Appendix 1: UHS Clinical Guidance Booklet and Educational document for patients with tracheostomy or laryngectomy

Clinical Guidance Booklet, Educational Document for Patients with Tracheostomy or Laryngectomy

1

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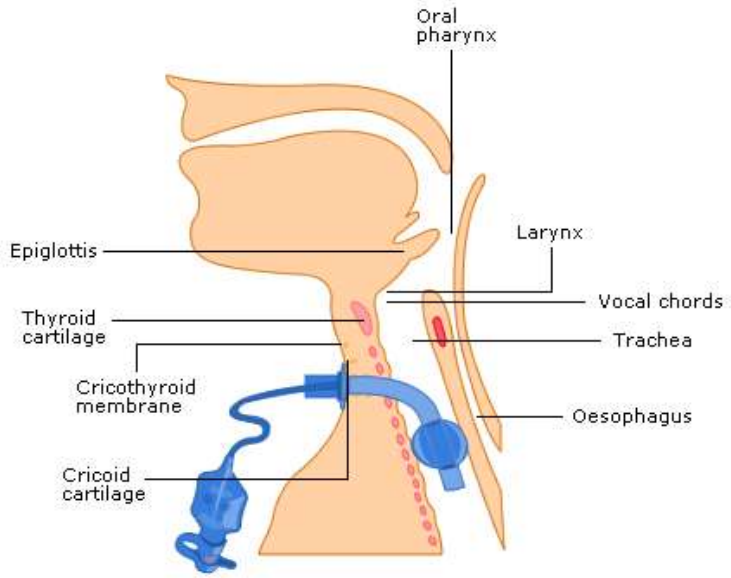
3 INTRODUCTION

A tracheostomy provides significant advantages to patients such as reducing the anatomical dead space by approximately 150mls and thus reducing the work of breathing. However there are also a number of disadvantages that require management, such as the reduction in the filtration warming humidification of gases and the subsequent risk of tube occlusion. These guidelines aim to provide the reader with a practical guide to the care of a patient with a tracheostomy. The Tracheostomy may be inserted using either percutaneous or surgical methods of insertion

4 What is a tracheostomy?

Tracheostomies are performed in head and neck surgical practice, with over 5,000 procedures performed yearly in England. Approximately 10-15,000 percutaneous tracheostomies are performed each year in England's critical care units, although the actual figure is unknown. Tracheostomies are also becoming more commonplace on the general wards of the hospital. This is partly due to pressures on intensive care beds and the increasing drive to de-escalate care quickly, along with increasing numbers of patients benefiting from temporary tracheostomy. These groups include those with chronic respiratory or neurological problems.

This has implications for the safety of patients who may be cared for on wards without the necessary competencies and experience to manage this challenging cohort and local measures need to be in place to ensure that safe routine and emergency care can be provided. This guideline should provide information to those caring for patients with temporary or permanent tracheostomies either regularly or occasionally. It aims to provide basic background information and the rationale for tracheostomy care.



INDICATIONS FOR TRACHEOSTOMY

- To facilitate weaning from ventilation
- To prevent complications of long term ET intubation. (E.g: Mucosal damage. Vocal cord paralysis)
- To provide emergency access to the airway
- To facilitate long term mechanical ventilation
- To facilitate the removal of bronchial secretions
- Post Major surgery to mouth, neck and/or face
- Protect airway in the absence of laryngeal reflexes
- Permits speech/oral feeding

What problems can occur with tracheostomies?

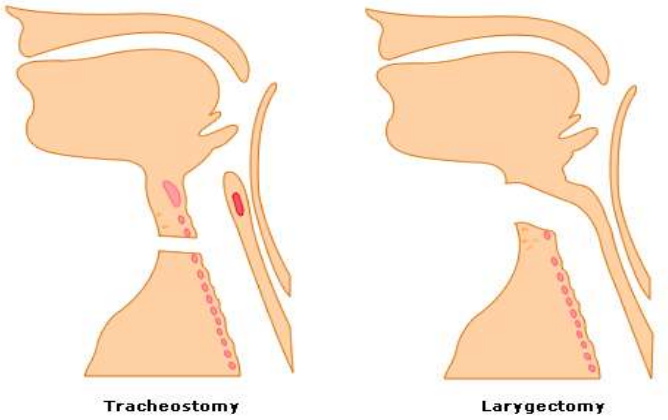
Whilst tracheostomies are increasingly commonplace, patient safety incidents associated with their use are unfortunately also increasing. Over 1,700 incidents were reported to the NPSA between 1st January 2005 and 31st December 2008, including over 30 deaths. We know from research with the NPSA that when a clinical incident occurs relating to a tracheostomy, then the chance of some harm occurring is between 60 and 70%, depending on the location in which that the patient is being cared for.

Incidents may be classified as:

- Incidents at the time of performing the tracheostomy (e.g. airway loss, damage of adjacent structures, bleeding)
- Blockage or displacement of the tracheostomy tube after placement
- Equipment incidents (usually lack of equipment or inappropriate use)
- Competency (skills and knowledge) incidents
- Infrastructure (staffing and location) incidents
- Late complications (e.g. Tracheomalacia, stenosis, infection of stoma)

5 What is a laryngectomy?

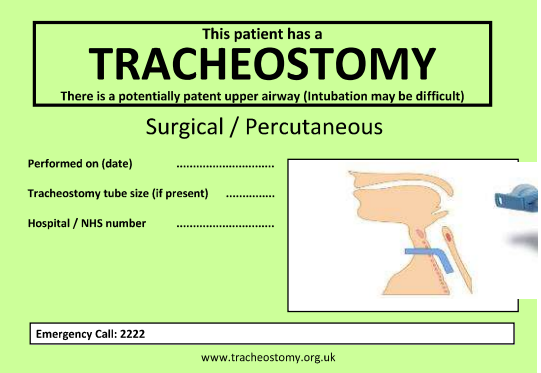
The larynx (voice box) can be involved in oral, pharyngeal or laryngeal carcinomas. Surgical resection of the tongue base or epiglottis may not necessarily involve removal of the larynx and is sometimes referred to as a *supraglottic laryngectomy.* It is sometimes possible to resect only one half of the larynx for localised disease with a *hemilaryngectomy.* However, if a *total laryngectomy* is required, this involves complete surgical removal of the larynx which disconnects the upper airway (nose and mouth) from the lungs. This is a permanent and irreversible procedure (although partial laryngectomies are possible). The trachea is transected (cut) and then the open end is stitched onto the front of the neck. Once this has been performed, the patient will never be able to breathe or be oxygenated or ventilated through the upper airway again.

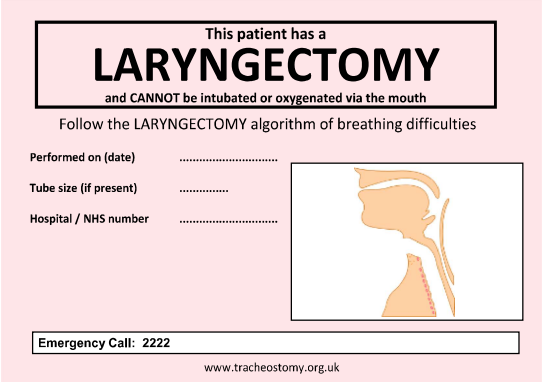


What problems can occur with laryngectomies?

The laryngectomy patient has had the normal upper airway humidification mechanisms bypassed in the same way as a tracheostomy patient. They are at risk of blockage of the trachea with secretions or blood. The airway is often more secure than with a temporary tracheostomy as the trachea is stitched onto the front of the neck. It can still become compromised however, particularly within a few days of surgery. Laryngectomy stomas are usually simple open stomas without a tube inserted.

There are a variety of covers, valves and humidification devices available, which can make distinguishing between a tracheostomy and laryngectomy very difficult. Tubes are sometimes inserted into laryngectomy stomas, especially when they have just been created, the patient needs invasive ventilation or requires repeated suctioning. Tracheostomy tubes are usually used, although specific laryngectomy tubes are available. The use of bedhead signs to alert staff that a patient does not have an upper airway must be used, especially if the patient cannot tell you themselves due to acute illness or not being able to talk following a laryngectomy.





One of the commonest problems with a laryngectomy, particularly in an emergency, is that responders fail to appreciate that the patient has actually had their larynx removed. It can be difficult to tell the difference at the bedside between a laryngectomy and a surgical tracheostomy, particularly close to major surgery. Colour coded 'bed head' signs (as above) and algorithms must therefore be used to immediately distinguish laryngectomies from tracheostomies as recommended by the NPSA and ICS.

