

## ARTYKUŁ POGLĄDOWY/REVIEW PAPER

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# Face-to-face intubation in traumatised patients

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## Summary

Within the remit of the activities of the Emergency Medical Services (EMS), there are occasions when it is hard to position the head of the patient in an adequate position for endotracheal intubation. Pre-hospital trauma life support suggests the „face-to-face” intubation method in these situations. In patients with injuries sustained in accidents, this method is recommended prior to the removal of the patient from the vehicle; in this case, the patient is placed in the seated position. The „face-to-face” method of intubation and its application. For this method of intubation and its application, at least two members of the EMS team are required, with the medical technician conducting manual head and neck stabilisation into a neutral position, while the practitioner prepares for the so-called “face-to-face” position with the patient. Initially, the practitioner is to grip the handle of the laryngoscope firmly in their right hand while keeping the top of the blade in the upright position (contrary to normal intubation technique). Upon opening the respiratory passage in the patient with the left hand, the practitioner is to position the laryngoscope blade in the patient’s mouth, press the tongue slightly downward together with the lower jaw, and move the blade up and forward to produce epiglottal visualisation. The endotracheal tubus is then applied with the left hand between the patient’s glottis, to the desired depth. After intubation, the cuff is to be inflated with air by syringe. The third member of the team, if present, connects an Self inflating bag to the ET tube and checks the whole is correctly arranged. The „Face-to-face” intubation method is the ideal way of providing and maintaining airways in patients with trauma, and is often crucial to their survival. *Anestezjologia i Ratownictwo 2009; 3: 193-197.*

*Keywords: orotracheal intubation, traumatised patient, face-to-face method*

## Introduction

Compromised airways are the most frequent causes of death or deterioration of the condition of traumatised patients [1]. Rarely can it be said that there is a procedure in emergency medicine more significant than treatment of the airways. Development of emergency medicine and resuscitation techniques mean that modern emergency technicians and doctors are masters of endotracheal intubation [2]. Endotracheal intubation is the method employed to maintain an open airway in unconscious patients, and is often crucial to their survival. Specifically, endotracheal intubation is used for the following presentations: respiratory arrest,

cardiopulmonary arrest, trauma injury, burn injuries, intoxication etc. However, it is to be emphasised that intubations performed under hospital conditions and intubations performed in the street are two entirely different things. Although endotracheal intubation is considered to be standard in the course of treating the airways of critical patients at accident scenes, the skill is hard to acquire, maintain and perform well. Factors attributed to unsuccessful intubation efforts, especially in traumatised patients [3], are not only inadequate sedation and the low dexterity and insufficient experience of the emergency responders, but also the need for *in line* cervical spine stabilisation as well as reactive reflexes of the airway, all of which are easily detectable

in patients with the Glasgow Coma Scale (GCS) from 3. A well-drilled team of EMTs can turn theoretical conditions for intubation into ideal ones, by applying neuromuscular relaxants and sedatives.

Apart from the endotracheal, there are also nasotracheal, digital, pharmacologically induced, “face-to-face” and retrograde intubations. In cases when the pre-hospital team is not skilled at endotracheal intubation [4], or in cases of hindered intubation, the acceptable alternatives are as follows: Combitube, Laryngeal Mask Airway (LMA), ProSeal LMA and laryngeal tube. Ultimately, the preceding factors are indicative of a need for re-estimation of the „golden standard” for pre-hospital treatment of airways in the course of Cardiopulmonary Resuscitation (CPR).

## Difficult intubation

Endotracheal intubation is a golden standard of pre-hospital airway treatment under emergency conditions, as well as in releasing airways under hospital conditions including emergencies together with elective operative procedures. Endotracheal intubation in the theatre is a simple, routine procedure, however in some cases a hindered intubation might have lethal effects. Danger signs include unfavourable conditions for proper procedures and insufficiencies in staff training and equipment. Difficult intubation is actually the situation in which even the experienced anaesthetist does not succeed in intubating the patient after three running efforts.

