



## Submental Intubation in Panfacial Fracture: A Case Report

Authors

**Dr Anita R. Pal<sup>1</sup>, Dr Sunita R. Pal<sup>2\*</sup>, Dr Varun Tiwari<sup>3</sup>**

<sup>1</sup>Consultant, Oral & Maxillofacial Surgeon, 32 Pearls Dental Care & Cure Multi-speciality Hospital, Navi Mumbai, Maharashtra-400708

<sup>2</sup>Post graduate, Department of Periodontology, Rajarajeswari Dental College and Hospital, Bangalore-560074

<sup>2</sup>Post graduate, Department of General Surgery, Rajarajeswari Medical College and Hospital, Bangalore-560074

\*Corresponding Author

**Dr Sunita R. Pal**

Post graduate, Department of Periodontology, Rajarajeswari Dental College and Hospital, Bangalore-560074, India, Tel: +91 9611654096; Email: [sunitarpal1989@gmail.com](mailto:sunitarpal1989@gmail.com)

### Abstract

*The various methods of endotracheal intubation practiced today includes oral, nasal, submental, retrograde, optical fibre & tracheostomy. Submental intubation is an exceptional alternative of tracheostomy, especially in postoperative period when short-term control of the airway is needed without disturbing the oral cavity and the nasal bone. Here is a case of submental intubation with paramedian incision in a 34-year patient of Panfacial trauma presented to the Department of Oral and Maxillofacial Surgery, Rajarajeswari Dental College Hospital and, Bangalore. The patient had Lefort II and comminuted Nasal bone fracture and anterior wall of maxilla along with midpalatal split. After orotracheal intubation a passage was made by blunt dissection using an artery forceps through the floor of the mouth in the submental area by placing a paramedian incision in the region of 44 and 45. The proximal end of the endotracheal tube was withdrawn through this paramedian incision. The procedure was completed without any interference from the ET tube.*

**Keywords:** *Submental intubation, Maxillofacial fractures, Panfacial fractures, Airway management, ET tube, Tracheostomy.*

### Introduction

Panfacial fractures are known to affect cranium, midface and mandible.<sup>1</sup> Patients presenting with Panfacial fractures are treated with open reduction and rigid internal fixation which is considered standard treatment protocol for early reconstruction. A vital consideration during surgery is maintenance of the airway passage without any hindrance with the reconstruction of

the fractured segments. The surgeon need to access an unobstructed clear operating field; and in most cases; maxillamandibular fixation is mandatory during surgery for appropriate reconstruction of the facial fractures.<sup>2,3</sup> Thus, in such type of injuries, the intubation mode is controversial and many anesthetists argue against nasal intubation. Oral intubation can hamper the appropriate maxillo-mandibular reduction. The

surgical correction of maxillofacial trauma often requires maxillo-mandibular fixation. Cases in which maxillomandibular fixation is obligatory and nasoendotracheal intubation is contraindicated, the tracheostomy has been the conventional method of airway control.<sup>4</sup>The submental intubation technique involves inserting the tube through the anterior floor of the mouth which allows free intraoperative access to nasal pyramid and the oral cavity without jeopardizing patients with trauma to the skull base. Therefore, the submental intubation, as a substitute to tracheotomy, can be used in cases where short-term postoperative airway control is desirable with undisturbed access to both the nasal and oral airways and good dental occlusion. As a result, unnecessary surgery and possible complications associated with a cricothyrotomy or tracheotomy can be prevented by using submental intubation.

