



# Successful experience in dealing with tooth aspiration after extubation: a case report

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**Abstract:** There is a high incidence of tooth injury or loss due to endotracheal intubation or extubation. Tooth injury may be costly or even life threatening. In particular, tooth aspiration may cause airway obstruction, aspiration pneumonitis, or lung collapse, but tooth aspiration after tracheal extubation is rarely reported and easily overlooked. A missing tooth after extubation can be more dangerous. However, there are no practical guidelines and standard intervention strategies to deal with a loose or missing tooth. This article presents the case of a 67-year-old man who underwent laparoscopic colectomy for a colonic tumor under general anesthesia, and whose left maxillary incisor was loose. After surgery, the loose tooth was missing and we had to go through a difficult process to find it. Finally, a chest X-ray revealed a foreign body located in the trachea, and it was successfully removed by fiber-bronchoscopy. The patient woke up with no discomfort and was discharged without complications on the third day after surgery. Based on our experience in this case, we put forward a complete and effective flowchart named “VICTOR” as an option for the prevention of tooth loss and aspiration during surgical procedures and for locating a missing tooth in a timely, appropriate and safe way during the perioperative period.

**Keywords:** Aspiration; endotracheal extubation; tooth injury

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## Introduction

The reported incidence of peri-anesthesia dental injury ranges from 0.04% to 12.08% due to endotracheal intubation and extubation (1-3). However, the most common causes of injury are pre-existing dental risk factors, such as loose teeth, weakened crowns, and a history of dental implants (1,4). Such injuries may be costly or even life threatening, because if the lost tooth falls into the trachea, it may cause airway obstruction, aspiration pneumonitis, or lung collapse (5). Despite the seriousness of this problem, there have been few reports of missing teeth after extubation, which means that clinicians lack guidelines for handling this emergency.

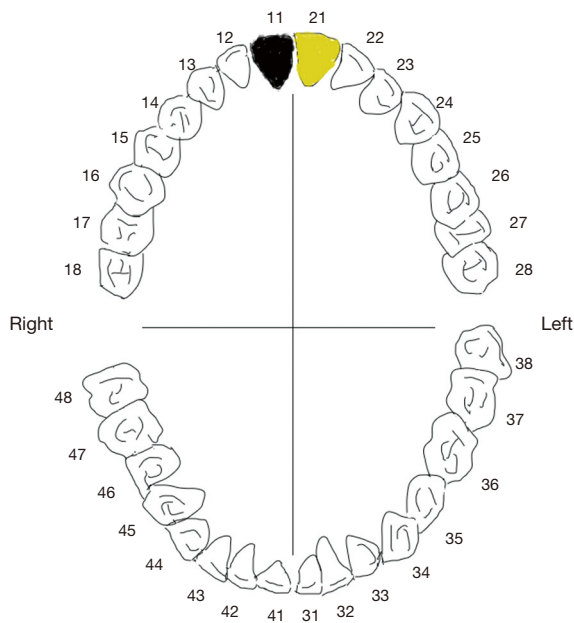
This article reports a case of a patient undergoing

elective surgery who aspirated a missing tooth after extubation. After a series of examinations, we were able to locate the missing tooth and successfully remove it using fiber-bronchoscopy. Based on our experience, a complete and effective process for the prevention of tooth loss and aspiration during surgical procedures and for locating a missing tooth was created. We present the following case in accordance with the CARE reporting checklist (available at <http://dx.doi.org/10.21037/apm-20-2541>).

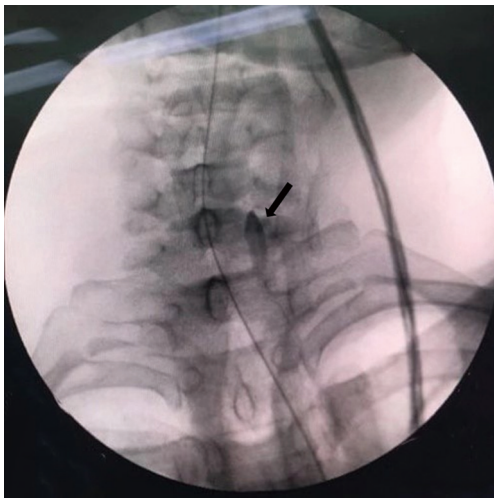
## Case presentation

A 67-year-old man was admitted to the hospital due to an abdominal mass for two months. The medical history of the

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**Figure 1** Dental chart showing the location of the teeth. The black is the missed tooth, #11, and the yellow is the loose tooth, #21.



