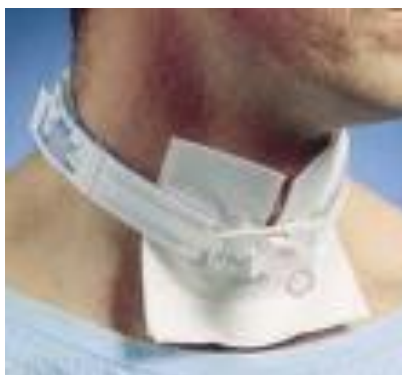
COMPETENCY ASSESSED SELF DIRECTED LEARNING PACKAGE

TRACHEOSTOMY CARE



NAME____

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GRNE Points 2 for package + 1 point for competency assessment

November 2022

Approved by the Gippsland Region Nurse Educators Group November 2022
Acknowledgements to Gippsland Health Service Consortium Members for input

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NB: All Enrolled Nurses remain under the supervision of a Registered Nurse.

AIM

This self-directed learning package is designed for nurses to provide them with the rationale and clinical practice to provide aspects of care for a patient with a tracheostomy. It should be used in conjunction with practical sessions on Tracheostomy Care.

LEARNING OBJECTIVES:

At the completion of this package, the nurse will be able to:

- State the indications for a tracheostomy
- Identify the upper airway anatomical changes associated with laryngectomy
- Describe the different types of tracheostomy tubes and the indications for their use
- List the emergency equipment to be kept by the bedside of a patient with a tracheostomy
- State the importance of appropriate cuff pressure and demonstrate how to measure cuff pressure
- State the short and long-term complications of a tracheostomy
- Describe how to prevent the long-term complications of a tracheostomy
- Describe how to manage lung secretions of a patient with a tracheostomy
- Describe how to provide the additional care needs of a patent with a tracheostomy (mouth care, stoma care, etc)

The nurse will be able to on two occasions under direct supervision of a Unit Manager, Clinical Nurse Specialist, Clinical Teacher or experienced Registered Nurse.

1. Describe and demonstrate the cleaning and care of the stoma
2. Describe the cleaning of an inner and outer tube

INTRODUCTION:

Tracheostomies have been traced back to 100BC. A tracheostomy is an incision into the trachea for the purpose of establishing an airway. A stoma is created and a tracheostomy tube is placed in the trachea below the epiglottis and larynx, to create an artificial airway.

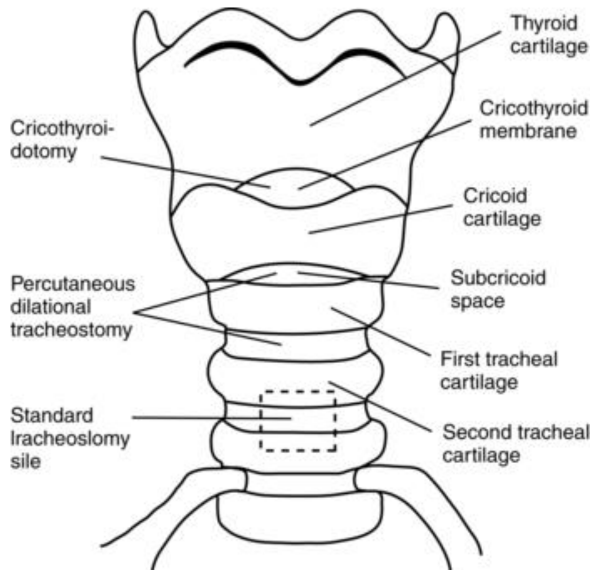
Historically a tracheostomy was only used for the short-term management of upper airway obstruction. With surgical advances in the treatment of upper airway obstruction, refinement of tracheostomy tubes and equipment and advances in management and support for patients with tracheostomies, tracheostomies are not uncommon in the hospital and community settings.

Indications for tracheostomies:

- Patients who have undergone, or are anticipated to require, prolonged mechanical ventilation and/or have difficulty weaning off the ventilator
- To prevent laryngeal and upper airway damage due to prolonged trans-laryngeal intubation
- Patients with poor airway protection who need ventilation and/or secretion control (e.g., neuromuscular disorders associated with recurrent aspiration)
- Patients with severe subglottic stenosis unresponsive to conventional therapies
- Patients with severe vocal cord paralysis who are refractory to other therapies
- To relieve upper-airway obstruction due to tumour, surgery, trauma, foreign body, or infection
- To prevent gastric fluid aspiration associated with loss of the gag reflex or laryngeal incompetence
- Patients with severe obstructive sleep apnoea who are refractory to other therapies
- To establish an end tracheostomy following total laryngectomy. In this case the cut end of the trachea is anastomosed permanently to the skin surface

PROCEDURE:

A tracheostomy may be performed under local or general anaesthetic either in theatre or the intensive care unit. The patient may have an endotracheal tube (ETT) in-situ prior to the procedure.



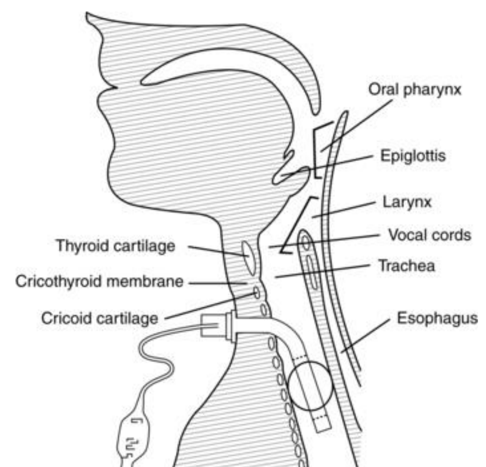
Sites for tracheostomy creation
(Serra 2000)

The initial insertion of a tracheostomy is only performed by a medical practitioner

There are two techniques that may be used for the creation of a tracheostomy.

1. *Surgical Incision*

- An incision in the shape of a cross is made through the skin into the trachea, one finger space below the cricoid cartilage and through the 2nd and 3rd and 4th tracheal rings
- The tracheostomy tube with obturator is inserted into the incision
- The obturator is removed
- Patency of the tracheostomy tube is checked
- The ETT is removed
- The tracheostomy tube cuff is inflated
- The tube is secured with tapes



2. Percutaneous Dilatation

- A small incision is made in the patient's neck
- A guide wire is inserted into the trachea
- A series of dilators are passed over the guide wire until an appropriately sized stoma is created
- The tracheostomy tube is inserted, cuff inflated if the tube is cuffed and secured with tapes

Percutaneous dilatation has been reported as being a faster, simpler procedure with a lower incidence of complications. It is the method of choice for creating a temporary tracheostomy.

In an emergency a cricothyroidotomy may need to be used and is often referred to as a "Can't Intubate, Can't Oxygenate" (CICO) situation. CICO Rescue is the term used in the Vortex Approach to describe emergency cannula or scalpel cricothyroidotomy/tracheostomy procedures required during CICO events. This approach enables it to be readily distinguished from non-emergency techniques to access the airway via the anterior neck (e.g., surgical incision, percutaneous dilation) which are inappropriate for the time critical situation of a CICO event.

