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## Assessment of the Risk Factors for Oro-Dental Injuries to Occur during General Anesthesia and Measures taken by Anesthesiologist to Prevent them

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### Abstract:

**Background and Aim:** Anesthesiologist gain access to the airway passage orally with the help of laryngoscope. Dental trauma can occur during different steps in anesthesia. The aim of the study is to evaluate the risk factor for dental trauma perioperatively and to look for the preventive measures mostly employed by the anesthesiologist to prevent dental insult.

**Materials and Methods:** The present study involved 40 anesthetists working in private hospitals using simple random sampling. They were asked to answer a questionnaire designed to look for the risk factors that makes tooth most prone for injury and find out the measures that anesthesiologists follow to prevent such injuries to occur. Codes were placed for the obtained data and Medcal statistical package was used for analysis.

**Results:** Injuries mostly occur during intubation with a laryngoscope in patients where there is limited visibility to the hypopharynx. Maxillary left central incisor was mostly affected. Some anesthetists used plastic blades or curved blades to prevent such injury.

**Conclusion:** Patient with poor dentition and history of difficult intubation should be sent for pre-operative dental evaluation to prevent dental injuries.

**Key Words:** Avulsion, laryngoscope, mouth guards, oropharyngeal airway, subluxation

### Introduction

Perioperative dental damage is one of the most common anesthesia-related adverse events and is responsible

for the greatest number of malpractice claims against anesthesiologists.<sup>1</sup> Dental injuries includes enamel fracture or tooth subluxation to more severe forms of crown fractures and tooth avulsion. Anterior dislocation of mandible condyle leading to a locked position of temporomandibular joint, tongue injuries, and a variety forms of pressure-induced lesions of the oral cavity soft tissues have also been reported.<sup>2</sup>

As per retrospective data available, perioperative damage to dental tissues varies from 0.02% to 0.07%. Though the incidence is reported much higher in prospective studies. In a study conducted by Chen *et al.*, the incidence of damage to dental structures before or after anesthesia using endotracheal tube was 12.1%. In a survey by Lockhart *et al.*, the incidence of trauma to dentition during tracheal intubation was 1:1000.<sup>3</sup>

In order to decrease the incidence of dental trauma related to intubation, measures to protect the teeth have been recommended. Dental trauma due to small forces applied at wrong angles during laryngeal blade contact can be prevented by placing the dental shield. Use of dental shields during intubation might become mandatory in the days to come as a standard for ideal clinical practice. As of today, only 2% of anesthesiologists use dental shields.<sup>4</sup>

Most often anesthetist comes to know of the traumatic dental incident immediately. Even the relatives and patient takes a note of the injury as the tooth is placed in a position that is very sensitive and being noticed very easily. It was found by Newland *et al.* that anesthesia provider discovered trauma to teeth in 86% of the reported incidents while only 14% of the patients reported the injury.<sup>3</sup>

Whenever a tooth is fractured during endotracheal intubation, the dental surgeon should be called to ascertain the degree of damage and to make an exact count of the broken tooth fragments. If all the broken pieces are not retrieved, then radiograph of the abdomen and chest should be taken to rule out aspiration into stomach or respiratory passage.<sup>5</sup>

The present study was taken among anesthesiologists working in private hospitals to evaluate the risk factors for

oro-dental injuries to occur during general anesthesia and the measures taken by anesthesiologists to prevent them.

**Materials and Methods**

The present study involved 40 anesthetists working in private hospitals using simple random sampling. The study was reviewed and approved by Institutional Ethical Committee and clearance was obtained. A questionnaire was prepared with six questions to explore the most probable risk factors for iatrogenic oro-dental injuries and preventive measures taken by anesthetists to minimize them (Table 1). For each question, multiple options were provided. Subject matter expert raters of our institution evaluated the content validity of the prepared questionnaire. They examined if the preventive skills or knowledge of injuries measured by different set of questions is essential for the questionnaire to be effective. Written consent was taken from them for participation. The questionnaires were given to anesthetists and were asked to answer. The data thus collected were coded and analyzed using statistical package Medcalc (Version 12.7.0.0).