**Figure 2** The missing tooth on X-ray. It is marked with arrows.

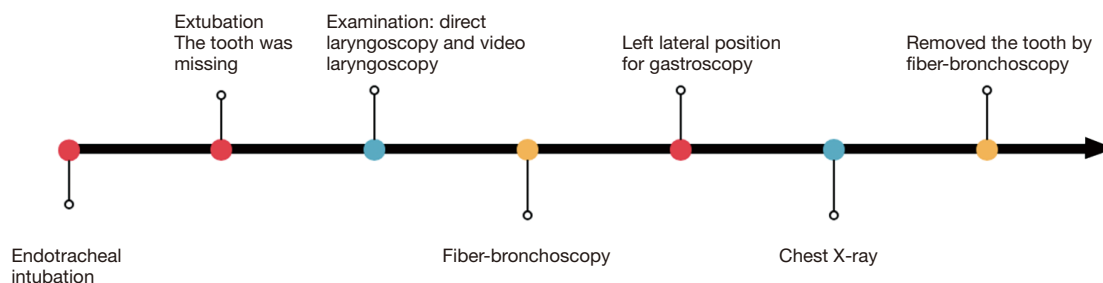
patient was not significant. Computed tomography (CT) revealed an enlarged mass in the right lower abdomen, measuring 5 cm × 6 cm. The dental exam showed that the right upper incisor (#11) of the patient was missing, and the left maxillary incisor (#21) was loose (*Figure 1*), with a high risk of dislodgement. The mobility of the tooth was classified by the clinic as grade III: can be moved 1 mm



**Figure 3** The missing tooth in the trachea.

or more in a lateral direction and can be depressed in a vertical direction. He was scheduled to have laparoscopic colon tumor resection under general anesthesia. A cautious endotracheal intubation was completed with a Glidescope and it was confirmed that the left incisor was still in place. Out of concern that the patient might bite the tube at the end of anesthesia, the anesthesiologist removed the tube when the patient resumed regular spontaneous breathing. However, after extubation, we noticed that the left maxillary incisor was missing. Inspection by normal direct laryngoscopy or video laryngoscopy revealed that the tooth was not in the oral cavity or the pharynx. An initial fiber-bronchoscopy examination of the trachea also failed to show the tooth. As the tooth was suspected to have lodged in the esophagus or passed into the stomach, the patient was placed in the left lateral position for gastroscopy by a gastroenterologist, but the dislodged tooth was still not found. Finally, a chest X-ray revealed a foreign body located in the trachea (*Figure 2*), which was later determined to be the missing tooth. The dislodged tooth was removed by fiber-bronchoscopy (6) (*Figure 3*). The patient woke up with no discomfort and was discharged without complications on the third day after surgery. The timeline of this patient's historical and current information is shown in *Figure 4*.

All procedures performed in studies involving human participants were in accordance with the Declaration of Helsinki (as revised in 2013). Written informed consent was obtained from the patient for publication of this case report and any accompanying images.



**Figure 4** The timeline of this patient's historical and current information.

## Discussion

The patient's loose tooth presented the anesthesiologist with the dilemma of whether to remove the tooth before intubation. Dental injuries are mainly caused by the insertion or removal of a laryngeal mask or while using a laryngoscope for tracheal intubation. In our case, we avoided dental injury during intubation, but the patient's tooth was missing after extubation. This case emphasizes the need for anesthesia providers to check for dental injury not only during intubation, but also after extubation. Although, as in this case, the maxillary incisors are the most frequently injured teeth (7), all teeth should be carefully examined before intubation and after extubation. An adequate preoperative oral examination reported on a dental charting diagram complete with notes is the procedure that must be followed before intubation (8,9). Securing a loose tooth with a suture is a prudent measure to prevent aspiration and to facilitate the tooth's retrieval if it is dislodged. Preventive measures such as the use of surgical foam tape, a laryngoscope blade, gauge roll, blades with modified shapes or enfolded with surgical tape, and preformed tooth protectors like mouth guards have also been suggested (10). Bowcock proposed a cost-effective, individualized thermoplastic mouth guard for patients who had a full set of upper veneers and presented a potentially difficult endotracheal intubation (11).

