WORKSTATIONS
Needle and Surgical Cricothyroidotomy

Needle cricothyroidotomy - equipment that you will use

- 12 gauge or 14 gauge cannula
- 2ml syringe
- Oxygen tubing
- Oxygen source (cylinder or wall oxygen)

Needle cricothyroidotomy - procedure

The instructor is to perform a *silent demonstration*, then a *talk through*, then ask each *student to demonstrate* the task, talking a colleague through.

1. Identify the cricothyroid membrane.
2. Place a 2ml syringe on the end of the wide bore cannula. Stand or kneel at the head of the patient and introduce the cannula through the cricothyroid membrane at 90^0. Aspirate gently as the cannula is introduced.
3. When there is a free flow into the syringe tilt the syringe 45^0 towards the head so that the cannula is now pointing 45^0 towards the feet. Advance the cannula over the needle.
4. Remove the needle from inside the cannula together with the syringe.
5. Take the plunger out of the 2ml syringe and then force the oxygen tubing down the end of the barrel of the 2ml syringe. Cut a small hole in the wall of the oxygen tubing just where the tubing protrudes from the barrel of the syringe.
6. Push the syringe into the cannula. Connect the oxygen tubing to the oxygen source.
7. In adults turn the oxygen source up to 15 litres per minute (in children start at 1 litre per minute per year, and increase by 1 litre per minute as required until ventilation occurs).
8. Allow oxygen to jet into the patient for 1 second (by occluding the hole in the oxygen tubing with your thumb) and allow the chest to recoil for 4 seconds (by removing your thumb from the hole on the oxygen tubing).
9. *This is a ventilation technique and you should see the chest rise.*

During the talk through cover the following points:

- indications for needle cricothyroidotomy
- landmarks for cricothyroidotomy
- complications for needle cricothyroidotomy

Remember, cricothyroidotomy is a technique of failure. It is performed when other means of establishing an airway have failed, including:

- manual airway manoeuvres (jaw thrust)
- simple airway adjuncts (oropharyngeal airway, nasopharyngeal airway)

- advanced airway adjuncts (laryngeal mask airway, Combi-tube)
- endotracheal intubation

The reason that these interventions may fail is because of upper airway obstruction from one of the following causes:

- Facial and oropharyngeal swelling from severe trauma
- Facial, oropharyngeal and laryngeal oedema from inhalational burn
- Foreign body obstruction
- Facial, oropharyngeal and laryngeal oedema from anaphylaxis (insect sting, drugs)
- Infection (epiglottitis)

Rural Trauma Tip

- Assemble your jet insufflation kit in advance, with a good length of oxygen tubing fitted to the barrel of a 2ml syringe, and port cut in the side of the tube.

Rural Trauma Tip

- You cannot breathe spontaneously through a cannula, or effectively bag-valve ventilate a patient through a cannula.

  If you do not have an oxygen source to jet insufflate a patient, then proceed immediately to surgical cricothyroidotomy.

Surgical cricothyroidotomy - Equipment

- MINI-TRACH II, or;
- 6mm high volume low pressure cuff tracheostomy tube, plus
  - scalpel and blade
  - tracheal spreaders
  - local anaesthetic

Surgical cricothyroidotomy may provide a definitive airway when a 6mm cuffed tube is used in an adult. This technique is not recommended for children of less than 12 years, because incision through the cricothyroid membrane may disrupt the support for the incompletely developed upper trachea. The only technique for children of 12 years or less is therefore needle cricothyroidotomy (see above).

Surgical Cricothyroidotomy - Procedure

The instructor is to perform a *silent demonstration*, then a *talk through*. There is an option for each *student to demonstrate* the task, talking a colleague through, dependent on the skill mix of the group.

1. When the patient is conscious local anaesthetic will be required. If this is injected directly over the cricothyroid membrane there is a risk of distorting the anatomical landmarks. Local anaesthetic should be injected over the middle third of sternomastoid bilaterally.

   The rest of the instructions refer to the use of a MINI-TRACH II system which is recommended here because of its simplicity and the fact that all the required equipment is contained in one small package.

2. Locate the cricothyroid membrane.
3. Make a transverse incision across the width of the cricothyroid membrane. ***Leave the blade in situ and twist through 45^0***.
4. Insert the 4mm uncuffed tube with its introducer (stiffener), inserting it at 90^0 and tilting 45^0 towards the head when it is felt the tip is inside the trachea.
5. Advance the 4mm tube over the introducer.
6. Remove the introducer and allow the patient to spontaneously breathe, or attach the ISO connector and bag-valve ventilate the patient with 100% oxygen.
7. Secure the tube with the length of tape provided.

Practical Tip

Do not remove the blade before introducing the cannula and stiffener, otherwise the track may be lost and the cannula placed subcutaneously.

During the talk through cover the following points:

- indications for surgical cricothyroidotomy
- complications of surgical cricothyroidotomy

COMPLICATIONS OF SURGICAL CRICOTHYROIDOTOMY

- Bleeding
- Placement of the tube anterior to the trachea (subcutaneously)*
- Infection (late)

* This is a common complication and may result in massive surgical emphysema if the patient is subsequently ventilated. Anatomical landmarks would then be lost with possible fatal consequences.