**Table 1: Questionnaire along with response to evaluate the risk factors for oro-dental injuries to occur during general anesthesia and measures taken by anesthesiologists to prevent them.**

Question	Number	Percentage
1. At which stage of anesthesia do maximum oro-dental injuries occur?		
At the time of intubation	32	80
While ETT in place	00	00
During extubation	06	15
Recovery phase	02	05
2. Which clinical conditions put tooth at maximum risk for injury?		
Limited mouth opening	10	25
Poor visibility in hypopharynx	16	40
Narrow thyromental distance	08	20
Low neck mobility	06	15
3. Which anesthetic equipment is most likely to cause dental damage?		
Laryngoscope	26	65
Oropharyngeal airway/laryngeal mask airway tube	12	30
Bite blocks	02	05
4. Which tooth is most prone for dental injury?		
Maxillary left central incisor	20	50
Maxillary left lateral incisor	14	35
Maxillary right central incisor	04	10
Maxillary right lateral incisor	02	05
5. What preventive measures do you follow to prevent dental injury?		
Use of McCoy blade/Macintosh blade with a low-height flange	08	20
Mouth guards	02	05
Use of bescop blade	06	15
Use of plastic blades	10	25
Fiberoptic nasal intubation	02	05
None	12	30
6. Do you send patients for preoperative dental checkup?		
Yes	14	35
No	26	65

EET: Endotracheal tube

**Results**

About 65% of the anesthesiologists felt laryngoscope is the main reason for dental trauma which mostly occurs at the time of intubation (80%). Around 40% felt that poor visibility to hypopharynx carries more risk for dental injury. The tooth most prone for dental insult was found to be maxillary lateral incisor. Very few anesthesiologists (5%) were using mouth guards to prevent direct impact on the tooth. Around 65% of anesthesiologists felt the need of pre-operative dental consultation in order to minimize injuries to oral and perioral tissues.

**Discussion**

Though anesthesiologists always operate intraorally, they might not have extensive education of oral, perioral tissues, and intraoral prostheses. The chances of perioperative dental injury increase with poor dentition along with associated anesthesia-related risk factors.<sup>3</sup>

In the present study, 80% of anesthetists felt that the dental injury occurs at the time of intubation. Some anesthetists felt that the injury occurs during extubation. Similar results have been found in a study by Monaca *et al.*<sup>4</sup>

Endotracheal intubation with laryngoscope blades was first performed using straight blades. Magill described his approach in 1930. In 1941, Miller laryngoscope was used to intubate. Curved laryngoscope blade was introduced by Macintosh in 1943.<sup>1</sup>

Most of the anesthetist marked laryngoscope as the anaesthetical equipment which causes dental trauma. High incidence of dental insult following conventional laryngoscopy has also been reported by Mourão *et al.*<sup>6</sup> During laryngoscopy, the blades of the laryngoscope might hit against the tooth or anesthetist might use the tooth as fulcrum to depress the tongue thereby causing damage to the teeth.<sup>2</sup> Around 30% marked oropharyngeal airway as the cause of dental trauma. Oropharyngeal airway can cause injury during extubation stage as patient might involuntarily bite on airway and it might act as a fulcrum to cause insult.<sup>3</sup>

Bite blocks are used during the recovery phase to prevent mouth closure. Ideally bite blocks should be placed in the molar region. Wrong placement of bite block can cause damage to the anterior tooth.<sup>5,7</sup> Son *et al.* had reported a case in which bite block placement during intubation led to intrusive luxation of the tooth.<sup>5</sup> In the present study, around 5% had experienced dental trauma due to the use of bite block, most probably due to the wrong use of bite block.

Most of the anesthetists marked that maxillary left central incisor is most prone for injury. Similar results have been observed in previous studies. Some studies have also shown injuries occurring in the lower tooth.<sup>6,8</sup> This finding could

be attributed mostly to the path of insertion of anesthetic equipment that comes in contact with the tooth.