The frequency of difficult intubation in pre-hospital cardiopulmonary resuscitation differs between individual studies. Under hospital conditions the frequency of hindered intubation ranges from 3-18%, and difficult intubation by approx. 0.05% [5]. Death caused by difficult intubations are 2-7 cases per 100,000 anaesthesias. In coma patients under pre-hospital conditions, the incidence of difficult intubation is 20% [6]. Complications connected to emergency intubation under hospital conditions range from 9 to 56% and are related to the oesophageal position of the tubus. Under pre-hospital conditions the percentage of hindered medical team intubation is 5.3% whereas the percentage of impossible intubations is 1.1%.

Difficult intubation is divided into four categories in accordance with the visibility of the epiglottis and glottis (vocal cords) in the course of laryngoscopy [7]:

Category 1: Glottis (vocal cords) are visible

Category 2: Glottis (vocal cords) are partially visible

Category 3: Only epiglottis is visible

Category 4: Neither glottis nor epiglottis can be seen

Hindered intubation might be expected and unexpected. Under pre-hospital conditions and in difficult trauma incidences, it is important that the patients alike should be recognized [4,6].

The following causes are to be emphasised, apart from anatomic variations (congenital and acquired deformation of the upper airways, protruded teeth, rheumatoid arthritis and ankylosing spondylitis etc): mouth and throat tumour, struma, obesity, pregnancy, significant injuries to the face and neck, infections (abscess) etc. However, hindered intubation might be a consequence of allergic manifestation or simply that the patient has a full stomach. Patients at risk are those with multiple injuries, especially head injuries and brain oedema (vomiting). So as to prevent the possibility of aspiration, if no clinical signs of cervical spine injuries present, the collar is removed and either cricoid cartilage compression or a modified Jackson’s manoeuvre (cervical flexion) are applied prior to laryngoscopy. In cases of excessive facial injury, other methods for the opening of airways must be chosen very quickly.

### Mnemonic for difficult intubation prediction – “MEDICTUBES”

**M**outh, Mandible (mouth, lower jaw)

**E**xcessive Weight (excessive body weight)

**D**eformity

**I**ncisors (protruded incisors)

**C** – Spine (cervical spine)

**T**hyromental Distance

**U**vula

**B**urns

**E**mesis

**S**tridor

- M.** To estimate the possibility of mouth opening, under all conditions it should be possible to open the mouth by three horizontal fingers width, as anything less might result in hindered laryngoscopy. The lower mandible should be without injuries or deformity.
- E.** Pregnancy or a short neck might make intubation difficult.

- D. Any deformity is to be estimated; haematoma, struma, and other non-typical manifestations alike. This includes burns.
- I. The presence of dental injuries should be established, as well as incisors and eye-teeth' protrusion and presence of false teeth.
- C. Immobilisation of, or suspected or evident injury to the cervical spine, as well as dislocation of the trachea.
- T. If the distance from the chin to the thyroid cartilage (thyromental distance) is less than 6 cm (three horizontal fingers' width), intubation in the patient is almost impossible.
- U. According to Mallampati, visualisation of the complete structure of the oropharynges and uvula in the course of intubation is ideal.
- B. Burns
- E. Vomiting
- S. Stridor is a typical sign of airways obstruction, and might be caused by a foreign body, tumour, inflammations or trauma.

### A specific screening tests for hindered intubation prediction

It is almost impossible to predict the cause of a hindered intubation under emergency conditions due to the lack of time available for a detailed clinical check-up. As a quick indicator, the Mallampati Test might be used [8]: 1. The hard palate, soft palate and uvula are visible; 2. The hard and soft palate are visible but the uvula is disguised by the tongue base; 3. Only the soft palate is visible; and 4. The soft palate is not visible.

### Hindered Intubation Predictors

- \* The combination of the third and fourth degree of the Mallampati Test with a thyromental distance less than 7 cm, is a predictor of hindered intubation [9].
- \* A sternomental distance of 12.5 cm or less is a predictor of hindered intubation [10],
- \* Mandibular protrusion,
- \* X-ray studies. A variety of studies show that X-ray estimation of the mandibula's anatomic shape might be useful in prediction of hindered intubation.

Usage of a variety of tests is better than application of only one. Modified Mallampati, thyromental distance, mandibular protrusion capability and cranio-cervical movements are all mostly safe predictors of hindered intubation.

