

Intensive Care Unit
Policy for the care of adult patients with a tracheostomy

Originator	ICU Tracheostomy group: Suman Shrestha, Linda Kent, Kirsty Jerrard, Georgina Sears, Mike Peterson, Madan Narayanan, Michaela Payne
Lead Director	Alison Szewczyk
Version Number	1
Version/implementation date	February 2013
Ratified at	Critical Care Senior Team
Adapted from	Standards for the care of adult patients with a temporary tracheostomy- ICS guidelines National Tracheostomy Safety Project resource. St.George's Tracheostomy Guidelines
Review date	February 2016

Please continue to use this guideline but be aware that it is in review (16/12/2024).

CONTENTS

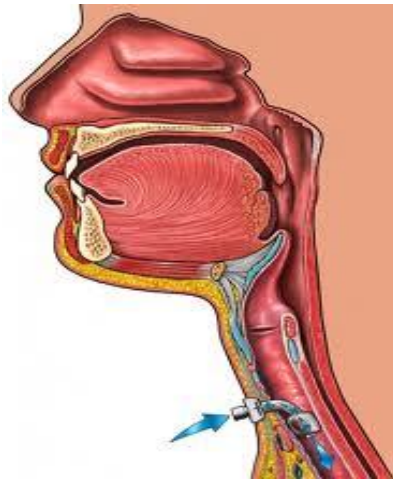
Introduction.....	3
Tracheostomy insertion.....	4
Tracheostomy tube types	4
Management of the patient with a tracheostomy	8
Routine care of the established tracheostomy.....	9
Changing the tracheostomy inner cannula	10
Care of the stoma	10
Communication and swallowing.....	19
Transfer of a patient with a tracheostomy within FPH	22
References and bibliography.....	23
<u>Appendices</u>	
1. Tracheostomy Care Plan	24
2. Advanced Emergency Tracheostomy Management	29
3. Tracheostomy Equipment	30
4. Nursing Care	31
5. Application of Passy-Muir Speaking Valves	32
6. Passy-Muir Speaking Valve Trial	34
7. Checklist for commencement of oral intake/referral to SALT	35
8. Protocol for re-introducing oral intake.....	36
9. Ward Stock.....	37
10. Sizing the Silver Negus Tracheostomy Tube.....	38

Abbreviations

ENT	Ear, Nose and Throat
ICU	Intensive Care Unit
Outreach	Critical Care Outreach Team
PACU	Post-anaesthetic Care Unit
FPH	Frimley Park Hospital NHS Foundation Trust
SALT	Speech And Language Therapy
MDT	Multi-disciplinary Team

Introduction

A **tracheostomy** is a surgical opening in the anterior wall of the trachea to facilitate ventilation; the opening is usually maintained by use of a tracheostomy tube.



The indications of tracheostomy can be varied, ranging from airway obstruction, weaning from mechanical ventilation and/or for airway protection in patients with severe neurologic injury. Tracheostomy is a common procedure in the intensive care. The procedure may be performed either surgically or by a percutaneous method. The choices depend on patient anatomy, risk of bleeding, availability of surgical expertise and operator experience. Depending on the reason for insertion of the tracheostomy, it can be temporary or permanent.

Tracheostomies can be effective in accelerating weaning from mechanical ventilation and facilitating early discharge from level 3 care, though the evidence is equivocal. This often results in patients with temporary tracheostomies being cared for in multiple locations. As with all procedures, the benefits are associated with risk, both during and after insertion. The most common problems, in both general wards and critical care, are related to obstruction or displacement. Continued pressure on intensive care beds and a drive to use resources effectively has encouraged earlier discharge of an increasing number of patients with temporary tracheostomy to intermediate and ward care. This creates a risk that they are cared for separately from the clinical services that are best placed to identify and treat the potentially life threatening complications associated with a temporary tracheostomy. It is therefore very important that there is clear documentation and communication, together with explicit responsibility and training for the healthcare staff involved.

A total laryngectomy is an operation to completely remove the larynx, usually following a diagnosis of cancer. Before surgery the oesophagus and the trachea meet to form the pharynx above the larynx. After a total laryngectomy the oesophagus and trachea are permanently separated. The trachea is brought out through a permanent opening, or stoma, at the front of the neck. The patient will breathe through this stoma for the rest of his or her life and the oesophagus is repaired to make a complete tube. This means that the lungs have been disconnected from the mouth and nose and are now only connected to the stoma in the patient's neck. Therefore ventilatory support in resuscitation must be given via the stoma. The major effects of removal of the larynx are permanent loss of normal voice and alteration of the airway.

The focus of this document is on the care of adult patients with temporary tracheostomies within the Intensive Care Unit.

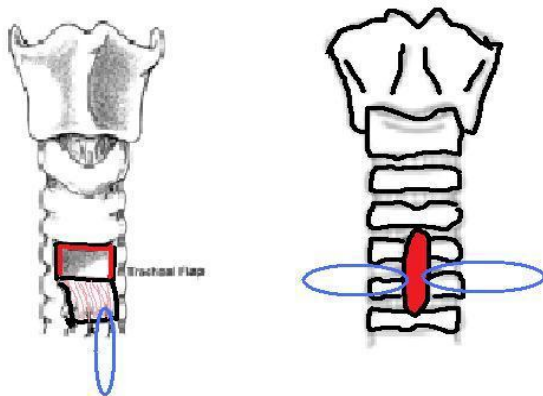
Tracheostomy insertion

The tracheostomy can be inserted percutaneously in the intensive care unit or surgically in the operating theatre. The choice of technique depends on the previously mentioned factors.

The percutaneous method is the most commonly used technique in critical care as it is simple and quick, can be performed at the bedside using anaesthetic sedation and local anaesthetic, and therefore is often the technique of choice in the critically ill. The procedure involves the insertion of a needle through the neck into the trachea followed by a guide-wire through the needle. The needle is removed and the tract made gradually larger by inserting a single stage dilator over the wire until the stoma is large enough to fit a suitable tube (Seldinger technique). This is then secured by cloth ties or a holder.

Surgical tracheostomy

A surgical tracheostomy requires the transfer of the patient to the operating theatre and is done under sterile conditions under general or local anaesthesia. The tissues around the trachea are dissected and then the trachea is entered by making an incision in its anterior wall between the 2nd and 3rd or 3rd and 4th tracheal rings. The tracheal incision can be T, H or U shaped and can be done with or without flaps.



Far left figure:
Björk Flap with a 'flap suture' to the skin (blue)

Right figure:
Slit-type tracheostomy with 2 stay sutures (blue) to the skin. These can be used to manipulate the trachea

Tracheostomy tube types

The important features when considering a tracheostomy tube for a patient are:

1. Construction
2. Dimensions
 - internal and outer diameter (ID and OD respectively)
 - proximal and distal length (i.e. length of tube proximal and distal to its angulation)
 - shape and angulation
3. Presence and nature of tube cuff
4. Inner cannula (dual cannula tracheostomy tube)
5. Fixed versus adjustable flange
6. Presence of fenestration
7. Specialist features, e.g. low contour on deflation, tight to shaft cuffs, subglottic secretion control systems, voice enhancement tubes etc

Factors influencing selection of a temporary tracheostomy tube are:

1. Respiratory function (ICU cuffed tubes during mechanical ventilation, uncuffed/fenestrated tubes/dual cannula tubes during spontaneous ventilation in ward)
2. Abnormal airway anatomy (obese- extended length tubes)
3. Airway pathology (longer distal length tubes)
4. Airway protection and weaning problems (uncuffed, fenestrated, dual cannula tubes, subglottic suction, speaking valve attachment)
5. Obstructed/absent upper airway
6. Clinical environment (ICU - single cannula cuffed tubes; wards - uncuffed, fenestrated dual cannula tubes)

Types of tracheostomy used at Frimley Park Hospital

	Shiley Cuffed Fenestrated dual cannula tracheostomy
	Portex Blue line® Ultra®- dual cannula tracheostomy
	Subglottic suction tracheostomy
	Shiley XLT
	Silver Negus tracheostomy tubes

