

## Submental Intubation with Laparoscopic Trocar in Maxillofacial Surgery an Alternative Technique

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### ABSTRACT

**Background:** Submental intubation is commonly employed in maxillofacial surgeries as it offers safe, unrestricted access to the surgical field, without the need for a tracheostomy, which carries higher risks and complications. Submental intubation causes obstruction of the endotracheal tube by soft tissues or blood clots. To address this, a laparoscopic trocar can be used to facilitate the procedure. The trocar helps create a clear passage for the tube, minimizing the risk of blockage and enhancing overall procedural efficiency.

**Case:** 35 year-old male weighing 58kg, presented with fractures involving the zygomatico maxillary complex was scheduled to undergo an open reduction and internal fixation. We performed laparoscopic trocar guided submental intubation, which provided sufficient space for endotracheal tube insertion. Unlike conventional methods, the technique avoided the need for blunt dissection, resulting in significantly minimum soft tissue damage and reducing the overall time required for the procedure.

**Conclusions:** Submental intubation using a laparoscopic trocar is a single-step, fast and accessible technique that carries fewer complications compared to conventional methods.

**Keywords:** Airway management; Submental intubation; Maxillofacial trauma; Laparoscopic trocar.

### INTRODUCTION

Airway management is still challenging in maxillofacial. Choices in airway management for these patients include nasotracheal intubation, tracheostomy, retromolar intubation and

submental intubation.<sup>1</sup> Especially in cases where nasotracheal intubation not preferred in the presence of pan-facial fracture, cervical spine injury, cranial base fracture and cause potential complications, including epistaxis, accidental cranial or intracranial intubation and meningitis.<sup>2</sup> Tracheostomy is a conventional and effective method to establish the airway in such patients, both routinely and in emergencies but can be associated with post-operative care, complication and morbidity. Submental intubation technique provides excellent access to the operative field and allows temporary intraoperative intermaxillary fixation without requiring tracheostomy.<sup>3,4</sup> We present a case of submental intubation using a reinforced endotracheal tube with maxillofacial trauma. The use of trocar reduced trauma and intubation time.

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## CASE REPORT

A 35-year-old male, weighing 58 kg, presented with fractures involving the zygomatico maxillary complex, indicative of a Le Fort II fracture. He was scheduled for open reduction and internal fixation. After proper pre-anesthetic check-up and written consent were obtained, the patient was shifted to the operating room. All standard monitoring devices were attached to ensure the patient's vital signs were continuously observed during the procedure. After standard orotracheal intubation with an armored endotracheal tube, the floor of the mouth was exposed. A 1.5 cm incision was made in submental region and a 12-mm laparoscopic trocar was passed in direction of skin-to-oral. After ventilating the patient with 100% oxygen for several minutes, the tracheal tube was briefly disconnected from the breathing circuit of ventilator. The connector of tube was removed and

the proximal part of the tube was gently pulled through lumen of the trocar. Once the tube was in place, the trocar was removed. The connector was then reattached and the tube was reconnected to the breathing circuit. The correct placement of the tracheal tube was confirmed using capnography and chest auscultation. The tube was then secured to the submental skin with silk suture. Revert the procedure after completion of the surgery. Cut the skin sutures and the tracheal tube was briefly disconnected from the breathing circuit. The connector was removed and the tube was pulled back through floor of the mouth. The tube was connected with breathing circuit of ventilator. The submental incision was closed with silk sutures and suture removed after postoperative day five. The patient recovered without complications. The use of a laparoscopic trocar causes insignificant tube occlusion due to soft tissue and blood.



Fig. 1: The armored endotracheal tube and The laparoscopic trocar



Fig. 2: Oral intubation done with armored endotracheal tube



Fig. 3: Showing the incision for submental intubation

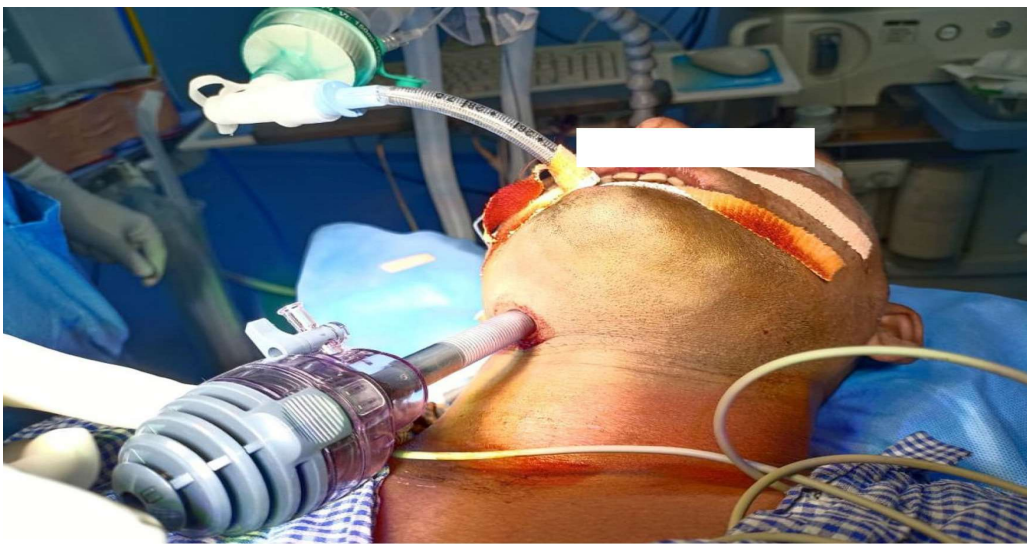


Fig. 4: Laparoscopic trocar inserted in the skin-to-oral direction



Fig. 5: The tube pulled through the passage of the trocar's lumen



Fig. 6: The endotracheal tube connect to the breathing circuit of workstation and fixed to skin with silk suture

## DISCUSSION

Securing an airway in complex maxillofacial trauma is always a challenging task for an anaesthesiologist and an oral & maxillofacial surgeon. Orotracheal intubation is not appropriate it restrict the surgical access of the operative field.