5.1.1 TYPES OF TRACHEOSTOMIES

Temporary – will be formed when patients require long/short term respiratory support or cannot maintain the patency of their own airway. They can also provide a degree of 'protection' of the airways against aspiration if the swallowing or neurological control mechanisms of the larynx or pharynx are damaged (commonly in head injuries or neurological diseases). These tubes will be removed if and when the patient recovers.

Long term/permanent – are used when the underlying condition is chronic, permanent or progressive e.g. carcinoma of the naso-oropharynx or larynx. Dependent on the stage of the disease either a tracheostomy or a laryngectomy will be performed. Some patients need chronic respiratory support or long term airway protection and this requires a long term/permanent tracheostomy.

PERCUTANEOUS TRACHEOSTOMY

This involves the insertion of a cuffed tracheostomy tube between the first and second, or second and third tracheal ring. The method used in this hospital (Ciaglia method) employs the use of a Seldinger guide-wire. With the guide-wire in situ, the single stage dilator is passed over the catheter to dilate the trachea to a size appropriate for the tracheostomy tube to be inserted. The guide-wire and dilator are then removed and the appropriate size tracheostomy tube is inserted into the trachea through the newly formed stoma.

5.1.2 Advantages or indications for percutaneous Tracheostomy:

- Patients do not require transfer to and from theatre as the Anesthetists can perform the procedure. In the appropriate patient this technique has been shown to be safe with possibly less incidence of hemorrhage and infection Van Heurn (1992).

- Lower incidence of wound infection scarring and early complications compared to a surgical tracheostomy (Van Heurn, 1992).

Disadvantages or contraindications

- Obesity, enlarged thyroid or other abnormal anatomy.
- Coagulopathy.
- Is not appropriate in children under 12 years of age. (There is difficulty in clearly identifying anatomical landmarks).
- Increased risk of surgical emphysema
- It is a blind technique.

SURGICAL TRACHEOSTOMY

This is performed in theatre usually by a head and neck surgery specialist e.g. MFU or E.N.T. An incision is made over the second and third tracheal rings usually around 4-5 CMS in length. The anatomy such as the thyroid, strap muscles and major blood vessels are clearly identified. The incision requires suturing and these are usually removed after seven days or when the wound is healed.

Advantages/indications of surgical tracheostomy

- Should be used for elective procedures.
- Used in patient s with abnormal anatomy
- Coagulopathy.

Disadvantages/contraindications

- Requires the transfer of a sick patient to and from theatre. Although it can be performed at the bedside it is not common practice.
- This requires co-ordination of medical teams and available theatre space.
- There may be an increased incidence of infection and wound breakdown, due to greater tissue trauma (Worthley and Holt 1992).

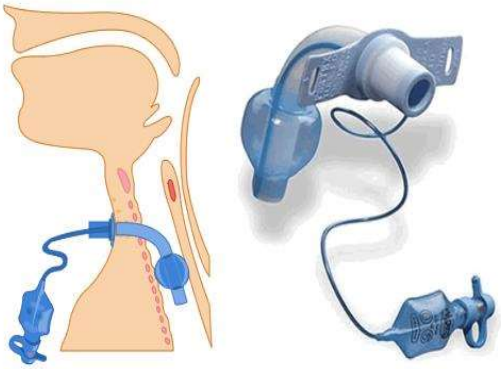
TYPES OF TRACHEOSTOMY TUBES

Cuffed tubes

- Have a soft balloon around the distal end of the tube which inflates to seal the airway.

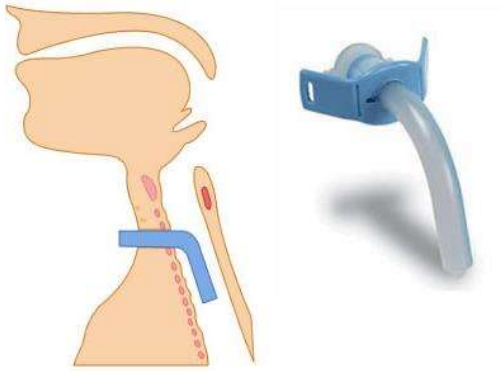
- Are necessary when positive pressure ventilation is required or in situations where airway protection is essential to minimize aspiration of oral or gastric secretions (although all cuffs are not an *absolute* barrier to secretions).
- If the tracheostomy tube lumen is occluded when the cuff is inflated, the patient will not be able to breathe around the tube, assuming the cuff is correctly positioned and inflated within the trachea.

PATIENTS WITH CUFFED TUBES SHOULD NOT BE NURSED ON A GENERAL WARD AT ST RICHARD'S OR WORTHING SITES



Un-cuffed tubes

- Do not have a cuff that can be inflated inside the trachea and tend to be used in longer-term patients who require on-going suction to clear secretions.
- Will not allow sustained effective positive pressure ventilation as the gas will escape above the tracheostomy tube.
- It is essential that patients have an effective cough and gag reflex to protect them from aspiration, as there is no cuff to 'protect' the airway.



Single Cannula Tubes

- **These are disposable plastic tracheostomy tubes which come with an introducer and an inflatable cuff to give an airtight seal, which prevents blood reaching lungs during surgery, and facilitates ventilation**
- If a single Cannula Tube is inserted, it is good practice to change the tube after 7 – 10 days to prevent possible blockage of the tube.
- **The Intensive Care Society in their 2008 guidance have recommended that these tubes are not used routinely in critical care due to concerns about them becoming occluded with secretions, and the difficult in cleaning this type of tube.**

- **These tubes should not be found in patients at St Richard's or Worthing Hospitals.**

6 Double Cannula Tubes :

- **These are the safest type to use inside and outside of the specialist environment**
- **Have an outer cannula to keep the airway open and an inner cannula which acts as a removable liner to facilitate cleaning of impacted secretions. (see below for information about fenestrated / non-fenestrated tubes)**
- The inner cannula reduces the inner lumen by 1mm this may increase the patient's effort when breathing.
- **Can be cuffed or uncuffed,**
- **If an un-cuffed tube becomes blocked, it is more likely that a patient can breathe past the tube via their upper airway, making these tubes inherently safer for non-specialist locations.**
- **If there is a high risk of aspiration or need for long-term ventilation, then a cuffed tube may be required long-term. Regular care of the inner tube will prevent build-up of secretions and reduce the risk of tube blockage.**
- **The inner tube should be removed and inspected, at least 2-4 hourly or more frequently according to secretion load to reduce the risk of airway occlusion due to secretions.. It must be cleaned in sterile water every 6-8 hours or more frequently if there is a high secretions load.**
- **A spare inner tube should be kept in a clean container at the patient bedside when not in use.**

If Patients with longstanding tracheostomy are admitted to a general ward, they must have a double cannula tube in place.

FENESTRATED DOUBLE LUMEN TRACHEOSTOMY TUBES

- Have an opening(s) on the outer cannula, which allows air to pass through the patient's oral/nasal pharynx as well as the tracheal opening.
- Are used with fenestrated and non-fenestrated inner cannula – depending on patient need.
    - Non-fenestrated inner cannula should be used in patients with the cuff inflated, when patients require respiratory support, protection of the airway, and resuscitation.
    - Fenestrated inner cannula should be used in patients who are weaning, are spontaneously breathing, and in whom the passage of air into the oropharynx is required for speech.
- Are indicated for airway management of the patient requiring tracheal access where the use of a fenestration is desirable in order to allow for safe and effective weaning from mechanical ventilation or adjunctive airway support.
- With the cuff deflated, and non-fenestrated innertube in situ, primary ventilation is allowed to be spontaneous through the fenestrations and around the main tube. The air movement through the fenestrations allows the patient to speak and produces a more effective cough, and lowers resistance to airflow, especially when using one-way valves
- Fenestrations can increase the risk of oral or gastric contents entering the lungs. It is therefore essential that patients who are at high risk of aspiration or on positive

pressure ventilation do not have a fenestrated tube, unless a non-fenestrated inner cannula is used to block off the fenestrations.

- Suctioning with a fenestrated tube should only be performed with the non-fenestrated inner cannula in situ, to ensure correct guidance of the suction catheter into the trachea.

7 CARE OF THE INNER CANNULA

- Check the patency of the inner cannula immediately if the patient is experiencing respiratory distress, **or at least every 2 hours**.
- To remove the inner cannula, hold the outside of the tracheostomy tube, gently twist to release and pull the inner cannula out in an outward and downward direction. By using the small ring-pull at the end of the cannula.
- If the inner cannula contains no obvious secretions and is free from kinks, it may be re-inserted. If the cannula requires cleaning use a swab and sterile water and then re-insert. Please note - swabs are for single use only. (always replace with a spare inner-tube while cleaning the inner cannula – this is to avoid the outer cannula becoming occluded without an inner cannula present)
- To insert the inner cannula, stabilize the outer tracheostomy tube, and insert inner cannula in an upward and forward movement. Ensure that the cannula is adequately locked into position.