TRACHEOSTOMY TUBES

All tubes are designed for single patient use and are disposable.

LOW PRESSURE CUFFED TUBE (SINGLE OR DOUBLE LUMEN)

- The outer cannula is radio opaque
- It is made of non-toxic material
- It is semi-rigid (softens at body temperature)
- It is curved to conform to adult anatomy
    - A neck plate (flange) swivels to conform to a patient's neck and to prevent the tube from pressing on the posterior wall of the trachea
- An inner translucent tube locks into place. When the blue arrows are aligned, the inner tube is locked in
- It can be attached to ventilator equipment
- The inner cannula is an exact fit to prevent build-up of mucus on the inner surface of outer cannula
- Inner cannula can be removed for cleaning
- High-volume, low-pressure cuff (designed to prevent excessive pressure to tracheal mucosa)
- Pilot balloon has a one-way luer valve to inflate cuff and measure cuff pressure
- The cuff is required to form a seal to facilitate manual positive pressure breaths or mechanical ventilation. It also provides some protection of the airway from aspiration of gastric contents. It ***is not*** a means of securing the tracheostomy tube in place

Indications

- Most commonly used following tracheostomy procedure
- Ventilated patients

Smiths Medical Soft Seal Tracheostomy Tube with Supraglottic Suction Port

Advantages

- Cleaning (inner cannula only)
- Patient comfort
- Decreased risk of complications

FENESTRATED LOW PRESSURE CUFFED TUBE

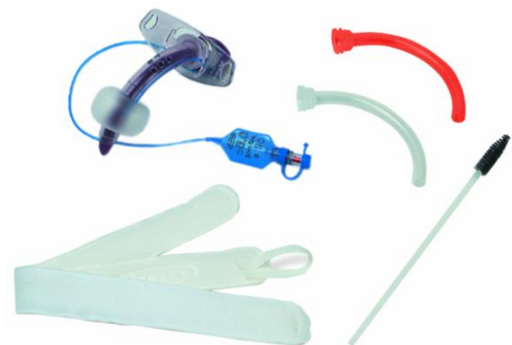
- Fenestration = Hole
- This tube has an inner and outer cannula, cuff and flange as above. These devices are rarely used, as having a cuff and fenestration cancels each function out
- The outer cannula has fenestration to allow air to pass through the tube to allow for communication/phonation and to allow the patient to breathe through their upper airway
- Inner cannula does not have fenestration
- A decannulation (removal of the tracheostomy tube) cannula is provided for occluding the lumen of outer cannula allowing patient to breathe entirely through upper airway. The cuff must be deflated to enable the patient to breathe around the tube

Indications

- Decannulation

Advantages

- Allows gradual weaning of the patient from tracheostomy enabling the patient to become accustomed to breathing and maintaining secretions prior to decannulation



Smiths Medical Fenestrated Tracheostomy Tube

CUFFLESS TUBE

- Does not seal airway, air can go above tube – i.e., thus a leak will be present if the patient requires mechanical ventilation. This is more common in paediatrics. In adults the leak may or may not be tolerated and if mechanical ventilation is required the tube may need changing
- Has both inner & outer cannula
- 2 inner cannulas available
  - Closed to allow vocalisation & for weaning
  - Open for breathing

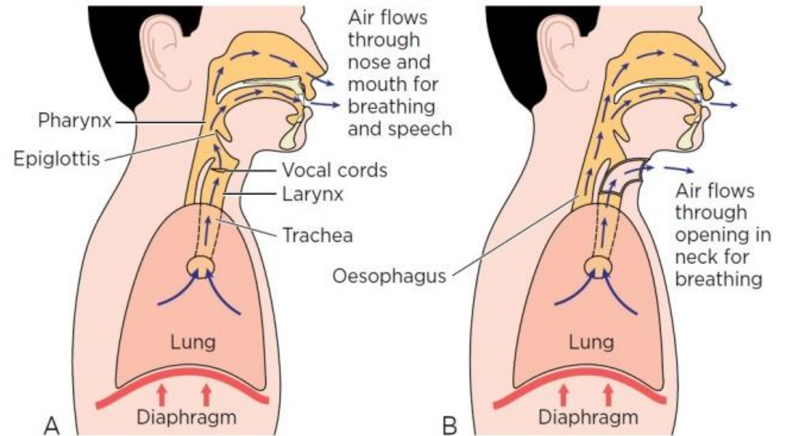
Do not use a closed inner cannula if upper airway is not patent as this will lead to asphyxiation and death

Indications

- Long term /permanent use
- Decannulation

Advantages

- Comfort
- Less trauma
- Easy to clean
- Economical



Altered Anatomy Post Laryngectomy
Nursing Times, 2016

Smiths Medical Uncuffed Tracheostomy Tube

Smiths Medical Tracheostomy Inner Cannulas

CUFFLESS FENESTRATED TUBE

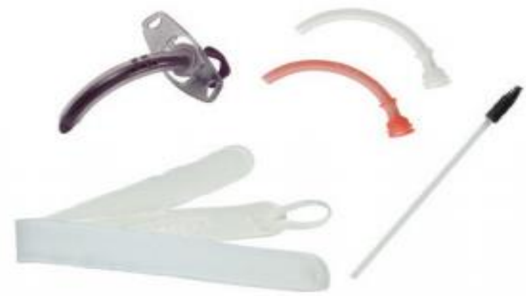
- Fenestrated to allow patient to breathe through upper airway and to allow vocalisation
- 3 inner tubes do not have fenestrations
  - With connector to allow attachment of humidification devices
  - Low profile with open lumen reduces bulk protruding from stoma
  - Decannulation (closed, short, does not go past fenestration) total respiration through upper airway, vocalisation

Indications

- Long term/permanent
- Decannulation

Advantages

- Comfort
- Less trauma
- Easy to clean
- Economical



Smiths Medical Cuffless Fenestrated Tracheostomy Tube Kit

All tubes are designed for single patient use. Cuffless tubes can be cleaned & reused by the same patient with a long-term tracheostomy

VOICE RESTORATION

There are a number of devices available to assist patients with verbal communication. Valves applied to the tracheostomy tube have been available for many years. For patients who have had a laryngectomy there are the artificial speech devices. The most commonly used device in most hospitals are Passy Muir valves (PMV).

PASSY MUIR VALVES (PMV)

A PMV is a one-way valve that attaches to the end of a tracheostomy tube, allowing a patient to inhale through the tracheostomy and exhale via the upper airway and vocal cords. The re-direction of air flow allows for vocalisation and improves pressure relationships for swallowing within the oral cavity and pharynx.