Mouth guards can help in preventing dental injury as it distributes the forces uniformly over the dentition. The limitation with its use is that it the direct view of glottis and makes it difficult to guide the endotracheal tube to larynx.<sup>3</sup> This could be the reason that very few anesthetist in the present study opted for mouth guard as a measure to prevent dental injuries. Similarly in a study by Tiku *et al.*, only 6% of anesthesiologist used mouth guard perioperatively.<sup>8</sup>

People planned for the elective surgical procedure under general anesthesia should be sent for a pre-operative dental checkup if difficult intubation is anticipated or if an anesthetist finds a mobile tooth and/or ill-fitting dental prosthesis. Moreover, the patient should be informed of his poor dental condition.<sup>3</sup> In the present study, only 65% of anesthetists felt the need of dental consultation while 35% of didn't ask for a dental opinion.

#### Recommendations

1. Further studies can be carried out to find relation between different laryngoscopy techniques and dental trauma
2. In the present study, only upper anterior tooth were assessed for dental injury, further studies can be done where posterior tooth and mandibular incisors are also examined
3. Studies can also be planned to evaluate the effectiveness of different commercially available mouth guards in reducing the impact on teeth with a laryngoscope.

#### Conclusion

A detailed examination of the patient's mouth pre-operatively can help in identifying the teeth at risk for damage. Anesthesiologists must take a detailed history of the dental procedures done in a patient such as prosthesis, veneers or crowns. Maxillary and mandibular anterior are more prone for injuries hence these teeth should be properly inspected for any mobility or crown fractures.<sup>9,10</sup> The patient should be made aware of his poor dental status and all the findings should be

documented. If the teeth are teeth Grade III mobile, it would be a wise option to get them extracted before any elective surgeries under general anesthesia are planned.

#### References

1. Huang YF, Ting CK, Chang WK, Chan KH, Chen PT. Prevention of dental damage and improvement of difficult intubation using a paraglossal technique with a straight Miller blade. *J Chin Med Assoc* 2010;73(10):553-6.
2. Poorsattar Bejeh Mir K, Poorsattar Bejeh Mir A. Neglected orodental facts during general anesthesia and intensive care unit admission in pediatric population. *Rev Bras Anesthesiol* 2012;62(6):847-51.
3. Yasny JS. Perioperative dental considerations for the anesthesiologist. *Anesth Analg* 2009;108(5):1564-73.
4. Monaca E, Fock N, Doehn M, Wappler F. The effectiveness of preformed tooth protectors during endotracheal intubation: An upper jaw model. *Anesth Analg* 2007;105(5):1326-32.
5. Son YK, Shin JM, An DA, Kim YH. Intrusive luxation of tooth due to bite block after oral endotracheal intubation. *Korean J Anesthesiol* 2013;65(3):280-1.
6. Mourão J, Neto J, Luís C, Moreno C, Barbosa J, Carvalho J, *et al.* Dental injury after conventional direct laryngoscopy: A prospective observational study. *Anaesthesia* 2013;68(10):1059-65.
7. Windsor J, Lockie J. Anaesthesia and dental trauma. *Anaesth Intensive Care Med* 2008;9(8):355-7.
8. Tiku AM, Hegde RJ, Swain LA, Shah FR. To assess and create awareness among anesthetists regarding prevention and management of injuries to the teeth and their associated structures during general anesthesia. *J Indian Soc Pedod Prev Dent* 2014;32(1):58-62.
9. Idrees SR, Fujimura K, Bessho K. Dental trauma related to general anesthesia: Should the anesthesiologist perform a preanesthetic dental evaluation? *Oral Health Dent Manag* 2014;13(2):271-4.
10. Feltracco P, Barbieri S, Salvaterra F, Tiano L, Gaudio RM, Galligioni H, *et al.* Unusual displacement of a mobilised dental bridge during orotracheal intubation. *Case Rep Anesthesiol* 2011;2011:781957.