WARNINGS

- Never use fenestrated tracheostomy tubes for mechanical ventilation unless a plain unfenestrated inner cannula is in place to prevent lost volume through fenestrations.

- When using the fenestrated tube and a speaking valve to enable speech, **always ensure that the tracheostomy cuff is deflated** and a fenestrated inner cannula is used to allow the easy passage of air through and around the tracheostomy tube (for further information see later section on speaking valves)

8 Adjustable Flange Tracheostomy Tubes

These tubes are used in patients who have an abnormally large distance from their skin to their trachea, and a standard tube would not fit properly. There are now dedicated kits for inserting these tubes. Standard tubes may not be the correct size for many critical care patients and increasing numbers may require these tubes.

Particular indications for an adjustable flanged tube are:

- Patients with very large neck girth including the obese
- Oedema caused burns classically or a capillary leak syndrome
- Actual or anticipated oedema after surgical procedures (including tracheostomy itself)

It is essential to review the position of the flange (hence the length of the tube) on a daily basis. If the patient has neck swelling, as this worsens or resolves, the flange may need adjusting.

9 Silver tracheostomy tubes

A silver tracheostomy tube (Negus or Jackson tube) is an un-cuffed tube suitable for long term use but unsuitable for ventilatory support. Components of these tracheostomy sets are made individually and are not interchangeable with others. Therefore all parts must be kept together and not thrown away.

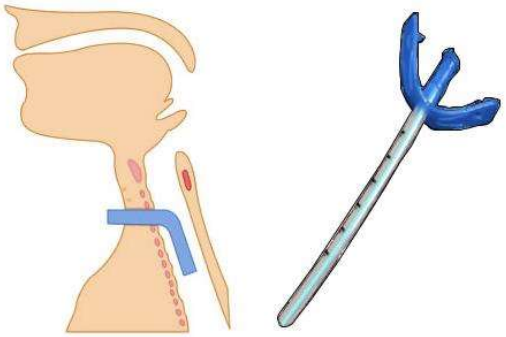
Each silver tracheostomy has 4 components;

- The silver tracheostomy outer tube – connected to the silver flange
- An introducer to enable insertion of the tracheostomy
- A plain inner cannula
- An inner cannula with a speaking valve to allow speech

10 Mini Tracheostomy

'Mini trach's' are small bore un-cuffed tubes that are used as a sputum clearance aid only. They can be inserted through the cricothyroid membrane or through an existing tracheostomy stoma. Patients are expected to breath around the tube, not through it. They are not suitable for patients who do not have a gag, swallow or cough reflex or for positive pressure ventilation. There are advantages to this because it means the patient can still talk, eat and naturally

humidify the air that they breathe. The largest size catheter that will fit through a mini tract is size 10. Therefore this is not ideal for patients with viscous secretions



Note: If the inner cannula becomes damaged or lost, a small stock of replacement cannula are available in the Intensive Care Unit however, this should not normally be necessary.

11 MINI TRACT ™

Mini Tract ™ Are small bore tubes, which are used to facilitate sputum clearance. They can be inserted through the cricothyroid membrane or through an existing tracheostomy stoma.

11.1.1

Mini- Tract ™ are not suitable for patients who do not have a gag, swallow or cough reflex or for provision of positive pressure ventilation.

11.1.2

Mini- Tract ™ do not have cuffs. This is because the lumens are very small, and the patient is required to breathe round the “Mini-Trach” rather than through it. There are advantages to this because it means the patient can still talk, eat and naturally humidify the air that they breathe.

The largest size catheter that will fit through a mini tract is size 10. Therefore, this is not ideal for patients with viscous secretions

12 COMPLICATIONS OF A TRACHEOSTOMY

IMMEDIATE

- Haemorrhage.
- Misplacement - pretracheal tissue or in main bronchus or tube migration / decannulation.
- Occlusion of the tube tip against the carina or tracheal wall.
- Pneumothorax

DELAYED/LATE POTENTIAL COMPLICATIONS

- Blockage with secretions. This may be sudden or gradual. Prevented with adequate humidification and suction and use of tubes with removable inner tubes. See later section on humidification and suctioning.
- Displacement of Tube - The tube may migrate out of the stoma or into the soft tissue of the neck. The tube may become displaced by coughing, because of its weight or the weight of attached breathing circuits, or by patient interference. Partial tube displacement is more dangerous as it is not always visibly obvious that there is a problem with the tube. In order to keep tracheostomy tubes in position they must be secured carefully and monitored. Any concerns raised by the patient or MDT staff must be promptly investigated.
- Infection of the stoma.
- Granuloma of the trachea may cause tracheal stenosis at the cuff site which could lead to respiratory difficulty when the tracheostomy tube is removed.
- Persistent fistula at the tracheostomy site.
- Scar formation requiring revision.
- Distention of the trachea or mucosal ulceration due to over inflation of the cuff, excessive cuff pressures or tube movement this can be prevented by monitoring pressures by using the cuff manometer.
- Pneumonia
- Obese or fatigued patients who have difficulty extending their neck are at risk of occluding their tracheostomy tube.
- Altered Body Image
- Difficulty Communicating
- Poor Swallow
- Tracheal Stenosis

13 MANAGEMENT OF THE DAY-TO-DAY NEEDS OF THE PATIENT WITH A TRACHEOSTOMY AND LARYNGECTOMY

Good routine care is relatively simple and will avoid almost all emergencies. Patients with tracheostomies should only be cared for in areas where staff are competent to do this.

14 Daily Checks

The patient with a tracheostomy needs diligent observation and assessment. The nurse caring for the patient is responsible for this, seeking advice from other professionals as appropriate.

15 Patient assessment

At the start of each shift the Staff Nurse caring for the patient with a tracheostomy should carry out a full assessment of the patient, which should include:

- Is this a tracheostomy or laryngectomy?
- Why does the patient have a tracheostomy / laryngectomy?
- When was the tracheostomy performed?
- Type and size of tracheostomy tube
- Availability of spare & emergency equipment
- Cough effort
- Ability to swallow, including any SALT assessments
- Sputum characteristics (Colour, Volume, Consistency, Odour)
- Check and change inner cannula for any build-up of secretions
- Check tracheostomy holder is secure and clean
- Check stoma dressing is clean
- Routine observations

16 EMERGENCY EQUIPMENT

- Working wall suction (or portable suction if transferring the patient) plus an assortment of suction catheters.
- Working Oxygen and humidification
- 2 Spare cuffed tracheostomy tubes (one the same size and one smaller)
- Spare inner cannulae
- Tracheal dilators
- Catheter Mount
- Hyperinflation bag
- Bag Valve Mask.
- 10ml syringe

Emergency Equipment must stay with the patient at all times, including when travelling between areas or departments.

17 OTHER EQUIPMENT

- Appropriate humidification
- Tracheostomy mask.
- Small bowl, sterile water (to rinse tubing through after use)
- Clean disposable gloves
- 10ml syringe to inflate cuff*
- Cuff manometer.
- Dressings
- Velcro collar
- Saline
- HME device
- Pulse Oximeter.
- PPE as required

18 OBSERVATIONS.

Patients with a tracheostomy or laryngectomy will require regular and diligent observations of their airway and vital signs. These should include:

- Respiratory Rate.
- Oxygen saturations
- Oxygen delivery
- Heart Rate.
- Blood Pressure.
- Temperature
- Inner tube patency check (if appropriate)
- Cuff pressures (if appropriate)
- Suction (Frequency, colour, amount)

MONITORING CUFF PRESSURE

- Tracheostomy cuff pressures should be measured using a hand held manometer at least once a shift and each time the tracheostomy cuff is re-inflated.
- The cuff deflator should not be used to deflate the tracheostomy cuff, because it is not possible to remove all of the air with this device.
- The capillary occlusion pressure within the tracheal wall is 30mm Hg. The cuff pressure should therefore be less than this in order to reduce perfusion occlusion. The recommended safe pressure is 25mmHg.
- The safe pressure range is marked in green on the manometer.

19 HUMIDIFICATION

Normally heating and humidification of inspired air occurs in the nose, mouth, and upper airways. The Tracheostomy by-passes the upper airways. As a result of this the normal humidification and heating mechanisms are bypassed leading to a risk of retained secretions or airway obstruction due to thicker, more tenacious secretions. Artificial humidification is therefore essential to minimise this risk.

'Dry' oxygen should never be given to someone with a tracheostomy or laryngectomy. Failure to adequately humidify could result in tube or stoma blockage as secretions become dry and viscous, forming a crust around the tracheostomy.

Maintaining systemic hydration is also important and a dehydrated patient is at a greater risk of developing problems due to thick and dry secretions.