Benefits of use:

- Improves Oxygenation: The closed position no leak design of the PMV restores a more normal closed respiratory system
- Facilitates secretion management: The PMV design improves swallowing and facilitates a more effective cough with oral expectoration of secretions
- Provides opportunity for patients to communicate verbally
- Facilitates infection control by eliminating the need for finger occlusion of the tracheostomy tube

Indications for use:

- Consultation and approval from the treating medical officer or intensivist
- Medically stable with a good cough

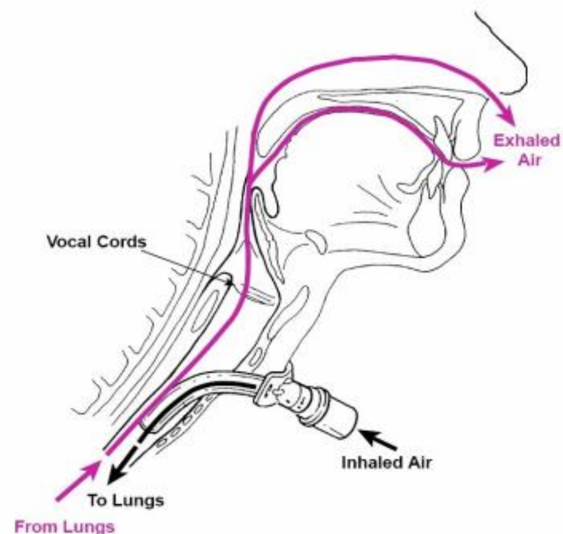
- Able to tolerate cuff deflation for a period of time
- No known upper airway obstruction
- Awake and alert
- Spontaneously breathing and off mechanical ventilatory support for an established period of time (> 2 hours)

Contraindications for use:

- A foam-cuffed tracheostomy tube
- Excessive and/or thick unmanageable sputum
- Ineffective sputum clearance
- A high risk of aspiration
- A non-patent upper airway
- Mechanical ventilation
- Decreased conscious state
- Laryngectomy: a PMV is not indicated for someone who has had a laryngectomy
- Caution shall be exercised with patients who have had a tracheostomy tube insertion or change less than 48 hours prior (due to risk of tracheal swelling and/or bronchospasm)
- Patients with an ETT in-situ
- Patients with severe anxiety and/or severe cognitive impairment

The pressure created in the trachea by these devices does take some getting used to, and the patient may only tolerate brief trials in the initial stages of use. They should not be left in-situ overnight or when the patient is unsupervised.

Passy Muir Valve
Passy Muir, 2022



Redirection of air flow with PMV
Alfred, 2021

PAEDIATRIC TRACHEOSTOMY TUBES

- Paediatric tracheostomy tubes are generally uncuffed and do not have an inner cannula due to the smaller tracheal diameter and to avoid reducing the lumen further
- However, some tubes may be cuffed and the aim of tracheostomy cuff management is to use the minimum occlusive volume/minimum cuff pressure required
- If the cuff pressure is too high this can lead to reduced capillary blood flow to the tracheal mucosa with subsequent risk of tissue damage and tissue necrosis leading to ischaemic changes, subglottic and tracheal stenosis

Further information surrounding paediatric tracheostomy management can be found in the Royal Children's Hospital Clinical Guideline for Tracheostomy Management:

https://www.rch.org.au/rchcpg/hospital_clinical_guideline_index/Tracheostomy_management/#Trache%20Tube%20Cuff%20Management

EMERGENCY TRACHEOSTOMY MANAGEMENT:

A tray of equipment needs to be prepared for use in case of tube occlusion or accidental dislodgement. The tray and the bedside equipment must be checked at the beginning of each shift. It should contain the following items:

Emergency equipment:

- Emergency management algorithm (see below)
- Spare tracheostomy tubes; one of the same size and one of a size smaller
- Tracheal dilators
- 10 mL Luer lock syringe
- Fixation device
- Neonatal face mask
- Water based lubricant
- Stich cutter
- Tracheostomy oxygen (O2) mask
- O2 face mask (size appropriate e.g., adult/paediatric)

Equipment at bedside:

- Disposable bag-mask-valve device (e.g., Air Viva) connected to wall O2
- Suction catheters of appropriate size
- Spare inner cannulas (usually a size in a diameter smaller than the tracheostomy tube is used, check with individual brands)
- Cuff manometer
- Spare tracheal dressings and tapes
- Working suction unit with suction tubing and Yankuer sucker attached
- Water to clear suction tubing
- Stethoscope

Emergency tracheostomy management algorithm:

Below are two emergency management algorithms from Austin Heath Tracheostomy Review and Management Service (TRAMS) for both primary responders and advanced responders. Numbers for initiating internal response are specific to Austin Health, consult your healthcare facility for their internal emergency phone number. The front also includes a space for tracheostomy information for reference to size, date of insertion, etc.

EMERGENCY TRACHEOSTOMY MANAGEMENT

PRIMARY RESPONDERS

Blocked tracheostomy

1. **Initiate Respond Blue**
   - Dial 7777
2. **Remove**
   - Inner cannula (if present)
   - Speaking Valve
   - HME
3. **Deflate the cuff**
4. **Instill/ Suction/ Nebulise**
   - Instill 5ml saline lavage
   - Suction
   - Apply saline nebuliser and suction PRN
5. **Oxygen**
   - Apply oxygen via nose/ mouth and tracheostomy

   If tracheostomy remains blocked:

   > 7 days post initial insertion, consider tracheostomy change by experienced staff
   < 7 days post initial insertion, do NOT change the tracheostomy. Wait for CODE BLUE team

Accidental decannulation

1. **Initiate Respond Blue**
   - Dial 7777
2. **Oxygen**
   - Apply oxygen via nose/mouth and tracheostomy stoma if required

   Consider:

   > 7 days post initial insertion, experienced staff can reinsert the tracheostomy

   < 7 days post initial insertion, do NOT reinsert tube. If long blue stay sutures present, pull anteriorly to keep stoma open while waiting for CODE BLUE team

Bleeding from tracheostomy

1. **Initiate Respond Blue**
   - Dial 7777
2. **Protect airway**
   - Inflate cuff
   - Sit patient up

   Note:

   Hyperinflation of tracheostomy cuff +/- direct digital compression may help in the event of catastrophic bleeding
3. **Oxygen**
   - Apply oxygen via tracheostomy if required
4. **IV access**
   - Establish wide bore IV access

   Note:

   <10mls bright blood activate Urgent Clinical Review

   Notify surgeon responsible for inserting tracheostomy

   A CT angiogram neck is recommended to exclude possibility of a tracheo-arterial fistula

FRONT – this side to be displayed

To be completed by airway specialist at time of insertion (Anaesthetist or ICU Doctor).
If not completed please contact: TRAMS (x3095 - Mon-Fri 8:30 to 5pm) / Anaesthetics (x3186) / ICU Doctor (x8409)

PATIENT
UR
Name
DOB

TRACHEOSTOMY INFORMATION
Insertion method
☐ Surgical ☐ Percutaneous
Insertion date / /
Size ☐ 6 ☐ 7 ☐ 8 ☐ 9
Cuff ☐ Yes – Air / Water ☐ No
Last tracheostomy change / /

UPPER AIRWAY INFORMATION
Date / /
Difficult upper airway
☐ Yes ☐ No ☐ Unknown
Laryngoscopy grade
Laryngoscopy device
Mask ventilation (BMV)
☐ 2 hands ☐ Guedel
LMA type / size

