

Submental Endotracheal Intubation for Maxillofacial Surgery: A Report of Two Cases

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Abstract

The technique of submental endotracheal intubation has been established as a safe alternative to tracheostomy and can be utilized when oro-tracheal and naso-tracheal routes of intubation are not ideal for orofacial surgical intervention. The technique is simple and avoids the complications of tracheostomy. We present 2 cases of adults with orofacial injuries requiring surgery. Both cases were managed using the submental method of intubation and the procedure was well tolerated. There were no perioperative complications and patients were discharged on the fifth postoperative day.

Keywords: Maxillofacial, Submental, Trauma, Intubation

1. Introduction

Patients undergoing oral and maxillofacial surgery under general anaesthesia pose the greatest airway challenge to the anaesthetist.^[1] Such procedures are often required, following traumatic injury to the face and upper airway, for tumour resection and orthognathic surgery.^[2] In craniofacial trauma, each type of fracture combination poses anaesthetic consideration that is unique, that is, one method does not fit all.^[3] Generally, anaesthesia for intra-oral and maxillofacial procedures requires management of a shared airway and may involve a potentially difficult endotracheal intubation.^[2] Often the maxillofacial surgeon usually needs to perform surgery in areas that would otherwise be obscured by the endotracheal tube, and also, achieving the correct teeth intercuspsation is one of the cardinal objective of most oral and maxillofacial procedures.^[4] Hence, orotracheal intubation, which is the conventional technique of securing the airway during general anaesthesia, might prove to be a poor choice in this group of patients. Other possible routes of intubation that can be employed are nasotracheal, retromolar, fibre

optic or a surgical airway such as tracheostomy, and the submental.^[5]

Nasotracheal intubation is contraindicated in patients with fractured base of the skull, as this could lead to encephalization of the tube, and the presence of the tube could also impede the surgical reconstruction of the nasal complex.^[6] Meanwhile, retromolar intubation is unpredictable because the available space might be insufficient due to impacted/erupting third molar and the space occupied by the tube may interfere with the application of intermaxillary fixation devices.^[7-9] The traditional tracheostomy, the next feasible option that seemingly solves the above problems is associated with many difficulties and complications.^[10]

The method of submental intubation described in 1986 by Hernandez Altemir, has been shown to serve as an alternative to the classic methods.^[5] This technique as described by Altemir involve the introduction of the endotracheal tube through the anterior floor of the oral cavity to the trachea. The submental route of intubation allowed free intraoperative access to the nasal pyramid without endangering patients with fracture of the

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base of skull and offers no interference to achieving dental occlusion.^[4,5] While it avoids tracheal dissection, submental intubation obviates the risk associated with naso-tracheal intubation in patient with facial trauma. Reports by other authors supported Altemir's claim of normal healing of the mucosa of the floor of the mouth, unaffected salivary ducts and production of saliva and absence of motor or sensory deficit.^[11-13] Some authors also report overall patient satisfaction and it provides a useful alternative to tracheostomy for maintenance of the airway during oral and maxillofacial reconstruction especially following trauma.^[5,8,10,14]

Knowledge and awareness of submental intubation as an alternate intubation route in oral and maxillofacial reconstruction is still largely unpopular in Africa and in Nigeria as a whole. The aim of this write up is to show the use of submental intubation, its simplicity and its safety in oral and maxillofacial reconstruction especially in craniofacial trauma. We present two cases where submental intubation technique was used in orofacial reconstruction surgery in our hospital. Intercommunication between the anaesthetist and surgical teams in the perioperative period is essential and invaluable in minimizing potential complications.

Case 1

A 39-year old utility staff of a cement company was brought to the Accident and Emergency (A & E) section of our hospital following a road traffic accident. He had multiple facial injuries, nasal bleeding, inability to breathe through the nostrils and a displaced lower jaw which made speaking difficult (Figure 1a).

On examination, the patient had multiple facial fractures but was conscious and alert. Computerised

Tomogram (CT) (Figure 1a) showed bilateral Lefort II, anterior maxillary dento-alveolar, mid-palatal and a comminuted right mandibular angle fracture.

