

## Evaluation of Awareness among Anesthesiologists for Prevention and Management of Traumatic Injuries during Anesthesia: A Crosssectional Questionnaire Study

Review Article

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### Abstract

**Aim:** The purpose of the present study was to evaluate the knowledge of anesthesiologists regarding the prevention and management of dental traumatic injuries during general anesthesia.

**Material and Methods:** A survey was distributed to specialist doctors and faculty members who are working in the Anesthesiology department of Medicine Faculties and hospitals. The questionnaire had twelve questions designed to look for the risk factors for orodental injuries and preventive measures. A total of 82 anesthesiologists completed the survey. SPSS 11.5 program was used for the evaluations and the statistical significance limit was accepted as  $p < 0,05$ .

**Results:** Results showed that 68% of the physicians encountered dental trauma in their professional life. The results showed that anesthesiologist consider limited mouth opening as the most common reason for orodental traumas. It was found that 59.8% of the doctors use pre-ventive practices to avoid trauma. Also only 23.2 % of anesthesiologists refer their patients for a dental check-up before surgery. Findings of the study showed us that, most of the anesthesiologists that completed the questionnaire wanted to be informed about dental traumas that may occur during general anesthesia.

**Conclusion:** It should be noted that an increase in the awareness of anesthesiologists among the risks of dental trauma and management measures during general anesthesia will be useful in reducing potential complications and costs associated with the treatment.

**Keywords:** General Anesthesia, dental trauma, management, awareness.

### Introduction:

Traumatic dental injuries are considered one of the most common dental health problems that are observed in permanent and primary dentition [1]. The causes behind dental trauma can be listed as falls, bumps and during various sports activities and also because of various medical applications such as interventions during general anesthesia [2,3,4,5,6]. It has been reported that dental injuries that are caused by general anesthesia varies between 0.01% to 0.1% and has been so for over a period of 30 years [5,7,8,9,10]. However it's also believed that this numbers

might not be representing the actual situation and numbers might actually be underestimated [4].

Studies have shown that tooth damage occurs quite frequently during anesthesia. (11-12). The prevalence of reportings about dental trauma incidence during endotracheal intubation report it to be 50-57% of the perioperative dental injuries [5,6], while Adolph's et al. reported it to be only 32.9% (10). Maxillary anterior teeth are found to be teeth with highest risk of injury [6]. Luxation injuries are the most commonly reported dental injury during anesthesia procedures followed by enamel fracture [6,10]. Even

though anesthesiologists considered 80% of the dental injury that occurred to be not avoidable [10], it has also been reported that great number of malpractice cases against anesthesiologists consist of dental trauma cases [1,13].

Increasing the awareness of anesthesiologist about dental trauma would help decrease of the trauma cases, which has psychological, economic, and even judicial dimensions [14,15]. How-ever when the literature is examined, a limited number of studies have been carried out to evaluate the awareness of this complication among anesthesiologists [14,15,16].

The main aim of this study is to evaluate the awareness of the anesthesiologists about perioperative orodental trauma risk factors and management of the traumatic injury status.

**Material and Methods:**

This study was approved by Başkent University Institutional Review Board and Ethics Committee Board (Project No: D-KA 16/01 94603339-604.01.02 / 20054) and supported by Başkent University Research Fund. Questionnaire consisting of 12 questions (with 2 to 5 options with possible answers), for the assessment of validity and reliability of orodental injury risk factors and preventive practices based on previous studies, applied on specialist doctors and faculty members working in the Anesthesiology Departments of Medical Faculties and Hospitals.

**Table 1:** Demographic data.

	Female	54/82 (%65.9)
	Male	28/82 (%34.1)
<b>Seniority (Year)</b>	16.5±7.98	
	10 year<	18 (%22)
	10 year>	64 (%78)
<b>Age</b>	45.50±7.57	

A power analysis was conducted prior to the study revealed that minimum participation number of 50 anesthesiologist would be sufficient for our study. Questionnaires were distributed to 120 anesthesiologist face to face and the purpose of the study was explained. 82 participants agreed to answer the questions and completed survey forms without their name information. Chi-Square Test / Fisher's Exact Test was used to compare the answers given by questionnaire surveys by physicians who worked less than 10 years. SPSS 11.5 program was used in the evaluations and the statistical significance limit was accepted as p <0.05.

**Results:**

65.9% (n = 54) of participants were female and 34.1% (n = 28) were male. 22% (n: 18) of the participants had a service year of less than 10 years and 78% (n: 64) of more than 10 years (Table 1).