Guidelines for percutaneous tracheostomy in the ICU:

1. Prerequisites: $\text{FiO}_2 < 50\%$, PEEP < 10 .
2. Contraindications: (morbid obesity, abnormal anatomy, airway pathology, cardiovascular/respiratory instability)
3. Check:
 - a. Clotting: PT, APTT, platelets, last dose of heparin/Dalteparin
 - b. Consent
 - c. NG feed stopped 4 hours before and NG aspirated
 - d. Baseline ultrasound scan of neck to identify aberrant vessels
4. Equipment:
 - a. Full monitoring including EtCO_2
 - b. Airway trolley/Crash Trolley
 - c. Spare ETT same and smaller size, laryngoscope
 - d. Bougie
 - e. Yankaeur
 - f. Scissors & tube tie
 - g. Saline bag under shoulder
 - h. Ultrasound machine with sterile probe cover (optional)
 - i. Bronchoscope and stack
 - j. ETT, bronchoscope, valved connector and suction assembly
 - k. 2% chlorhexidine sticks
 - l. Appropriate sized percutaneous tracheostomy set
 - m. Gown, gloves, mask, hat, sterile drape set
5. Personnel
 - a. Doctor performing the procedure
 - b. Top end bronchoscopist & anaesthetist
 - c. Nursing staff
6. Preprocedure:
 - a. Preoxygenate with 100% oxygen
 - b. Patient positioned, sedation, muscle relaxant, on IPPV
 - c. ETT withdrawn to cords/LMA inserted
7. Drugs:
 - a. Vasopressors
 - b. Lignocaine with 1:200,000 adrenaline
8. Documentation - indication, type, size, operators, technique, complications, bronchoscopy equipment sticker, tracheostomy tube sticker.
Check Xray

Cleaning of appropriate equipment and resending bronchoscope to Endoscopy with appropriate documentation and bronchoscope stack to theatres

Management of the patient with a tracheostomy

The key considerations:

1. Competency and training
 - a. Staff must have received documented training on caring for patients with a tracheostomy
 - b. Staff must know who to call and what to do in an emergency
2. Equipment provision
 - a. Tracheostomy related equipment are stored in ICU A Store Room.
 - b. Bedside emergency equipment (see Appendix 2) must be available at all times and accompany the patient if they move around the unit/hospital. They will be kept at the bedside in a blue tracheostomy box.
 - c. Equipment must be checked and documented in PICIS every shift.
3. Discharge planning from ICU
 - a. Patients with a tracheostomy will have their cuff **deflated** and an inner cannula sited prior to discharge
 - b. Will involve the MDT including critical care outreach, ward staff, SALT and physiotherapists
 - c. Patients with tracheostomy are discharged only to the designated wards. Placing patients with tracheostomies together into designated wards reduces the risks to these patients as it allows training and equipment to be targeted and concentrates expertise and experience.
 - d. Ideally, at least 24 hours' notice should be given to the ward when transferring a patient out of ICU to the ward area
 - e. Patients with a tracheostomy will not be discharged from the critical care unit between the hours of 2000 and 0800
 - f. A tracheostomy care plan will be completed by the ICU staff, Critical Care Outreach Team and physiotherapist and communicated to the receiving ward nurse before the patient is discharged from critical care.
 - g. A documented visit to meet the patient and to assess dependency by a member of the receiving ward should be carried out prior to discharge
 - h. The patient will receive an emergency tracheostomy box (**see Appendix 2**) to accompany them at all times in case of an airway emergency
5. Follow-up following discharge from ICU
 - a. The ICU or Outreach consultant will have overall responsibility for the management of the tracheostomy
 - b. Critical Care Outreach Team will review the patient at least once every day to offer advice, education and support for the ward staff and assist with management of the tracheostomy
 - c. The physiotherapist will review the patient every day and liaise with Outreach
 - d. An MDT meeting will take place once a week with the Critical Care Outreach Team, physiotherapists, speech and language therapist and the ward staff and medical team caring for the patient to discuss the management of the tracheostomy

6. Documentation

All care and plans will be fully documented in the tracheostomy care pathway in PICIS.

Please note:

Bed managers must ensure that patients with a tracheostomy transferred from another hospital are assessed by the ICU or Outreach consultant in ICU or PACU before being admitted to the ward environment. A bed must be obtained in ICU or PACU and the ward before the transfer. All patients admitted from the community are placed in a designated ward environment for patients with a tracheostomy and Outreach must be informed.

Routine care of the established tracheostomy

Essential bedside equipment

Essential equipment should be immediately available at all times for a patient with a tracheostomy, both by the bedside as well as during transfers. The list for the emergency box & bedside equipment is in Appendix 3.

Cuff management

The tracheostomy cuff provides a seal to enable positive pressure ventilation and also provides some protection against aspiration of secretions. Over-inflation of the cuff may cause ischaemia of the tracheal mucosa and thereby lead to tracheal stenosis, tracheomalacia and arterial erosion. The pressure within the cuff should be checked regularly (at least 4hrly) with a hand held pressure manometer and documented.

Cuff pressure should be adjusted using hand held pressure manometer. Pressure should normally be between 15 and 25 cm H₂O and should not exceed 35 cm H₂O.

If an air leak occurs with the cuff pressure at the maximum recommended, the tracheostomy may have become displaced or may require changing. Medical or other professionals who are competent in tracheostomy management should review the patient. Finger tip pressure on the external pilot balloon is not an accurate method of measuring cuff pressure.

The cuff should be deflated to remove the tube to allow the patient to eat or drink and when a speaking valve (PMV) or decannulation cap is secured to the tube.

Failure to deflate the cuff when the speaking valve or decannulation cap is secured to the tube will result in a total occlusion of the patient's airway.

Humidification

Inadequate humidification may lead to life-threatening blockage of the tracheostomy. It is essential, therefore, to provide adequate humidification of oxygen. This can be provided via a heat-moisture exchanger (HME), heated humidification system or cold water Venturi humidified system connected to a T-piece on the tracheostomy mask. Patients with more

tenacious sputum, or who require high flow oxygen therapy may require additional saline nebulisers or regular carbocisteine.

Changing the tracheostomy inner cannula

Inner cannulas

Inner cannulas, if being used, must be removed, inspected and cleaned at regular intervals. The frequency of inspection is determined by the volume and tenacity of a patient's secretions and the stability of patient's respiratory condition (e.g. higher level of ventilator support), but should be at least 4 hourly. Disposable inner cannulas should be discarded if soiled and replaced with a new one. Basic guidelines for changing the inner cannula of a tracheostomy tube are listed in the box below:

Guidelines for changing inner cannula

1. Position patient with neck slightly extended
2. Pre-oxygenate and suction as necessary
3. Wearing gloves remove or change the inner cannula. If non-disposable clean with sterile saline 0.9% or water and dry thoroughly
4. Clear persistent secretions on cannula in line with manufacturer's instructions, rinsing the inner cannula thoroughly with normal saline or water before re-insertion. Do not leave inner cannula to soak

Please consult with ICU doctor or Nurse in Charge if the patient is requiring increasing levels of ventilatory support.

Care of the stoma

The presence of the tracheostomy tube, the resultant secretions and stoma site in an already debilitated and possibly immune compromised patient increase the risk of infection. Secretions that collect above the cuff ooze out of the stoma site producing a moist environment leading to excoriation and infection. The site should be assessed and the stoma cleaned at least once a day. The back of the neck should also be assessed for redness and soreness from the Velcro tapes, but more frequently if they become soiled. Stoma care is a two person technique to prevent decannulation, whereby one nurse will support the tube for the duration of the procedure, whilst the other removes the tapes and performs the stoma care using an aseptic technique. The stoma should be cleaned with normal saline and redressed with Lyofoam © and the tracheostomy tube should be secured effectively with a commercial tracheostomy holder. Hand washing must be performed before and after the procedure and contaminated gloves changed between procedures. Eye protection should be worn for suctioning and tube changes or when there is a risk a patient may cough towards the carer. Crusted or exuding tracheostomy stomas should be swabbed, the sample sent to Microbiology and the patient's doctor informed. Procedure for cleaning the stoma is in Appendix 4.

