South Tees Hospitals NHS
NHS Foundation Trust

Clinical Guidelines for Tracheostomy Care

SOUTH TEES TRACHEOSTOMY CARE GROUP

June 2017

On behalf of the Tracheostomy Care Group,

South Tees Hospitals NHS FT

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1. INTRODUCTION

Tracheostomy is a common procedure in intensive care and in surgical patients with airway compromise. As with all procedures, the benefits are associated with risks, both during and after insertion.

The indications for temporary tracheostomy in the intensive care environment have centered upon treatment for upper airway obstruction, the avoidance of the laryngeal complications of prolonged tracheal intubation and the continued need to protect and maintain the airway in patients with severe neurological injury. More recently temporary tracheostomy has become regarded as beneficial for the general critical care population. This has coincided with the development of percutaneous techniques that enable a temporary tracheostomy to be inserted by the critical care physician as a bedside procedure. The result is that temporary tracheostomy has become a more commonplace, and frequently early, intervention in critical care units.

At the same time, pressure on intensive care beds and a desire to use resources effectively has encouraged earlier discharge to intermediate and ward care. The very effectiveness of tracheostomy in accelerating weaning from mechanical ventilation and discharge from level 3 care often results in patients with temporary tracheostomies being cared for in multiple locations throughout an organisation. 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. Also, there are longer-term respiratory support for a range of conditions with an associated increased use of tracheostomy, and the drive to de-escalate intensity of care as soon as possible.

Surgical indications are varied, including inability to safely perform a percutaneous tracheostomy, acute airway compromise from infection or trauma, prevention of aspiration or prophylaxis in surgery to the head or neck with potential for airway swelling.

A laryngectomy is a different procedure with a permanent change in the airway. When well established this type of airway is extremely safe, but problems of blockage and infection can lead to this airway becoming unsafe. Equally some of the issues surrounding the management of a patient with a laryngectomy are similar to those in the management of a tracheostomy, so both situations will be discussed in this document.

A patient with a tracheostomy or laryngectomy is at risk of death or harm if inappropriate or inadequate care is provided. This patient group requires airway devices to be safely inserted, securely positioned and appropriately cared for, in order to continue to provide the patient with a patent airway. Failure to do so may lead to a displaced or blocked tube, which if not dealt with immediately, may be fatal within minutes.

This clinical guideline focus on the care of adult patients with tracheostomies following an episode of critical illness, but also those patients that are in the community with tracheostomies and get readmitted to the acute hospitals. There is a separate guideline for paediatric tracheostomy care.

Key Issues

Following recommendations from lessons learnt from serious untoward incidents related to the care of patients with tracheostomies and the advice from the National Tracheostomy Safety project, we have summarized the following key issues from those documents:

- Identify a clinical lead in each NHS Trust or institution to co-ordinate the management of patients with tracheostomies.
- Trusts must have a local policy in place, which outlines the expected management of patients with a tracheostomy or laryngectomy.
- Identify appropriate environments in which to manage patients with tracheostomies and laryngectomy.
- Identify a comprehensive risk assessment of the patient that is agreed locally to determine the dependency of the patient, the level of the observation and visibility required. The frequency of risk assessment should be determined by the patient's condition, clinical environment, staffing levels, skills and competence. The risk assessment must be retained in the patient record as appropriate.
- Trusts who are unable to develop systems to reduce risks effectively in all clinical areas should consider identifying designated areas where the risks are reduced.
- Equipment for the management of the tracheostomy including suction should be kept near the patient at all times. The equipment should be checked, as a minimum on a daily basis.
- Emergency equipment must remain immediately available at the bedside and accompany the patient if they leave their base location.
- All tracheostomy tubes used should have a removable inner cannula. Exceptions to this must be clearly documented in the patient's medical record and a date for review determined. The inner cannula should be regularly checked and cleaned as this greatly reduces the risk of a tracheostomy tube becoming blocked.
- Patients with tracheostomies must be cared for by staff that have been appropriately trained and are currently considered competent in tracheostomy care. Staff escorting the patient outside of the clinical area must be competent in dealing with suctioning and in managing a tracheostomy emergency. All training received should be documented.
- All staff caring for patient with tracheostomies and laryngectomies must be competent to do so, both in routine care and in the emergency situation. This includes designated wards and clinical areas, and also acute services such as acute medical units and emergency departments who may be expected to see tracheostomy complications.
- Tracheostomy training and support is locally coordinated by the clinical lead. Trusts must ensure that training programmes are in accordance with best evidence-based guidelines on the management of a tracheostomy.
- Emergency algorithms should be taught, displayed and used to manage tracheostomy or laryngectomy emergencies. Essential information can be displayed at the bedside to assist in managing an emergency at which the attending staff may not know the history of the patient.
- These recommendations can be extended to carers outside of the hospital environment, in nursing homes, patient's own homes and to those responding to patients who are community based.