In this study, 96.3% of anesthetists reported that dental injuries occurred most frequently during intubation. The answer to the question of which anesthetic equipment caused the most trauma was marked as laryngoscope with 97.6%. The response to the question of which clinical situations posed the greatest risk for dental injury was expressed as 78% limited mouth opening. Participants in this study reported that the most common

**Table 2:** Distribution of responses of all Participants to survey questions.

	Most answered	n	%
At what stage of anesthesia orodental injuries occur at maximum	Intubation	79	96.3
	Other*	3	3.7
Which clinical situations creates maximum risk for dental injuries	Limited mouth opening	64	78
	Other**	18	22
Which anesthetic equipment causes the most dental injuries	Laryngoscope	80	97.6
	Other	2	2.4
What is the most common oro-dental injury seen during anesthesia	Lip injury	47	57.3
	Dental trauma	16	19.5
	Other <sub>x</sub>	19	23.2
Which tooth is susceptible to dental injuries?	left central incisors	34	41.40%
	right central incisors	32	39.10%
	left lateral incisors	8	9.70%
	right lateral incisors	2	2.40%
	left central and right central	5	6.10%
	right central and right lateral	1	1.30%
What protective practices are you following to prevent dental injury?	the use of miller blade or macintosh blade	16	19.50%
	the use of mouth guards	7	8.50%
	the use of video-assisted laryngoscope	13	15.90%
	the use of plastic blade	3	3.70%
	the application of fiberoptic nasal intubation	3	3.70%
	the use of mouth guards- the use of video-assisted laryngoscope	100.00%	1.20%
	the use of video-assisted laryngoscope- the use of plastic blade	100.00%	1.20%
	the use of video-assisted laryngoscope- the application of fiberoptic nasal intubation	3	3.70%
	the use of miller blade or macintosh blade- the use of mouth guards	1	1.20%
	the use of miller blade or macintosh blade- the use of video-assisted laryngoscope	1	1.20%
Would you direct the patients to the dentist for dental check-up before the operation?	Yes	19	23.2
	No	63	76.8
Do you perform preoperative risk assessment as an anesthesiologist?	Yes	72	87.8
	No	10	12.2
How would you interfere with displaced tooth during anesthesia?	Do not apply a treatment	17	20.8
	Consult a dentist	37	45.1
How would you interfere with avulsed tooth during the anesthesia?	Other	28	34.1
	Consult a dentist	21	25.6
Have you had oro-dental trauma experience before?	Other <sub>y</sub>	61	74.4
	Yes	56	68.3
Do you want to be informed orodental against injuries that may occur during anesthesia?	No	26	31.7
	Yes	75	91.5
	No	7	8.5

\* : While the endotracheal tube is in place, During extubation, During the separation phase

\*\* : Oropharyngeal tube / laryngeal mask, Citation blocks, Airway

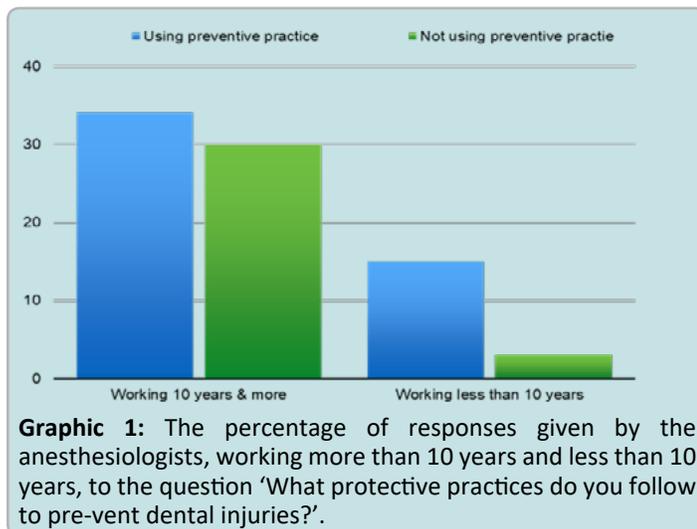
x: Oral mucosal injury, Farinx 's injury

y: I will deliver tooth to his relatives, I throw away the tooth , I keep the tooth

