

## **Submental Intubation in Panfacial Trauma: A Prospective Clinical Study in Tertiary Health Care Center**

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### **ABSTRACT**

Management of Pan facial trauma requires an intubation which should have an undisturbed oral and nasal airway access and a good dental occlusion. Submental intubation is a good alternative to tracheostomy, especially when short term postoperative control of airway is required. Submental intubation with paramedial approach has been used in 20 cases from January 2012 to January 2020 in the Department of Oral and Maxillofacial surgery, G.S.L General Hospital. All the patients who had Pan-facial trauma were successfully treated with least morbidity and high success using Submental approach.

## **KEYWORDS:**

Submental intubation, Pan-facial fractures, Maxillofacial surgery, Naso-orbital fractures, Lefort fractures, Inter maxillary fixation.

## **INTRODUCTION:**

Complex maxillofacial fractures are associated with significant complications such as hemorrhage, midline shift, limited mouth opening, trismus, tongue fall back, decreased posterior pharyngeal space. Treatment of such complex fractures is a challenge for both surgeons and anesthetist. Surgical repair of maxillofacial injuries requires nasal/oral endotracheal intubation.

Nasal intubation is the most common method for achieving optimal occlusion, which is fundamental aim in treating maxillofacial fractures <sup>[1]</sup>.

Nasotracheal intubation is contraindicated in complex fractures, skull base fracture and naso-orbito-ethmoidal fractures due to the risk of entry in to cranial fossa and difficulty in reconstruction of naso-orbital complex. Surgical repair of such injuries has to be treated by modifications in the standard anesthetic procedure <sup>[2]</sup>.

Modified technique of airway management through submental route have been described by Altemir in 1986.<sup>[3]</sup> Submental intubation has undergone many changes over a period of time and is now the most preferred method of management of airway in complex maxillofacial injuries.

Submental intubation presently is used in the treatment of Pan - facial trauma, Orthognathic surgeries, Rhinoplasty procedures. Due to its advantages over conventional intubation methods and tracheostomy, we in our unit has used it in many procedures. In this prospective clinical study, we aim to discuss the technique, Ease of operation and Complications associated with the technique.

## **MATERIAL AND METHOD:**

Present study was conducted from January 2012 to January 2020 in twenty patients (sixteen male patients and four female patients), who had undergone submental intubation.

Inclusion criteria:

1. Pan - facial trauma.
2. Lefort II fractures
3. Lefort III fractures

Exclusion criteria:

1. Patients requiring long term airway support.
2. Patients with systemic illness.

### **OPERATIVE PROCEDURE:**

Under strict aseptic precautions, Oral intubation done with cuffed Flexometallic tube. A 2-2.5cm incision is made at Submental and paramedial region, parallel to long axis of mandibular lower border. A curved hemostat is held in place through the incision and dissection was carried out into the subcutaneous layer, the platysma, mylohyoid muscle, submucosal layer and mucosa.

An intraoral incision was made parallel to soft tissue cover of gingiva to create a tunnel for Endotracheal tube. A curved hemostat is held through submental region and the connector is detached and the tube is exteriorized through tunnel outside and connected to Ventilator. Tube secured with 1-0 silk suture. After completion of surgical procedure, tube connector is detached and the pilot and endotracheal tubes are reversed back in original path. The incision is then sutured with 3-0 silk suture.

### **DISCUSSION:**

Treatment of Complex Maxillofacial injuries are associated with difficult Airway management. Tracheostomy has been standard method of intubation previously, but complications included Hemorrhage, Emphysema, Pneumothorax, Tracheal stenosis, Recurrent laryngeal nerve damage, Respiratory tract infections and Unaesthetic scar.<sup>(5)</sup> Other techniques such as submental intubation, retromolar intubation, fiberoptic intubation are the current methods of choice.

Fiberoptic intubation has been an efficient method in treating fractures below the nasal bone. Naso-orbital fractures cannot be suitably operated through Fiberoptic intubation.

Retromolar intubation introduced by Martinez-Lage et al in 1998<sup>(6)</sup>. A semilunar osteotomy is made in retromolar region, after oral intubation and the endotracheal tube is disconnected and pulled through retromolar region extra-orally. It is an effective method in treating Complex Maxillofacial fractures and Intermaxillary fixations can be achieved. All maxillofacial fractures can also be addressed; however, the bony anatomy is destroyed to make space for the tube. An average of 30minutes is required to perform these procedures.

