ABSTRACT
Background: The submental approach for intubation allows an unhindered reduction and fixation of the complex maxillofacial fracture that required simultaneous access to nasal pyramid fractures by avoiding the need for tracheostomy. Aims and Objectives: To assess the efficacy of Submental approach intubation for the management of maxillofacial trauma. Materials and Methods: The sample consists of six patients. Data recorded were personal details, type of maxillofacial fracture, time required for intubation and intraoperative and postoperative complications related to the use of submental intubation. Results: Submental orotracheal intubation was completed successfully in six male patients with ages ranging from 35 to 55 years. No accidental extubation or tube injuries occurred. The mean time from the ventilator was approximately 2 minutes and there was no significant oxygen desaturation in any patient during the procedure. No major complications such as hemorrhage, injury to sublingual glands, Wharton’s duct, lingual nerve, or oro-cutaneous fistula were observed. Conclusion: Submental intubation has proven effective in terms of efficiency and surgical time required.

Key words: Maxillofacial Trauma; Pan facial fracture; Submental Intubation

Introduction
Management of the airways in the presence of midfacial or panfacial injuries with mandibular involvement requires special consideration. The submental approach for intubation allows an unhindered reduction and fixation of the complex maxillofacial fracture in which simultaneous access to nasal pyramid fractures is required and thereby avoiding the need for tracheostomy. The technique is comparatively simple and consists of diverting the proximal end of the orotracheal tube through the floor of the mouth out from an opening in the submental region. This allows free intraoperative access to the dental occlusion and naso-ethmoidal region without endangering patients with skull base trauma and at the same time avoids trans tracheal dissection and associated complications. The present study was conducted to assess the efficacy of Submental approach for intubation for the management of Maxillofacial trauma.

Materials and Methods
This study was conducted among the trauma patients reported to the department of oral and maxillofacial surgery, EMS Co-operative Hospital and Research Centre, Kerala, India for open reduction and fixation under general anesthesia using submental intubation during December 2011 to June 2013. The institution Ethics Committee approved the study and informed consent was obtained from each patient. Sub mental approach for tracheal intubation was performed on six patients undergoing surgery under general anesthesia. All patients participated in this study were indicated for open reduction and fixation under general anesthesia and oral intubation was not suitable for surgical techniques and nasal intubation was contraindicated or impossible. Data recorded were personal details, type of maxillofacial fracture, time required for intubation, and intraoperative and postoperative complications related to the use of submental intubation.

Surgical Procedure: The technique used for submental intubation was in accordance with the general principles laid down by Hernandez Altemir in 1986. The treatment plan consisted of submental intubation followed by open reduction and internal fixation (ORIF). General anesthesia was established by intravenous infusion of sodium pentothal. The patient was orally intubated after muscle relaxation with reinforced orotracheal intubation tube (Nos.7-8.5) with a detachable connector. An incision of 1.5-2 cm was made in the median region of the submental area directly adjacent to the lower border of mandible. The muscular layers, platysma and mylohyoid muscles, were dissected using blunt dissection with artery forceps. The mucosal layer on the floor of the mouth was incised over distal end of the forceps located in front of the sublingual caruncle and the forceps are then opened creating a tunnel. During the dissection it was important that the width of the submental access should be sufficient to pass the tube without any interference. Once the surgical access was made, the tube was de-cuffed and the balloon was first introduced into the mouth, being passed through the tunnel with the forceps and the tube was re-routed through the sub mental path. The total time needed for this procedure did not exceed 3 minutes. The plastic connector was immediately reattached to tube and ventilation re-established. The cuff was inflated again and tube was now secured with the help of stay sutures in submental region. Following the completion of the surgery stay sutures were removed and after achieving 99-100% oxygen saturation the tube was again disconnected, the connector removed and the proximal end of it was pulled inside the mouth after the cuff balloon. Once the patient resumed breathing submental incision was sutured. The scarring was observed for six month. The data obtained was assessed using SPSS 20 for mean, median and percentage.