Inadequate humidification can result in a number of physiological changes which can be serious to the patient and potentially fatal, including:

- Retention of viscous, tenacious secretions
- Impaired muco-ciliary transport
- Inflammatory changes and necrosis of epithelium
- Destruction of cellular surface of airway causing inflammation, ulceration and bleeding)
- Reduction in lung function (e.g. atelectasis/pneumonia)
- Increased risk of bacterial infiltration.

The assessment of a patient with a tracheostomy or laryngectomy should include management of their secretions and should identify the effectiveness and adequacy of the current humidification of that patient.

METHODS OF HUMIDIFICATION:

- Humidified oxygen via a tracheostomy mask for non-ventilated patients.
- Heat Moisture Exchange (H.M.E) device. These trap moisture from expired air which then humidifies the air on subsequent inspirations. Examples include: Swedish nose, H.M.E filter, and Buchannon Bibs.
- Nebulisers.
- Fisher & Paykel humidifier systems for ventilated patients.
- Mucolytics

Saline Nebulisers:

- May be indicated in tracheostomy patients who are mechanically ventilated, receiving oxygen therapy or self-ventilating on air.
- Help to loosen secretions which making them easier to remove by suction or cough.
- Involves administration of 5 to 10mls 0.9% sterile normal saline into the nebuliser unit 2-4 hourly or as required or in some circumstances hypertonic saline (9%) as prescribed.
- Nebulisers must be connected to a gas source with a flow rate of 6-8 litres/minute. Remember if the patient is requiring ≥35% supplemental oxygen, then the gas driving the nebuliser should be oxygen and not air. Ensure nebulisation is given via the tracheostomy (not the face mask). A nebuliser can be attached to tracheostomy mask or T-piece circuit.

Heat Moisture Exchanger (HMEs) –

- HMEs consists of rolls of metal gauze or a condenser element like propylene sponge/fibre sheet/corrugated paper.
- Are placed either directly onto the end of the tracheostomy tube or can be placed into a breathing circuit. They conserve heat and moisture on expiration via tube.
- Need to be checked regularly to ensure they are not occluded by secretions which may obstruct the airway.
- Must be changed at least every 24 hours
- Some products include oxygen delivery inlets. HMEs are available as small cylinder or nozzles which attach directly to tracheostomy tubes allowing for patient mobility and may have speaking valves incorporated in them. Examples include Swedish Nose:

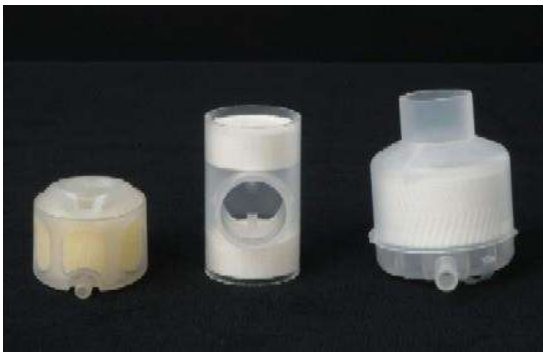


Image taken from:
http://www.nhsggc.org.uk/content/mediaassets/images/wee%20hmes%200024.jpg

Stoma filters or bibs

- Contain a foam layer which absorbs moisture from the patient's expired gases.
- Sre predominantly used for established tracheostomy patients and are often favoured by patients as they are less bulky and conspicuous and are able to completely obscure the tube from sight.
- The image shows a 'Buchannon bib'. These can be used by tracheostomy or laryngectomy patients and come in a variety of styles and designs. Some can disguise the stoma completely and the patient just appears to be wearing a scarf or cravat.

Image taken from
http://www.nhsggc.org.uk/content/mediaassets/images/wee%20bb%200027.jpg

Mucolytic Medications:

- Reduce the 'thickness' of secretions by breaking down some of the bonds that exist between the mucus.
- Are indicated when the patient has excessively thick secretions that are difficult to expectorate. Examples include hypertonic saline (via nebuliser) and carbocisteine (via mouth).

Systemic Hydration:

- Ensuring that the patient is adequately hydrated is essential in managing the secretion load and sputum viscosity. This can be enteral, intravenous or even subcutaneous.

20 SUCTIONING

The health of the lower respiratory tract is usually maintained by the muco-ciliary escalator. Mucus produced in the trachea and bronchi is transported up to the larynx by the ciliated mucosa of the trachea. The Muco-ciliary escalator is disturbed following tracheostomy for several reasons.

- The loss of normal humidification from the nasal airway
- The post-surgical inflammation produces a more tenacious mucus blanket
- The presence of the tracheostomy tube paralyses the cilia in contact with it
- The loss of a normal cough from bypassing the larynx

This results in the tracheal mucus collecting at the lower end of the tracheostomy tube. The amount of mucus build up and the problems it causes will vary between patients and with the duration of the tracheostomy. Some patients may be able to project the mucus through the tube by forced expirations, but most often it must be removed by suctioning the trachea via the tracheostomy tube.

Frequency of routine tracheostomy suction varies considerably between patients depending on their clinical status.

Suctioning systems can be 'open' or 'closed'

- **Open suction** single-use catheters inserted via the open end of the tracheostomy tube.
- **Closed suction (in some critical care patients) -** the same catheter can be used multiple times. They are especially useful if the patient is connected to a breathing circuit of a ventilator as repeated disconnection of the circuit is not required. Closed systems are cleaned following use with sterile saline and the systems are usually changed every 72 hours, or according to manufacturers' instructions. They are useful when trying to minimise aerosol generation during suction

21 Indications for suctioning:

22

- Maintain patency of airway
- To remove excess secretions and stimulate cough in the presence of:
- Presence of viscous secretions
- Visible / audible secretions that patient is unable to expectorate (evidenced by increased work of breathing, increased Peak Inspiratory Pressures on Volume Controlled ventilation, or reduced tidal volumes on Pressure Controlled ventilation; Deteriorating oxygenation levels)
- Reduced breath sounds / reduced saturations as a result of secretions
- Suspected aspiration of gastric or upper airway secretions
- For sputum specimen

23 Hazards / Complications of Suctioning

- Atelectasis
- Hypoxia / hypoxaemia
- Trauma to tracheal / bronchial mucosa
- Increased microbial colonization of lower airway
- Raised ICP
- Cardiac arrhythmias
- Increased or decreased BP

Types of Tracheal Suctioning

- Most patients only need routine tracheostomy suction and this should be limited to the lumen of the tube. If the suction catheter is passed deeper into the normal trachea it can further paralyse the cilia and aggravate the problem. In some patients with chest problems the tracheostomy will have been performed to give access to the lower respiratory tract. In such patients deep bronchial suction may be required.

Patient assessment

- In order for the practitioner to assess whether the patient requires suctioning, with an awake, co-operative patient, it may be possible to firstly encourage them to cough up the secretions, thereby reducing excessive suctioning.
- Support the patient in a position that will aide coughing (unless contraindicated) and address any factors that may reduce the effectiveness of coughing such as pain or hydration status.

Suction catheter selection

- It is important to use appropriate sized suction catheters in order to minimize the risk of tracheal damage or hypoxia which can occur during tracheal suction.
- The diameter of the catheter should be no more than half the internal diameter of the tracheal tube.
- If the catheter is too small it may not be adequate to remove secretions so repeated attempts will be necessary which can cause unnecessary trauma to the tracheal mucosa, and stress for the patient.

Suctioning frequency

- This will be dictated by the various patient factors related to their ability to spontaneously clear their own secretions.

- Attempting tracheal suction at least once per 8 hours strikes a reasonable practical balance. This should ensure that the tube remains patent. Failure to pass a suction catheter is a 'Red Flag' warning that that tube may be blocked or displaced and should prompt assessment by an appropriately trained individual.
- Suction may be required more frequently in the presence of increased amount of secretions.

Depth of suctioning

- Passing a suction catheter to the tip of the tracheostomy tube can be considered 'shallow' suctioning. This is often all that is required if the patient has reasonably loose secretions which can be coughed towards the end of the tube.
- Passing a suction catheter any further than this can be considered as 'deep' suctioning and may be required if more shallow suctioning does not clear the secretions adequately.
- During deep suction, when passing the catheter through the tube it should not go deeper than the level of the carina (where resistance will be encountered). Once at Carina level, the catheter should then be withdrawn slightly before suction is commenced. The length of the tracheostomy tube in situ needs to be known so that the suction catheter is inserted to an appropriate distance.

Suctioning Pressures:

- Should avoid pressures greater than 30kPa in order to prevent trauma to tissues.
- If pressures are too low, the suction can be ineffective
- Aiming for pressures of 20kPa is an appropriate start point for most patients

Equipment for suctioning

- 'Clean' disposable gloves
- Appropriately sized sterile suction catheters (See selection guide above)
- Sodium Chloride 0.9% ampoules (only for closed circuit units)
- Oxygen therapy – wall flow meter & tracheostomy mask - if necessary
- Oxygen saturation monitor – where appropriate
- Suction equipment (wall or portable unit) – should be checked at the start of each shift that it is in working order.
- Disposable, sterile 'double' gloves can be used to keep the catheter tip sterile from the packet and allow easy disposal

Most closed suction systems allow the suction tubing from the wall mounted suction unit to be constantly connected to the catheter assembly. To prevent continuous suction being applied, there is a valve to stop the suction being applied. When not in use the valve should always be locked.