The patient was subsequently scheduled for Open Reduction and Internal Fixation (ORIF) of the multiple facial fractures. A pre-anaesthetic review revealed no co-morbid disease. Oro- and naso-tracheal route of intubation was precluded because of nasal bones fracture, suspicion of fracture of the base of skull and the surgical requirement to achieve dental occlusion. Therefore, the submental route of intubation was chosen and planned. The endotracheal intubation was initially performed using oral route with a size 7.0 mm reinforced polyvinyl chloride tube, following standard method of general anaesthesia. After inflating the cuff, tube placement was confirmed by observation of the chest for symmetrical movement and auscultation of breath sounds.

A 2 cm incision was made in the submental region and extended intra-orally by blunt dissection through the mylohyoid muscle and finally into the oral cavity just lingual to the (Figure 1b). The Endotracheal Tube (ETT) was detached from the ventilatory system and with this ETT connector covered with nylon tube sac, the pilot balloon, followed by the ETT itself, were pulled out through the submental incision. The connector was reattached and reconnected to the ventilatory system (Figure 1b). The lung fields were auscultated again for equal air entry bilaterally. The tube was then fixed to the skin with 1.0 silk suture (Figure 1c). The total time taken from incision-making at the submental region to when breathing circuit was re-established was 9 minutes.

At the end of surgery the submental intubation was reconverted to orotracheal intubation by pulling the ETT and the pilot into the mouth in a similar fashion



Figure 1a. Preoperative picture and CT of the first case.

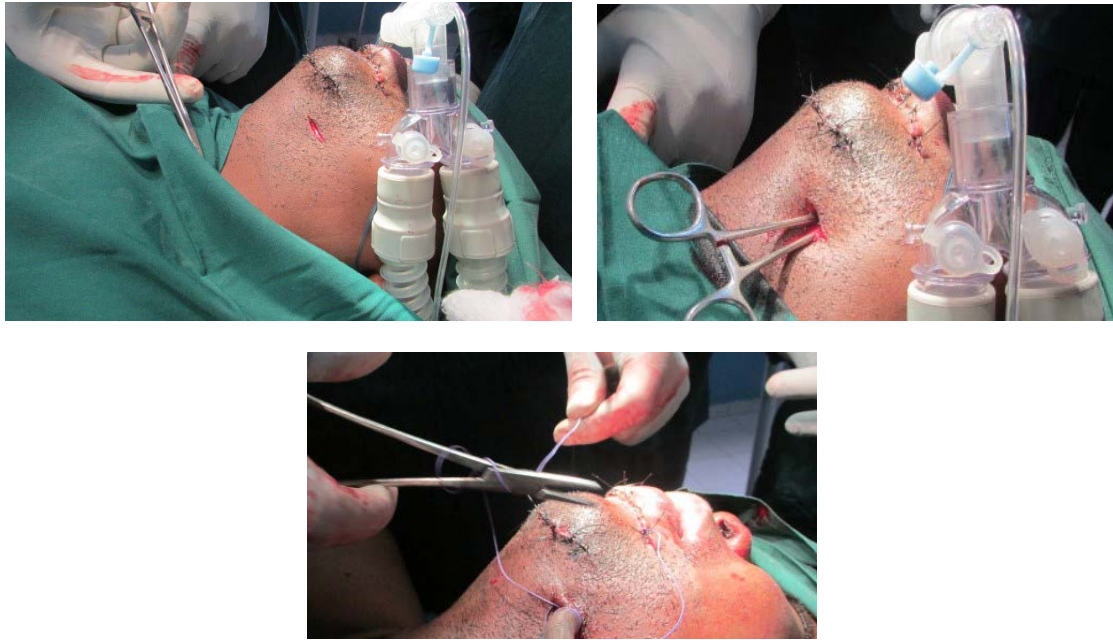


Figure 1b. Orotracheal tube in place and an artery forceps in submental incision, the submental tube is being secured.

as above and the submental incision was closed. There was no episode of arterial desaturation while converting orotracheal intubation to submental intubation and vice versa.



Figure 1c. Submental tube in place.

Case 2

A 49-year old ambulance driver who was brought to Accident and Emergency unit of our hospital following road traffic accident and presented with soft tissue swelling of the face, multiple facial abrasive injuries and inability to achieve dental occlusion. An assessment of Le-fort II fracture was subsequently made. CT (Figure 2a) showed the presence of a Le-fort II fracture on the left,

and a zygomatic complex fracture on the right side. The patient was subsequently scheduled for ORIF under general anaesthesia. The concern was how to achieve optimal aesthetics in view of contraindication to oro- and naso-tracheal intubation while minimizing morbidity. Submental intubation was, once again, opted for in lieu of tracheostomy. The submental intubation procedure was essentially as described below (figure 2b) and the total time taken, this time, was 10 minutes. The postoperative extubating and recuperation were uneventful.