COMPLETED BY
Name
Designation

THIS COGNITIVE AID TO REMAIN WITH THE PATIENT AT ALL TIMES

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Austin HEALTH

EMERGENCY TRACHEOSTOMY MANAGEMENT
ADVANCED RESPONDERS

Difficulty breathing or ventilating via tracheostomy tube
Stop when patient is stable

Step	Action	Details
1	Remove attachments and inner cannula	**Remove / disconnect** ■ Ventilation circuit and filter ■ Speaking valve or heat moisture exchanger ■ Inner cannula
2	Suction	**Pass suction catheter through entire length of tracheostomy tube** ■ If suction catheter does not pass: **DO NOT VENTILATE VIA TRACHEOSTOMY TUBE** and proceed to Step 3 ■ If suction catheter passes easily, look listen and feel at tracheostomy – If breathing, apply oxygen via tracheostomy, consider partial obstruction – If not breathing, ventilate tracheostomy with air viva. **STOP IF HIGH RESISTANCE**
3	Deflate tracheostomy tube cuff	**Look, listen and feel at mouth** ■ If breathing via upper airway, apply oxygen to face ■ If not breathing, manage upper airway – mask ventilate/LMA/ intubate **Consider partial obstruction whether or not breathing**
4	Patient causes	■ Rapidly consider patient causes e.g. large pneumothorax, anaphylaxis, sputum plugging
5	Consider immediate bronchoscopy	**Consider immediate bronchoscopy of tracheostomy tube if scope available and the following apply** ■ New tracheostomy (<10 days old) and ■ Obstructed upper airway
6	Remove tube	■ **Remove tracheostomy tube and proceed to the next emergency pathway (Completely removed tracheostomy tube)**

Completely removed tracheostomy tube
Stop when patient is stable

Step	Action	Details
1	Assess breathing	■ Patient may be breathing adequately via the tracheostomy stoma or upper airway, no immediate action may be required
2	Consider replacing tracheostomy tube	■ If greater than 7 days post initial insertion, experienced staff can reinsert tracheostomy tube
3	Upper airway	■ Manage upper airway - mask ventilate/ LMA / intubate
4	Upper airway and tracheostomy at same time	■ **Airway team** – manage upper airway ■ **Neck team** – via tracheostomy 1. Primary measures: LMA or paediatric mask over stoma 2. Secondary measures: endotracheal or tracheostomy tube in stoma **Consider:** **- traction on stay sutures** **- tracheal dilators** **- endotracheal tube on bronchoscope** **- bougie / exchange catheter** **- guidewire and Melker**
5	New surgical airway	

Bleeding from tracheostomy
Complete all steps

Step	Action	Details
1	Protect airway	■ Sit upright ■ Hyperinflate tracheostomy cuff ■ Consider pushing finger on bleeding point ■ Pass suction catheter if required
2	Oxygen and IV access	■ Oxygen via tracheostomy ■ Establish wide bore IV access
3	Urgent contact	■ ENT and/or Thoracic surgery ■ Charge Anaesthetist 3186 ■ Theatre ANUM 3466
4	Go to theatre or interventional radiology	**Note:** **- a small bleed may precede a life threatening bleed from a tracheo-arterial fistula**

IN ALL CASES

1. Confirm tracheostomy not laryngectomy
2. Confirm airway information on opposite side
3. Apply high flow oxygen via tracheostomy and face mask
4. Call Code Blue 7777 and assess ABC
5. Use capnography as soon as possible
6. Call surgeon if required

THIS COGNITIVE AID TO REMAIN WITH THE PATIENT AT ALL TIMES

An advanced responder is a trainee or consultant doctor with specialist airway skills eg Anaesthetist, Intensivist, ENT/Thoracic/Maxillofacial surgeon.

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Emergency laryngectomy management algorithm:

Emergency management differs with patients who have undergone a laryngectomy, as they no longer have a patent upper airway. Below is an emergency management algorithm specific to these patients from the Intensive Care New South Wales, based on the United Kingdom National Tracheostomy Safety Project.

Emergency laryngectomy management

Call for airway expert help or rapid response team or code blue
Look, listen and feel at the mouth and laryngectomy stoma
A manual breathing system with a **flow-inflating bag** may help assessment (if available)
Use **waveform capnography** whenever available: exhaled carbon dioxide indicates a patent or partially patent airway

Is the patient breathing?

NO:
Call rapid response team or code blue
CPR if unresponsive AND absent or abnormal breathing
Apply high flow oxygen to laryngectomy stoma
If in doubt, apply oxygen to face also*

YES:
Apply high flow oxygen to laryngectomy stoma
If any doubt whether patient has a laryngectomy, apply oxygen to face also*

Assess laryngectomy stoma patency

Most laryngectomy stomas will **NOT** have a tube in situ

Remove **stoma cover** (if present)
Remove **laryngectomy tube** (if present)
Do not remove the voice prothesis (if present)

Can you pass a suction catheter?

YES:
The laryngectomy stoma is patent
Perform tracheal suction
Consider partial obstruction
Ventilate via stoma if not breathing
Continue ABCDE assessment

NO:
Deflate the **cuff** (if present)
Look, listen and feel at the laryngectomy stoma or tube
Use waveform capnography or manual breathing system

Is the patient stable or improving?

YES: Continue ABCDE assessment

NO:
REMOVE THE TUBE FROM THE LARYNGECTOMY STOMA if present
Look, listen and feel at the laryngectomy stoma. Ensure oxygen is re-applied to stoma
Use waveform capnography or manual breathing system with flow-inflating bag

Is the patient breathing?

YES: Continue ABCDE assessment

NO:
Call rapid response team or code blue
CPR if unresponsive AND absent or abnormal breathing

Primary emergency oxygenation

Laryngectomy stoma ventilation via either
Paediatric face mask applied to stoma OR
LMA applied to stoma

Secondary emergency oxygenation

Attempt **intubation of laryngectomy stoma**
Small tracheostomy tube, 6.0 cuffed ETT
Consider bougie, airway exchange catheter, flexible bronchoscope +/- aintree catheter

Laryngectomy patients have an end stoma and **cannot be oxygenated via the mouth or nose**
*Applying oxygen to the face and stoma is the default emergency action for all patients with a tracheostomy

Intensive care NSW
Based on UK National Tracheostomy Safety Project.
www.tracheostomy.org.uk

Each healthcare agency may have their own guidelines for these procedures so you need to consult your individual facilities guidelines

CLEANING, CARE OF THE STOMA AND DRESSING CHANGES

- Care of the tracheostomy and tracheostomy tube is performed to minimise contamination and to decrease the risk of obstruction by a build-up of secretions, this is completed by aseptic non-touch technique
- Patient education is commonly around the clean technique
- The stoma site should be cleaned at least daily but more frequently depending on the amount of secretions present.
- This is typically a two-person procedure unless the flange is sutured in place in which case one person can undertake the dressing change
- If the flange has been sutured in place these will need to be removed after seven days
- If it is a long term/permanent tracheostomy encourage the patient and family's participation in the care process