Suctioning

Tracheal suction is an essential component of secretion control and maintenance of tube patency. However, it may be both painful and distressing for the patient, and can also be complicated by hypoxaemia, bradycardia (particularly in patients with autonomic dysfunction such as in spinal injuries), tracheal mucosal damage, bleeding and infection. As a result, the suction requirements of an individual patient should be re-assessed each shift, and, wherever possible, patients should be encouraged to expectorate their own secretions.

Tracheal suctioning should be carried out using closed suction system when patient is on a ventilator. However, open suctioning needs to be carried out if patient is self ventilating and this process has to be carried out aseptically.

Gloves

As minimum, clean gloves should be worn when caring for a tracheostomy. Clinical staff should undertake a risk assessment when deciding whether to use sterile or clean gloves. For patients with a new surgically-formed tracheostomy and laryngeal stomas, individually packaged, sterile, disposable gloves should be worn (*DoH 2007, Pratt et al 2007, Dougherty & Lister 2006*). Clean disposable gloves may be appropriate for use with established stomas or for the patient performing their own suction.

Documentation

Ensure that you complete the tracheostomy care pathway (in PICIS) noting the colour, viscosity and volume of secretions. The time of suction, frequency of suction and inner tube check should also be documented.

Guidelines for tracheal suction

1. Suctioning should be performed with the patient upright and in a neutral head alignment
2. Always suction with a non-fenestrated inner tube in situ. (A non-fenestrated inner tube might have to be inserted for suction)
3. The suction catheter should have a diameter no greater than half internal diameter of the tracheostomy tube

Suction catheter size (Fg) = 2(size of tracheostomy tube – 2)

For example, 8.00mm ID tube: $2(8-2) = 12$ Fg

4. The lowest possible vacuum pressure should be use (13-16kPa) to minimise atelectasis. This should be checked by occluding the end of the suction tubing whilst the suction is on.
5. Patients with high oxygen requirements may require pre-oxygenation (increase to 100% for 1 minute prior to suctioning)
6. Clean hands in line with 5 Moments for Hand Hygiene. Wear personal protective equipment (PPE) according to the risk of contact with bodily fluids. Face and eye protection is required if there is a risk of splashing especially with open suctioning method.

For patients requiring open suction, please follow the following procedure:

7. Open the outer package of the sterile catheter by peeling back the adapter end of the catheter
8. With the rest of the catheter in the package, attach the adapter to the suction tubing
9. Hold the catheter with the dominant hand and remove the outer packaging with the other hand.
10. Gently insert the catheter into the tracheostomy tube until resistance is felt (approximately 10-15 cms or less depending on length of tracheostomy tube) before withdrawing slightly and then apply suction, keeping the catheter moving slowly out of the tracheostomy tube.
11. Suction should be applied for a maximum of 10 seconds
12. Assess the patient's respiratory status following suctioning.
13. Installation of saline to 'aid' suctioning is not recommended
14. Dispose of the catheter (if performing open suction method) and glove.
15. Repeat the process as necessary, using a new catheter and glove each time.
16. After the final suction, flush through suction tubing with sterile water and wash hands.

Any difficulty in passing the suction catheter should lead to consideration that the tube may be partially blocked, badly orientated or misplaced and requires immediate attention.

Weaning, speaking valve and decannulation

Overview

Decannulation should be undertaken as soon as is feasible in order to minimise the risks of complications. However, there are some risks associated with decannulation, including airway obstruction, aspiration, ventilatory failure, sputum retention and difficulty in oral re-intubation. The decision and processes involved in decannulation should therefore demonstrate an assessment of both the risk and benefits. These should be undertaken as follows:

- Using objective criteria
- By competent staff
- In appropriate environment
- With appropriate monitoring
- With equipment/ medication available to address potential hazards
- There should be clear guidance to staff who will be monitoring the patient, to enable them to look for complications
- Clear criteria for review by specialist teams such as Outreach or ENT
- Point of contact clearly documented in order to obtain urgent review of airway

A tracheostomy should be removed as soon as it is no longer required

Weaning

Some patients will tolerate a rapid progression to airway decannulation. Other patients may require a prolonged weaning process. It is essential that this process is planned, consistent and sequential.

Weaning from mechanical ventilation is the responsibility of the multi-disciplinary team. However, the wean should be led by an individual within that team who can follow the patient throughout that weaning process and co-ordinate with the various members of the team. This individual should be clearly identified at the onset of the patient's weaning process. If a patient is transferred out of Critical Care with a tracheostomy in situ the 'key worker' who will facilitate the wean for that individual will be clearly identified prior to the transfer. This individual will be either a Critical Care Outreach Nurse or a Critical Care Physiotherapist, who will oversee the weaning of this patient on the ward.

Weaning from mechanical ventilation

The process usually will begin on the Critical Care Unit. Usually patients requiring a tracheostomy will have received a period of mechanical ventilation prior to the decision to insert a tracheostomy.

Some patients may wean rapidly from mechanical ventilation. Others, whose primary reason for requiring mechanical ventilation was respiratory failure, may take longer.

The process of weaning from mechanical ventilation should be an individualised process, taking into account the patient's physiological needs.

The following areas should be considered:

- Level of PEEP required
- Level of inspiratory support required

- Speed at which to increase weaning periods
- Impact of other treatments, such as rehabilitation, on weaning ability
- Secretion load

For all patients who are about to commence weaning from mechanical ventilation clear parameters should be set in order to safely assess success of weaning. These may include the following:

- SpO₂
- HR
- RR
- PaO₂
- PaCO₂

For all patients commencing a wean from mechanical ventilation a clear plan of the weaning goals for a specified time frame, such as the next 24hrs, should be agreed by key members of the multi-disciplinary team, including:

- Critical Care Consultant
- Critical Care Physiotherapist
- Critical Care Nurse

Weaning from oxygen

As able the concentration of oxygen inspired via the tracheostomy should be weaned as per trust protocols. The oxygen should always be humidified. If the patient no longer requires oxygen then either regular saline nebulisers or another device, such as a Swedish nose should be used in order to maintain adequate airway humidification.

Cuff deflation

Weaning usually includes increasing the time periods which the patient can tolerate the tracheostomy cuff deflated. The inflated cuff provides some protection against aspiration, although some micro-aspiration may still occur with the cuff inflated. Prolonged presence of either an endotracheal or tracheostomy tube with an inflated cuff means that the patient may have become unaccustomed to managing their own oral secretions or swallowing safely.

Periods of cuff deflation allow the patient to become re-accustomed to doing so and enable the multi-disciplinary team to assess their ability to protect their airway. Initial cuff deflation may occur when the patient is still receiving mechanical ventilation. The following criteria should be considered when assessing whether a patient is suitable for cuff deflation:

- PEEP of 10 cmH₂O or less
- Total inspiratory support of 20 cmH₂O or less
- Secretion load
- Any reason where airway protection may be compromised, such as neurological injury
- The patient's cognitive status

Assessment may be carried out by the anaesthetist, physiotherapist or nursing staff if they are suitably trained and confident to do so.

Phase I: Cuff Deflation (For Ventilated and Self-Ventilating Patients)

- Explain process fully to patient, including the possibility of an alteration in tracheal airflow sensation or that coughing may be induced
- Ensure any excess pulmonary and oropharyngeal secretions are effectively cleared prior to deflation
- Deflate tracheostomy tube cuff completely
- Encourage the patient to cough to clear any upper airway secretions that have been lodged around the inflated cuff; suction as necessary

Phase II: Upper Airway Patency (For a Self Ventilating Patient)

- Instruct the patient to inhale through the tracheostomy tube
- Ensure that the patient can effectively and comfortably exhale using their upper airway by manually occluding the tracheostomy with a clean, gloved finger as they exhale
- Encourage the patient to vocalise to determine presence and quality of voice
- If the patient continuously coughs with the cuff deflated and this does not resolve with either suction or reassurance then re-inflate the cuff, using a manometer to check the cuff pressure

Repeat this process as required until the patient can tolerate cuff deflation.