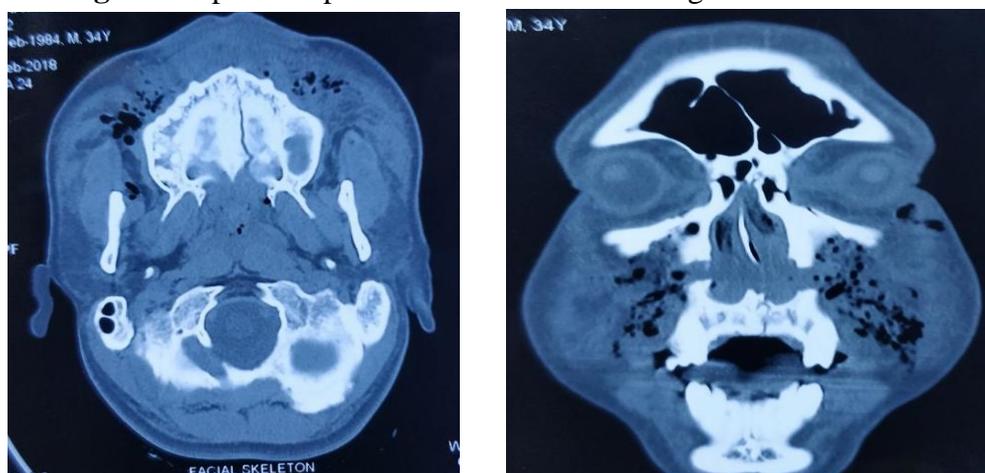
Once oroendotracheal intubation is done, it can be converted into a submental intubation.

**Case Report**

A 34 year old patient reported to the casualty of Rajarajeswari medical college and hospital with an alleged history of road traffic accident following hit by a two wheeler while crossing the road. The patient had the following fractures upon evaluation: Lefort II fracture, Fracture of the Anterior wall of Maxilla and Communitated Nasal Fracture along with midpalatal split. The patient was intubated orally by the use of standard direct laryngoscopy post general anaesthesia with reinforced ET tube of 7.5 or 8.5 mm size. The Oro-tracheal intubation was then subsequently converted to submental endotracheal intubation by employing the following procedure described herewith.



**Fig 1:** Preoperative picture and CT Scan showing the Fracture Line



**Fig 2:** CT Scan showing midpalatal split and nasal bone fracture

Under strict aseptic condition, Local anaesthetic (lignocaine 2% with 1:100,000 adrenaline) infiltration was given at the incision site. A paramedian incision having 1.5 cm length was placed anteriorly to the inferior border of mandible at the level of chin. A curved artery forceps was passed from this submental incision through the subcutaneous layer, subsequently separating the platysma, mylohyoid, submucosal layer and mucosa as shown in [Figure 1]. As soon as entering the oral cavity at junction of the attached lingual alveolar mucosa and the free mucosa of the floor of the mouth, again an incision of 1.5 cm in length was placed parallel to gingival margin. The artery forceps was used for making a soft tissue passage for the ET tube. With the help of curved artery forceps, the deflated pilot tube cuff was made to pass extra orally. Then the



**Fig 3:** Incision placed and tunnelling done on the medial side of mandible to approach the floor of mouth

Reduction and internal fixation of the maxillofacial fractures was attained by using miniplates osteosynthesis. Temporary maxillomandibular fixation was done to achieve optimal maxillomandibular reconstruction. In the end, the maxillomandibular fixation was released and submental intubation was converted to oral

ET tube was disconnected from the ventilator circuit and the standard connector was pulled out from the ET tube and passage of the ET tube through the submental incision was done. Thus, to prevent any unwanted pull being exerted on the tube from larynx, the tube was then manually stabilized and tip of the ET tube was gently pulled out through the incision with the help of a curved artery forceps. After confirming adequate tracheal position of the ET tube by capnography and bilateral auscultation of the lungs, the ET tube was then reconnected to the ventilator circuit. Securing of the tube was done using 3-0 silk sutures as shown in [Figure 2&3]. Intraorally the tube was placed between the tongue and the mandible, just above the mucosa of the floor of the mouth. It was taken care that the tube should be freely movable to properly allow intraoral manipulation.



**Fig 4:** Submental exit and stabilization of endotracheal tube with adhesive tape and sutures

intubation. The ET tube was pulled back intraorally in reverse order (first the tube, then the pilot tube cuff). The submental skin incision was closed with interrupted sutures (Silk 3-0) and the intraoral incision was left to heal with secondary intention.



