Patients in any healthcare setting can quickly become acutely unwell, and assessment and management of the airway is always the priority in any clinical situation (Resuscitation Council UK, 2021). When patients are critically unwell, there is a high risk of respiratory deterioration, and many patients require an artificial airway to facilitate their treatment. Knowing how to assess and manage the airway is a key skill for the nurse working in critical care.

Anatomy and physiology of the airway
The function of the airway is to help transport air to and from the external environment, so knowledge of the associated anatomy is important in airway assessment and management. The airway is divided into two main sections. The upper airway – this includes the nasal cavity, oral cavity, pharynx and larynx – warms, filters and humidifies inhaled air (Mete and Akbudak, 2018). The lower airway begins with the trachea, divides at the carina, and leads into the bronchi of the lungs, delivering air to the bronchioles and alveoli (Moots, 2016) (Fig 1).

Airway assessment
Clinical complications associated with the airway have three main causes: airway obstruction, loss of airway protection and respiratory deterioration (Box 1).

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In this article...
- Understanding the clinical causes that affect the airway
- How to undertake a comprehensive airway assessment
- Common airway manoeuvres and adjuncts

Keywords
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If the patient is not breathing, indicated by no chest movement or breath coming from the nose or mouth, then check for a pulse. If this is absent, start cardiopulmonary resuscitation (Resuscitation Council, 2021). If the patient has a pulse, but there are still concerns for the airway, continue your assessment and use an airway manoeuvre as required.

**Airway manoeuvres**

Treat problems with the airway as an emergency and call for help immediately. Simple steps can be taken until expert help arrives (Resuscitation Council, 2021):  
- If the patient is awake, help the person sit in an upright position, as this makes breathing feel more comfortable (Crouch et al, 2016);  
- Where the patient is breathing, but there are suspected blockages in the mouth/upper airway, put the patient in the recovery position to prevent aspiration;  
- If equipment is available, suction any oral secretions;  
- Where the patient has a low level of consciousness, the carer or witness should not try to remove the blockage themselves; they should help the patient remain still, and call for help immediately.

### Clinical causes affecting the airway

**Airway obstruction**
- Airway spasm such as laryngospasm or bronchospasm
- Blockage such as vomit, foreign body, blood or secretions
- Infections such as tonsillitis, epiglottitis or abscesses of the throat/tonsils
- Tumour

**Loss of airway protection**
- Acute loss of consciousness such as head injury, stroke, drug/alcohol intoxication or cardiac arrest
- Reduction in neurological function such as myasthenia gravis or Guillain-Barré syndrome
- Acute illness causing reduction in level of consciousness due to hypoxia, hypoglycaemia or altered blood pH

**Respiratory deterioration**
- Respiratory failure due to acute conditions such as Covid-19, pneumonia or sepsis
- Respiratory failure due to chronic conditions such as chronic obstructive pulmonary disease or asthma

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Consciousness or has stopped breathing, lift the patient’s chin and tilt the head (Fig 3a) – this will prepare you to insert an airway adjunct (Lloyd, 2020);

- If none of these are successful, a jaw thrust (Fig 3b) will open the airway and help when inserting an airway adjunct. A jaw thrust involves hooking the little and ring fingers under the jaw and using the middle and index fingers on the top of the jaw and chin. This is also helpful when holding a mask onto the face to provide a tight seal (Lloyd, 2020);

- Administer high-concentration oxygen (15L) via a non-rebreathing mask to prevent hypoxia and potential irreversible brain injury (Nolan and Soar, 2016).

Airway adjuncts
There are various adjuncts that open the airway and keep it patent until suitable help arrives, as described below. If the patient tolerates an airway adjunct, this suggests a low level of consciousness and requires a health professional with advanced airway skills (Nolan and Soar, 2016).

Nasopharyngeal airway
The nasopharyngeal airway (NPA) is a flexible tube that passes from the nose to the pharynx (throat). It is the easiest adjunct to insert and is particularly useful when patients are unable to open their mouth (for example during a seizure or if they have a mouth injury) (Matten et al, 2017). It can be used to help deep suctioning in drowsy patients with copious upper airway secretions. Contraindications include facial trauma, head injury and skull fractures. Use as follows:

- Inspect the size of the patient’s nostril (usually 6mm for an average-size female, or 7mm for an average-size male (Roberts et al, 2005);
- To insert, apply lubricating gel to the soft end, hold like a pen and insert into the mouth, pushing it down until the base is at the back of the throat.

Oropharyngeal airway
The oropharyngeal airway (OPA) is a rigid, curved plastic tube that opens the mouth and pharynx. It may be slightly harder to insert than an NPA and be difficult for the patient to tolerate unless entirely unconscious. Use as follows:

- Measure between the patient’s front teeth and the angle of the jaw to select the most appropriate size;
- To insert, start with the OPA upside down. When it is in halfway (behind the tongue), twist it through 180 degrees and push in fully. The wide end should sit in line with the front teeth (Lloyd, 2020);
- If the OPA causes the patient to vomit or the throat to spasm, remove it immediately.