All patients with a tracheostomy in situ on the wards should be able to tolerate permanent cuff deflation

Speaking Valves

A one-way speaking valve attached to the tracheostomy allows air in through the tracheostomy, but closes on expiration. This diverts air past the vocal cords and out via the mouth and the nose.

Not being able to speak is a major cause of distress for this group of patients. It is reasonable to assume that mood and motivation could increase by allowing speech.

Several studies have examined the effect of the speaking valves on aspiration and have concluded that their use substantially reduces the risk but does not completely alleviate the risk. The use of speaking valves can produce a more normal glottis closure resulting in a more effective cough. This could lead to more effective secretion clearance and possible earlier decannulation.

There are a few absolute contraindications to consider:

- Unconscious, sedated and/or patients failing to wake
- Inability to protect airway when cuff is down
- Foam filled cuffed tracheostomy tube
- Severe airway obstruction which may prevent sufficient exhalation e.g. tracheal stenosis
- Thick and/or copious secretions
- Laryngectomy

- Endotracheal tube

The following table gives suggested parameters to help assess the patient's readiness for a trial of the valve.

Disease Process	Evidence for some reversal of the underlying cause that led to ventilatory support Assessment that the disease process has been treated adequately
Cognitive Status	Patient must ideally be awake and responsive Can be used on those with neuromuscular pathology if they are initiating a respiratory effort and can protect their airway when the cuff is down
FiO₂	< 0.5
PS	+ 10 cm H ₂ O or less
PEEP	< 8 cm H ₂ O
Cardiovascular	Absence of active myocardial ischemia Haemodynamically stable
Respiratory Mechanics and Tracheostomy	48-72 hours post tracheostomy insertion Ability to initiate and maintain a respiratory effort Tracheostomy tube sized to allow for sufficient airflow around it (NB: the cuff can create an obstruction when deflated and should be taken into consideration when assessing airway patency) No known airway obstructions

This is no substitute for clinical reasoning; some patients may not tolerate the valve at this level.

Upon determination that the patient is able to exhale adequately, speaking valve placement may be considered if other criteria are met

For ventilated patients, the speaking valve should be attached as close to the tracheostomy tube as possible and not further down the ventilator circuit. This prevents an increase in dead space and obstruction from water condensation in the ventilator tubing.

For diagrams of the correct placement of speaking valves please refer to Appendix 5

Monitoring when the speaking valve in situ is important, especially during the first assessment. The patient should be assessed before, during and after speaking valve placement for, but not limited to:

- Cardio-respiratory observations (e.g. heart rate, respiratory rate, oxygen saturation)
- Breath sounds
- Responsiveness

- Cyanosis
- Work of breathing and peak inspiratory pressures
- Tidal volumes
- Tracheal and oral secretions
- Distress

Appendix 6 provides a tool for monitoring the patient whilst the speaking valve is in place.

It is not unusual for patients to experience breathlessness when starting to use a speaking valve. They need a calm environment and reassurance.

If a patient is struggling to breathe, cannot vocalise at all, sounds wheezy or a stridor is present then the speaking valve must be removed IMMEDIATELY and the cause investigated

If difficulties persist then:

- Check that the lumen of the tracheostomy is clear
- If it is a double lumen tracheostomy, clean the inner tube
- Consider the use of a fenestrated inner tube if the outer tube is fenestrated
- Consider the down-sizing the tracheostomy or changing to an uncuffed tube to increase the space around the tracheostomy
- Consider a referral to Speech and Language Therapy and/ or ENT team, as may indicate an upper airway problem

After use of the speaking valve the following should be done:

- Explain procedure to patient
- Remove the valve from the circuit
- Re-inflate the tracheostomy cuff if appropriate using the manometer to check the pressure

A clear plan for the progression of use of speaking valves should be agreed by the multi-disciplinary team. Some patients may only tolerate short periods with a speaking valve and need to build up gradually. Others may be able tolerate prolonged periods from the outset.

Speaking valves are single patient use and should be cleaned as per the manufacturer's instructions.

Speaking valves should only be used in uncuffed tubes, cuffed tubes with the cuff deflated or a fenestrated tube with the cuff deflated

Occlusion or Decannulation Cap

A tracheostomy cap effectively seals the tracheostomy and requires air to move in and out via the upper respiratory tract. With this in place, the tracheostomy is effectively blocked. This can significantly increase the work of breathing as the airway is effectively partially obstructed by the tracheostomy.

The patient should have a fenestrated tracheostomy, fenestrated inner tube in situ and the cuff deflated at all times when using a decannulation cap.

A tracheostomy cap should not be left in situ overnight

Decannulation Criteria

It is essential that the 'need' for a tracheostomy is reviewed on a daily basis.

Prior to the removal of a tracheostomy the following criteria should be considered:

- Is breathing spontaneously
- The pathological process necessitating the tracheostomy has resolved sufficiently not to warrant a tracheostomy
- The patient is able to cough and swallow effectively in order to protect their airway
- The patient has adequate ventilatory reserve to cope with the additional anatomical dead space and work of breathing that may result on decannulation
- Adequate nutritional status
- Patient is can tolerate a minimum of 24 hours with the cuff deflated
- The airway is patent above the level of the stoma
- The patient has tolerated a prolonged period with a speaking valve such as 12 hours or 4 continuous hours of decannulation cap in situ
- The patient can effectively expectorate lower respiratory tract secretions with either a speaking valve or decannulation cap in situ

These criteria are to avoid the need for re-insertion of the tracheostomy and allow an objective assessment of the patient. Failure to meet all these criteria is not necessarily an indication to leave the tracheostomy in situ. The overall condition of the patient should be considered e.g. motor power and consciousness levels.

Decannulation Process

The optimum time for decannulation is early morning, when the patient is most rested and their condition can be well-monitored and reviewed subsequently throughout the day.

The individuals performing the decannulation must be competent in the assessments as discussed in 4.1. They must be trained or have rapid access to an individual who is trained in tracheostomy re-insertion and difficult airway management.

The decannulation process is as follows:

- The procedure explained in full to the patient and informed consent gained
- The patient is laid flat
- The cuff is fully deflated
- The tracheostomy ties are undone
- Any sutures are removed
- The patient takes a large breath in and coughs out as the tube is removed in one motion
- The stoma is covered in a semi-permeable dressing
- The patient and/ or carers are instructed to maintain pressure over the dressing with a clean hand in order to produce an adequate pressure for effective coughing and phonation
- The decision to decannulate and the procedure itself clearly documented in the patient's clinical notes
- A point of contact from the team who performed the decannulation should be left with the staff observing the patient

In the event of a failed decannulation the following equipment should be readily available:

- Airway devices including a range of tracheal and tracheostomy tubes (both the size of the current airway and smaller sizes should be available)
- Laryngoscopes, bougies and other aides to intubation
- Laryngeal masks
- A means of oxygen insufflation if airway becomes obstructed, such as a suction catheter which can be advanced through the stoma and connected to the oxygen supply
- A means of ventilatory support, such as a waters circuit
- A means of re-opening the stoma, such as tracheal dilator forceps
- Access to a tracheostomy kit
- Effective suction equipment
- Suitable monitoring equipment, including ECG, pulse oximeter, automated BP recordings
- Access to capnography should the patient require re-intubation
- Anaesthetic drugs, vasopressor agents and atropine
- Access to resuscitation equipment, such as defibrillator

Post-decannulation Observations

After decannulation the patient should be observed for the following signs:

- Dyspnoea
- Laboured or noisy breathing
- Stridor
- Increased respiratory rate
- Increased heart rate
- Increased use of accessory muscles
- Increased pattern of abdominal breathing
- Agitation or acute confusion
- Oxygen desaturation

If any of the above are noted or there is a clinical concern the usual care pathways should be utilised, such as MET scoring. In addition to this the team taking responsibility for the decannulation should be contacted immediately.

