



Successful repair of a partially transected endotracheal tube with Dermabond surgical adhesive during a Lefort osteotomy: a case report

Daniel Ahn, Tuan-Hsing Loh

Department of Anesthesiology, UT Health Science Center at San Antonio, San Antonio, Texas, USA

Damage to the endotracheal tube (ETT) during oral and maxillofacial surgeries is a rare but serious intraoperative complication. Herein, we present a case of a partially damaged ETT that was repaired using Dermabond surgical adhesive (Ethicon, Sommerville, NJ, USA) during a Lefort osteotomy. Dermabond surgical adhesive can be a simple and viable tool to repair partially transected ETTs where ETT exchange carries a high risk of airway loss. Our case adds to one of the several techniques for managing damaged ETT in an intraoperative setting.

Keywords: Endotracheal Intubation; Dermabond; Lefort Osteotomy.



This is an Open Access article distributed under the terms of the Creative Commons Attribution Non-Commercial License (<http://creativecommons.org/licenses/by-nc/4.0/>) which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.



INTRODUCTION

Damage to the endotracheal tube (ETT) during oral and maxillofacial surgeries is an intraoperative complication with potentially catastrophic consequences. Airway compromise is a significant concern for anesthesiologists during these surgeries because of the proximity of the ETT to the surgical field. Thus, it is imperative that there be a viable plan to carry out in cases in which the ETT is damaged intraoperatively. Herein, we present a case of a partially damaged ETT that was repaired using Dermabond surgical adhesive (Ethicon, Sommerville, NJ, USA) during a Lefort osteotomy.

CASE REPORT

An 18-year-old female (BMI, 35 kg/m²) without significant medical problems presented for elective left osteotomy after experiencing complications related to maxillary hypoplasia, mandibular hyperplasia, and severe malocclusion. Physical examination revealed a Mallampati I airway, full cervical spine range of motion, and thyromental distance measuring greater than three finger breadths. A scopolamine patch was placed, and oxy-metazoline spray was administered to each nostril prior to the start of surgery.

The patient was premedicated with 1 mg of intravenous midazolam, and 25 mcg of sufentanil, 100 mg of lidocaine, and 50 mg of rocuronium were administered. The patient was intubated using a 7.0-mm nasal

Received: December 31, 2022 • Revised: March 9, 2023 • Accepted: March 21, 2023

Corresponding Author: Daniel Ahn, University of Texas Health Science Center at San Antonio, Department of Anesthesiology, 7703 Floyd Curl Drive, San Antonio, Texas 78229-3900

E-mail: Ahnd@uthscsa.edu

Copyright© 2023 Journal of Dental Anesthesia and Pain Medicine

ring-adair-Elwyn (RAE) ETT through the left nostril with a fiberoptic bronchoscope. A right radial arterial catheter was placed, and the operating table was rotated 180° away from the ventilator at the request of the surgical team. Anesthesia was maintained with 2% sevoflurane and continuous sufentanil infusion at 0.5 mcg/kg/hr, which we use routinely at our institution as part of a protocol to provide permissive hypotension and lessen the bleeding of the surgical site during Lefort osteotomy.

Approximately 1 h after the start of the surgery and shortly after the down-fracture of the maxilla, the surgeon noted a 5 mm transection of the ETT with air bubbles arising from the site of the defect, approximately 18 cm from the tip. The patient remained well-ventilated, maintaining a tidal volume of approximately 460 mL, end-tidal CO₂ of 35 mmHg, and a peak airway pressure of 15 cmH₂O during this time. After a discussion with the surgical team regarding airway management, a decision was made to proceed without exchanging the ETT, given the advanced stage of the surgery and the high risk of airway loss. To address the potential for inadequate ventilation due to the defect, the surgeon proceeded to apply Dermabond to the lesion site with 2-3 min of drying time (Fig. 1). The surgical adhesive successfully sealed the transection site, with no air bubbles visible thereafter. The patient remained stable throughout the surgery without changes in ventilatory parameters and was extubated safely after the surgery. The duration of surgery was 3.5 h.

DISCUSSION

Damage to the ETT during oral and maxillofacial surgery is an intraoperative complication that is well-documented in the literature, with the authors describing a variety of methods of intervention. A case report dating back to 1986 described placing a smaller, lubricated ETT in the lumen of a damaged tube and exchanging the damaged ETT with a stylet [1]. Another case in 1988 reported using a nasogastric tube as a