- \* After unsuccessful intubation, the need for an experienced anaesthesiologist and whether there is any easier technique for the intubation of the patient should be reconsidered. *It is vital that the problem of free airway maintenance should be recognised and experienced people summoned on time.*

### Face-to-face Intubation Technique (Table 1)

"Face-to-face" intubation, also known as the "tomahawk" or "pickaxe" method, is often used in the everyday work of practitioners within the EMS. In order to carry out this method, two members of an EMS team are necessary; a medical technician carrying out manual stabilisation of the head and neck in the neutral position, and a practitioner taking a position "face-to-face" with the patient. In contrast to conventional laryngoscopy, the practitioner holds the handle of the laryngoscope in his right hand with the top of the blade in the upright position (contrary to conventional intubation technique). After the opening of the patient's airways, the top of the laryngoscope's curved blade will be in place in the left part of the patient's mouth (Figure 1). The blade moves down the oral cavity along the left side, moving the tongue to the right, while the practitioner moves the laryngoscope towards himself, i.e. upwards, to the level of epiglottal visualisation. After this, the experienced person introduces the endotracheal tube between the patient's glottis to the desired depth. The tube should now be positioned with its convexity facing upwards (Figure 2). In patients with spontaneous breathing, the tube is placed in the course of inspiration when the glottis (vocal cords) are retracted and the glottis entirely open. It is placed far enough into the trachea so that the upper edge of the cuff is 2 cm below the glottis. When the patient is intubated, the balloon is inflated by means of syringe. In adults, 5-8 ml of air is enough to achieve hermetisation between trachea and tube. The third member of the team, if present, prepares an Self inflating bag with the ET tube and checks that the whole is correctly arranged.

Table 1. Endotracheal intubation in “face-to-face” position

<b>Conditions</b>	Patient in a sitting or supine position under existing indoor, ambulance, or outdoor lighting, temperature and weather conditions
<b>Indications</b>	Patients in respiratory failure or arrest
<b>Perform procedure</b>	
Place head, neck and torso into proper position	
If patient is sitting, direct assistant to support head in a neutral or extended position	
Position yourself in front of patient	
If patient is supine, stand over and straddle patient	
If cervical spine injury suspected, have assistant maintain manual stabilization	
Discontinue ventilations and remove airway adjunct	
Open mouth with cross finger technique if needed	
Suction if necessary	
Holding laryngoscope handle in your right hand, insert laryngoscope blade into mouth until the tip is at the base of the tongue	
Pull anteriorly to expose epiglottis	
Visualize and identify epiglottis, glottic opening, arytenoid cartilage and vocal cords	
Insert ET tube with stylette in right side of mouth, advancing toward midline	
Observe distal tip pass through glottic opening	
Advance ET tube until the cuff passes, or the tube marker is located at vocal cords	
Secure tube against upper teeth with fingers of left hand	
Withdraw laryngoscope and close blade against handle, setting it aside	
Remove stylette with right hand	
Inflate pilot balloon with syringe until firm, using right hand	
Detach syringe from cuff	
Attach bag	
If using esophageal detector device to confirm tube placement, utilize first before attaching bag to ETT	
Begin ventilating patient	
<b>Total time of ventilation interruption does not exceed 30 seconds</b>	
<b>Confirm endotracheal tube placement</b>	
Use at least two methods of confirmation	
If endotracheal tube is not correctly placed, deflate the cuff, withdraw the tube and ventilate the patient with bag mask and OPA	
<b>Secure endotracheal tube</b>	
Use tape or a commercial device according to manufacturer's directions	



Figure 1. The top of the laryngoscope's curved blade will be in place in the left part of the patient's mouth



Figure 2. The tube should now be positioned with its convexity facing upwards

It is obvious that this technique is intended for unconscious patients not presenting trismus, and is mainly applied in patients found in a seated position in the course of vehicle impacts and other kinds of accidents. Variations of this technique are limited in patients found in horizontal positions and when the practitioner should be facing the patient. This inverse method of intubation is convenient for unconscious patients as well, such as those found in bathrooms, wedged between a bath and toilet, or in similar circumstances making traditional endotracheal intubation impossible due to a lack of space [11].

## Conclusion

Under pre-hospital intubation conditions, use of the „face-to-face” method is the ideal way to provide and maintain the airways in traumatised patients and is frequently crucially significant in their survival. However, it is intended only for professionals experienced with the technique.

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