**Fig 5:** Submental intubation done



**Fig 6:** Plating Done after fracture reduction



**Fig 6:** Postoperative picture

### Discussion

The difficulty in securing an airway is usually associated with the management of complex maxillofacial trauma. Modern interventions for the surgical treatment of midfacial and Panfacial fractures in maxillofacial trauma pose particular problems for airway management. When neither nasotracheal nor orotracheal intubation techniques are suitable, tracheostomy is a conventional method preferred by surgeons and anaesthesiologists. However, this procedure is associated with complications such as subcutaneous emphysema, haemorrhage, pneumomediastinum, cellulitis, blockage of tracheostomy cannula, pulmonary atelectasis, tracheocutaneous fistula, tracheoesophageal fistula, recurrent laryngeal nerve damage, pneumothorax, tracheal stenosis, stomal and respiratory tract infection, dysphagia, tracheal erosions, problems related to decanulation and excessive scarring and requirement of careful surgical and perioperative management.

Nasotracheal intubation is usually not advised in these groups of patients with Panfacial fracture as there is risk of accidental passage of the tracheal tube into the cranial cavity during nasal intubation; this can cause major complications like meningitis, sepsis and CSF leakage<sup>5,6</sup>. Also there could be epistaxis, otitis media, trauma to the pharynx, sinusitis, pressure necrosis of external nares, and inability to pass the tube through nasal passage<sup>7-9</sup>. Generally, surgical correction of these type of nasal fractures require a tube-free surgical area, which can be achieved by choosing to avoid nasal intubations. Orotracheal intubation greatly facilitates manoeuvres for reduction and stabilisation of the jaws, which requires immobilisation with arch bars and wires. Therefore, oral intubation was avoided. Several solutions have been proposed as an alternative to tracheotomy. Anatomical modification includes variation of the exit trajectory of the ETT. In a study conducted by Stoll et al, they have

supported submandibular approach instead of the laterosubmental approach.

Mac Innis and Baigfound found that the laterosubmental approach was less satisfactory because of the difficulty in tube passage, bleeding and injury of the sublingual gland and thus preferred the median submental incision. However, the median approach can traumatise the Wharton's ducts and hamper with the attachment of the genioglossus. In addition to securing the airways, it provides an unobstructed intraoral surgical field and avoids intraoperative and postoperative complications. In this case report, submental intubation was possible in the patient. There was no difficulty passing the tube through the floor of the mouth and the estimated duration of the submental intubation procedure was ranging from 6 to 8 minutes.

There was no reports of any significant oxygen desaturation in any of the patients and it allowed simultaneous treatment for all the fractures without the need of changing the method of intubation and there was no interference from the tube during the operation, as well as easy access to the ET tube for the anaesthesiologist. Moreover, the extubation was found to be easy and simple. The submental intubation technique however is contraindicated in case where there is need of prolonged period of assisted ventilation, i.e. cases of polytrauma presenting with severe neurological damage or major thoracic trauma cases and in cases where the patients are expected to be in need of repeated surgical interventions. Therefore, these are the disadvantages of the submental intubation technique as well, but these are less severe than tracheostomy. As it is an extraoral procedure the complications often include detachment of the pilot balloon or its damage during exteriorization of the tube, damage to the cuff of the ET tube, abscess formation in floor of the mouth, salivary fistula, infection of the submental wound, development of mucocele and facial scarring.

In our patient, we chose to use single reinforced ET Tube, a paramedian submental approach. It permitted us simultaneous reduction and fixation

of all fractures and intraoperative control of dental occlusion without any interference from the tube in the surgical field and most importantly without any intraoperative compromise of the airway.

### Conclusion

According to literature and our experience, submental intubation is a simple technique with low morbidity. The technique without any need of specialized equipment offers a unique advantage over other techniques that are used to avoid tracheotomy. It combines the benefits of nasotracheal and orotracheal intubation by allowing easy access to interdental occlusion respectively. Submental intubation proved to be effective both in view of result and surgical time needed. It has low incidence of operative and postoperative complications and it completely eliminates the risks and the adverse effects of tracheotomy. Henceforth, it can be very well used as an alternative to tracheotomy in selected cases of maxillofacial trauma, in which nasotracheal or orotracheal intubation is not at all possible or is contraindicated and long-term ventilatory support is not needed.

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