24 Procedure and Technique for Suctioning:

Technique:

Equipment:

- Working suction unit (including collection bottle and tubing)
- Catheters
- Gloves (sterile)
- Monitoring
- Use smaller catheters when possible - Multiply tracheostomy size by 3 then divide by 2

Procedure:

- Pre-oxygenate
- Assess observations
- Check the suction pressure - set as low as possible to clear secretions

- Ensure able to monitor patient throughout (see below)
- Explain procedure to patient, and pass the catheter into the tracheostomy inner cannula - Shallow suctioning is recommended to prevent mucosal damage. If patient coughs, apply suction while removing the catheter (do not apply suction during insertion)
- If deep suctioning – do not force catheter against resistance – look at the length of the trach (can check the spare one) and pass catheter no more than the length of the tracheostomy (or until feel gentle resistance) – once feel resistance (or the equivalent of length of tracheostomy – move the catheter out a short distance before applying the suction
- Duration of suction < 15 seconds
- Sterile technique encouraged
- Saline should not be routinely used
- Post- oxygenate and reassess observations
- Document – quantity, and appearance of sputum
- Repeat if required, using a new catheter.

25 Monitoring:

Auscultation pre and post

Oxygen saturations

RR and pattern

HR and BP

Sputum characteristics

Ventilator parameters

26 Suction Procedure and Technique

(Adapted from NPSA expert working group)

Action	Rationale
Explain the procedure to the patient	Relieve patient anxieties
Consider analgesia prior to or following suctioning	Suctioning can be a painful procedure
Switch suction unit on and check that the suction pressure on circuit occlusion does not exceed-150 mm Hg or 20kPa pressure	To ensure the machine is working correctly. Too great a suction pressure can cause trauma, hypoxaemia and atelectasis
Wash hands, put on gloves, apron and goggles	Reduce the risk of cross infection, and to ensure appropriate PPE
Ensure that an appropriate non-fenestrated inner tube is in place	Larger fenestrations allow the suction catheter to pass through, causing trauma to tracheal wall or giving the false impression that the catheter will not pass
Consider pre-oxygenation if receiving oxygen or ventilated (or at risk of vagal response)	To prevent hypoxaemia
Remove tracheostomy devices prior to opening suctioning	To allow access for sterile suction catheter tip
Connect suction catheter keeping catheter tip covered (sterile)	To reduce the risk of transferring infection from the hands to the suction tubing.
Place top ‘double’ glove on dominant hand	To aid removal and replacement of fresh gloves per each suction episode
Do not apply suction whilst introducing the catheter, or push against resistance at any time	Suctioning while introducing the catheter causes mucosal irritation, damage & hypoxia
Occlude suction port with gloved thumb and suction on removal of suction catheter (no need to rotate on removal as catheters have circumferential holes)	Prolonged suctioning can result in hypoxia and trauma
Period of suction should not exceed 15 seconds	To reduce risk of mucosal damage and hypoxaemia

Action	Rationale
Suctioning should be continuous not intermittent	Intermittent suctioning does not reduce trauma and is less effective
Observe the patient throughout the procedure to ensure their general condition is not affected.	Tracheal suction may cause vagal stimulation leading to bradycardia, hypoxia and may stimulate bronchospasm
For patients requiring oxygen therapy, reattach O_2 within 10 seconds.	To limit hypoxia
Remove the glove from the dominant hand by inverting it over the used catheter & dispose clinical waste bag	To minimise the risk of infection
Assess the patient's respiratory rate, skin colour and/or oxygen saturation to ensure they have not been compromised by the procedure and determine if they need further suction.	Suction should be performed only when needed and not as part of a routine, so that damage to the trachea is avoided
It is recommended that no more than 3 episodes of suctioning are carried out in succession – unless absolutely necessary for safety of observations	To limit side effects and maximise recovery period
Difficulties in suctioning tenacious mucus may be due to inadequate humidification. Try a more effective humidifier. Consider use of nebulizer, mucolytics and concurrent physiotherapy. Saline instillation may be useful in some situations such as deep bronchial suction and bronchial lavage.	
If O_2 delivery was increased pre suction, review for return to previous level. Wash hands.	To prevent unnecessary oxygen delivery
Flush through the connection tubing with the clean water. Empty water receptacle and ensure this is ready for further use.	To minimise the risk of infection

Other methods for improving secretions clearance:

Chest Physiotherapy and Mobilisation:

- There is good evidence that mobilising patients will help to improve the clearance of secretions.
- Mobilisation should be encouraged for all patients with an airway stoma.

- The assistance of physiotherapists is essential for patients who cannot mobilise independently, or who are sedated and/or ventilated.
- These interventions can be combined with chest physiotherapy who may use adjuncts to assist with secretion clearance (eg CoughAssist Machine, Manual Hyperinflation, Intermittent Positive Pressure Breathing)
- Prior to mobilisation it is important to ensure that the tracheostomy site is secure, and not at risk of dislodgement.

27 CHANGING A TRACHEOSTOMY DRESSING

Secretions may ooze out of the surgical excision and stoma site which can result in wetness and cause irritation of the skin and can lead to skin maceration and/or excoriation. This moist environment may also act as a medium for bacterial growth and can prevent the stoma site from healing. The aim of stoma care is therefore to keep the area clean and dry, reducing the risk of skin irritation and infection.
It is important that two nurses are available when changing the dressing; one to hold the tube in place whilst the Velcro straps or ties are released and the other to change the dressing and secure the Velcro straps or ties.

Equipment Requirements for Changing the Dressing

- Gloves (and protective eye wear)
- Dressing pack
- Normal saline 0.9%
- Pre-cut keyhole dressing (Metalline™),
- Tracheostomy tube holder or tracheostomy tapes
- Tracheal dilators

Tracheostomy dressings should be changed at least every 12 hours (more often if soiled) using an aseptic technique.

Skin around the stoma is always in contact with moisture, therefore is at risk of breaking down. It is important to inspect the skin regularly to assess for signs of this. The site should be cleaned with normal saline and a tracheostomy dressing applied.

Dressings placed at the tracheostomy site should always be pre-cut by the manufacturers to avoid loose fibres from a cut dressing edge entering the airway.

Tracheostomy tapes should be changed and tied (one finger should be a comfortable fit between the patient's neck and ties). **N.B.** It is important to note that patients who have had micro vascular or extensive surgery to the neck and face should not have restrictive ties placed around their neck. In this situation the tracheostomy tube will be secured to the skin using a suture through the wings of the tube.

Patient assessment - When selecting the most appropriate technique and product for securing the tracheostomy tube, consideration must be given to the risk factors that each patient is exposed to. A tracheostomy tube that becomes displaced is at risk of causing significant respiratory difficulties and/or airway obstruction. It is, therefore, vital to ensure the tracheostomy tube is appropriately secured at all times.

Patients at risk of their tube becoming displaced are:

- Agitated or confused patients

- Patients with ventilator circuits attached
- Patients with tapes that are too loose allowing excessive tube movement

Regular checks of the tapes will help prevent the tube becoming displaced.

Action	Rationale
Explain and discuss the procedure with the patient as appropriate.	Reduce anxiety and gain consent and co-operation
Wash hands and put on gloves, apron and eye protection if patient high risk	PPE requirements
Prepare sterile dressing trolley	Prerequisite for maintaining asepsis
Position the patient with their neck slightly extended. Remove any clothing that will impede procedure.	To help access to the neck area for the procedure.
Practitioner 1 holds the tracheostomy tube, whilst Practitioner 2 removes the tapes and dressing.	To stabilise the tracheostomy tube and reduce the risk of dislodgement of tracheostomy tube.
Discard old tapes and dressings into the waste bag.	
Assess the stoma for signs of infection, inflammation, or trauma, and record accurately on the appropriate documentation. Take a swab if there are any signs of infection: Sign of infection include: • Purulent discharge • Pain • Odour • Abscess formation • Cellulitis and discolouration	To assess for skin excoriation, haematoma, signs of infection. To facilitate early recognition and treatment of infection.
Observe for signs of hyper-granulation	Granulomas may cause scarring, bleeding, pain and cause difficulty at ube changes
Perform hand hygiene and changE gloves to proceed with aseptic wound care and dressing application	To adhere to aseptic technique
Sterile gauze squares soaked in saline should be used to clean the wound and around the tube to remove secretions and crusting. Gently pat dry	Saline is the preferred wound cleansing solution.
The tube should be held firmly throughout with minimal movement of the tube	Tube movement can cause coughing and discomfort and may increase the risk of accidental decannulation.
Apply a thin layer of barrier cream if the skin is at risk of excoriation from moisture from humidification and/or secretions.	To promote skin integrity.
Apply a clean tracheostomy dressing.	To bring secretions away from the wound, and also to provide comfort from the tube constantly resting on the neck.
Re-secure the tube using an appropriate tie. Allow 1 finger's distance between the tie and the neck skin	Secure the tube effectively

28 ORAL CARE

All patients with a tracheostomy / laryngectomy must be referred to Speech and Language Therapy (SLT)

Oral care is essential in preventing healthcare associated infections. Dental plaque and the oropharynx can become colonized by bacteria and a 'biofilm' can develop on the inside of airway devices. Secretions can also pool in the subglottic region. Normal oral airflow is disrupted when gas is directed through the tracheostomy and this leads to reduced evaporation of oral secretions, which subsequently accumulate in the mouth.