Equipment needed:

- Procedure trolley
- Foam or non-woven split dressing (e.g., Topper dressing)
- Sterile dressing pack
- 0.9% sodium chloride
- Personal protective equipment (PPE) – non-sterile gloves and goggles
- Velcro/cotton tapes if changing (see below for separate process)

Procedure:

1. Prior to commencing the dressing change ensure that the tapes are securely tied (if not changing them with dressing)
2. Cleanse any dried secretions from around the stoma with normal saline
3. Dry area thoroughly before placing the pre-cut tracheostomy dressing under the flange and around the stoma
4. Replace O2 and humidification source (if in-situ)
5. The dressing needs to be changed at least once daily but more frequently as required
6. Document procedure in patients' history

Changing tracheostomy dressing
Vancouver Coastal Health, 2012

CHANGING TRACHEOSTOMY TUBE TAPES/TIES

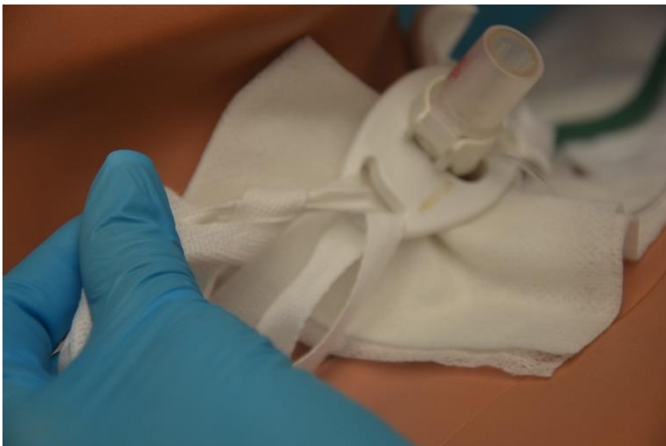
Tapes should be changed daily or more frequently as required. Changing tapes is a two-person procedure. If using cotton ties they need to be at least 1cm wide. If the tracheostomy is sutured in place, additional tapes are not required.

Equipment needed:

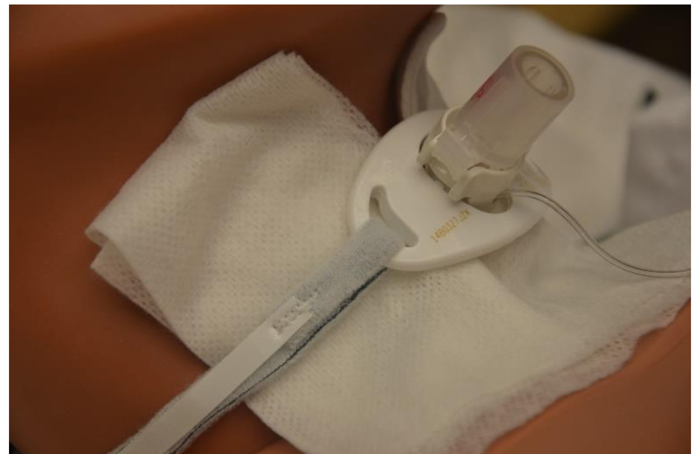
- Cotton ties cut to appropriate size or Velcro ties

Procedure:

1. One person stabilises the tracheostomy tube whilst the other person changes the tapes
2. Change only one side at a time to reduce the risk of decannulation
3. Tie the tapes securely at each side of the neck using bows or secure the Velcro in place if using Velcro ties
4. Make sure that the tapes are changed and tied securely before changing the dressing
5. Document procedure in patient history



Cotton tracheostomy ties
Vancouver Coastal Health, 2012



Velcro tracheostomy ties
Vancouver Coastal Health, 2012

CLEANING OF INNER CANNULA

Inner Cannula

Cleaning the inner cannula clears the airway of accumulated secretions. It decreases the risk of infection. It should be performed at least once daily or more frequently if needed. It is completed by aseptic technique and is not a sterile procedure. Ensure that the tapes are secure before removing the inner tube. Encourage the patient's and/or family's participation if it is a long-term/permanent tracheostomy.

Equipment needed:

- Procedure trolley
- Sterile dressing tray
- Spare inner cannula
- PPE – non-sterile gloves and goggles:
- 0.9% sodium chloride
- Non-sterile cannula cleaning brush

Procedure:

1. Remove inner cannula via and replace with clean alternate cannula
2. Clean removed inner cannula with 0.9% sodium chloride and non-sterile cannula cleaning brush
3. Dry removed cannula with gauze and store in dry container
4. Document procedure in patients' history

Cleaning of tracheostomy inner cannula
Vancouver Coastal Health, 2012

CUFF PRESSURE

There needs to be adequate cuff pressure to ensure there is no air leakage but not enough pressure to cause ischaemic trauma to the tracheal mucosa. Initially the cuff may be inflated with a 10 ml syringe but it needs to be checked as soon as possible with a cuff manometer. *It is very difficult to judge actual pressure by feeling the pressure in the pilot balloon.*

- An over inflated cuff causes trauma to the trachea & inhibits swallowing. It can also damage the cuff
- Under inflation causes air leaks & secretions can track into the lungs
- When the cuff is inflated the pilot balloon will be inflated
- When the cuff is deflated the pilot balloon will be deflated
- Check the cuff pressure with the cuff pressure manometer at least once per shift and record the details

To check the cuff pressure using a cuff manometer:

1. Connect the pilot balloon to the tip of the cuff manometer
2. Read the pressure dial. The reading should be in the green area at approx. 22-32mm Hg
3. If the cuff is over inflated release pressure by pressing the red button on the side of cuff manometer. Cuff pressures in excess of 40 – 45 mmHg will exceed venous pressures and result in ulcer formation
4. If the cuff is under inflated press the bulb to reinflate to the desired level

Low pressure cuffs do not require deflation to prevent ischaemic trauma to the tracheal mucosa.

- Periodic deflation is required to prevent pooling of secretions above the cuff. This provides a medium for infection. Ideally a suction catheter should be in place and in use immediately prior to the deflation to reduce the amount of secretions falling back down the trachea. Some tracheostomy tubes include a supraglottic suction port which can be aspirated with a 10mL syringe to clear secretions above the cuff.
- Suction the oropharynx prior to cuff deflation.
- The cuff is inflated or deflated when the patient is eating. This is dependent on an assessment by a speech therapist. Cuff inflation inhibits swallowing but prevents aspiration.

NURSING MANAGEMENT OF LUNG SECRETIONS

As previously noted, tracheostomies by-pass the natural cleaning, heating and moistening mechanisms of the upper airway. As a result, lung secretions are more likely to become thick and tenacious and difficult to expectorate. This may result in the development of sputum plugs or pneumonia. Thus, it is vital to keep secretions as moist as possible. The patient's humidification needs may vary throughout the course of their illness. A heated water-vapour circuit humidification (e.g., Airvo) is the preferred standard for all inpatients which can also be used for O2 therapy if needed, alternative options may include heat and moisture exchangers (HMEs, e.g. Swedish nose) or a nebuliser/steaming regime. HMEs should only be used if patient's can independently manage their tracheostomy care.
To reduce the damage to the cilia in the trachea, suctioning is only recommended when secretions can be detected around the tube or when troubleshooting respiratory difficulty and unexplained desaturation. Below describes the equipment and procedure for open system suctioning. Closed in-line suction units may be used if the patient is receiving mechanical ventilation.