Supraglottic airway
The supraglottic airway is a long, large flexible tube with a soft or inflatable oval-shaped ending that sits over the top of the larynx. It is the adjunct that gives the highest level of airway opening before intubation is considered. Use as follows:

- To size, use the patient’s estimated size/weight as a guide (as per manufacturer’s instruction). This is typically size 4 for females and size 5 for males (Doyle, 2021);
- To insert, apply lubricating gel to the soft end, hold like a pen and insert into the mouth, pushing it down until the base is at the back of the throat.

Bag valve mask ventilation
If patients are in respiratory arrest, they will require manual ventilation. Once an airway adjunct has been successfully inserted, a tight-fitting mask can be applied; this is attached to a self-inflating bag (also known as a manual resuscitator), meaning breaths can be given to the patient. Effective use of the bag valve mask ensures good ventilation until advanced airway management is available. Use the bag valve mask as follows:

- Ensure a tight seal around the face, using the head tilt/chin lift (Fig 3a), or jaw-thrust manoeuvre (Fig 3b) if needed, to prevent gas being forced into the stomach, as this increases the risk of aspiration;
- Once the mask is in place, squeeze the bag with gentle pressure, regularly but slowly to mimic normal breathing. Use one hand to hold the mask and the other to squeeze the bag.

Artificial airways
To continue mechanical ventilation, a patient will need an artificial airway; the gold standard is an endotracheal tube. Insertion (intubation) is by a practitioner specifically trained in airway management (Resuscitation Council, 2021). When appropriately trained and competent, critical care nurses often assist with intubations (Baid et al, 2016). Patients who need continuing ventilation or airway management, due to long-term critical illness, a neurological condition or pathophysiology of the upper airway, will require a tracheostomy.

Endotracheal tube
An endotracheal tube (ETT) (Fig 4) is a flexible plastic tube that is inserted through the mouth and into the trachea. It has an inflatable plastic cuff to aid positioning and prevent aspiration and is held in place using fabric ties or a plastic tube-holder device (Moots, 2016). ETTs are not designed for long-term use as they increase the risk of tracheal herniation and complications, such as bronchospasm and laryngospasm.
and reduce the ability to cough effectively. To tolerate an ETT, patients usually need continual sedation, except in cases of significant brain injury or severe weakness (Laws and Rudall, 2013).

**Tracheostomy tube**

A tracheostomy tube (Fig 5) is a rigid, curved plastic tube that is inserted directly into the anterior wall of the trachea, between the second and third tracheal cartilages, either percutaneously or surgically. Although designed for longer-term or permanent use, tracheostomies increase the risk of bleeding, accidental dislodgement, subglottic stenosis and site infection. A bedside safety kit should always be available in case of blockage or dislodgement, which is an airway emergency (Intensive Care Society, 2020).

**Nursing responsibilities**

The nurse caring for a patient with an ETT or tracheostomy is responsible for providing essential care and preventing adverse effects associated with artificial airways (Baid et al, 2016). This includes the following checks:

- **Securement** – ETTs are held in place by tapes or securement devices, and tracheostomies are held in place by sutures and tapes. Check these are appropriately placed and changed as required (Moore et al, 2020);
- **Length** – tracheostomies remain in the same position, with the flange flush with the front of the neck; ETTs are secured at a recorded length in centimetres. Check these are correct and escalate if there are any concerns (Moots, 2016);
- **Cuff pressure** – both types of tube are held in place by a small, inflated cuff in the trachea. Ensure this is inflated to 28-30mmHg (Coombs et al, 2013);
- **Blockages** – secretions from the mouth, throat and upper airways can cause the tubes to become blocked. Suction regularly to prevent this. Tracheostomies also have a removable inner tube which should be changed and cleaned every four hours (Intensive Care Society, 2020);
- **Prevent infection** by keeping the surrounding areas clean. For ETTs, this is the mouth and securement device; for tracheostomies it is the skin and dressing around the area.

**Conclusion**

Nurses assessing critically ill patients require knowledge on airway compromise, assessment and management. Whether there is a need for a simple manoeuvre and adjunct before expert help arrives, or continuous care of an artificial airway on the critical care unit, this article has outlined the knowledge required. Nurses should only carry out care if competent to do so, and should follow local policies and procedures. NT

**References**


Resuscitation Council UK (2021) ABCDE Approach. RCUK.


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**Fig 4. Endotracheal tube**

**Fig 5. Tracheostomy tube**

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**Part 3:** Arterial lines Jan 2022

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