Communication and swallowing

The ability to communicate successfully is one of a patient's daily needs. Successful communication helps to maintain a sense of identity, status and well-being. In addition it is essential to make every effort to involve the patient in decisions regarding their care. Providing them with an effective means of communication wherever possible can help achieve this aim.

Patients/relatives should be informed about the tracheostomy procedure, including the fact that the patient will be temporarily unable to speak. Information should be available in written form as well as verbal (*'Rehabilitation after Critical Illness'* – NICE 2009)

With the cuff deflated, air can flow around the tube allowing for some voicing. Speaking can be aided by occlusion of the tracheostomy with a gloved finger on expiration to direct airflow over the vocal cords. When possible, patients should be provided with a speaking valve (see separate section on guidelines for the use of Passy-Muir speaking valves).

Not all patients tolerate speaking valves. Therefore alternative options may include: writing, whiteboard, alphabet charts, symbol/word selection chart. If patients are very frustrated by this method and/or are likely to require it longer term, referral to the SALT should be made for advice on electronic communication options.

Communication may be possible by mouthing however this requires patience from the communication partner and reasonable range, speed and strength of movement of oral musculature (often not present due to neurological damage). In addition the patient needs the cognitive ability to remember to slow down and articulate slowly to aid the process. If this is possible the Speech and Language Therapist can provide an electrolarynx to help facilitate 'voicing'.

Referral to a SALT should be made for any patient who is alert but without an effective means of communication.

Swallowing

Patients with tracheostomies may experience problems with swallowing. If there are problems with swallowing, there is an increased risk of aspiration. The risk is greatest in those patients with associated neurological or mechanical causes of dysphagia, or those with significant ongoing respiratory failure.

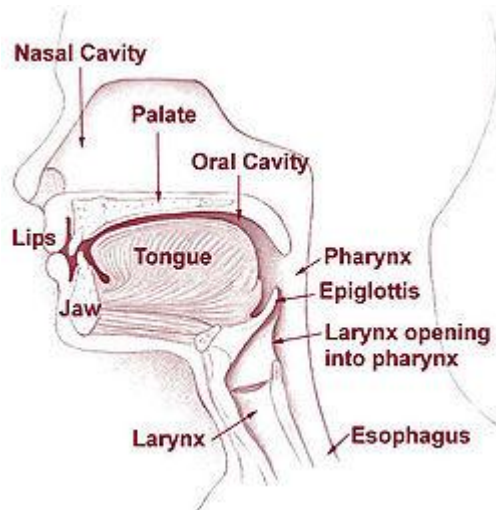
Risk factors for swallowing problems in patients with a tracheostomy

1. Neurological factors e.g. bulbar palsy/Parkinson's Disease/Guillain-Barré Syndrome
2. Disuse/atrophy
3. Head and neck tumour or surgery
4. Evidence of aspiration of enteral feed or oral secretions on tracheal suctioning.
5. Increased secretion load or persistent wet/weak voice when cuff deflated.
6. Coughing and/or desaturation following oral intake
7. Patient anxiety or distress during oral intake.

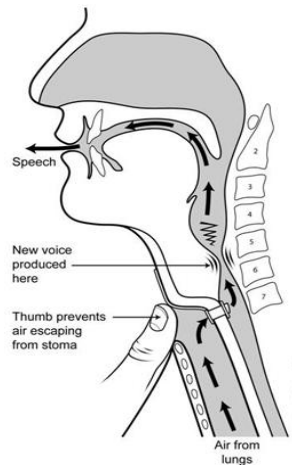
Laryngectomy

Patients with a laryngectomy may have had surgical voice restoration (SVR). A fistula is present between the top of the trachea and the oesophagus and a valve is inserted which allows airflow into the oesophagus for speech. If the valve is dislodged, the fistula must be kept patent with a catheter until a new valve can be placed by ENT. If the SVR should become dislodged, then the ENT registrar should be contacted urgently.

Normal upper airway



Laryngectomy with SVR



Re-introduction of oral intake

Following the insertion of a tracheostomy, the patient should remain nil by mouth until the multi disciplinary team determine that oral intake can be tried. The 'Checklist for commencement of oral intake/referral to SALT' (Appendix7) should be completed by a trained member of staff, signed and inserted into the patient's notes. This checklist determines which patients are suitable for a swallow trial and which patients should be referred to SALT for assessment. Patients who do not need referral to SALT, and who are not indicated to remain nil by mouth based on the checklist, should have their swallowing screened by a trained member of staff using the 'Protocol for re-introducing oral intake' (appendix 8) with the results documented in the notes. Patients who fail this should be referred to SALT for ongoing management and advice.

Patients with dysphagia may be able to manage modified food or fluid consistencies under the direction of the SALT and it is essential that these recommendations are followed at all times to minimise the risk of aspiration.

Transfer of a patient with a tracheostomy within FPH

The process of transfer of patient with tracheostomy needs to be assessed individually when transferring within the hospital, portable suction equipment and the emergency tracheostomy box must be taken with the patient.

A qualified nurse or physiotherapist, competent in the care of a tracheostomy, must accompany the patient at all times but, if the patient is requiring a mechanical ventilator, the patient should also be accompanied by a doctor with proficiency in the management of the airways.

Some patients requiring long term ventilation (e.g. patients awaiting placement for home ventilation) who are clinically stable can be transferred accompanied by a qualified nurse or physiotherapist, competent in the care of a tracheostomy and mechanical ventilator. However, the decision should be made with consultation with ICU consultant and the nurse in charge, taking consideration of all the risk factors.

References and bibliography

National Tracheostomy Safety Project; "Information resource for the safer management of patients with tracheostomies and laryngectomies" (Draft 2010)

The Intensive Care Society (2008), Standards for the care of adult patients with a temporary tracheostomy

Pratt RJ et al (2007) epic2: National Evidence-based Guidelines for Preventing Health-care Associated Infections in NHS Hospitals in England. <http://www.epic.tvu.ac.uk/PDF%20Files/epic2/epic2-final.pdf>

DoH 2007. "Saving Lives: reducing infection, delivering clean and safe care". High impact intervention number 5: Care bundle for ventilated patients

Dougherty, L. & Lister, S. (eds.) 2006. The Royal Marsden Hospital Manual of Clinical Nursing Procedures. 6th edition. Blackwell Science.

Nice Guidelines (2009), Rehabilitation after Critical Illness

Frimley Park Hospital Infection Control Manual

Tracheostomy Care Plan

Patients Name	
D.O.B.	
NHS Number	
Hospital Number	
Consultant	

Admission date ICU _____ Discharge date ICU _____

Date of Tracheostomy Insertion	
Reason for Insertion	
Inserted by	
Dates of all tracheostomy changes	
Date next outer tube change	
Type of Tracheostomy	☐ Extended Length Shiley ☐ Shiley ☐ Portex ☐ Silver Negus ☐ Fenestrated ☐ Non-fenestrated ☐ Cuffed ☐ Uncuffed ☐ Percutaneous ☐ Surgical
Size of Tracheostomy	
Current Humidified O2 Requirements	Yes ☐ No ☐ O2%
Current Passy-Muir Valve (PMV) Tolerance	
Suction Requirements i.e. frequency	
Secretions (i.e. colour, viscosity)	
Plan (including short and long term)	

Contacts:

Critical Care Outreach: Bleep467/330

Out of hours: ICU reg: Bleep429

Physio: Bleep071

Loss of airway = crash call 2222

Patient Name:**DOB:****Hosp No:****NHS No:****Weekly MDT Reviews / Weaning Recommendations****Doctor:****Signature****Date****Critical Care Outreach:****Signature****Date****Physiotherapy:****Signature****Date****Speech and Language Therapist:****Signature****Date**

Patient Name:

DOB:

Hosp No:

NHS No:

--

Patient Name:

Date:

Hosp No:

NHS No:

Daily Shift Tracheostomy Checklist

	Early	Late	Night
Signature			
Emergency equipment check	Y / N	Y / N	Y / N
Tracheostomy box completed	Y / N	Y / N	Y / N
Stoma assessment	Y / N	Y / N	Y / N
Tracheostomy tube secure	Y / N	Y / N	Y / N
Tracheostomy site cleaned & redressed daily	Y / N	Y / N	Y / N
Inner tube cleaned & replaced (2-4 hourly or as clinically indicated)	Y / N	Y / N	Y / N
Patient suctioned via tracheostomy (2-4 hourly or as clinically indicated)	Y / N	Y / N	Y / N
Are you able to pass suction catheter down without resistance	Y / N	Y / N	Y / N
PMV applied (if appropriate)	Y / N	Y / N	Y / N
If answer no to any of the above contact Outreach / NNP / Doctor	Y / N	Y / N	Y / N

Tracheostomy documentation of care

	Inner tube assessment <i>i.e. blocked, partial, clear</i>	Suction / Sputum assessment <i>i.e. volume and type of secretions</i>	Inner Tube Cleaned (Y / N)	Stoma Check/ dressing change (Y / N)	PMV on	PMV off	Signature
00:00							
01:00							
02:00							
03:00							
04:00							
05:00							
06:00							
07:00							
08:00							
09:00							
10:00							
11:00							
12:00							
13:00							
14:00							
15:00							
16:00							
17:00							
18:00							
19:00							
20:00							
21:00							
22:00							
23:00							

Care of the patient with a tracheostomy

Inner tube cleaning & suctioning: Frequency of inspection, cleaning and suctioning will be determined by volume and tenacity of secretions, but should be at least 4hourly.

Care of the stoma: The site should be assessed and redressed at least once a day for trauma, infection or inflammation and findings documented, but frequency may need to be increased in certain circumstances, e.g. excessive secretions, hot weather.

Humidification: The patient with a tracheostomy should be provided with adequate humidification of oxygen or air. This can be via a heat-moisture exchanger (HME) or cold water venture humidified system connected to a T-piece on tracheostomy mask

Emergency Equipment: This should be checked at the beginning of every shift and any items missing should be replaced immediately.

Cuff management: All patients in the ward environment should have the cuff deflated, and if they require their cuff to be inflated should be nursed in the critical care department.

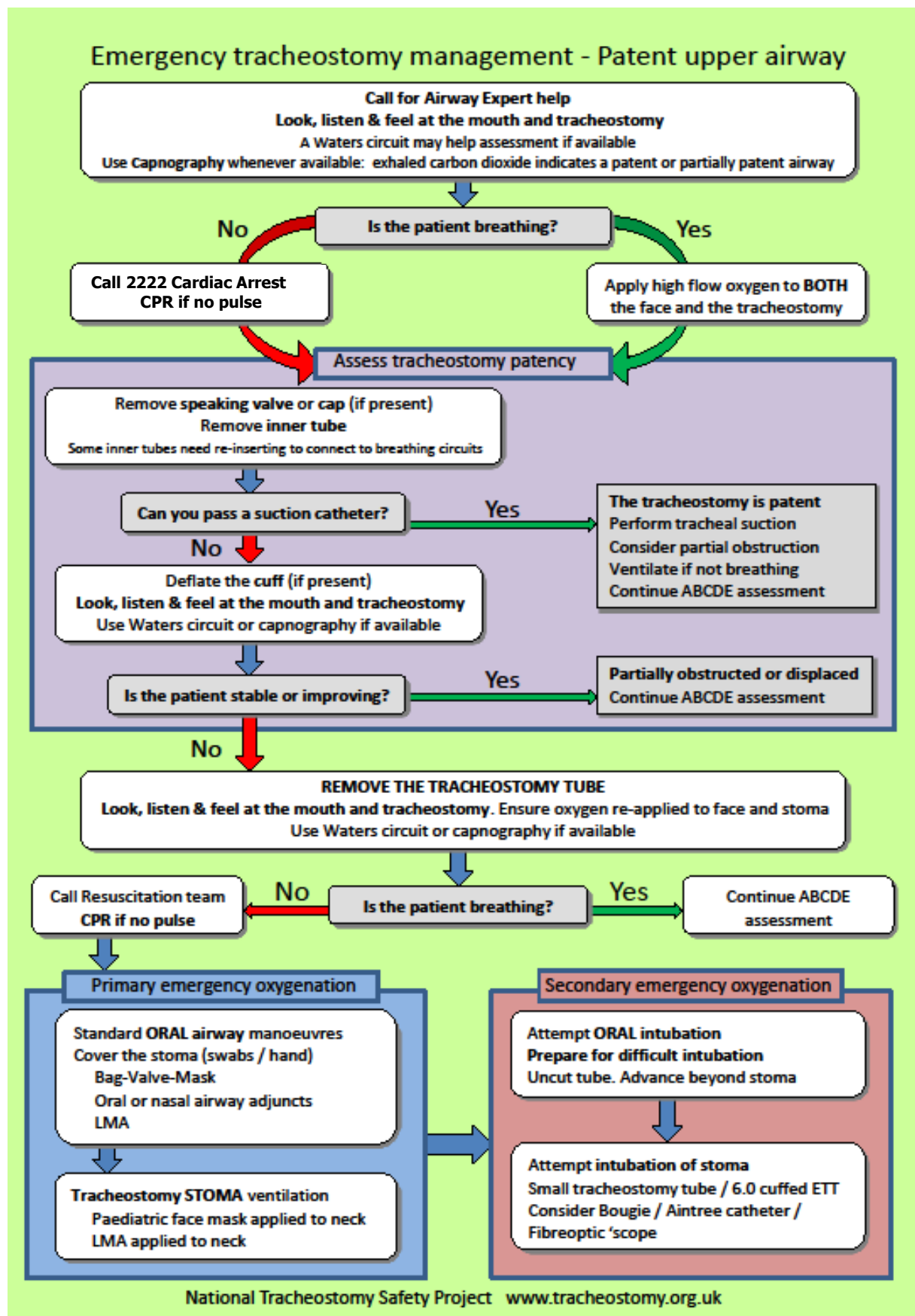
Emergency Bedside Equipment Checklist:

- Operational suction unit, which should be checked at least daily, with suction tubing attached and Yankeur sucker
- Appropriately sized suction catheters
- Minimum of 2 inner cannulas with patient
- Bottle of sterile water
- Double oxygen point
- Nebuliser kit
- Sputum trap
- Gloves (unsterile & sterile), aprons & eye protection
- Clinical waste bag
- Cleaning swabs
- Plastic cups
- Tracheostomy O2 mask and humidified circuit
- Waters circuit by bedside & on crash trolley (only to be used by staff trained & competent to use)
- Catheter mount
- Clinical Waste bag
- Tracheostomy care pathway

Tracheostomy Box Checklist:

- Spare tracheostomy tubes of the same type as inserted, one of the same size and one of a size smaller
- Suction catheters x 3 depending on tracheostomy size:
 - Size 14 green – tube size 9
 - Size 12 cream – tube size 8
 - Size 10 black – tube size 7
 - Size 8 blue – tube size 6
- 10 ml syringe (if tube cuffed)
- Scissors
- Tracheal dilators
- Tracheostomy dressing (Lyof foam T) & tube holder
- Sterile gloves
- Catheter mount
- Emergency flowchart
- Tracheostomy mask

Advanced Emergency Tracheostomy Management



Tracheostomy Equipment

Emergency box

The emergency tracheostomy box provided by critical care outreach when a patient is discharged to the ward must be placed by the bedside of each patient with a tracheostomy. It is the responsibility of the nurse on each shift to ensure that the box is unopened by the bedside other than in an emergency. The contents of the box are:

- Spare tracheostomy tubes of the same type as inserted, one of the same size and one of a size smaller
- Suction catheters x 3 depending on tracheostomy size:
 - Size 14 green – tube size 9
 - Size 12 cream – tube size 8
 - Size 10 black – tube size 7
- 10 ml syringe (if tube cuffed)
- Scissors
- Tracheal dilators
- Tracheostomy dressing (Lyof foam T) & tube holder
- Sterile gloves
- Catheter mount
- Emergency flowchart
- Tracheostomy mask

Bedside equipment (on a trolley)

The following equipment should be immediately available at all times for a patient with a tracheostomy, both by the bedside as well as during transfers:

- Operational suction unit, which should be checked at least daily, with suction tubing attached and Yankeur sucker
- Appropriately sized suction catheters
- Bottle of sterile water
- Double oxygen point
- Nebuliser kit
- Sputum trap
- Gloves (unsterile & sterile), aprons & eye protection
- Clinical waste bag
- Cleaning swabs
- Plastic cups
- Tracheostomy oxygen mask and humidified circuit
- Documentation chart
- Waters circuit (also on crash trolley) N.B. only to be used by staff trained in its use.