2. Discussion

The submental technique for endotracheal intubation was first used by Hernandez Altemir in 1986.^[5] The method provided an assured airway and simultaneously an un-obstructive operative field for adequate treatment of mid-face and/or pan-facial fractures. It also eliminates the complications usually associated with nasal intubation and tracheostomy and obviates the demand to change the tube during surgery.^[14]

The first patient, had a fracture of the middle third facial complex and mandibular angle, with a suspected fracture of the base of skull, hence oro/naso-tracheal route of intubation was avoided. Also, the presence



Figure 2a. CT showing fracture of the nasal complex, and orotracheal tube in place.



Figure 2b. Intraoperative pic showing submental intubation.

of a comminuted mandibular angle fracture which needed ORIF precluded the use of retromolar route as advocated by some authorities.^[7-9] Tracheostomy a form of surgical airway is strongly indicated in this situation as it bypasses the upper aero-digestive tract but it is fraught with complications, such as tracheal stenosis, internal emphysema, damage to the laryngeal nerves, tracheoesophageal fistula and scarring and requires adequate postoperative management^[8,15] and much more, our patient declined its use.

In the 2nd case, achieving a good balanced normal dental occlusion was crucial as it was the patient wish and tracheostomy was also not an option to him.

The technique of submental intubation was found to be a very good alternative in both cases. The alternative technique in these situations would be tracheostomy. However, Submental intubation has an advantage in that, it allows extubation to be done immediately after the operation, and this avoids the trouble of care for the in-situ tracheostomy tube during the postoperative recovery period.^[4,16] The time taken (9 and 10 mins) to convert to submental route from oral route in the two

cases was comparable to what is in the literature,^[12,14] lending further credence to its simplicity especially when compared to tracheostomy.

Notwithstanding, several modifications of submental intubation as originally described by Altemir in 1986 have been performed by various researchers with the aim of improving safety of the technique and to further reduce the incidence of potential complications.^[5,6,17] Stoll et al., reported a technique similar to that described by Altemir, but the incision was placed further down in the submandibular region while Green and Moore described a technique in which 2 endotracheal tubes were used.^[1,6,18] The patient was first intubated via the oro-tracheal route, and then through a submental incision, the second ETT was pulled into the oral cavity with the cuffed end first and then passed into the trachea after removal of the first tube. This technique avoided the difficulties encountered with detachment and reattachment of the ETT connector. Maccinis et al., utilized a midline incision because they encountered difficulties with passage of ETT through the lateral submental incision originally described by Altemir but this was complicated by haemorrhage and

damage to sublingual glands.^[19] Drolet also reported the use of a lubricated “Cook” tube exchanger which was passed through the ETT and then pulled through the submental incision.^[18] Subsequently the ETT was exchanged for a fresh reinforced ETT. This technique allowed the ventilation device to remain in the airway all the time and avoided the problems encountered during detachment of the reinforced ETT connector. The potential complications of the submental technique include infection, damage to adjacent structures such as submandibular and sublingual nerve, subcutaneous fistula and scar formation but the problems associated with the technique of submental intubation was found to be minimal and therefore the technique is advocated when indicated.^[15,20,21]

We followed the original technique of submental intubation described by Hernandez Altemir and had no problems disconnecting and reconnecting the ETT connector. Haemorrhage was minimal. Our patient was extubated in the operating theatre and there was no immediate postoperative complication. He had a smooth course of recovery in the recovery room and subsequently on the ward. He was finally discharged home on the 5th post-operative day.

3. Conclusion

Although, there exists no known consensus as to the best way to maintain a patent airway when orotracheal and nasotracheal routes of intubation are contraindicated, Submental endotracheal intubation proves to be a useful alternative to tracheostomy. Tracheostomy allows unimpeded surgical access to the airway in patients with complex craniomaxillofacial injuries but the technique is fraught with some serious complications which may lead to increased morbidity or even mortality. Good communication and team work are, however, essential for a safe and successful outcome when submental intubation is employed.

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