Submental intubation is considered as a relatively quick and less morbid alternative to tracheostomy. Submental intubation is used in the management of complex maxillofacial fractures, Orthognathic surgery, Rhinoplasty, Trans-facial cranial base surgeries.<sup>(4)</sup> It requires 5-8 minutes to perform.<sup>(7)</sup> In our unit submental intubation took an average of 7 minutes.

Paetkau et al., proposed incision modification to Altemir technique. Skin incision is given equidistant from the angle of the mandible and the symphysis and just medial to the inferior border of the mandible. Care should be taken to avoid injury to the lingual nerve, submandibular duct and sublingual gland.<sup>(8)</sup> Amin et al., suggested incision which is one-third of the distance from the symphysis to the angle of the mandible close to the lower border on lingual surface.<sup>(9)</sup>

MacInnis described the use of the midline incision to prevent the injury of the structures as it is avascular plane between the mylohyoid and the anterior bellies of digastric.<sup>(10)</sup> Green and Moore in 1996 suggested two tubes intubation one Oral and other Submental, this modification allows the use of endotracheal tube with nondetachable connector.<sup>(11)</sup>

A comparative study performed between submental intubation and Tracheostomy by Schutz and Hamed concluded that the morbidity associated with submental intubation is negligible.<sup>(12)</sup>

A blunt dissection close to the medial border of mandible and thorough knowledge of anatomy is required to prevent inadvertent damage to the structures in the floor of the mouth. Paetkau et al., suggested to leave the incision without suturing. In our practise, we sutured the skin incision alone.

Amin et al., proposed the use of capnography while shifting the oral tube to submental. Another method of managing the damaged tube is by the use of endotracheal tube exchanger which successfully replace the damaged tracheal tube by the submental approach. <sup>(9)</sup> Drolet et al., advised lubrication of endotracheal tube exchanger which avoids delay in exchanging the damaged tube.

(13)

Submental route is very safe and alternative technique to tracheostomy for short term management of airway. Our study shows excellent result with the use of submental approach for intubation in Pan-facial trauma where airway is compromised.

Submental intubation should always be done with Flexo-metallic tube and the conversion of submental route to oral route of the tube should be done before the patient is moved out of operation theatre. If post- operative airway management is not advocated for several days, then submental intubation forms the bases for anesthesia. When long term airway assistance is desirable, tracheostomy is the ideal method.

**RESULTS:**

S. No	Type of trauma	Age (Years)	Sex	Time (Minutes)
1.	Lefort II	46	Male	6
2.	Pan-facial trauma	40	Male	7
3.	Pan-facial trauma	35	Male	8
4.	Pan-facial trauma	29	Male	5
5.	Pan-facial trauma	52	Male	8
6.	Lefort III	48	Female	8
7.	Pan-facial trauma	38	Male	6
8.	Pan-facial trauma	55	Male	6
9.	Pan-facial trauma	43	Female	7
10.	Lefort III	46	Male	8

11.	Lefort II	32	Male	7
12.	Pan-facial trauma	58	Male	8
13.	Pan-facial trauma	20	Male	8
14.	Pan-facial trauma	25	Male	7
15.	Lefort II	49	Male	6
16.	Pan-facial trauma	33	Female	8
17.	Lefort III	57	Male	7
18.	Pan-facial trauma	39	Male	8
19.	Lefort II	36	Male	5
20.	Pan-facial trauma	38	Female	7

Average time taken at our institute is about 7 minutes. Three cases of superficial wound infection were noticed, which resolved after using antibiotics for 5days. All the patients were evaluated after 1week,1month and 6months. Complications such as Oro-cutaneous fistula, Mucocele, trauma of salivary glands, the displacement of the tube and accidental extubation which were mentioned in the literature were not encountered in our cases.

## **CONCLUSION:**

Airway management in patients with Pan-facial trauma can be performed using submental intubation. It assists in intra operative occlusal correction and enable to correct dentofacial abnormalities. Complications pertaining to classical endotracheal intubation and Tracheostomy can be avoided.

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