



## CASE STUDY

### A STUDY ON PARAMEDIAN SUBMENTAL INTUBATION IN MAXILLOFACIAL TRAUMA PATIENTS

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#### ARTICLE INFO

##### Article History:

Received 19<sup>th</sup> April, 2017

Received in revised form

22<sup>nd</sup> May, 2017

Accepted 04<sup>th</sup> June, 2017

Published online 30<sup>th</sup> July, 2017

##### Keywords:

Intubation, Facial fracture,  
Submental intubation.

#### ABSTRACT

**Aim:** This study was carried out to assess the versatility of the submental intubation in the airway management of maxillofacial trauma patients.

**Materials and Methods:** 20 patients with facial trauma were intubated with submental intubation for treatment of maxillofacial fractures at our center.

**Results:** The patients ranged in age from 18 to 34 years. No complications due to submental intubation such as infection, hypertrophic scarring, bleeding, ranula formation, orocutaneous fistula, lingual nerve injury and hematoma were observed following submental intubation.

**Conclusion:** The Submental intubation is a very useful technique in the management of maxillofacial trauma patients. It is a simple, secure and effective procedure for operative airway control in patients of maxillofacial trauma.

#### INTRODUCTION

Management of the airways in the presence of panfacial injuries or midface fractures with mandibular involvement requires special consideration. Various methods of intubation and surgical airways are described in the literature (Meyer, 2003), but no consensus exists to date as to the best way of controlling the airway when orotracheal or nasotracheal intubations are contraindicated (Caron, 2000). However, under certain circumstances such as persistent cerebrospinal fluid leakage, hyperopic turbinate, stenosis of the nasal airway by deviated nasal septum and nasal polyps the nasotracheal intubation in patients with jaw fracture is not recommended (Uma, 2009; Gibbons, 2003 and Schütz, 2008). In some cases, extraction of a mandibular third molar tooth will create sufficient space for the passage of the armored tube with its flexible metallic reinforcement. The Submental intubation is a surgical method of obtaining oral intubation in cases in which the surgeon needs to evaluate dental occlusion during surgery (MacInnis, 1999).

#### MATERIAL AND METHODS

In this study, 20 patients were treated with submental intubation (Table 1). All the patients were males and ages ranged from 18 to 34 years. All patients were victims of facial trauma. Most of the facial injuries were a combination of fractures affecting the dental occlusion.

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#### Surgical Technique

We used paramedian submental intubation in all 20 cases with maxillofacial trauma. After induction, the orotracheal intubation was done with spiral reinforced tube. A 2 cm skin incision was made in the paramedian region about 1 cm inferior to the lower mandibular margin and parallel to it on the midline after infiltrating local area with vasoconstrictor solution (Figs.1-2). Using a curved hemostat, a passage was created by blunt dissection near the lingual surface of the mandible. While the tongue was pushed backward, the tip of the hemostat was visible just below the mucosa of the floor of the mouth. A mucosal incision was made parallel with the gingival margin on top of the tips then a passage for the tube was created from the mouth through the mylohyoid muscle to the submental incision (Fig. 3). The orotracheal tube was secured in the mouth to avoid accidental extubation. It was then disconnected from the breathing circuit. The end was grasped with the haemostat and withdrawn through the submental tunnel and reconnected. When capnography and lungs auscultation confirmed the correct tracheal position of the tube, the tube was fixed at the submental level with suture (Fig. 4). At the completion of the surgical procedure, the armored tube was returned to the mouth. The submental skin was then sutured. The exit point in intraoral floor of the mouth did not require suturing.

#### RESULTS

We performed submental intubation in all 20 patients with maxillofacial trauma. The Submental orotracheal intubation was completed successfully in all 20 patients.

**Table 1. Demographic details and type of facial fractures in patients with paramedian submental intubation**

S.no	Sex	age	Type of fractures	Duration of procedure (minutes)
1	Male	25	Bilateral zygoma; nasal ; mandibular angle fracture	5
2	Male	29	Lefort I; palatal Fracture; saddle nose deformity	5
3	Male	29	Nasal bone; right Zygoma; Lefort I fracture	6
4	Male	32	NOE; Lefort I fracture	7
5	Male	22	Lefort II,NOE,Mandible Alveolar fracture	5
6	Male	23	Nasal; mandibular body and angle; Lefort I fracture	5
7	Male	24	NOE; right Zygoma; Lefort I fracture	6
8	Male	18	Lefort III; Lefort I; mandibular symphysis and bilateral condylar fracture	5
9	Male	27	Nasal bone and septum fracture; Lefort I; mandibular symphyseal fracture	7
10	Male	22	Lefort III,NOE,Mandible fracture	5
11	Male	18	Left zygoma; left supraorbital rim; saddle nose; Lefort I	5
12	Male	23	Comminuted left malar bone ; nasal bone, mandibular left angle fracture	6
13	Male	32	Lefort III,NOE fracture	7
14	Male	24	Nasal bone and septum fracture; Lefort I; mandibular symphyseal	5
15	Male	29	Lefort II,NOE,Mandible fracture	5
16	Male	25	Left zygoma; left supraorbital rim; saddle nose; Lefort I	7
17	Male	25	Lefort I,NOE fracture	5
18	Male	34	Lefort III; Lefort I; mandibular symphysis and bilateral condylar fracture	6
19	Male	24	NOE; right Zygoma; Lefort I fracture	5
20	Male	20	Nasal; mandibular body and angle; Lefort I fracture	5

