incidence of tooth-blade-contact
Endodontically treated teeth (without crowns)	Ease of fracture
With crown	Risk of dislodging crown
Isolated teeth	Usually longstanding predisposing to brittle structure and ease of fracture
Tooth structure abnormalities (amelogenesis/dentinogenesis imperfecta)	Ease of fracture
Large restorations	Ease of fracture
Prostheses	Ease of dislodgement

WHAT TEETH EXACTLY ARE AT RISK?

The 12 anterior teeth, canine to canine of the maxilla and the mandible, are at most risk. Tooth #8 (maxillary right central incisor) is most likely to get injured during intubation compared to the rest. When a satisfactory view of the glottis is difficult to obtain during laryngoscopy, the patient's maxillary anterior incisors are sometimes used as a fulcrum by the laryngoscope blade. Consequently, the maxillary incisors are injured most frequently. The right side has higher frequency of dental injury due to the provider's insertion of the laryngoscope with their right hand, using the patient's front teeth as fulcrum, as shown in the image below (8).



THE DENTAL EXAM

The provider is recommended to start the dental exam with a patient interview. The following includes some questions to consider:

- When was your last dental check-up?
- Do you have any crowns/caps?
- Do you have any removable bridges, dentures, or partials?
- Do you have any loose teeth?
- Do your gums bleed when you brush your teeth?

The interview is then followed by clinical assessment: presence of periodontal disease, cracks, chips and/or severe discoloration, identification of loose teeth, position of missing or loose teeth, and position and condition of dental restorations. Manual retraction of lip or cheek with adequate lighting can improve one's visualization for an intraoral inspection.

By documenting all the answers from the patient interview and the clinical findings, the provider is recording the information for future reference. And remember, if you did not write it down, it did not happen. Good clinical notes must be clear, accurate, legible and written in a scientific manner. So instead of documenting "none loose" or "intact", you should document for example, "poor oral hygiene with generalized periodontal disease, multiple mobile teeth, with a fracture tooth #8." (9)

TYPES OF DENTAL TRAUMA

The following are the most common types of dental trauma with general anesthesia (10):

- **Avulsion:** when the entire tooth is dislodged from the socket. An avulsed permanent tooth that has been replanted back into the mouth within 60 minutes has up to 80% success rate. A primary tooth should be replanted.
- **Fracture:** when the tooth gets chipped, all fragments should be accounted for, kept in sterile saline and bonded later onto the tooth. In case of missing fragments, a chest x-ray is warranted to rule out aspiration. Most dental fragments pass through the GI tract without causing harm.
- **Subluxation:** when there is injury to the tooth-supporting structure with some loosening of the tooth but without fracture or displacement. The tooth should be left as such.
- **Luxation:** when there is injury to the tooth-supporting structure with some loosening of the tooth with a displacement. If permanent tooth, the tooth should be repositioned. If primary tooth, leave as such.

Fracture and loosening/subluxation of a tooth were found to represent 55.2% of all injuries, followed by tooth avulsion (9%) and crown fracture (7.7%) (5).

RECOMMENDATIONS

In the ideal situation, a dental evaluation would be carried with every physical exam completed by the anesthesia team and consult the dental team when needed.

However, In many instances, it is not possible to obtain a dental consultation and/or a definitive treatment pre-operatively. The following are options for the dental and the anesthesia team to consider:

- Splinting of loose teeth with orthodontic wire or Ribbond (11) and composite bedside
- Pre-formed mouth guard, taped to the side of the cheek
- DentaSafe (12) elastic foam strip taped to the blade of the laryngoscope
- TubeGuard (13) to secure the endotracheal tube from dislodgement and accidental extubation
- Bite blocks to withstand occlusal forces on the airway tube
- Tying the mobile teeth with silk sutures and tape to the side of the cheek.

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10. International Association of Dental Traumatology. Dental Trauma Guidelines. Revised 2012.
11. Ribbond is a bondable reinforcement ribbon
12. DentaSafe is an elastic foam strip applied over the laryngoscope to protect teeth during endotracheal intubation
13. TubeGuard is a soft mouthguard that surrounds the endotracheal tube and protect the anterior teeth.