

# Panfacial Injury Submental Intubation A Valuable Option A Retrospective Study

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## Abstract

Maxillo-facial trauma involving maxillary and mandibular structures presents with difficulties in maintaining airway and sometimes challenges anaesthesiologist and surgeon more often at intra-operative period. Patient can have serious destruction of soft tissue, bony and cartilagenous components of the upper airway. Nasal intubation in these patients is controversial<sup>1</sup>, more particularly when performed without fibre optic bronchoscope. The necessity of intra-operative restoration of occlusion by maxillo-madibular fixation(I.M.F) makes oral intubation not feasible. For patients with pan facial trauma where nasal and oral intubation not possible and tracheostomy is the only option and only when short term post operative airway control is required, submental intubation can be a valuable option<sup>2</sup>. In our study submental intubation was done on 12 patients with a technical modification to prevent tearing of the oral mucosa which is known to be common in submental intubation.

**Keywords:** Panfacial trauma; Submental intubation; Airway management.

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## Introduction

Conventional age old practices of intubation namely oral, nasal intubation and tracheostomy though are tried and tested methods of airway management<sup>1</sup>, the use of alternative methods of intubation like retromolar intubation, retrograde intubation etc are also practiced depending on necessary situation.<sup>2</sup> However all these procedures both conventional and alternative are all known to have either interfered with operative procedure Intermaxillary fixation (I.M.F) or considerable rate of complication post operatively.<sup>3,4</sup>

Submental intubation was described in the year 1986 by Hernandez Altemir to avoid tracheostomy and also where intermaxillary fixation required intra operatively. The method has been widely accepted in pan facial trauma since then.

Submental intubation as a procedure is much simpler than any other conventional methods discussed with relatively less morbidity. The choice of intubation however is dependent and variable for each condition and sole discretion of operating surgeon and anaesthesiologist depending on the technical skills of individual.

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## Materials and Methods

The study was conducted on total of twelve patients who reported to Sanjay Gandhi institute of trauma and orthopaedics and Bangalore Medical College and Research Institute from March 2019 to March 2020 in whom pan facial injury was diagnosed and submental intubation was performed. In our study patients with pan facial injury in which maxilla, mandible and nasal-orbital ethmoid all fractures where intraoperative intermaxillary fixation was required, anaesthetic fitness was mandatory were set as inclusion criteria.

In our study patients who required long term post operative airway, patients in whom oral intubation was not possible were excluded from the study.

A flexometallic endotracheal tube size 7.5 and 8 were used with standard general anaesthetic technique. In all the patients GA was induced with intravenous induction agents and maintained using mixture of O<sub>2</sub>, nitrous oxide and isoflurane/halothane. Following orotracheal intubation and securing FMET (flexometallic endotracheal tube) the extra oral incision was placed close to the lower border of mandible in the submental region below symphysis of mandible.

A blunt instrument curved artery was used to gently pass through the skin incision between two heads of geniohyoid muscles to reach the mucosa in the floor of the mouth close to the lingual cortex of the mandible.

After the instrument is palpated intraorally a small nick was made in the mucosa carefully so that tip of the blunt instrument retrieved intra orally. Now the adapter of FMT is disengaged and free end of FMT is fed into the open beaks of the blunt instrument which is crimped firmly and withdrawn slowly from inteoral region to submental region without losing the hold and brought out of the submental incision through skin.

The adapter replaced and airway reestablished. The tube is secured with 2-0 silk to the skin in the submental region to avoid any displacement. After the surgical procedure, the FMT was withdrawn intraorally, submental wound closed with 3-0 proline and intraorally with 3-0 vicryl following which the patient was extubated.



Fig.:



Fig.:



Fig.:



Fig.:

## Results

Submental intubation provided definitive and secured airway both for short and long duration of surgery. The procedure for submental intubation is relatively easy and quicker when compared to tracheostomy. The submental intubation in our study did not interfere with planned surgical procedure and intermaxillary fixation. The added advantage was prevention of tongue from coming in to the way of occlusion and avoiding other soft tissue deformation of per oral and nasal region. The technique was definitely advantageous and well accepted by the patient, when we assess postoperatively morbidity of other interventional airway management.

The patients followed up on monthly basis for a period of three months. In our study there was no reported complications like infection, bleeding, fistula formation, ducal injuries, however there was a minimal scar formation in five patients which later became inconspicuous at the end of three months.

## Discussion

The technique of submental intubation was introduced by Altemir in the year 1986<sup>6</sup> and since then, the procedure has been followed as a valuable alternative in providing a secure airway without obstructing the operative field. This technique also allows the surgeon to perform intermaxillary fixation<sup>7</sup> which in turn helps in anatomical reduction of displaced facial bone and in proper assessment of facial form.

Other techniques such as nasotracheal intubation done in cases with nasoethmoidal complex or facial middle third fracture especially with CSF leak are known for complications including meningitis, sepsis<sup>8</sup> due to the introduction of endotracheal tube into the cranial vault at the time of induction, along with this it also interferes with reduction and fixation of nasoethmoidal complex fractures.

The well known and widely used technique namely tracheostomy can cause many complications such as hemorrhage, tracheal stenosis, laryngeal nerve damage, pneumothorax, etc. This procedure not only demands the good knowledge of neck anatomy and skills of the surgeon, but also a good postoperative care of the tracheostomy tube. However the procedure definitely provides a secure airway and similar to the submental intubation, does not interfere with intraoral/intra nasal field of operation and is a definitive choice in patients who require long duration airway management postoperatively.<sup>9</sup>

In cases with panfacial injury, submental intubation would surpass complications and technical difficulties of tracheostomy and nasotracheal intubation. In these patients where oral or nasotracheal intubation is not feasible, submental intubation proves to be a better choice when short term airway management is required postoperatively.<sup>10</sup>

It has been described that the technique of submental intubation is associated with various complications such as bleeding, sublingual gland involvement, damage to submandibular duct and difficulty in withdrawing the tube through the extraoral incision. Various modifications in the approach were tried and inculcated to overcome these complications.<sup>6,11</sup> In our study, we have used submental region between the two heads of the geniohyoid muscles in the midline for the withdrawal of endotracheal tube.<sup>12</sup>

The advantage of this regions is that it is devoid of any major blood vessels, nerve and glandular structures. The incision site also offers least distance between intraoral and extra oral points of entry, hence avoiding the need for excessive dissection of the soft tissue and the tube can be withdrawn easily through the extra oral incision. The two heads of geniohyoid holds the tube passively and thereby prevents any inadvertent tear or laceration of intraoral mucosa during the procedure. Although submental intubation is relatively free of the commonly discussed complications, considering its vicinity to the orifice of the mandibular duct warrants careful handling of tissue in that region.

During our study it was observed that the passage of endotracheal tube between the two heads of geniohyoid muscle was sometimes difficult, which was overcome by the proper dissection and correct identification of the geniohyoid muscle. In our study all the patients recovered uneventfully. Antibiotic prophylaxis<sup>2</sup> was mandatory and there was minimal scar formation with no reported incidence of any damage to the orifice of the submandibular gland, duct or any other minor salivary glands.

## Conclusion

Submental intubation as an alternative technique does serve as a valuable option when oral/ nasal intubation needs to be avoided and short term airway management is required postoperatively. However the need for airway, the duration of airway maintenance post operatively and skills of surgeon and anaesthesiologist needs to be assessed for determining the airway management.



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