SUCTIONING

Equipment required:

- Wall or portable suction unit
- O2 therapy equipment (if required)
- Y suction catheter – correct size. It should occlude no more than half the diameter of the artificial airway i.e., if it is a size 7 tracheostomy tube a size 14fr suction catheter is the maximum that should be used. A new catheter is needed for each episode of suctioning
- Sterile water or saline to wash through the suction tubing after each suctioning episode
- PPE – non-sterile gloves and goggles

Preparation of the patient for suctioning:

Suctioning should only be performed when assessment of the patient indicates it is required. If the patient is able to cough, they should be encouraged to cough up secretions themselves. Assessment includes the following:

1. Vital signs, in particular O2 saturations – may need pre-oxygenation if the patient has borderline O2 saturations prior to procedure to prevent hypoxia
2. Knowledge of their medical condition and history
3. Knowledge of the respiratory assessment over the past 24 hours – this can help in establishing between any chronic deterioration and an acute episode
4. Observe for signs and symptoms of lower airway obstruction such as burbling noise on inspiration or expiration, excess secretions in the tracheostomy tube, sputum, amount, colour and consistency, coughing without clearing the airway
5. Assess presence of cough reflex

Explain to the patient that suctioning will relieve breathing difficulty. It will be painless but uncomfortable and may stimulate coughing reflex. Give a clear explanation to them of the purpose of the procedure and what sensations they may feel. Suctioning the patient can be done in any position however patients who are conscious may benefit from being placed in a semi- or high-Fowlers' position. Unconscious patients may be placed in a lateral position.

Procedure:

1. Collect and assemble the required equipment
2. Apply goggles and visor
3. Provide pre-oxygenation as clinically indicated
4. Place the patient as upright as possible and if not contraindicated, extend their neck to expose the tracheostomy hub
5. Remove the tracheostomy shield or lower the tracheostomy mask (if in place)
6. Open the suction catheter exposing the connector only and connect the suction tubing
7. Turn wall or portable suction unit on
8. Perform hand hygiene and apply clean gloves
9. Slowly withdraw the catheter from the packaging ensuring you do not handle the terminal port of the suction catheter or allow it to come in contact with any surfaces
10. Insert the catheter into the tracheostomy tube until the patient coughs or hard block resistance is met (approximately one third of the tube length)
    - • Do not apply suction whilst inserting the catheter into the tracheostomy - Mucosal trauma can be caused by any contact of the suction catheter with the tracheal wall
    - • Twirling the catheter in between the fingers may assist in passing the catheter if resistance is felt before reaching the end point
    - • If a hard block is felt on catheter insertion, withdraw the catheter slightly prior to applying suction to avoid damaging the carina or airway mucosa

11. Apply continuous or intermittent suctioning by occluding the suction port and slowly withdrawing the catheter using a twisting motion. Secretion yield will determine if continuous or intermittent suctioning is required
12. Dispose the suction catheter in the appropriate clinical waste disposal
13. Provide oropharyngeal suction as required or encourage the patient to spit out oral secretions
13. Assess the patient and suctioning requirements. If further suctioning is required repeat steps 1 – 12
14. Reconnect the humidification source and ensure pre-suctioning oxygenation status is regained
15. Upon completion of the procedure, clean the suction tubing by flushing with water to clear the entire length of the tube
16. Discard of gloves and perform hand hygiene
17. Document suctioning in the patient's history, including the colour, amount and consistency of the secretions suctioned from the patient

ORAL HYGIENE

This is performed both for hygiene and health purposes and also comfort for the patient. When patients have a tracheostomy air no longer passes through the mouth. This results in stale secretions and a foul taste in the mouth. Normal oral airflow is also disrupted, leading to reduced evaporation of oral secretions. Therefore, it is very important that mouth care is performed regularly. This can be done by assisting the patient to clean their own teeth with a regular tooth brush or using a suction tooth brush. Foam mouth swabs can also be used however they are not always as effective. Lubricate dry lips with peppermint cream, lanoline or Vaseline.

REMOVAL OF TRACHEOSTOMY TUBES/DECANNUALTION

This may take place days or months after the formation of the stoma. There is generally a step-down process of cuffed tube to uncuffed tube or devices known as minitrachs. This enables the patient to continue to breath spontaneously and cough up secretions if they are able. Prior to decannulation the patient should meet the following criteria;

- Able to protect own airway
- Able to forcefully cough to clear secretions
- Sustain spontaneous breathing using less than 40% FiO2
- Adequate Forced Vital Capacity
- Minimal suctioning requirements
- Able to tolerate cuff deflation for a minimum of 12 hours and able to tolerate tube occlusion
- No upper airway obstruction

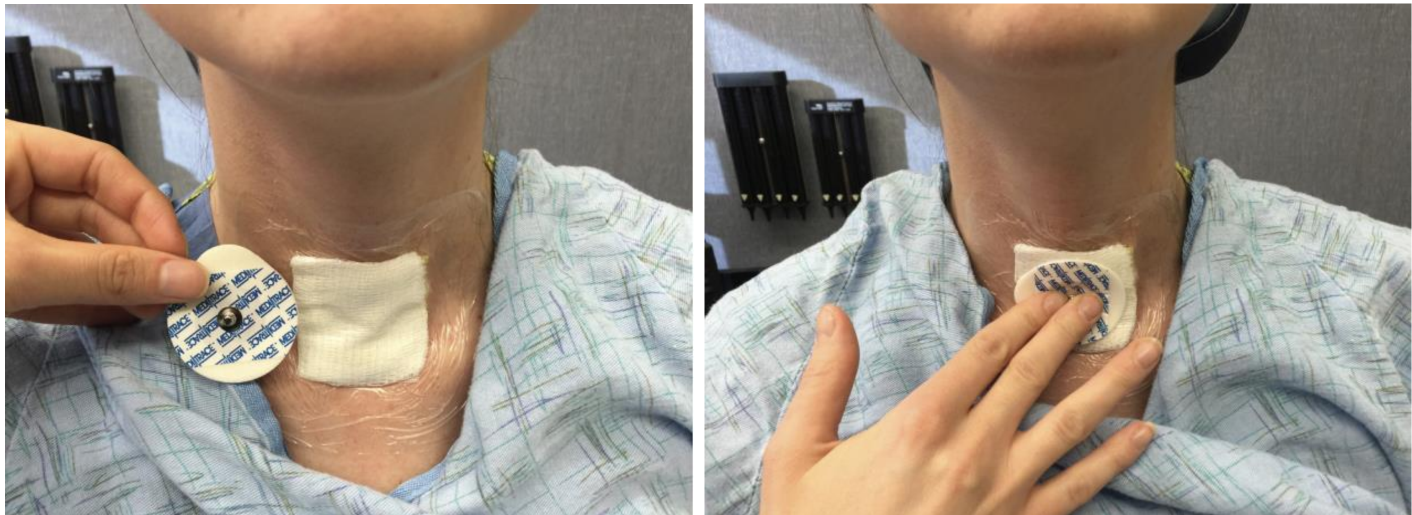
Equipment required:

- Spare tracheostomy tubes (one of the same size and one a size smaller)
- Tracheal dilators
- Bag-mask-valve device (e.g., Air Viva)
- 10 m syringe
- Oxygen (if required, connected to face mask/nasal prongs)
- Suction equipment
- Stethoscope
- Sterile dressing pack
- 0.9% sodium chloride
- Sterile gauze
- Occlusive dressing
- ECG dot (Reference for when the patient coughs/speaks post decannulation)
- Pulse oximeter

Procedure:

1. Suction via the tracheostomy and oropharynx
2. If a supraglottic suction port is present, clear the above cuff secretions
3. Remove existing tapes or ties and deflate the cuff of the tracheostomy
    - If cuff deflation triggers transient coughing allow time for the patient to settle
4. Request the patient to inhale deeply and slowly exhale
5. Upon exhalation gently remove the tracheostomy tube in an outward and downward motion
6. Remove the tracheostomy dressing and clean the stoma
7. Dress the stoma with the sterile gauze and occlusive dressing
8. Place the ECG dot over an occlusive dressing as a reference to tracheostomy location
9. Educate the patient to apply firm digital pressure over the stoma dressing when coughing or speaking, to prevent air leaking from the stoma
10. Apply oxygen via the nasal prongs or facemask if clinically indicated
11. Suction the mouth oropharynx as clinically indicated
12. Observe for any signs of respiratory distress such as:
    - Increased work of breathing or O2 requirements
    - Shortness of breath
    - Decreased conscious state
    - Difficulty coughing or expelling secretions
13. Monitor the patient's vital signs
14. Ensure the emergency tracheostomy equipment remains with the patient for 48 hours post decannulation
15. Document planned decannulation in the patient's history

The stoma will eventually close. The longer it has been in-situ, the longer it will take. Generally scarring is minimal.



Occlusive dressing post decannulation
Garcia-Rodriguez et al., 2017

COMPLICATIONS OF A TRACHEOSTOMY

- Haemorrhage
- Pneumothorax
- Subcutaneous & mediastinal emphysema
- Respiratory & cardiovascular collapse
- Dislodged tube
- Airway obstruction – partial or complete that may be due to an accumulation of secretions in the tube.
- Infection – this is due to altered ciliary function or colonisation of the airway with bacteria. The nosocomial infection rate in tracheostomy patients is 50-60%. This is largely due to natural body defences being bypassed by the tracheostomy tube. The infection can be pulmonary or stomal.
- Aspiration of secretions, gastric contents, foreign bodies.
- Tracheal damage – tracheal necrosis and stenosis; trachea-oesophageal fistula
- Psychological impact
  - alteration to body image
  - frustration from an inability or reduced ability to communicate effectively
  - anxiety
  - uncertain outcome
  - risk of unmet needs

PREVENTION OF LONG-TERM COMPLICATIONS

Prevention of Obstruction
Refer to management of secretions using suction

Infection

- Aseptic suction & dressing technique
- Clean mask & tapes
- Oral hygiene
- Hand hygiene prior to procedures
- Observation & documentation of secretions (colour, consistency, amount)
- Observation & documentation of erythema, pyrexia

Prevention of Aspiration

- Suctioning
- Education
- Speech therapy
- Cuff pressure
- Position of tube
- Correct tube size
- Filter

Prevention of Tracheal Damage

- Correct size tube
- Position of tube
- Ensure the cuff pressure is at the minimum level to prevent air leakage, no higher
- Prevent pulling on tube
- Ensure correct tension on tapes
- Careful removal & insertion of tube

Prevention of Dislodged Tube

- Check tapes and position of tube every shift
- Correct tube size
- Education
- Two persons present for dressings, tape changes

Psychological Support

- Education
- Family involvement
- Allied health
- Ensure adequate methods of communication available
- Suction
- Adequate hydration
- Humidified oxygen therapy
- Physiotherapy
- Nutrition
- Positioning
- Reassurance

FURTHER READING

The following clinical practice guide also provides a nice overview of tracheostomy management and care in adult patients, also consult your local healthcare facility policy for further guidance;

Intensive Care NSW. (2021). Care of adult patients in acute care facilities with a tracheostomy. Retrieved from

https://aci.health.nsw.gov.au/__data/assets/pdf_file/0004/685300/ACI-CPG-Tracheostomy.pdf

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Everitt, Erica. (2016). Caring for patients with tracheostomy. *Nursing Times, 112*(19), 16-20.

Hyzy, Robert & McSparron, Jakob. (2022). Tracheostomy: Rationale, indications, and contraindications. *UptoDate.* https://www.uptodate.com.acs.hcn.com.au/contents/tracheostomy-rationale-indications-and-contraindications?search=Tracheostomy%20&source=search_result&selectedTitle=1~150&usage_type=default&display_rank=1

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Madhava, Sivapuram (2021). Tracheostomy: Management of patients. JBI Evidence Summary.

Monash Health (2022). Adult tracheostomy management protocol.

Myatt, R. (2015). Nursing care of patients with a temporary tracheostomy. *Nursing Standard, 29*(26), 42-49.

Patton, Julie. (2019). Tracheostomy care. *British Journal of Nursing, 29*(16), 1060-1062.

Riley, Richard. (2019). Australian Anaesthesia. *Australian and New Zealand College of Anaesthetists.* https://www.anzca.edu.au/getattachment/220cc6da-3eee-463b-9b66-4e8b33861d7e/Australasian-Anaesthesia-2019

Royal Children's Hospital (2022). Clinical guideline – Tracheostomy management.

Whitmore, Kirsty., Townsend, Shane., & Laupland, Kevin (2020). Management of tracheostomies in the intensive care unit: a scoping review. *BMJ Open Respiratory Research, 7(*000651), 1-9.