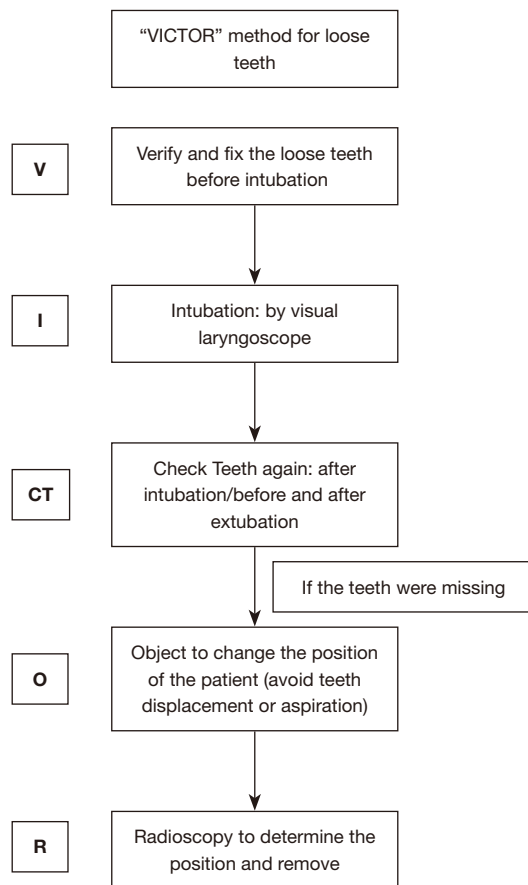
We speculate that the tooth was dislodged into the mouth during extubation but we failed to notice it. We think that the tooth entered the trachea when the patient was placed in the left decubitus position during gastroscopy, which explains why it was not found on the first bronchoscopy, but on the second one. Tooth injury is common during the peri-anesthesia period, and a normative oro-pharyngeal evaluation should be performed, as it helps to choose the most appropriate airway strategies and reduce clinical risks

and possible legal cases. To the best of our knowledge, there is a lack of practical guidelines and standard operating procedures, which makes it more difficult to find and remove missing teeth.

Based on the literature review and the experience of this case, we propose a process flowchart with the mnemonic "VICTOR" illustrating a procedure for safely dealing with loose teeth (*Figure 5*). In following the "VICTOR" process, we reiterate the importance of verifying ("V") any loose teeth and fixing them in place by tying with silk thread or using a mouth guard before intubation (3). For patients with loose teeth, we recommend endotracheal intubation by visual laryngoscopy ("I") (12). At the same time, we emphasize the necessity of checking teeth ("CT") again after intubation, and before and after extubation (6). If a tooth is missing, the patient's position should not be changed to prevent the tooth from entering the esophagus or trachea ("O"). To locate the missing tooth and ensure its successful retrieval, radiology should be immediately performed, such as a chest X-ray, to determine the position of the tooth and take appropriate steps to remove it ("R") (5,13).

There are some limitations of this case report. Firstly, the "VICTOR" method is put forward based on our single centre experience, and its efficacy and safety should be tested in more patients. Secondly, it is proposed for dealing with a perioperative tooth loss emergency after extubation, the "VICTOR" flowchart should be considered as a general process involving intubation/extubation and not just used in emergencies. The goal should be to find and secure a loose tooth before it is lost during a procedure.

In summary, a missing tooth or other dental injury after extubation can be dangerous, and it is very important to check the patient for loose teeth before intubation and after extubation. We hope that the "VICTOR" method will provide an effective procedure for dealing with loose or



**Figure 5** Flowchart showing the “VICTOR” method.

missing teeth in a more timely, appropriate and safer way during the perioperative period.

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## Footnote

*Reporting Checklist:* The authors have completed the CARE reporting checklist. Available at <http://dx.doi.org/10.21037/apm-20-2541>

*Conflicts of Interest:* Both authors have completed the ICMJE uniform disclosure form (available at <http://dx.doi.org/10.21037/apm-20-2541>). The authors have no conflicts of interest to declare.

*Ethical Statement:* The authors are accountable for all

aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved. All procedures performed in studies involving human participants were in accordance with the Declaration of Helsinki (as revised in 2013). Written informed consent was obtained from the patient for publication of this case report and any accompanying images.

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