



Original Contribution

# Transmylohyoid orotracheal intubation: case series and review

Samprati J. Badjate BDS, MDS (Associate Professor)<sup>a,\*</sup>,  
S.R. Shenoï BDS, MDS (Professor and Vice Dean)<sup>b</sup>,  
Nilima J. Budhrajā MDS (Senior Lecturer)<sup>a</sup>, Pranav Ingole MDS (Senior Lecturer)<sup>a</sup>

<sup>a</sup>Department of Oral and Maxillofacial Surgery, Vidya Shikshan Prasarak Mandal's (V.S.P.M.'s) Dental College and Research Centre, Nagpur-440019, Maharashtra, India

<sup>b</sup>V.S.P.M.'s Dental College and Research Centre, Nagpur-440019, Maharashtra, India

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## Abstract

**Study Objective:** To evaluate the outcome of airway management in patients with complex maxillofacial fracture by submental intubation, time required for intubation, accidental extubation, and postoperative complications.

**Design:** Retrospective study.

**Setting:** University-affiliated hospital.

**Measurements:** The medical records of the 10 patients who underwent submental intubation from December 2008 to June 2011 were reviewed.

**Main Results:** At the end of the procedure, all 10 patients were extubated without any complications. Postoperatively, only one patient presented with superficial infection of the submental wound.

**Conclusions:** Submental endotracheal intubation is a simple technique with very low morbidity, and may be used as an alternative to tracheostomy in selected cases of maxillofacial trauma.

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## 1. Introduction

The submental approach for intubation allows unhindered reduction and fixation of the complex maxillofacial fractures, for which simultaneous access to nasal pyramid fractures is required. Submental intubation was first described by Altamir [1]. The term “transmylohyoid intubation” was

coined by Gadre and Kushte [2], since the path of exit of the endotracheal tube (ETT) is across the mylohyoid muscle and not restricted to the submental triangle.

We present a study of 10 cases with a review of the literature, emphasizing technical details, indications, contra-indications, advantages, disadvantages, and complications of this technique.

## 2. Subjects and methods

Patients with maxillofacial trauma in whom submental intubation was used, from December 2008 to June 2011,

\* Correspondence: Dr. Samprati J. Badjate, Badjate's Hospital, Centre For Maxillofacial Oral and Dental Surgery, 39, S.E. Rly Colony, Ind Layout, Ranapratap Nagar, Nagpur-440022, Maharashtra, India. Tel.: 093 7099-7210.

E-mail address: [drsamprati@rediffmail.com](mailto:drsamprati@rediffmail.com) (S.J. Badjate).

were reviewed retrospectively. Data recorded included demographics, type of maxillofacial fracture, time required for intubation, and intraoperative and postoperative complications related to submental intubation. A total of 10 patients had undergone submental intubation for management of complex craniomaxillofacial or panfacial fractures.

## 2.1. Anesthesia technique

All preparations for difficult airway were taken. Before intubation it is important to detach and reattach the sealed universal connector gently from the proximal end of the flexometallic ETT (Portex, Smiths Medical UK, Ashford, UK) so that it may be easily disconnected during the procedure. The flexometallic ETT is preferred since it is reinforced with metallic spring material that has a shape memory; the ETT is flexible and kink-resistant, and it retains patency despite the acute angle of the airway, particularly at the submental route. Initially, standard orotracheal intubation was carried out and the ETT was connected to the breathing circuit. Orotracheal intubation is then converted to submental intubation using the following surgical technique. Standard extubation procedure was carried out after completion of the anticipated procedure.

## 2.2. Surgical technique

Under all aseptic precautions and after temporary draping of the mouth and chin, a 1.5-2 cm skin incision was made in the paramedian submental region, directly adjacent to the medial aspect of the lower border of the mandible (Fig. 1). A pair of curved artery forceps was used to traverse the platysma and mylohyoid muscles such that it remained in contact with the lingual cortex of the mandible. The mucosal layer in the floor of the mouth was incised over the distal end of the forceps, and the forceps was then



**Fig. 1** View of the 1.5-2 cm incision in the paramedian submental region, for submental intubation.

opened, creating a wide tunnel so that the tube is withdrawn easily.

We prefer to pass the tube in two steps: the tube cuff is first introduced into the mouth after its deflation, a closed curved artery forceps is then inserted intraorally through the surgically created tunnel, the tube cuff is grasped with curved artery forceps, then pulled inferiorly to pass through the tunnel with forceps and emerge through the incision in the submental skin. The same maneuver then was carried out with the proximal end of the ETT itself, after disconnection from the circuit and detachment of the connector. It should be noted that the patient is ventilated with 100% oxygen for about 3 minutes to prevent oxygen desaturation during the period of ventilator interruption when the ETT is passed across the floor of the mouth. After the ETT tube emerges extraorally through the tunnel, the connector is reattached and the circuit is re-established. Auscultation is used to confirm final ETT positioning. At this point, the position of the ETT is reassessed and adjustments made so that there is equal bilateral air entry. A pharyngeal pack is inserted to seal the pharynx from blood and debris during surgery.

Stay sutures with 3-0 silk were placed around the ETT to secure it, minimizing perioperative movement and preventing accidental extubation (Fig. 2). The ETT crossed the oral mucous membrane of the floor of the mouth, submucosa, mylohyoid muscle, deep cervical fascia, platysma, subcutaneous tissue, and skin of the paramedian submental region. After completion of submental intubation, the anticipated procedure was carried out. At the end of the procedure, the stay sutures around the ETT were removed and the deflated pilot tube cuff and the ETT were pulled in reverse order from the tunnel to the oral cavity, thus converting submental intubation to orotracheal intubation. The skin wound was



**Fig. 2** View of the endotracheal tube, which was secured with stay sutures to minimize perioperative movement and accidental extubation, at the end of the procedure.

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