Nursing Care

Stoma care/dressing change

1. Explain the procedure to the patient and gain consent
2. Wash hands, put on gloves and apron.
3. Lay the dressing pack out and prepare the normal saline and dressing in a sterile area
4. Two nurses are required. One supports the tube for the duration of the procedure, whilst the other removes the tapes.
5. Remove the soiled dressing and observe the condition of the skin. Swab stoma if required
6. Clean the stoma
7. Apply the dressing with opening at the top. Secure in place using the tapes allowing for 2 fingers to fit under the tapes.
8. Record assessment and procedure in patients notes

Changing tracheostomy ties and dressing

This procedure should be carried out at least daily, but may need more frequent changes if the patient has excessive secretions or in hot weather, and by 2 people to maintain safety.

Equipment:

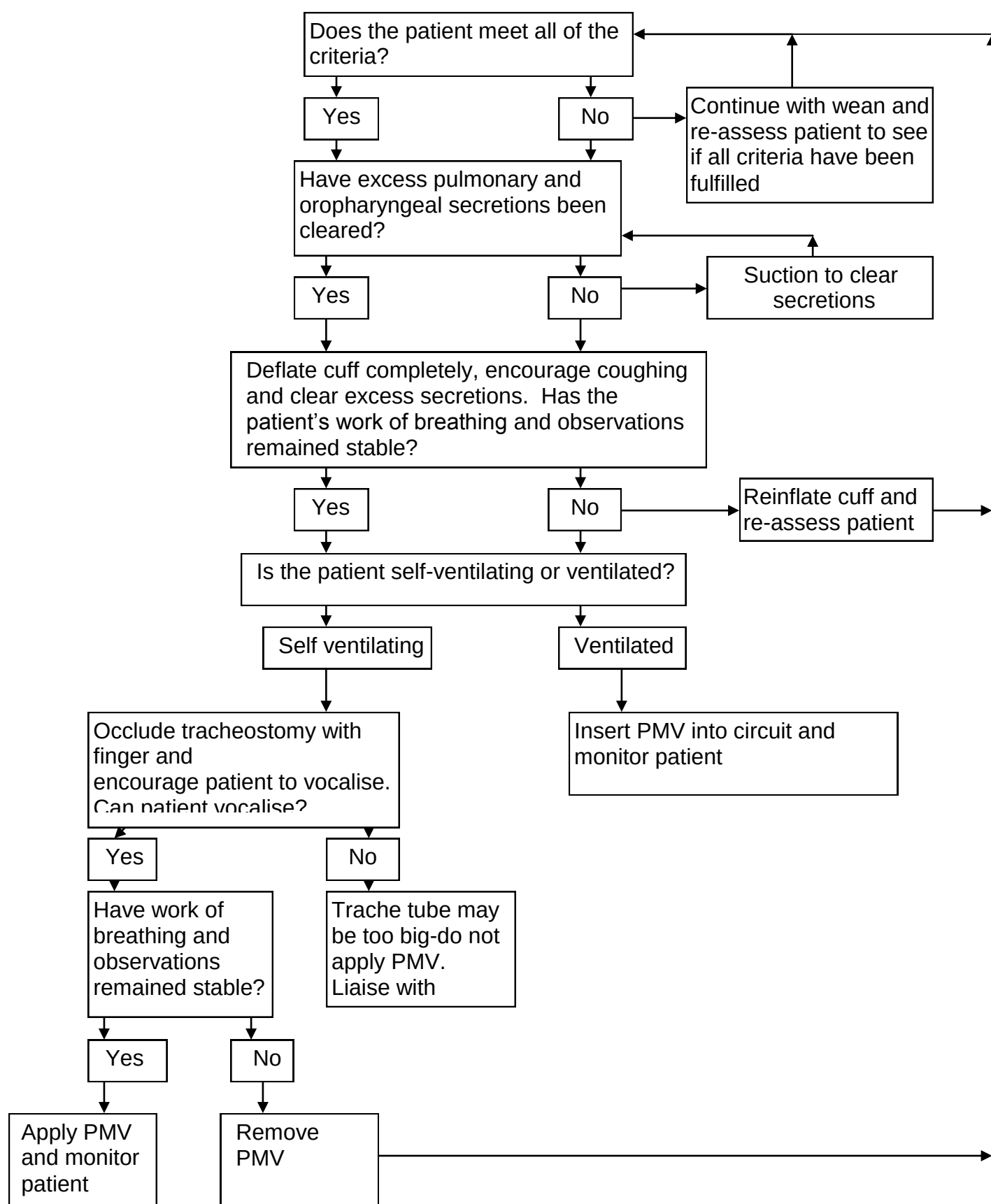
1. PPE: gloves & eye protection
2. Sterile dressing pack
3. Tracheostomy dressing, e.g. Lyofoam tracheostomy dressing
4. Sterile cleaning solution of 0.9% sodium chloride
5. Tracheostomy Velcro neck ties

Action:

1. Explain and discuss procedure to patient
2. Screen area and assist patient to comfortable position
3. Prepare dressing trolley items
4. Wash hands, put on disposable not-sterile gloves
5. Assisting nurse will hold tracheostomy until procedure complete to prevent from being dislodged or being coughed out
6. Remove the soiled dressing and tapes. Swab side for micro-organisms if needed
7. Using an aseptic technique, clean around the tracheostomy tube with sodium chloride using sterile gauze. Dry thoroughly with gauze
8. Apply clean tracheostomy dressing around tube
9. Secure tracheostomy tube with Velcro neck tie. One finger should fit between the tapes and patient's neck.
10. Clear away equipment as per the clinical waste disposal guidelines, remove gloves and wash hands.

Do not leave a double cannula tracheostomy without an inner tube in situ

Application of Passy-Muir Speaking Valves



Placement of the Passy-Muir speaking valve in a self-ventilating patient



Passy-Muir on green fenestrated tube on Shiley tracheostomy



Passy-Muir on adjustable flange tracheostomy

Passy-Muir Speaking Valve Trial

Trial of the Passy-Muir Valve (PMV) is usually initiated in the critical care unit. If initiated in the ward, it should be done by competent staff, such as Outreach nurse or physiotherapist. It is not compulsory to fill in this chart, providing all necessary assessments have been made. However, it can be used as a tool to facilitate monitoring of the patient.