Results
A total of six patients underwent open reduction and internal fixation from a total of 157 surgical operations performed under general anaesthesia from December 2011 to June 2013 in the Maxillofacial Surgical Department at EMS Co-operative Hospital and Research Centre, Kerala, India. Submandibular intubation was performed successfully on all six male patients.
(3.187% of facial fracture surgical operations performed). All patients were adult males with an age ranging from 22 year to 39 year with a mean age of 30.50 ± 6.380 year). The study population consists of patient indicated for submental intubation because the oral intubation was contraindicated or not possible. Four patients had panfacial fractures associated with fracture base of nasal bone (66.7%) and one required additional rhinoplasty reconstruction surgery (16.7%). One patient had maxilla-mandibular fractures associated with fracture base of the skull (16.7%). No accidental extubation or tube injuries occurred. The mean time from the ventilator was approximately 2 min and there was no significant oxygen desaturation in any patient during the procedure. No major complications such as hemorrhage, injury to the sublingual glands, Wharton’s duct, lingual nerve, or orocutaneous fistula was observed. No motor or sensory nerve disturbance was recorded. Postoperative scarring of the submental wound was detectable only upon close inspection with the neck hyperextended. None of the cases showed keloid or hypertrophic scars. However, we experienced one case of superficial infection of the submental wound, which was resolved after systemic antibiotics and debridement. The postoperative healing was uneventful. Only one patient had postoperative superficial infection and recovered completely after 3–4 days with antibiotics and dressing.

**Discussion**

Difficulty in securing an airway is often associated with the management of complex maxillofacial trauma. When neither nasotracheal nor orotracheal intubation is suitable tracheostomy is a traditional method favored by some surgeons and anesthesiologists. However, this procedure is associated with complications such as hemorrhage, subcutaneous emphysema, pneumomediastenum, blockage of tracheostomy cannula, tracheitis, cellulitis, pulmonary atelectasis, tracheoesophageal fistula, tracheocutaneous fistula, pneumothorax, recurrent laryngeal nerve damage, stomal and respiratory tract infection, tracheal stenosis, tracheal erosions, dysphagia, problems with decannulation, excessive scarring and requires careful surgical and perioperative management. Different alternatives to tracheostomy have been proposed in the literature.

Submental intubation is now a known alternative to tracheostomy to secure airway in the management of severe maxillofacial injuries. It was first discovered by Altemir. Altemir’s surgical approach for intubation was a 2 cm submental incision just medial to the lower border of the mandible, approximately one-third of the distance between the symphysis and the angle of the mandible. Potential complications of this approach include damage to adjacent structures, such as sublingual and submaxillary ducts, sublingual gland, and lingual nerve. Several investigators tried Altemir’s technique with good success and with no major problems. In the present study, we used a submental intubation as an alteration of tracheostomy for all six patients and found the technique easy and effective when orotracheal and nasotracheal intubations cannot be done. The limitation of this procedure is for patients who also present a neurological deficit or thoracic trauma and need more than 7–14 days of postoperative ventilator support and patients expected to need repeated operations. In such cases a tracheostomy is a safer procedure than endotracheal intubation. The submental intubation technique was simple and during intubation and extubation in our study and the intraoperative and the postoperative periods were uneventful. It helps to maintain a patent airway and an uninterrupted surgical access to the nose and to the oral cavity and allowed to achieve a good dental occlusion. One of our patient required postoperative airway protection during the postoperative period because of suspected postoperative airway edema and some delay in the return to a satisfactory level of consciousness because of an associated head injury. Therefore, the submental intubation tube left in place under careful supervision for duration of 40 h after surgery. Maxillomandibular fixation was avoided postoperatively in this patient as submental intubation was in place to allow immediate access to the oral airway. All other five patients were extubated after recovery from anesthesia before they left the operating theatre. The patients were satisfied as tracheostomy was avoided.

**Conclusion**

In conclusion, submental intubation is a simple and effective technique for the airway maintenance with minimal risk. The submental intubation technique was very convenient to the surgeon because of the unobstructed access to the surgical field and to the anesthetist concerning the safety of the patients’ airways.

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**References**


How to cite this article

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Source of Support: Nil
Conflict of Interest: None Declared