traumatized teeth were the upper central teeth with 86.6%(total upper central ratio) and the distribution of the rates of trauma to the teeth separately as follows only left central incisors (41.4%) and right central incisors (39.1%), at the same time the possibility of injury left central and right central (6.1%). the rest of the participants reported only left lateral incisors (%9.7), and right lateral incisors (2.4%), lastly right central and right lateral (1.3%). 59.8% of the physicians stated that ap-praisal was used frequently to prevent dental injury. Protective measures which anesthesiologists used include the use of miller blade or macintosh blade (19.5%), the use of mouth guards (8.5%), the use of video-assisted laryngoscope (15.9%), the use of plastic blade (3.7%), the application of fiberoptic nasal intubation (3.7%),

and 8.5 % of anesthetists stated that they used combinations of these techniques. And 40.2% of the doctors stated that they did not use any protective application. 45.1% reported that they would consult their dentist after subluxation and 25.6% after the avulsion. (Table 2)

The percentage of anesthetists working over 10 years and using any preventive practice to prevent dental injury was found to be statistically significantly less than those who worked less than 10 years ( $p < 0.05$ ) (Graphic 1).



#### Discussion:

Previous studies investigating the reasons behind dental trauma during anesthesiology re-vealed that traumas mainly occurs during laryngoscopy [4,6]. During laryngoscopy, the blades of the laryngoscope might hit against the tooth or anesthetist might use the tooth as fulcrum to depress the tongue there by causing damage to the teeth [17]. Studies showed that dental in-jury risk is greater during intubation, especially with difficult intubation, though it may occur during extubation as well, but the risk is less than intubation [4,18,19,20]. The findings from pre-sent study may be considered in accordance with these findings. In the present study 96,7% of the anesthetist marked laryngoscope as the anesthetic equipment which causes dental trauma. Also 96.3% of anesthetists that completed the questioner felt that the dental injury occurs at the time of intubation. These results are similar with the other studies that investigated the responses of the anesthetists as well [15,14].

Before anesthesia administration, it is has been advised to make an evaluation of the dental state for any degree of difficulty to be expected, like limited mouth opening. The most com-mon answer to the question 'which clinical situations create maximum risk for dental injuries' has been limited mouth opening in the previous study. In the study conducted by Daradawe et.al. [14] the anesthetists chose poor visibility in hypo pharynx as the main condition creating risk for dental injury followed by limited mouth opening. Use of fiberscope for endotracheal intubation has been recommended to reduce the incidence of damage of teeth during difficult intubation [21].

In our study, it was observed that the respondents felt that the lip injury was the most com-mon (57.3 %), and the teeth at risk were thought to be only left central incisors (41.4%) and right

central incisors (39.1%), only left lateral incisors (9.7%), and right lateral incisors (2.4%), at the same time the possibility of injury left central and right central (6.1%), lastly right central and right lateral (1.3%) respectively. Our results are similar to the previously conducted studies [14,15]. Studies conducted by Chen et.al. [9] and Lockhart et.al. [5] eventually showed that most frequently traumatized teeth are maxillary central left teeth followed by maxillary right teeth. Thus, we may say the anesthetologist answering the present study has the correct sense of knowledge on the subject.

In the present study 59.8% of the anesthetologists answered they were using protective practices during the operation and our results showed that anesthetologists with 10 years or more practice are less likely to use protective measures than less experienced anesthetologists ( $p > 0.05$ ). The act of making a recommendation can alter the clinical course being taken. The decision-making ability and the measures taken in professional life change with the experience over the years [22]. Therefore, in our survey study, we evaluated the year of anesthesia in professional life in order to determine whether there is a difference in the patient's approach to dental conditions. Anesthetists who have been working for more than 10 years may be less likely to use protective measures because of their experience and orodental risk assessment to reduce the likelihood of dental trauma. Hence, this might be the reason for our findings. However, in the present study number of anesthetologist that worked less than 10 years has been lower than those who had been working for more than 10 years. This may also have affected the statistical findings. We believe that a more detailed study on level of professional experience and dental trauma might be useful to explore this furtherly.

Protective measures used include the use of miller blade or macintosh blade (19.5%) most used technique, the use of mouth guards (8.5%), the use of video-assisted laryngoscope (15.9%), the use of plastic blade (3.7%), the application of fiberoptic nasal intubation (3.7%) and 8.5% of them use the combinations of these techniques. 40.2% of the doctors stated that they did not use any protective application. Similarly, in the study of Darawade et al. [14], 30% of anesthetologists stated that they did not use any protective application. Most of the anesthetologists, who used protective measures, stated that they use McCoy blade/ Macintosh blade with low-height flange. Tiku et al. [15] stated that 8% of the anesthetologist that responded to their study use no preventive measures, 6% of them use mouth guard, 84% of anesthetologist use teeth padding to prevent injuries to teeth. Results of the these above mentioned studies and the present study showed that most of the anesthetologist prefer to use protective techniques however we believe that improvement in these numbers is possible with ongoing educations about dental trauma.