Tracheostomy Care Group at South Tees Hospitals

The broad purpose of this multidisciplinary group is to enhance the care and safety of patients with tracheostomy with particular remit to those performed in the critical care setting.

More specific aims are:

- To ensure best practice is utilised throughout the trust on the management of tracheostomy patients and the management of patients with established laryngectomies
- To produce evidence based guidelines on optimal tracheostomy care for use within the James Cook University Hospital and the Friarage Hospital, Northallerton
- Provide teaching sessions to ward areas that frequently see tracheostomy patients based on these guidelines
- To audit aspects of tracheostomy care, particularly critical incidences and compliance with the guidelines
- To provide a competency package for ward staff caring for tracheostomy patients.

The post-surgical care of a newly performed laryngectomy is dealt with in ENT Ward guidelines and is outside the remit of this document.

Overall it is expected that improvements in tracheostomy care should lead to:

- Decrease in tracheostomy related critical incidents
- Decrease in hospital length of stay
- Improvement in patient outcomes
- Overall cost savings

The group membership incorporates clinical staff from Critical Care, ENT and Maxillo-Facial surgery, Trauma, Neurosciences, Spinal Cord Injury services, as well as educators from Critical Care and the Resuscitation Department. The membership includes nurses, physiotherapists, speech and language therapist, doctors and educators.

The main members of the Tracheostomy Care Group that have contributed to this guideline are:

- ENT and Maxillo-Facial:
  - Mr Shane Lester, ENT Consultant
  - Col. Bryant Douglas, MaxFac Consultant
  - Amy Gregory, ENT Specialist nurse
  - Stephanie Boon, ENT Specialist nurse
  - Shanon Davies, Macmillan Speech and Language Therapist for Head & Neck

- Critical Care:
  - Lindsay Garcia, Nurse Consultant Critical Care
  - Maureen Tiernan, Senior Educator for Acutely Ill Patient
  - Dr Isabel Gonzalez, Critical Care Consultant

- Physiotherapy team:
  - Phil Howard, Senior Physiotherapist Critical Care
  - Heidi Williams, Senior Physiotherapist Critical Care and Postoperative Care
  - Leanne Sculley, Physiotherapist Spinal Cord Injury Unit

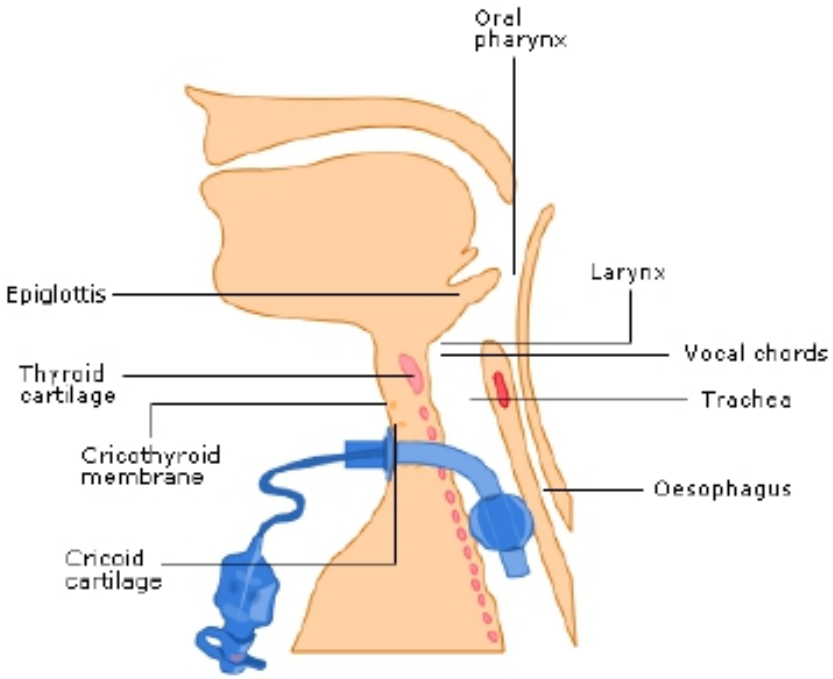
- Speech and Language therapy Team:
  - Michelle St John, Speech and Language Therapist
  - Kathryn Dawson, Speech and Language Therapist