When able, patients should be encouraged to maintain their own oral hygiene by using a toothbrush and using mouthwashes. Incapacitated patients should have a daily assessment of their buccal mucous membranes to observe for bacterial, viral or fungal infections, skin tears or ulceration.

Aspirated infective saliva can contribute to respiratory problems. If the patient has a dry mouth, then consider artificial saliva. Nebulizers via face mask should be considered when cuff is deflated,

Any obvious dental problems should be assessed promptly by an oral hygienist. Simple measures such as teeth cleaning and intermittent removal of oral secretions can have a significant impact on hospital-acquired infections such as ventilator-associated pneumonia.

Specific oral care measures

- Encourage self-care when possible
- Patient's teeth should be brushed with toothbrush and toothpaste at least twice a day.
- Chlorhexidine mouth washing twice per day (not immediately after tooth brushing)
- There is no reason why patients with tracheostomies can't wear their dentures.
- Showering is permitted
- Consider pharmaceutical treatments to control oral secretions eg hyoscine, glyccopyronium or atropine drops are commonly used. Other medication options should be discussed with pharmacy.

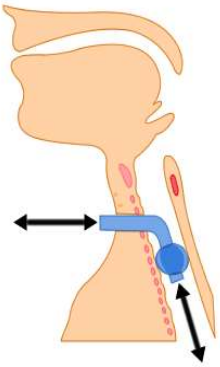
29 MANAGEMENT OF CUFF

A cuffed tube is usually a temporary measure until a patient is weaned from a ventilator and the patient can control their own secretions but may be required long term if the underlying condition does not improve sufficiently. Examples include:

- Patient requires long term ventilation, either continually or intermittently (e.g. overnight).
- Patient has a reduced conscious level or neuromuscular or mechanical problems affecting the pharynx. The airway is at risk of aspiration of GI contents and a cuffed tube can provide a degree of protection against this.
- Patient has excessive oral secretions that cannot be managed by the patient's own efforts.

An over-inflated cuff can cause complications including:

- Tracheal stenosis (scarring and narrowing of the trachea)
- Tracheomalacia (the cartilaginous structure of the trachea becomes weakened and the trachea is prone to collapse
- Tracheo-oesophageal fistula (an un-planned communication between the rear wall of the trachea and the oesophagus which lies behind. This can lead to GI contents contaminating the airway).
- Tracheo-inominate artery fistula – An artery near the trachea can get damaged due to prolonged pressure.



An inflated cuff may also lead to:

- de-sensitisation of the larynx,

- a reduced cough reflex
- loss of voice or sound production.

An under-inflated cuff can:

- Cause an air leak, resulting in ineffective positive pressure ventilation.
- Permit micro-aspiration of secretions which have collected above the cuff. This subsequently increases the risk of nosocomial pneumonia.
- The accepted pressure is the minimum pressure required to prevent a leak but which must not exceed 35cmH_2O.

Regular cuff pressure checks are carried out every 8 hour shift. Tracheal capillary pressure lies between 20- 30mmHg and an impairment of this blood flow will be caused by an obstruction between 22-37mm Hg.

Cuff leaks

A cuff leak can vary in its significance from being irritating to staff and the patient owing to ventilator alarms, through to life threatening complications from aspiration or ventilation failure.
The leak can come from a number of sources and importantly, may be associated with a partially displaced tube. Sources of leaks include:

- Defective or damaged cuff (sometimes occur on insertion of the tube)
- Cuff not adequately inflated (see above)
- Patient is requiring high ventilator pressures and/or PEEP/CPAP which exceed the sealing capacity of the cuff
- Tube does not fit the airway
- Simply too small
- Positional changes cause a leak
- Tracheomalacia or wound breakdown

From this, if there is evidence of cuff leak, assessment is required to establish the cause, and rule out problems that may not be directly associated with the cuff (eg weight of ventilator tubing partially displacing the trache) A fibreoptic inspection of the tube, stoma or trachea may be indicated if clinical assessment cannot determine the source of the problem.

Patient assessment: cuff deflation - The decision to trial cuff deflation should be made by appropriate members of the multidisciplinary team and carried out and monitored by appropriately trained and skilled staff. Patients who may require cuff deflation include:

- Prior to tube removal
- Prior to assessment of patients ability to manage oral secretions
- Prior to eating or drink (where swallowing is assessed as safe)
- A patient using a speaking valve or occlusion (decannulation) cap
- As part of a structured weaning programme

Cuff deflation can be difficult initially for some patients due to a number of reasons. Examples being,:

- Limited respiratory reserve may make it harder for patients to tolerate airflow through large dead-space in upper respiratory tract.
- Diluted FiO_2 compared to when Oxygen was given via tracheostomy
- Resistance from the tube within the trachea

Such factors such be considered when determining whether to trial cuff deflation.

It is vital to consider deflating the cuff as soon as possible due to the complications of an inflated cuff particularly with regard to micro-aspiration. Aspiration risk has been shown to be 2.7 times greater with cuff inflated, and greater still when considering silent aspiration. Inflated cuff impacts upper airway sensation, laryngeal movement and subglottic pressures. When the cuff is properly inflated, there is no airflow through the upper airway. This lack of airflow decreases the sensation to that area and can result in reduced spontaneous swallowing, pooling secretions and eventual aspiration, silent aspiration and lack of cough response.

Procedure: cuff deflation –

- Two people should be present for this procedure.
- Any secretions that may have collected above the cuff of the old tube need to be removed prior to cuff deflation. In the sedated patient, this will involve oral, pharyngeal and subglottic suction with a soft catheter. Awake patients will find this uncomfortable, but it is important to remove secretions from above the cuff if possible. Tubes with specific sub-glottic suction channels allow some of the secretions to be cleared more easily.
- Any remaining secretions can be removed by timing cuff deflation (prior to tube removal) with expiration. The patient is asked to take a breath in and exhale strongly or cough as the cuff is deflated. If the patient is ventilated, then deflation is timed with the expiratory phase.
- The cuff is deflated with simultaneous suctioning, to remove any material that may have accumulated above the cuff and remains, despite the subglottic suctioning.

Documentation - Document cuff pressure checks at least once per shift, or in accordance with local guidelines. Ensure handover of all appropriate information reporting any problems in measuring cuff pressures.

30 CHANGING OR REMOVING A TRACHEOSTOMY TUBE.

The decision to carry out these actions must be made by the attending physician. Changing of tracheostomy tubes in this hospital is an advanced practice role and should be performed by staff assessed as competent to do so.

31 Use of One-Way Valves (also referred to as Passy Muir or Speaking Valves):

For Weaning of Ventilation Support:

- One-way valves are used to facilitate weaning from ventilation support – in patients who can tolerate cuff deflation (following assessment by SALT or Respiratory Physiotherapists).
- One-way valves can be used in ventilated patients, who are able to tolerate cuff deflation. This is currently only initiated by Senior Respiratory Physiotherapists / SALT, after discussion with Consultant and wider multidisciplinary team..

To enable the patient to speak;

* Deflate the cuff while the plain inner tube is in situ and suction using the synchronized suction/cuff deflation technique.
* Remove the plain inner tube and insert the fenestrated inner cannula.
* Apply the plastic-speaking valve to the tracheostomy to enable the patient to speak, on expiration.
* Reassure patient that their voice may sound slightly different initially, and that this is normal.
* Speaking Valve Trials should be initiated after discussion with the MDT, and should be introduced in a planned, way that avoids fatigue. Initial trials may be up to ten minutes maximum if the patient is at risk of fatigue.

