# Retromolar Intubation:An alternative non invasive technique for airway management in maxillofacial trauma

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**ABSTRACT**

Airway management during surgery in patients with complex maxillofacial trauma has always been a challenge for anesthesiologists, as the surgeon and the anesthesiologist share the same limited space. The necessity of intraoperative restoration of dental occlusion by intermaxillary fixation (IMF) makes the presence of oral endotracheal tube unfeasible.The purpose of our study is to evaluate the Retromolar intubation is non-invasive technique of securing airway in patients with panfacial trauma. It avoids the complications of submental intubation and tracheostomy.

This review article emphasizes on the use of the retromolar intubation technique in certain cases of maxillofacial trauma.

**Keywords:**Retromolar intubation, panfacial trauma, Retromolar space

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## Introduction

According to WHO published data, trauma continues to rank among the leading causes of mortality and morbidity throughout the globe, affecting people of all ages and income groups [1]. Among the various forms of trauma, facial trauma is noteworthy on account of its emotional, esthetical and functional influences on people's life and the possibility of permanent cosmetic deformities [2]. These fractures frequently result from scuffles, traffic accidents, sports, falls and industrial accidents with definite geographic differences. All reports apparently show a higher frequency in males aged 21-30 years [3]. Other contributing factors such as socioeconomic status, environment and alcohol use show greater variability.

Patients with panfacial trauma require specific considerations for securing airway.Intraoperative assessment of occlusion and maxillomandibular fixation is often required for exact reduction of facial fractures [3].

While traditionally the use of nasal intubations , tracheostomies and submental intubation are preferred, but the use of retromolar intubation technique can be a better alternative airway management strategy due to its non invasiveness and less complication rates.

## Various techniques of airway management

The management of difficult airway always remains a challenge for emergency physicians and is also a significant cause of mortality and morbidity in the emergency department.In the anaesthesia literature, its frequency ranges from 0.4 to 8.5% of elective intubations [1,5]. Addressing facial trauma cases is one of the most challenging issue.These cases require a safe and secured technique for airway management along with an uninterrupted surgical field. The various available intubation techniques are tracheostomy, nasotracheal intubationand submental intubation.

The advantages and disadvantages of various techniques are summarized in table 1

**Table 1:Different modalities of airway management**

| | | |
|---|---|---|
| **Nasal intubation** | • Indicated in cases with minimal mouth opening.<br>• Useful in patients with thick, short neck<br>• Recommended for mandibular fractures. | • Traumatic<br>• Can cause complications(epistaxis, otitis media,pressure necrosis of external nares)<br>• Contraindicated in nasal fractures, CSF leak, Le fort fractures. |
| **Tracheostomy** | • Provides a small, secure connection to your airway for suctioning and for mechanical ventilation.<br>• Nebulized medication (sprays or mists) and oxygen can be delivered through it.<br>• Method of choice when long term life support mechanical ventilation is desired. | • Invasive technique<br>• Time consuming<br>• Can cause hemorrhage<br>• Injury to recurrent laryngeal nerve injury<br>• Can lead to subglottic stenosis<br>• Injury to oesophagus<br>• difficulty with speech and swallowing<br>• Requires good post operative care. |
| **Submental intubation** | • Less invasive<br>• Requires no specialized instruments<br>• Excellent for short term airway management | • Requires adequate mouth opening<br>• Injury to submandibular,sublingual glands and their ducts.<br>• Hypertrophic scarring may occur<br>• Can cause orocutaneous fistula<br>• Superficial infection of submental wound can occur |

## Anatomy of retromolar space

The retromolar space is located between the distal aspect of the last molar and the anterior edge of the ascending ramus of the mandible where it crosses the alveolar margin [5]. It is bounded superiorly by the maxillary tuberosity and the retrotuberosity area, inferiorly by the retromolar trigone area, anteriorly by the last erupted molar teeth,posteriorly by the anterior border of ascending ramus of the mandible, medially by the lateral surfaces of the tuberosity, the last erupted molars and the oral cavity, and laterally by the medial surface of ascending ramus and the buccal vestibule [6]. (Fig. 1)

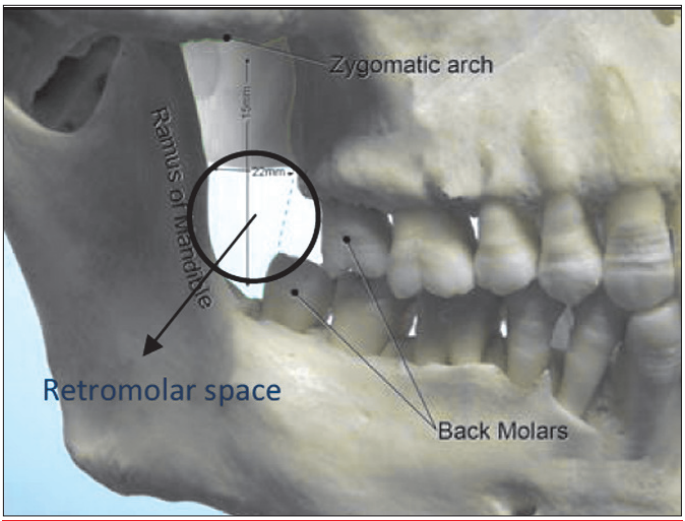


Fig. 1: Photograph showing retromolar space

## Testing the adequacy of space

The primary requisite for placement of tracheal tube in the retromolar space is the existence of enough space in this area. The adequacy of this space can be judged by placing a gloved index finger in the retromolar space and asking the patient to close his or her mouth slowly [7]. No compression on the finger shows enough retromolar space. This method is impractical in children as it requires patient cooperation [8]. An orthopantomogram may be helpful in these cases for evaluating the adequacy of the space.