Nasal intubation is contraindicated in panfacial fracture, cervical spine injury, cranial base fracture, distorted nasal field, or when use of nasal packing. Complications of nasotracheal intubation can include epistaxis, sinusitis, meningitis, sepsis, injury to the adenoids, dislodgment of bony fragments and rarely intracranial intubation.<sup>5</sup>

Tracheostomy is a conventional and effective method to establish the airway in such patients, both routinely and in emergencies. However, it may be causes surgical emphysema, pneumothorax, pneumomediastinum, recurrent laryngeal nerve palsy, respiratory tract infection, tube blockage, dysphagia, difficulty with decannulation, tracheal erosion, tracheal stenosis, tracheoesophageal fistula and visible scarring delay extubation.

In 1986, Francisco Hernandez Altemir introduced the submental approach to orotracheal intubation is alternative to short-term tracheostomy, particularly in the context of panfacial trauma surgeries. Tracheostomy, while effective, can be associated with significant morbidity, making the submental approach a valuable option.<sup>6,7</sup> Submental intubation provides undisturbed and safe surgical access and easily extubate the patient after completion of surgery. Submental intubation not having serious complications of surgical tracheostomy.<sup>8</sup>

Therefore, submental intubation is widely used in maxillofacial surgeries.<sup>9</sup>

During submental intubation, soft tissues and blood clots can become lodged in the endotracheal tube. To overcome this problem, we used a laparoscopic trocar.<sup>9</sup> Laparoscopic trocar guided submental intubation not needed any blunt dissection that causes minimal soft tissue damage and minimum time required. In conventional submental intubation endotracheal tube occluded by soft tissues and blood clots. For prevention of this problem we use laparoscopic trocar for submental intubation.<sup>10,11</sup>

## CONCLUSION

Submental intubation is indeed an alternative airway management technique, especially useful in maxillofacial trauma when traditional methods like oral or nasal intubation may be contraindicated due to the injury. The use of a laparoscopic trocar in this context is an innovative approach that can streamline the process by reducing the time needed for submental intubation and minimizing complications like luminal occlusion from soft tissue or blood clots. The potential for less soft tissue damage is also an important advantage.

Since no standard or definitive approach has been established for submental intubation, a large-scale comparative study would be valuable. Such research could help assess the efficacy of various methods, including the use of a laproscopic trocar and provide clearer guidelines for clinical practice.

### **Conflicts of Interest**

No potential conflict of interest relevant to this article was reported.

### **REFERENCES**

1. Mohan R, Iyer R, Thaller S. Airway management in patients with facial trauma. *J Craniofac Surg.* 2009;20:21-23.
2. Man K, Duffy N, Anwar Z, Basyuni S, Santhanam V. Submental intubation in craniomaxillofacial surgery. *Anaesth Crit Care Pain Med* 2021; 40:100796.
3. Emara TA, El-Anwar MW, Omara TA, Anany A, Elawa IA, Rabea MM. Submental intubation versus tracheostomy in maxillofacial fractures. *Oral Maxillofac Surg* 2019; 23:337-41.
4. Biglioli F, Mortini P, Goisis M, Bardazzi A, Boari N. Submental orotracheal intubation: an alternative to tracheotomy in transfacial cranial base surgery. *Skull Base.* 2003;13:189-195.
5. Joo DT, Orser BA. External compression of a nasotracheal tube due to the displaced bony fragments of multiple LeFort fractures. *Anesthesiology* 2000; 92: 1830-2.
6. Shetty PM, Yadav SK, Upadya M. Submental intubation in patients with panfacial fractures: a prospective study. *Indian J Anaesth.* 2011;55:299-304.
7. Agrawal M, Kang LS. Midline Submental Orotracheal Intubation in Maxillofacial Injuries: A Substitute to Tracheostomy Where Postoperative Mechanical Ventilation is not Required. *J Anaesthesiol Clin Pharmacol* 2010;26:498502.
8. Kita R, Kikuta T, Takahashi M, Ootani T, Takaoka M, Matsuda M, et al. Efficacy and complications of submental tracheal intubation compared with tracheostomy in maxillofacial trauma patients. *J Oral Sci* 2016; 58: 23-8.
9. Jundt JS, Cattano D, Hagberg CA, Wilson JW. Submental intubation: A literature review. *Int J Oral Maxillofac Surg* 2012; 41:4654.
10. Do H, Lee C, Hong HD, Hong H, et al. Submental intubation using laparoscopic trocar in zygomaticomaxillary complex fracture surgery in Korea: a case report. *J Trauma Inj* 2023;36(2):128-132.
11. Jung I, Yoo BH, Ju Y, Choi S, et al. Novel alternative for submental intubation - A case report - *Anesth Pain Med* 2020;15:247-250.