Tiku et al. [15] stated that 75% of the anesthetologist that responded to their study said they refer their patients for a dental check-up before the surgery. Study by Darawade et al. [14] revealed that only 65% of the anesthetologist refer their patients for dental check-up before surgery. In the present study, we found it to relatively lower than other studies since only 23.2% of the participants responded that they direct the patients to the dentist for dental check-up before the operation; however, they also mentioned that 87.8% of the anesthetists perform preoperative risk assessment. The present study is finding correlate with review

by Yasny [3]. The review informs that although preoperative assessment is almost always performed by the anesthesiologist, the focus is patient's airway, including dentition. However, it is generally performed as to direct patients to open his or her mouth and protrude the tongue, rather than more extensive evaluation of the patient's intraoral condition. Yasny [3] states that, it may not be practical to obtain a dental consultation and definitive treatment immediately before surgery in many cases however when an elective surgery is planned it may be advisable to send the patient to a pre-operative dental checkup if difficult intubation is anticipated or poor dental condition is noted in order to prevent dental trauma during anesthesiology [14].

In the present study, most of the anesthesiologists who participated in the survey did not have detailed information about emergency dental trauma and did not have detailed information about the appropriate treatment. Contrary to this situation, most of the anesthesiologists have previously experienced dental trauma in their cases. And 91, 5% of the anesthesiologists stated that they want to be informed against orodental injuries that may occur during anesthesia. As Tiku et al. [15] have noted that extensive awareness of such injuries is required, similarly results were obtained by Tiku et al. [15] as well 95% of the participants wanted to increase their awareness on dental trauma. As anecdotal, doctors do not receive any training from dentists related to dental trauma, during medical and specialist training. In a study, suggest that accident and emergency doctors have only partial knowledge of the management of dental injuries [23]. Doctors provide this knowledge through their experience and self-development [23]. Our work also confirms this. Emergency physicians and anesthesiologists are more likely to encounter dental trauma and to perform dental trauma than other physicians [4,23]. Dental trauma is less likely if anesthesiologists become aware of the protective practices and, if necessary, preoperatively refer the patient to the dentist.

In some cases, it is not possible to get a dental consultation and definitive treatment just before the surgery. Physicians should be knowledgeable about fixing a loose tooth, preventing aspiration, and placing and fixing a tooth in case of dislocation. Needle-free 3-0 silk suture can be wrapped several times on the gingival margins of the moving tooth and adjacent teeth for increased stability. Anomalies observed in the oral region should be noted, prosthesis, piercing etc. If there is, it should be removed [24]. Care should be taken not to place excessive stresses upon the teeth and temporomandibular joint while maintaining mouth opening. The incidence of dental trauma increased in patients with a Mallampati score of 3 or more. In these patients, it has been observed that the use of a Macintosh blade with a low-height flange reduces the direct contact of the tooth and blade, so it can be preferred [25] In preparation for extubation, a soft gauze roll or mouth opener can be used to reduce the possibility of dental trauma to the bite surfaces of the patient's mandibular premolar/molar region [26].

In the present study results revealed that dental trauma during anesthesia is a situation that is easy avoidable with correct protective methods however the knowledge about how to manage and prevent dental trauma is not extensively known among anesthesiologist. In the present study, the filling of the questionnaire helped all participants to notice that they had to update themselves on the measures that could be taken to

reduce the incidence of dental trauma. However, creating a wide awareness of such injuries is necessary in terms of patient comfort and the approach of anesthesiologists to dental trauma.

#### Conclusion:

This study suggests that assessing awareness of anesthesiologists for management of dental traumas will play a positive role in prevention of orodental injuries, which are frequently seen during general anesthesia. Anesthesiologists must take a detailed history of the dental procedures done to the patient such as prosthesis or a history of dental trauma must be learned. The patient should be made aware of his poor dental status and all the findings should be documented we believe that education on prevention of dental trauma and management of it during educational stages of anesthesiology residency will help to reduce the incidence of such injuries in a long term.

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#### Conflicts of interest:

Authors declare there is no conflicts of interest.

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