

Submental Intubation for LeFort Type III Fracture

Ashley Bumatay, BSN, RN

Affiliation:

Texas Christian University

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Abstract

This case report describes the use of submental intubation for an open reduction internal fixation (ORIF) LeFort Type III fracture encountered at Methodist Dallas Medical Center operating room (OR). Other airway management options in maxillofacial fractures include nasotracheal intubation or tracheostomy, however, these options come with complications and may be contraindicated in certain cases. Submental intubation is an alternative airway route for oral/maxillofacial surgeries when nasotracheal intubation or tracheostomies are not indicated. While submental intubations are low-risk, low-cost, simpler, and faster, it still comes with complications including minimal scarring. No special equipment is needed.

Purpose

- This case study discusses the use of submental intubation for oral/maxillofacial surgeries when nasotracheal intubation or tracheostomies are not indicated.

Introduction

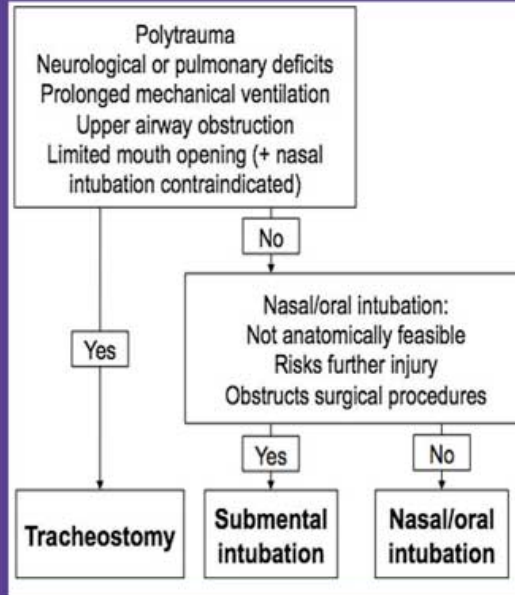
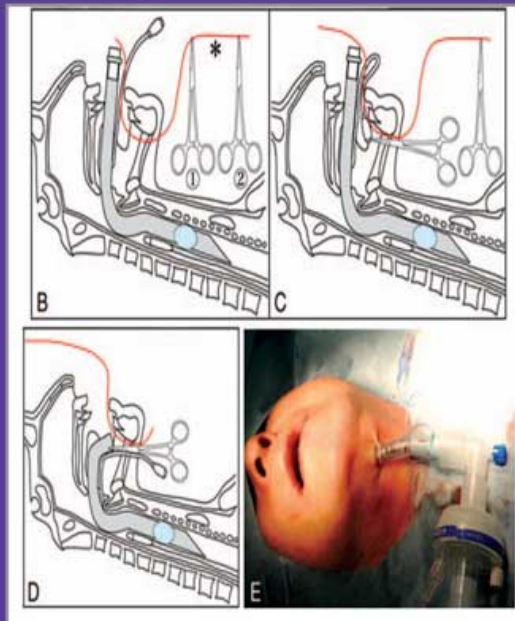
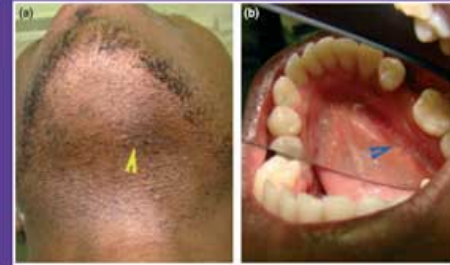
- LeFort fractures involve fractures of the mid-face and nasal region, where nasal intubation is contraindicated.
- Tracheostomy is employed in such cases, but often leaves a neck scar and is associated multiple risks and iatrogenic complications.
- In the same manner, nasotracheal intubation also comes with a list of potential risks and complications.
- Submental intubation is an alternative airway that permits reduction and fixation of the maxillofacial fractures without interference of the endotracheal tube during surgery.

Systematic Search

- Databases searched: EMBASE and PubMed
- Keywords used in each search included: *submental intubation, oral/maxillofacial fractures, LeFort Type III fracture*