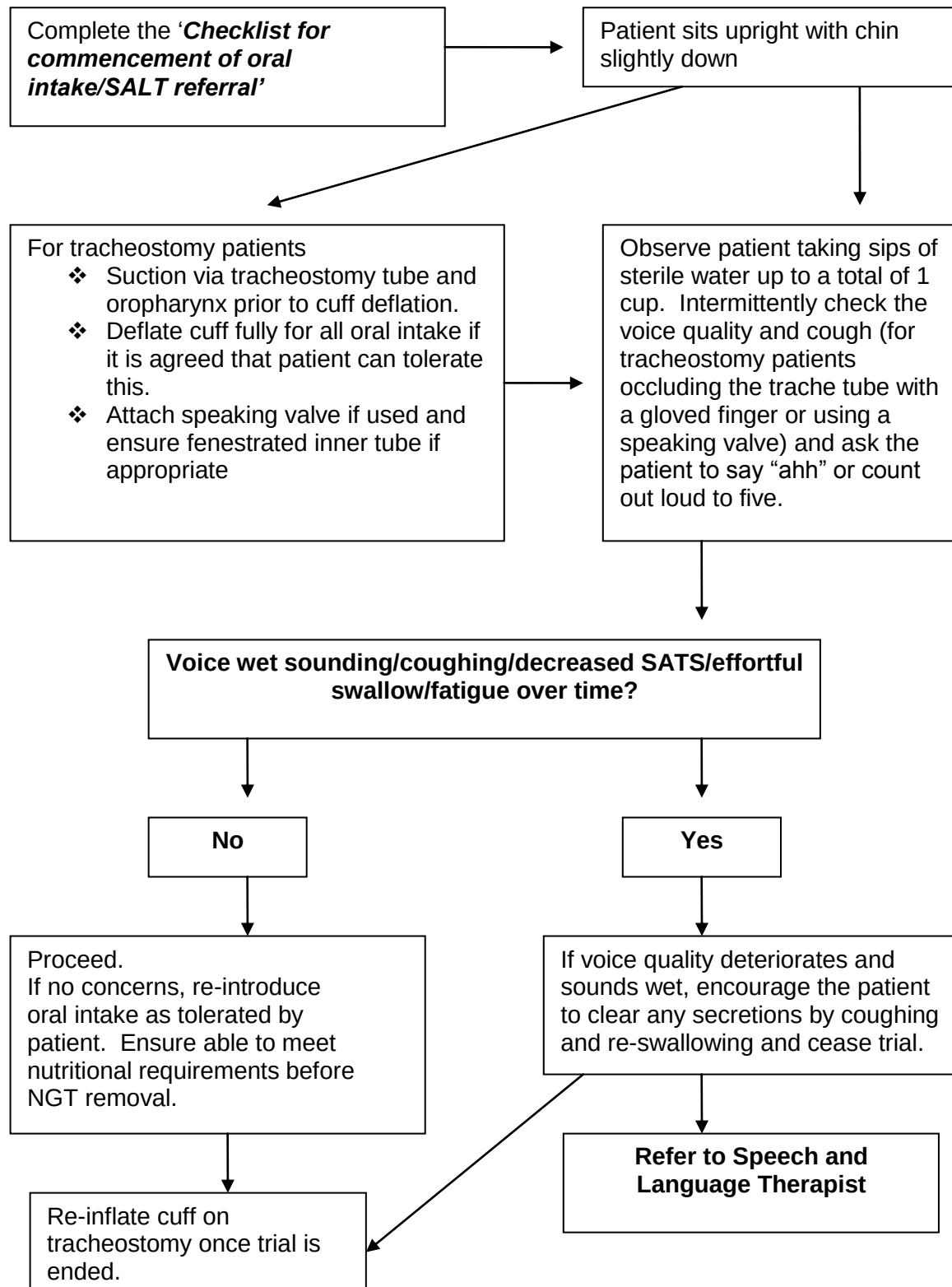
Name: _____ Hosp No: _____ NHS No: _____ Date: _____

Tracheostomy size 6 / 7 / 8 / 9 cuffed/uncuffed (please circle as appropriate)

- ☐ Do not use the Passy-Muir-Valve if the patient is unable to tolerate finger occlusion.
- ☐ Assess for adequate airflow around tracheostomy tube prior to and immediately after PMV placement
- ☐ Do not attempt PMV if there is inadequate airflow. Await tracheostomy downsize before further attempts.
- ☐ Cease trial immediately if any significant changes in HR, RR, SpO₂, respiratory effort or GCS.

	Baseline	On finger occlusion	PMV placement	5 mins	10 mins	15 mins	30 mins	1 hour
Respiratory Rate								
Oxygen Saturation								
Heart Rate								
Blood Pressure								

Protocol for re-introducing oral intake



Ward Stock

All clinical areas caring for patients with a tracheostomy must have routine and emergency equipment immediately available at all times. The emergency tracheostomy box provided by Outreach will accompany the patient wherever they go during their hospital stay. The equipment that should be with the patient at the bedside is in Appendix 3. The designated wards caring for these patients should ensure they have adequate stock at all times.

These include:

Product Name	Order No.	Supplier
Shiley tracheostomy Sizes 4/6/8/10	4/6/8/10 FEN	Mallinkrodt
Shiley inner cannula Sizes 4/6/8/10	4/6/8/10 SIC	Mallinkrodt
Portex tracheostomy tubes (Blue line ultra) Size 6 Size 7 Size 7.5 Size 8 Size 8.5 Size 9 Size 10	100/800/060 100/800/070 100/800/075 100/800/080 100/800/085 100/800/090 100/800/100	Portex (via NHS logistics)
Shiley XLT Size 5 Size 6 Size 7 Size 8	50XLTCP 60XLTCP 70XLTCP 80XLTCP	Covidien
Shiley XLT inner tubes Size 5 Size 6 Size 7 Size 8	50XLTIN 60XLTIN 70XLTIN 80XLTIN	Covidien
Passy Muir speaking valves Green (for ventilated pts.) Purple (for self ventilating pts.)	TRPMV0002 TRPMV1003	Kapitex
Trachy tube holders	TH/100	Insight Medical Products
Lyof foam Tracheostomy Dressing	603014	Molnlycke Health Care
Tracheostomy cleaning brush Trachi-Swabs Small Trachi-Swabs Medium Trachi-Swabs Large	TRSWB0150 TRSWB0250 TRSWB0350	Kapitex
Argyle suction catheters Size 10 Size 12 Size 14	8888-250126 8888-250134 8888-250142	Tyco Healthcare
Hudson tracheostomy masks	1075	Teleflex Medical Inc
Trachea suction set (sputum trap)	24001182	ConvaTec
Nebuliser kits with T-piece	2505	Intersurgical

Other equipment required includes: Yankaeur suckers, gloves (sterile & unsterile), plastic cups, eye protection glasses, dressing packs, bottles of sterile water.

Tracheostomy care plan

Sizing the Silver Negus Tracheostomy Tube

To convert size from a Portex or Shiley tracheostomy tube to a Silver Negus multiply the outside diameter of the tracheostomy tube by three to get the size. For a Portex tube, round up to the nearest size and for a Shiley tube, round down to the nearest size.

e.g. Portex size 8mm has an outside diameter of 9.7mm, and a Shiley has an outside diameter of 12.2mm

Therefore: Portex size 8mm: $9.7 \times 3 = 29.1$ rounded up to a 30 Fg

Shiley size 8mm: $12.2 \times 3 = 36.6$ rounded down to a 36 Fg

Silver Negus Tracheostomy Tube

Order Number	Description	FG	L(mm)	OD (mm)
TR KAP 0006	Silver Negus Trach Tube Complete	16	48	5.3
TR KAP 0007	Silver Negus Trach Tube Complete	18	53	6.0
TR KAP 0008	Silver Negus Trach Tube Complete	20	56	6.7
TR KAP 0009	Silver Negus Trach Tube Complete	22	60	7.3
TR KAP 0010	Silver Negus Trach Tube Complete	24	62	8.0
TR KAP 0011	Silver Negus Trach Tube Complete	26	64	8.2
TR KAP 0012	Silver Negus Trach Tube Complete	28	68	9.0
TR KAP 0013	Silver Negus Trach Tube Complete	30	72	10.1
TR KAP 0014	Silver Negus Trach Tube Complete	32	74	10.3
TR KAP 0015	Silver Negus Trach Tube Complete	34	76	11.0
TR KAP 0016	Silver Negus Trach Tube Complete	36	82	12.2
TR KAP 0017	Silver Negus Trach Tube Complete	38	86	12.4
TR KAP 0018	Silver Negus Trach Tube Complete	40	90	13