## Factors influencing the adequacy of space

Many studies have revealed that insufficiency of Retromolar space is associated with eruption status/impaction of the third molar teeth, particularly the one from the ramus of a mandible [9]. Dutta et al. observed that there is great variation in the retromolar space in cases where third molar is impacted or fully erupted [10]. Martinez et al. described that if a third molar is found, whether erupted or unerupted, it is extracted before performing a semi lunar (180-degree) osteotomy large enough for the tracheal tube to lie below the occlusal plane [11]. During the osteotomy, the internal mucoperiosteal plane is protected to prevent injury to lingual nerve[12]. However, the technique of Martinez et al. involves destruction of bony anatomy. This bone may be useful for fracture or osteotomy segment fixation devices.

## Technique

### There are two techniques for retromolar intubation.

### a) Conventional method

Orotracheal intubation is done initially with a flexometallic tracheal tube using standard general anaesthesia technique. The aim is to place the orotrachealtube in the retromolar space i.e. space behind the last upper and lower erupted molar teeth (Fig. 2). The orotracheal tube is grasped with gloved fingers and is

Fig. 2: Photograph showing retromolar space

placed into the retromolar space . The retromolar tracheal tube allows adequate dental occlusion, thus rendering intraoperative intermaxillary fixation feasible. Restoration of adequate dental occlusion by IMF is the important step prior to surgical fixation of fracture segments by plates and screws. At the end of surgical procedure, wire IMF is opened resulting in adequate mouth opening. The retromolar tracheal tube is converted back to orotracheal tube. Subsequently, trachea is extubated by the standard method.

### b)Bonfils retromolar fibrescope technique

The Bonfils is a semi-rigid optical stylet with an angled end (Dimensions: 40 cm long, external diameter 5.0 mm and a anterior tip curvature of 40 degree) (Figure.3) .The adult stylet can accommodate 6.5 mm tracheal tubes or larger and the pediatric

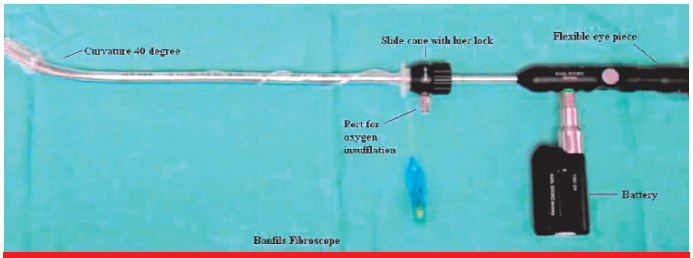


Fig. 3: Bonfils retromolar fiberscope

stylet, the Brambrink Intubation Endoscope can accommodate 2.5-6.0 mm tracheal tubes [13-16]. For Bonfils guided retromolar intubation, the patients are placed in supine position with their head and neck maintained in a neutral position. The initial steps involve premedication of the patient with sedatives, analgesics and anti-sialagogue agents, topical application of local anaesthetics to theupper airway and use of an appropriate nerve blocks. The fibroscope is preloaded with an appropriate sized cuffed tracheal tube fixed to its slide cone [17]. Continuous oxygen should be provided through the side port of the slide cone throughout the procedure. Thorough suctioning of the pharynx should be done before inserting the instrument. To avoid any fogging, the tip of the scope should be placed in either a warm saline or water, application an anti-fogging agent to the lens, and/or administration of oxygen through the system. Bonfils fibroscope may be introduced into the oral cavity either through the midline or from the angle of the mouth. When the tip of the fibroscope lies in front of the vocal cords, an additional local anaesthetic is injected onto the cords and trachea via the tube adapter. After waiting for approx. 1 min, the tracheal tube is railroaded over the scope. The Bonfils is then removed, leaving the tracheal tube in place. After confirming for bilateral air entry, patient is given standard general anaesthesia[18]. Now the orotracheal tube is positioned into the retromolar space and tied by a wire ligature in the similar manner as described in the conventional technique of retromolar intubation.

## Discussion

Retromolar intubation was first described as an alternative route for oral or nasal intubation by Martinez et al [11].Gibbons et al. reported a case where retromolar placement of theendotracheal tube was used in complex craniofacialtrauma after extracting the non-functional third molar [19]. Halsnad et al. also reported a case in which theyused the retromolar space for intubation because of amandibular fracture [20]. Since the first application of this techniquemany authors have studied the clinical use of this procedure. Very low rates of complications have been reported.

Retromolar intubation provides the following advantages over other techniques.If retromolar intubation can be done with adequate dental occlusion, then this technique avoids the need of any surgical airway.It is the least invasive and less time taking procedure. Also it avoids the complications of the other available modalities. However there are certain disadvantages too.In some patients, the retromolar space is not adequate. After retromolar placement of the tracheal tube dental occlusion is not possible. Therefore, intraoperative IMF cannot be done [11].

The tracheal tube can interfere with the main surgical field that may be partially draped. The tracheal tube can also interfere with positioning and application of dental fixation devices, especially in patients with bilateral maxillary/ mandibular fractures [13].Too zealous fixation of flexometallic tracheal tube by wire ligature can deform the tube [13].

## Conclusion

Management of facial injuries is one of the most challenging issue, clinicians are facing worldwide. Retromolar intubation offers a clear advantage over the surgical procedures like submental intubation and tracheostomy, especially in craniofacial, orthognathic, oncologic, and trauma surgeries involving dental occlusion or nasal deviation.

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