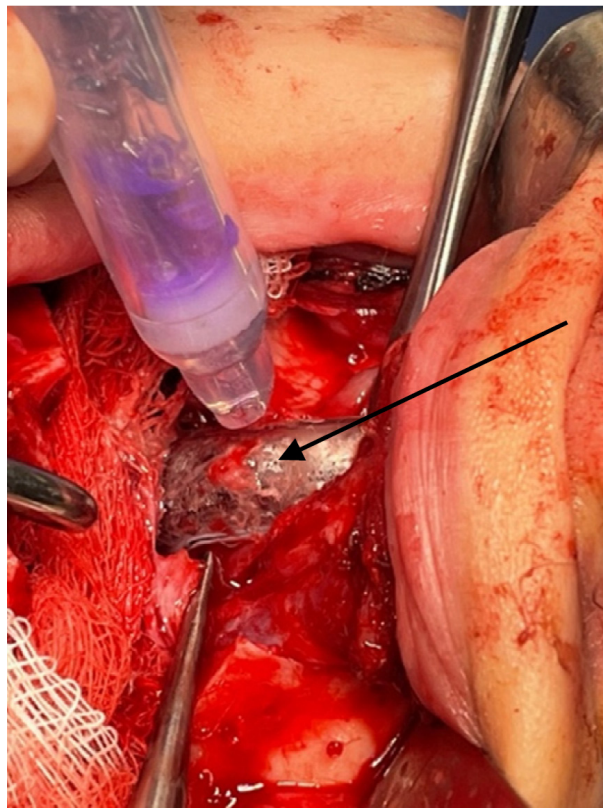


Fig. 1. Application of Dermabond surgical adhesive to the site of the defect.

conduit to deliver oxygen and guide ETT exchange [2]. Multiple case reports have described the use of the MacGrath video laryngoscope, direct laryngoscope, and fiberoptic bronchoscope to safely exchange damaged ETTs during oral and maxillofacial surgeries [3-5]. Others have reported the use of a gum-elastic bougie or a specialized airway exchange catheter, which has the advantage of providing ventilation during the exchange process [6,7]. In rare cases, an emergency tracheostomy is performed after the flexometallic ETT is completely transected [8].

In our case, we observed a 5 mm partial transection of the ETT, accompanied by visible air bubbles emanating from the defect site. Although ETT exchange was considered, the risk of airway loss was quite high given the altered oropharyngeal anatomy at the time of surgery. Thus, the decision was made to proceed without exchanging the ETT and attempt to seal off the defect. The air leaks were successfully sealed, and the surgery

was concluded uneventfully.

In conclusion, ETT damage during oral and maxillofacial surgery is a serious complication, and it is imperative for anesthesiologists to develop a viable strategy to address this problem. Off-label use of the Dermabond surgical adhesive can be a simple and viable intraoperative solution for partially transected ETTs, where ETT exchange carries a high risk of airway loss. Our case adds to one of the several techniques for managing damaged ETT in an intraoperative setting.

AUTHOR ORCID*s*

Daniel Ahn: <https://orcid.org/0000-0001-6983-2751>

Tuan-Hsing Loh: <https://orcid.org/0000-0003-3607-0484>

AUTHOR CONTRIBUTIONS

Daniel Ahn: Writing - original draft, Writing - review & editing

Tuan-Hsing Loh: Supervision, Writing - original draft, Writing - review & editing

CONSENT: This case report was submitted after receiving approval from the University Health Clinical Research IRB (HSC20220825N).

CONFLICT OF INTEREST: None reported.

REFERENCES

1. Peskin RM, Sachs SA. Intraoperative management of a partially severed endotracheal tube during orthognathic surgery. *Anesth Prog* 1986; 33: 247-51.
2. Baker CS, Kora S, Abadir AR. Management of a perforated endotracheal tube during orthognathic surgery. *Anesth Prog* 1988; 35: 158-9.
3. Koyanagi Y, Yokota E, Iwata M, Shimazaki R, Misaki T, Oi Y. A case of successful tracheal tube exchange with McGrath MAC for tube damage during oral surgery. *Anesth Prog* 2020; 67: 174-6.
4. Badger J. Endotracheal tube damage during surgically assisted rapid palatal expansion surgery; a case report. *J Dent Anesth Pain Med* 2020; 20: 45-7.
5. Himarani J, Nancy SM, Krishna Kumar Raja VB, Sundaram SS. Management of an intraoperatively damaged endotracheal tube in a case of difficult airway using fibre-optic bronchoscope with minimal apnoea period. *Indian J Anaesth* 2017; 61: 347-9.
6. Jain M, Garg M, Gupta A. Accidental perforation of endotracheal tube during orthognathic surgery for maxillary prognathism - a case report. *Indian J Anaesth* 2008; 52: 205-7.
7. Nair VA, Balagopal P. Intra-operative endotracheal tube damage: anaesthetic challenges. *Indian J Anaesth* 2012; 56: 311-2.
8. Ladi SD, Aphale S. Accidental transection of flexometallic endotracheal tube during partial maxillectomy. *Indian J Anaesth* 2011; 55: 284-6.