SKILLS ASSESSMENT TEST – Part A

TRACHEOSTOMY CARE

Student Name:

Please circle the correct answer

1. Patients with a tracheostomy are confined to

   a) Intensive Care Units only
   b) Intensive Care and High Dependency
   c) Anywhere in the hospital
   d) Anywhere in the hospital and community

2. The initial tracheostomy is performed by a

   a) Medical Officer only
   b) Medical Officer or ALS trained Registered Nurse
   c) Any Registered Nurse Division 1
   d) Any Registered Nurse

3. Which type of tracheostomy tube is best suited for ventilated patients?

   a) Fenestrated Low Pressure Cuff tube
   b) Low Pressure Cuffed tube
   c) Cuffless Fenestrated tube
   d) Cuffless tube

4. Which type of tracheostomy tube is best suited for long term use? (More than one answer may be correct)

   a) Fenestrated Low Pressure Cuff tube
   b) Low Pressure Cuffed tube
   c) Cuffless Fenestrated tube
   d) Cuffless tube

5. Paediatric tracheostomy tubes are (more than one answer may be correct)

   a) Cuffless
   b) Cuffed
   c) Single cannula
   d) Double cannula

6. If the tracheostomy tube becomes occluded and the upper airway is not patent (more than one answer may be correct)

a) Apply O_2 via facemask
b) Call a MET / Code Blue
c) Remove the tube
d) Insert a tube of a larger size

7. When cleaning the stoma, it is best to use

a) Normal gauze
b) Special non – fibrous gauze
c) Cotton wool
d) Tissues

8. When cleaning the inner cannula of a tracheostomy you must

a) Wear sterile gloves as it is a sterile procedure
b) Wash the cannula in hot soapy water
c) Remove the tapes to allow easy access to the tube
d) Ensure that the tapes are secure before removing the inner tube

9. The pressure in the tracheostomy tube cuff should be checked (more than one answer may be correct)

a) Using a cuff manometer
b) By feeling the pressure in the pilot balloon
c) Once a shift
d) To ensure that it is at approximately 22 – 32mmHg

10. Which of the following factors are indicative that the patient with a tracheostomy requires suctioning? (More than one answer may be correct)

a) Every hour whilst the patient is awake
b) If there is a noise on inspiration
c) If the patient cannot clear secretions with coughing
d) If when the patient coughs sputum comes out the end of the tracheostomy tube

11. When suctioning a tracheostomy tube, it is necessary to

a) Sedate the patient first as it very uncomfortable and they will fight
b) Apply the suction as the catheter is inserted into the tracheostomy to ensure you don't push anything further down
c) Pass the suction catheter into the tube as many times as it is necessary to get all of the sputum
d) Suction as you withdraw the catheter from the tube for no longer than 5 seconds

12. A patient with tracheostomy requires (more than one answer may be correct)

a) Their oxygen therapy to be humidified
b) Constant supervision to stop them removing their tube
c) Regular mouth care
d) An emergency equipment tray in case of obstruction or dislodgement kept next to the patient

13. To prevent tracheal damage as a complication of a tracheostomy it is necessary to

a) Ensure that cuff pressure is maintained between 22-32mmHg
b) Avoid excessive tension on the tapes
c) Insert the smallest tube possible
d) Pull on the tube regularly to ensure it is still mobile

14. It is possible to reduce the psychological effects on a patient of having a tracheostomy tube by (more than one answer may be correct)

a) Ensuring they can communicate effectively
b) Involving their family in their care
c) Placing them in a single room so no one can see them
d) Involving allied health professionals in their care

15. Changing the tapes on the tracheostomy tube requires

a) Pulling the tube out slightly so the tapes can be quickly secured
b) Having a second nurse to hold the tube in place
c) Securing the tapes so there is some slack for comfort
d) Securing the tapes tightly to prevent the tube from moving
e) Using coloured rather than white tapes

16. Tracheostomies may be required due to (more than one answer may be correct)

    a) Trauma
    b) Neuromuscular disorders
    c) Chronic obstructive pulmonary disease
    d) Tumours of the upper airway

17. When suctioning a tracheostomy tube, the suction catheter should be

    a) The same diameter as the tracheostomy tube
    b) No more than half the diameter of the tracheostomy tube
    c) No more than one third of the diameter of the tracheostomy tube
    d) No more than one quarter of the diameter of the tracheostomy tube
    e) The size of the suction catheter is not a concern

18. If the tracheostomy tube becomes blocked, your first action would be to

    a) Cut the tracheostomy tapes
    b) Call for help or press the emergency alarm
    c) Remove the tracheostomy tube
    d) Perform a tracheal suction
    e) Deflate the tracheostomy cuff

19. A fenestrated tube

    a) Prevents the patient from talking
    b) Allows air to pass through the vocal cords
    c) Allows air to pass into the lungs
    d) Promotes patient comfort
    e) None of the above

20. When the tracheostomy tube is removed completely the dressing that is applied needs to be

    a) Airtight
    b) Non-adhesive
    c) Gauze squares
    d) Hydrocolloid
    e) No dressing is required

Part A: Competent / Not competent

NURSE & MIDWIFE EDUCATION gippsland

CLINICAL SKILLS COMPETENCY -: TRACHEOSTOMY CARE

NAME:___________________________ **DATE**:______________

DEMONSTRATES: The ability to safely and effectively care for a patient with a tracheostomy. It is an expectation that the clinician is familiar with local policy and protocols and performs within these guidelines.	**CRITERIA** **C** = Competent **S** = Requires supervision **D** = Requires development		
PERFORMANCE CRITERIA	**C**	**S**	**D**
1. Identifies indication for tracheostomy			
2. Ensures all necessary emergency equipment is at hand			
3. Collects equipment for suctioning and dressing change			
4. Ensures positive patient Identification using 3 patient identifiers			
5. Explains procedure to patient and gains informed consent			
6. Demonstrates correct standard and transmission-based precautions including dons/doffs PPE and 5 moments of hand hygiene appropriately throughout procedure			
7. Demonstrates correct aseptic technique relevant to procedure			
8. Provides privacy			
9. Assess the patient and positions appropriately			
10. Prepares equipment			
11. Suctions tracheostomy tube safely & effectively			
12. Removes the old dressing			
13. Removes, cleanses and replaces inner cannula if appropriate			
14. Cleans and dries the stoma			
15. Redresses the stoma site			
16. With a second nurse assisting changes the tracheostomy tapes			
17. Provides oral hygiene			
18. Disposes used equipment and replaces as necessary			
19. Ensures patient is left comfortable			
20. Documents procedure in appropriate section of the patients notes			

COMMENTS____
____
____

COMPETENT **YES**

NOT YET – REQUIRES FURTHER SUPERVISION

NOT YET – REQUIRES FURTHER DEVELOPMENT I.E RE READING THE PACKAGE

Assessee____________________________

Assessor____________________________________

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TRACHEOSTOMY CARE

Date: _____ How long did this package take to complete? _______

Please indicate your response to each of these statements by ticking the appropriate box and return to Nurse Educator

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
1. Overall, I found this learning package worth while	❑	❑	❑	❑	❑
2. The way in which the learning package is presented made it easy to understand	❑	❑	❑	❑	❑
1. My knowledge of this topic was improved after completing this learning package	❑	❑	❑	❑	❑
2. My skills in this area have been enhanced since completing this learning package	❑	❑	❑	❑	❑
3. The resources provided were sufficient for me to answer the test adequately	❑	❑	❑	❑	❑
4. I would recommend this learning package to others	❑	❑	❑	❑	❑
5. I will be able to apply knowledge and skills acquired in my clinical practice	❑	❑	❑	❑	❑

Comments (Optional)

____

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Thank you for taking the time to complete this evaluation. Your comments are valued and appreciated. Please return this form to your Nurse Educator