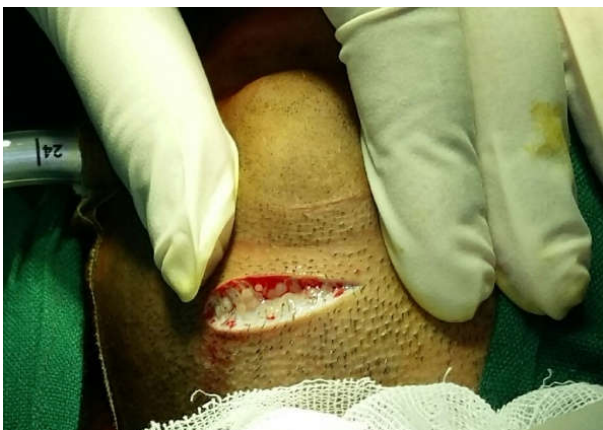
NOE=Naso-orbit-ethmoidal.



**Figure 1. Vasoconstrictor solution injected in the local area**



**Figure 3. Tunnelling done on the medial side of mandible to approach the floor of mouth to obtain the submental route**



**Figure 2. A 2-cm skin incision made in the paramedian region, about 1 cm from the lower mandibular margin**



**Figure 4. Intraoperative view of the completed submental intubation as tube is fixed at the submental area with suture**

The patients ranged in age from 18 to 34 years. The mean duration of the procedure ranged from 5 to 7 minutes (Table 1). In all patients submental intubation permitted simultaneous reduction and fixation of all fractures and intraoperative control of the dental occlusion without interference from the tube during the operation. No bleeding or infection in the area was reported. The salivary duct was preserved and a normal level of saliva fluids was maintained. The scar has normally

## DISCUSSION

The technique of submental intubation was introduced by Altimir in 1986 (Altimir, 1986). The Submental intubation is an alternative route for nasal or oral intubation, especially in

cases of major panfacial trauma (Gordon, 1955). The Submental intubation combines the advantages of orotracheal intubation, which allows access to frontonasal fractures and those of nasotracheal intubation, which allows the mobilization of the dental occlusion. It also avoids the risks of iatrogenic meningitis or trauma of the anterior skull base after nasotracheal intubation, as well as complications, such as injury to cervical vessels or the thyroid gland, tracheal stenosis related to tracheotomy (MacInnis, 1999). There have been several attempts to achieve short-term airway management, including retromolar intubation and nasal tube switch technique. According to literature, retromolar intubation has been reported to have disadvantages like obtrusive, being more traumatic, costly and requiring more operating time (Martinez-Lage, 1998). Another alternative nasal tube switch technique was not performed due to problems associated with the intraoperative re-intubation, risk of aspiration due to posterior nasal bleeding, potential airway compromise with need for emergency tracheostomy/cricothyroidotomy, excessive stress on fixations with possible loosening of plates and screws, unfavourable manipulation of an unstable cervical spine (Werter, 1994). Since its first description the submental intubation technique has undergone various modifications and found new indications (Green, 1996). It could be safely used in patients with midfacial or panfacial fractures with possible base of skull fractures (Biglioli, 2003 and Chandu, 2000). In our present study, the submental intubations were possible in all the patients without any major complications thus allowing unimpeded manipulation of the fractured fragments, establishment of maxillomandibular fixation and complete assessment of facial symmetry, satisfactory achievement of occlusion, as well as easy access to endotracheal tube for the anaesthesiologist. Moreover, extubation was found to be simple and the cosmetic results were acceptable with no long-term morbidity.