Case Description

- 51-year-old, 90 kg, 173 cm male presented for ORIF of a LeFort Type III fracture with hip graft
- Patient presented post an automobile vs pedestrian type of accident with injuries including: subarachnoid hemorrhage, subdural hemorrhage, pelvic fractures post external fixation, left lower extremity fractures post external fixation, LeFort Type III, bilateral orbit fractures, right zygomaticomaxillary complex fractures, frontal sinus fractures, and temporal bone fractures
- Video laryngoscopy with a Glidescope #4 was used and the airway was secured with a 7.5 mm armored endotracheal tube (ETT) with no complications.
- After the airway was secured, the oral/maxillofacial surgeon sterile prepped the skin and made a skin incision below the inferior border of the mandible in the submental region. The surgeon then used a pair of forceps to create a submental tunnel for the endotracheal tube.
- The breathing circuit was disconnected and the armored ETT was pulled through the submental tunnel.
- The ETT was reattached to the breathing circuit, ventilation was re-confirmed, and the surgeon sutured the ETT to the submental skin via sutures.
- After the surgeon completed the fixation of the LeFort III fractures, the armored ETT was repositioned back to the intraoral intubation position by the surgeon.
- Ventilation was re-established, ETT secured, and the submental incision was closed with sutures.
- A decision was made in conjunction with the surgeon to keep the patient intubated after the procedure and to wear them off the ventilator in the intensive care unit (ICU).
- The patient was transferred back to the ICU via manual Ambu bag through the ETT with 10 L/min of O₂ and connected to the ventilator.
- Follow-up care revealed no neurologic insults or adverse events and the patient was able to be extubated.

Figure 1: Decision pathway for submental intubation⁵Figure 4: Submental Intubation Technique²Figure 2: Late surgical wounds nearly invisible⁶Figure 3: Scarring 6 weeks postoperative⁶**Submental Intubation Technique**

- The submental intubation technique requires the patient to be initially intubated orally with a wire-reinforced ETT or armored tube to prevent kinking.⁴
- After sterile skin prep a 2 cm transverse skin incision is made midline 3 cm caudal to the inferior border of the mandible within the submental crease.^{2,4}
- A submental tunnel is created from the platysma to the mylohyoid muscle, and then to the floor of the oral mucosa.²
- Once the anterior floor of the mouth is encountered, the submental tunnel is bluntly enlarged to allow passage of the armored ETT.⁴
- The anesthesia circuit and ETT connector is removed to facilitate passage of the tube through the tunnel.⁴
- A pair of forceps is then passed from percutaneous to peroral, grasping the ETT, and pulling back through the tunnel.^{2,4}
- After it is drawn through the wound, the ETT is connected back to the anesthesia circuit and fixed to the skin via sutures.²
- Once the fixation of the maxillofacial fractures is complete, the ETT is repositioned back to the intraoral intubation position and the submental incision is closed with sutures.²

Discussion

- Airway management of oral/maxillofacial surgeries requires collaboration with the surgeon regarding individual needs for that patient case.
- Nasotracheal intubation is preferred to assess dental occlusion intraoperatively, however, it is contraindicated with nasal or basal skull fractures.^{1,2}
- Nasotracheal intubation risks include: intracranial penetration, mucosal trauma, epistaxis, meningitis, and sepsis.³
- Tracheostomy is performed in such cases when nasotracheal or orotracheal is contraindicated as it allows for more remote access and a stable and secure airway, however, it is associated with risks and iatrogenic complications.^{2,4,5}
- Tracheostomy complications include: tracheal stenosis, laryngeal nerve damage, neck scarring, long-standing tracheal fistula, accidental dislodgement during or after the procedure, injury to the esophagus, major vascular injury, or pneumothorax.^{2,4}
- Possible submental intubation intraoperative complications include: damage to the tube apparatus, desaturation, right mainstem bronchus, tube dislodgement/obstruction, accidental extubation, venous bleeding, or dislodgement of throat pack stickers.^{1,5}
- Possible submental intubation postoperative complications include: superficial skin infections, fistula formation, hypertrophic scarring/keloid formation, mucocele, transient lingual nerve paresthesia, hematoma, dehiscence of incision, submental swelling, or damage to the submandibular duct/gland.^{1,5,6}
- Contraindications that would preclude submental intubation: patients who require prolonged intubation, patient refusal, laryngotracheal injury, sub-mental infection, gunshot injuries, tumor ablation, and history of keloids.³
- Submental intubation requires technical skill, but the advantages are: it is safer, simpler, faster, cost-effective, low risk, low complication rates, less scarring, no specialized equipment necessary, no additional postoperative care required, lower length of hospital stay, and lower health care costs.^{1,2,3,5}
- Majority of patients evaluated had minimal scarring after 6 months.⁶

Conclusion

- Submental intubation is a preferable technique over nasal intubation or tracheostomy in select patients of oral/maxillofacial trauma, as long as there's no indication for prolonged ventilatory support.
- It decreases risks to the patient and provides good surgical access without oronasal distortion.³
- The procedure is easier, low-cost, and safer compared to alternative options.
- As long as there is no contraindication to submental intubation, it offers unencumbered intraoperative airway access in patients with complex midfacial fractures requiring fixation.

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