* A cap may also be used in the weaning process, to optimise swallow and to facilitate speech. It's advantage is that inspiration is normalised and inspired air naturally humidified. This may be considered after assessment by SALT

Speaking Valves and caps must not be used with cuff inflated as the patient will not be able to exhale

32 WEANING AND DECANNULATION

Each patient will require individual consideration and planning at each stage of the weaning process. This process may also be varied in certain situations and advice from the ENT, MFU Clinical Nurse Specialist and Anaesthetic team should be sought.

DECANNULATION

Before considering decannluation the patient needs to satisfy the following criteria:

- Not requiring mechanical ventilation support
- Able to tolerate cuff deflation
- Able to clear secretions effectively (demonstrating effective deep breath and cough)
- Able to tolerate finger occlusion test (see below)

Consideration should also be given to:

- The amount of secretions, and the patient's ability to expectorate. It is important to remember that the presence of a tracheostomy contributes to secretion volume and clinicians should always consider how removal of the tracheostomy will have a positive effect with regard to decreasing the amount and management of secretions.
- Patient's oxygen saturations
- Agreement sought from MDT e.g. Patient's Consultant, Physiotherapist, Speech Therapist, Clinical Nurse Specialist and Named Nurse.

ASSESSMENT FOR DECANNULATION.

Once the above decannulation criteria has been satisfied, perform the finger occlusion test. The finger occlusion test demonstrates whether a patient has airway patency and ability to breathe around the tracheostomy. If this successful the patient can be decannulated.

To perform the finger occlusion test:

- Ensure that cuff is deflated and if a fenestrated tube is being used make sure that the fenestrated inner cannula is inserted. This will reduce the resistance to airflow and therefore the work of breathing.
- Occlude the tracheostomy with a gloved hand to ensure that the patient is able to exhale through their upper airway. It is recommend to do this for one minute.
- The patient must be observed for any increased respiratory distress e.g. sounds of gurgling, noisy breathing, increased respiratory rate or oxygen de-saturation. Stop the test immediately if any of these signs occur.

If the finger occlusion test is unsuccessful, consideration is needed around cause / need for downsizing tracheostomy / need for fibre-optic endoscopy to assess for signs of upper airway obstruction.

NB there are some patients for whom digital occlusion may be difficult as the work of breathing is more than required than when decannulated. Eg patients with neurological difficulties may fall into this category. In addition there are patients who will pass the digital occlusion test but airway competency may fail later. It is best practice to directly view the airway prior to decannulation.

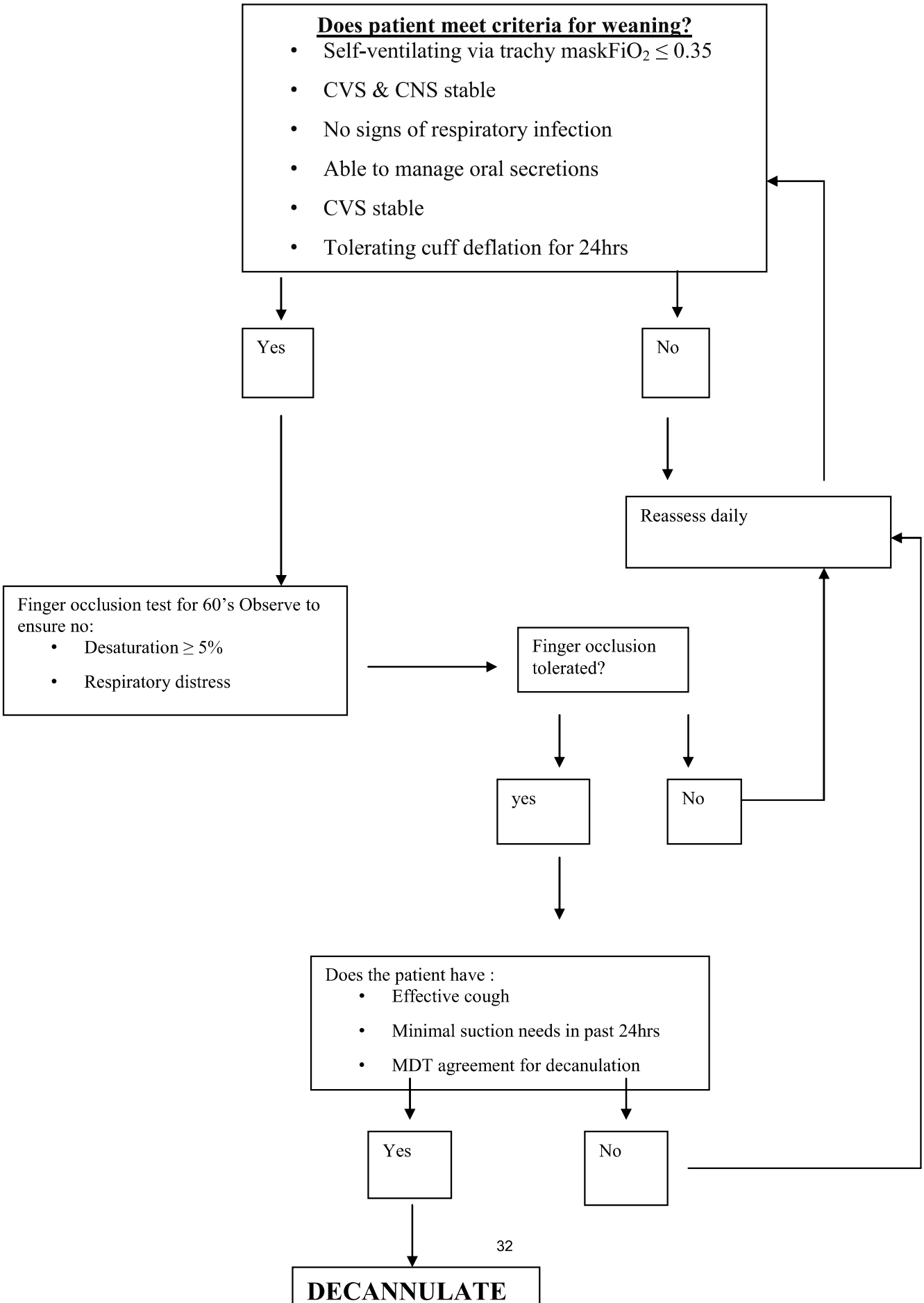
DECANNULATION PROCEDURE:

Ensure that:

- The patient is given a full explanation of the procedure.
- Emergency equipment is checked.
- Tracheal dilators are on hand,
- There are two spare tracheostomy tubes available to hand: one the same size and the other the next size down.
- The patient is in a comfortable and accessible position, then with the cuff deflated, perform suction before all dressings and ties are removed.
- The tracheostomy tube is then swiftly yet gently removed. This may provoke some coughing, suction around the stoma may be necessary.
- The patient is allowed to settle and compose him/herself, before attempting to cover the stoma.
- The stoma is covered with either a DuoDerm/Granuflex/Advasorb dressing.
- The dressing must be checked frequently and changed as soon as it becomes moist or air escapes.
- Granuflex™/ DuoDerm™/ Advasorb may be left in situ for several days, providing the dressing is intact, and adhering with an air tight seal to the skin around the stoma. If any signs of infection develop, then a swab for culture and sensitivity should be sent to microbiology.
- The patient should be instructed to place their hand on the dressing and gently exert pressure over the stoma when speaking or coughing. This will prevent air escaping, and lifting the dressing away from the skin, and will also help to direct sputum towards the oropharynx.

- Oxygen therapy, if appropriate, is then continued using a face mask.
- The patient is then assessed to ensure adequate respiratory function and cardiovascular stability.

GUIDANCE FOR DECANNULATION



Specific laryngectomy care

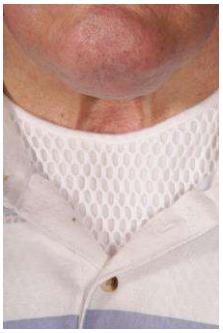
Humidification – laryngectomy

Following total laryngectomy, the normal warming and humidification that is provided by the native upper airways is lost as inspired and expired air flows directly through the laryngectomy stoma on the front of the neck, bypassing the nose and mouth.

Patients will therefore need an alternative method of ensuring that the gas inhaled into the lungs is humidified. This can be provided by applying specific covers to the stoma that contain hygroscopic material (like in HME filters), which can capture moisture, and to some degree, heat. Most patients will be self-caring shortly after their initial procedure and will be able to apply, remove and care for any bespoke stoma covers themselves. The covers do add a degree of resistance to respiration which may become clinically relevant if the patient develops an acute infection or the covers become blocked with purulent secretions. Any stoma covers should be removed in an emergency for this reason.

A Buchannon bib or similar device is another way of humidifying inhaled gases and is preferred by some patients. These can be used by tracheostomy or laryngectomy patients and come in a variety of styles and designs. Some can disguise the stoma completely and the patient just appears to be wearing a scarf or cravat (see images below).