In present study there were no complications related to submental tube placement. These results are in line with comprehensive literature review in 812 patients by Jundt, on complications of submental intubation which reported a 100% success rate with submental intubation and only minor complications (Jundt, 2012). Nowadays with the availability of modern craniomaxillofacial fixation techniques, the maxillomandibular fixation is usually not required in the postoperative period (Davis, 2000), and even if required, Postoperative maxillomandibular fixation could be achieved by simple elastics after extubation. In modern maxillofacial trauma care, elastics are routinely used for achieving maxillomandibular fixation instead of traditional wires. So if mechanical ventilation or intubation is required postoperatively, the submental intubation could be switched over back to standard orotracheal intubation. However, if mechanical ventilation is expected to be required for prolonged period because of severe head injury, tracheostomy remains the preferred technique for airway management (Caron, 2000). Many authors have recommended the technique of lateral incision through the body of mandible (Gordon, 1995 and Honig, 1993). However, for two reasons midline approach is used as described by MacInnis: 1. Only few anatomic structures are present and there is minimum risk of neurovascular damage. 2. The midline incision heals almost imperceptibly and therefore is cosmetically superior (MacInnis, 1999). This method of intubation is contraindicated for patients who

require a long period of assisted ventilation, i.e. multitrauma patients with severe neurological damage or major thoracic trauma. The Paramidline approach is preferable as there is less risk of damage to the submandibular and sublingual ducts and lingual nerves. The scar is in a more favourable position, and the region is usually relatively avascular hence submental intubation should be chosen in selected cases of maxillofacial fractures (Caubi, 2008).

## Conclusion

Submental intubation is a very useful technique in the management of maxillofacial trauma patients with low complications. It can be used as a good alternative to short term tracheostomy in selected maxillofacial trauma patients when tracheal intubation through both the oral and nasal routes is contraindicated.

## REFERENCES

- Altemir FH. The submental route for endotracheal intubation. *J Maxillofac Surg.* 1986; 14: 64–5.
- 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;13:189–95.
- Caron G, Paquin R, Lessard MR, Trépanier CA, Landry PE. Submental endotracheal intubation: an alternative to tracheotomy in patients with midfacial and panfacial fractures. *J Trauma.* 2000 Feb;48(2):235–40.
- Caron G, Paquin R, Lessard MR, Trépanier CA, Landry PE. Submental endotracheal intubation: An alternative to tracheotomy in patients with midfacial and panfacial fractures. *J Trauma.* 2000;48:235–40.
- Caubi AF, Vasconcelos BC, Vasconcellos RJ, de Morais HH, Rocha NS. Submental intubation in oral maxillofacial surgery: Review of the literature and analysis of 13 cases. *Med Oral Patol Oral Cir Bucal.* 2008;13(3):197–200.
- Chandu A, Smith AC, Gebert R. Submental intubation: An alternative to short term tracheostomy. *Anaesth Intensive Care.* 2000;28:193–5.
- Davis C. Submental intubation in complex craniomaxillofacial trauma. *ANZ J Surg.* 2004;74:379–81.
- Gibbons AJ, Hope DA, Silvester KC. Oral endotracheal intubation in the management of midfacial fractures. *Br J Oral Maxillofac Surg.* 2003; 41(4): 259–60. No abstract available.
- Gordon NC, Tolstunov L. Submental approach to oroendotracheal intubation in patients with midfacial fractures. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod.* 1995 Mar;79(3):269–72.
- Green JD, Moore UJ. A modification of submental intubation. *Br J Anaesthesia.* 1996;77:789–91.
- Honig JF, Braun U. Laterosubmental tracheal intubation. An alternative method to nasal – oral intubation or tracheostomy in single step treatment of panfacial multiple fractures or osteotomies. *Anaesthetist.* 1993; 42:256–8.
- Jundt JS, Cattano D, Hagberg CA, Wilson JW. Submental intubation: a literature review. *Int J Oral Maxillofac Surg.* 2012; 41(1): 46–54.
- MacInnis E, Baig M. A modified submental approach for oral endotracheal intubation. *Int J Oral Maxillofac Surg.* 1999; 28(5): 344–6.

- Martinez- Lage JL, Eslava JM, Cebrecos AI, Marcos O. Retromolar intubation. *J Oral Maxillofac Surg.* 1998;56:302–6.
- Meyer C, Valfrey J, Kjartansdottir T, Wilk A, Barrière P. Indication for and technical refinements of submental intubation in oral and maxillofacial surgery. *J Craniomaxillofac Surg.* 2003 Dec;31(6):383-8.
- Schütz P, Hamed HH. Submental intubation versus tracheostomy in maxillofacial trauma patients. *J Oral Maxillofac Surg.* 2008; 66(7): 1404–9.
- Uma G, Viswanathan PN, Nagaraja PS. Submandibular approach for tracheal intubation – a case report. *Indian J Anaesth.* 2009; 53(1): 84–7.
- Werter JR, Richardson G, Mcilwain MR. Nasal tube Switch: Converting from nasal to an oral endotracheal tube without extubation. *J Oral Maxillofac Surg.* 1994;52:994–6.

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