Speech after total laryngectomy

Surgical removal of the vocal cords results in an inability to phonate. This can be a source of immense frustration for patients. There are a variety of options available to total laryngectomees which will be considered in turn.

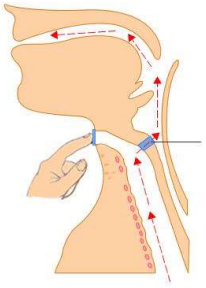
Electrolarynx - These devices vibrate the external skin of the neck. They are used in combination with altering the shape of the mouth to create artificial speech. A degree of training is usually required.

Oesophageal speech - This type of speech involves swallowing air into the gullet via the mouth/nose and then 'burping' it back into the pharynx. This can be coupled with mouth shaping to generate speech. Some patients are very good at this, but again, this technique requires practice.

Tracheo-Oesophageal Punctures - These devices are often known as TEP (from the US spelling of 'esophagus'). They can be created at the time of primary surgery, or later. A puncture is made into the posterior portion of the trachea into the oesophagus behind.

Exhaled air can be forced through this connection by the patient by covering their stoma in expiration. Air passes through the pharynx as above and oesophageal speech is possible. A one-way valve is usually placed into the puncture site to reduce the risk of contamination of the airways with GI contents. Some stoma covers incorporate an additional valve to direct air through the TEP valve without manual occlusion of the stoma, which makes hands-free speech possible. TEP valves *should not be removed* in an emergency as they should not occlude the airway and removing them will cause aspiration of pharyngeal and oesophageal content.

They last a variable period and are replaced when they start to leak. Patients should have a plug to insert into the valve hole if it leaks. Contact ENT(All sites) or SLT(At RSCH) if leaking.



33. Swallowing (Dysphagia):

All patients with a tracheostomy should be referred to SALT.
Swallowing is a highly complex sensorimotor process and when functioning optimally allows safe passage of a food, fluid or saliva bolus into the lower deglutitive tract. Disruption of the upper airway by way of a tracheostomy tube commonly leads to physiological and biomechanical changes to the swallow even in the absence of underlying neurology or head and neck pathology. These changes increase the risk of dysphagia, aspiration and choking. Assessment, management and review by SALT is essential to enable safe oral intake where appropriate, to advise on secretion management and airway competency which will also inform safe weaning. SALTs also advise on safe use of weaning valves and caps which enhance swallowing function and airway protection.

Fibre-optic endoscopic evaluation of swallowing (FEES), conducted by trained and competent SALTs as part of the above process, is considered best practice as part of the swallow assessment and weaning process.

34. Communication

Patients with tracheostomies who are experiencing difficulties with communication must be assessed by SALT.

With the cuff inflated patients will be unable to vocalise but may be very able communicators. For this group, communication should be enabled by the use of low and high tech augmentative devices such as:

- Ipads/tablets/laptops/phones
- picture, symbol, letter or word pointing boards accessed via pointing, eye gaze or switches,
- pen and paper for writing and drawing.

Other non verbal communication processes could include:

- mouthing words and sentences,
- gesture and facial expression,
- indication of yes/no eg head nod/shake, thumbs up/down

The successful use of the above is dependent on a number of physical and medical factors but may be trialled pending SALT review.

Often, patients with tracheostomy will have a variety of underlying physical, medical and cognitive difficulties that affect speech, voice and communication and this will be comprehensively assessed by SALT. Dysphonia, as a result of intubation is not uncommon and vocal cord function can be further affected by tracheostomy. SALT will assess this and liaise with ENT colleagues as required.

In the weaning phase patients may be able to achieve voice with cuff down and this can be assisted by the use of one way valves or a cap. Some of these (eg Passy Muir valves) have specific designs to enable placement within ventilator circuits. SALT and the wider MDT will review this for appropriate patients.

Patients with cuff up may be considered for Above Cuff Vocalisation and SALT will advise on this in discussion with the MDT.

Community SALT service for tracheostomy

Speech and Language therapists working at neighbouring community trusts do not have tracheostomy competencies. These are required to assess and manage patients with a tracheostomy who present with dysphagia and/or to input to decisions and management plans around weaning or other aspects of tracheostomy and airway management eg management of secretions.

Senior SALT at UHSussex (RSCH and PRH sites only) who are tracheostomy competent assess and manage these community referrals with agreement from fund payers and local health services eg GP, ENT.

Patients are accepted onto the caseload via the usual referral routes and funding on a cost by case basis is agreed with fund holders who are then invoiced.

Typically, appointments occur in patient's own homes; although outpatient appointments may also be arranged. SALTs will also access ENT, CNS and GP support and arrange VFL and FEES as required. ENT and other hospital medical support may be within a neighbouring acute Trust. Safe, effective and optimal management of these patients necessitates a collaborative and multi-disciplinary approach. For patients on a tracheostomy weaning programme, risks and plans will have been agreed with relevant professionals and safety nets/protocols devised.

In addition, SALTs will liaise with community counterparts in speech and language therapy with regard to communication, speech and voice issues. Although these aspects of patient care are in the remit of the community services there will be areas of overlap, eg vocal cord pathology and use of a one way valve to facilitate speech.

Patients are discharged when tracheostomy and dysphagia goals are achieved. If the patient has ongoing communication needs only, of which the tracheostomy is not the underlying cause of the impairment; then care will be handed back to community services. Re-referral back to our service is welcomed, as appropriate.

GUIDANCE FOR THE MANAGEMENT OF PATIENTS WITH A TRACHEOSTOMY: SWALLOWING (Worthing and St Richards)

Pre referral information:

Tracheostomy in situ
Nil by mouth

- Ready for cuff deflation trial periods
- Weaning from BIPAP/assisted ventilation
- Able to sit up, head control with support for short periods

SIGNIFICANT ISSUES

- Neurological involvement
- Cognitive impairment
- Head & Neck surgery
- Respiratory history (COPD etc)
- Evidence of aspiration on suction

Refer to Speech & Language Therapy for swallowing assessment

SLT assessment:

- Collateral history
- Oro-motor assessment
- If first assessment, consider speaking/one-way valve
- Swallow trials
- SLT discussed outcome of assessment with team

Possible outcomes of SLT assessment:

- Nil by mouth with non-oral feeding
- Oral trials with non-oral feeding
- Oral feeding – eating and drinking

SLT review as required

If no significant issues, trial cuff deflation.

If tolerated without concern, proceed with commencing oral intake

Nursing observation of:

- sips of water / clear fluids
- small amounts of food

MONITOR EATING & DRINKING

- Monitor chest
- Monitor suction frequency and characteristics
- Record oral intake on food / fluid charts

If possible, aim to establish full oral intake – eating and drinking.
If dysphagia remains severe, consider appropriate non-oral nutrition.

33 Communication – What to consider:

Consideration should be given about how a patient can communicate their needs if

- They are experiencing increased pain
- They are worried about situations at home (eg their pets)
- They are exhausted but couldn't sleep
- They have no voice
- They have no hand movements

(these are just some of a number of challenges experienced by patients with tracheostomy or laryngectomy):

What should be done?

- Attempt to establish a means of communicating as early as possible
- This can sometimes be achieved when a patient is ventilated
- Allow time for the patient to respond
- Use speaking valves for key times in the patient's day, e.g. ward rounds, relatives visits, therapy sessions and when most alert (see later section on one-way valves)
- Think/ act as a team~ involve/liaise with others
- Use communication aids - being flexible:

    - Alphabet board
    - Call buzzer
    - Eye pointing frame
    - Word/picture chart
    - Mouthing should be encouraged
    - Apps are available for mobile phones or tablets to help with producing message – this should only be attempted with patients who are fully aware and can choose this means of communication.

Physiotherapy for patients with tracheostomy

Respiratory Physiotherapy:

Physiotherapists are involved with the respiratory management of patients with tracheostomy, and work closely with the MDT to ensure optimal weaning and decannulation when appropriate.
The respiratory physiotherapy team will review patients who have:

- risk of or of evidence of retained broncho-pulmonary secretions
- reduced lung volumes or atelectasis
- increased work of breathing
- v/q mismatch

General Rehabilitation:

Many patients with a tracheostomy may have global muscle weakness post critical illness. They may be unable to reposition themselves because of weakness, breathlessness and fear of dislodging intravenous lines. Physiotherapists will guide the patients through their rehabilitation, and multidisciplinary rehabilitation goals will be regularly updated and documented in their rehabilitation plan or therapy notes

As a general principal all patients should be sat out of bed as soon as possible, provided that they are medically stable and that all members of the caring team are in agreement. If a patient is unable to sit out of bed, it is important to ensure that they are sat upright, avoiding slumped positions as this could affect their lung volumes and ability to cough effectively. Side-lying is also a recommended position to optimise lung capacities and drainage of secretions.

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