If you require any information about the Tracheostomy Care Group at South Tees Hospitals, please contact us by emailing isabel.gonzalez@nhs.net

2. TRACHEOSTOMIES AND LARYNGECTOMIES

Definitions

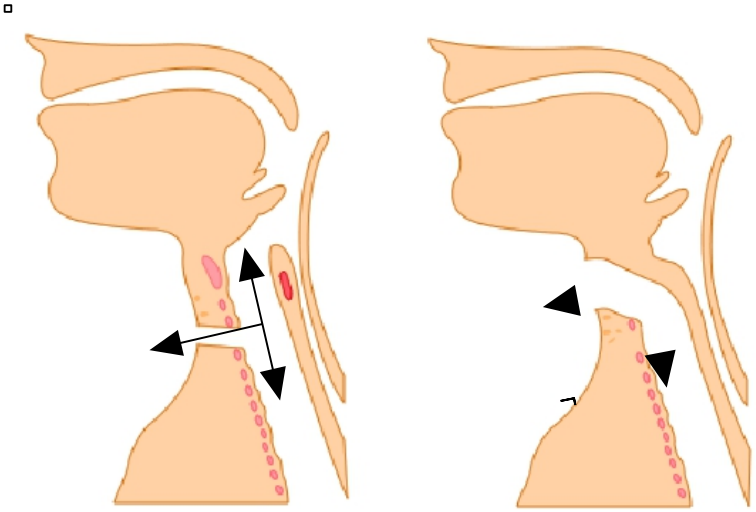
A **tracheostomy** is a surgical operation that creates an artificial opening made into the trachea through the neck. This may be temporary or permanent. A tracheostomy tube is usually inserted, providing a patent opening. The tube enables air-flow to enter the trachea and lungs directly, bypassing the nose, pharynx and larynx.



Tracheostomies are performed in Head and Neck Surgery and in Critical Care Units. There are about 5000 tracheostomies performed in operating theatres every year in England and an estimated amount between 10000-15000 percutaneous tracheostomies performed in critical care units.

A **laryngectomy** is a surgical procedure to remove part or all of the larynx, usually to treat cancer of the larynx. A total laryngectomy implies the complete surgical removal of the larynx and therefore a disconnection of the upper airway (nose and mouth) from the lungs. A patient with a laryngectomy will have a permanent opening of the trachea to the front of the neck to allow breathing known as stoma. These patients may or may not have a tracheostomy tube inserted. If a tube is used then it may be a tracheostomy tube which can be potentially confusing to carers, or it may be a specialised laryngectomy tube or stoma button. Patients may also have a tracheo-oesophageal speech valve inserted in the back wall of the stoma to allow them to speak. Patients with laryngectomies are sometimes also known as neck breathers, although this term is also sometimes used to include all patients that have some form of tracheal air diversion, i.e., may include tracheostomy patients as well.

The illustration below shows the difference between a tracheostomy and a laryngectomy.



Tracheostomy (larynx present and may be patent) *Laryngectomy*

There are a variety of tracheostomy techniques but they all aim to enter the trachea around the gap between the second and third tracheal rings. Emergency access to the airway can be achieved through the relatively avascular cricothyroid membrane. This is reasonably anterior in the neck and close to the surface, and can be identified by feeling for the 'dent' below the 'Adam's Apple' or thyroid cartilage. The further down the neck towards the chest you palpate, the deeper into the neck the trachea goes.

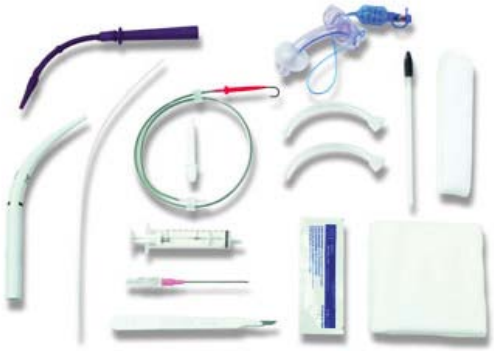
Types of tracheostomy

Tracheostomy may be temporary or long term/permanent, and may be formed electively or as an emergency procedure. They may also be classified by their method of initial insertion, either surgical or percutaneous.

- **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, infections or neurological diseases). Certain maxillofacial or ENT surgical procedures require a temporary tracheostomy to facilitate the procedure. 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. This includes carcinoma of the oropharynx or larynx or when this area has been irreparably damaged by treatment. A laryngectomy is usually reserved for advanced laryngeal cancer. Some patients that need chronic respiratory support, long term airway protection or help with secretion clearance may also require a long term/permanent tracheostomy.

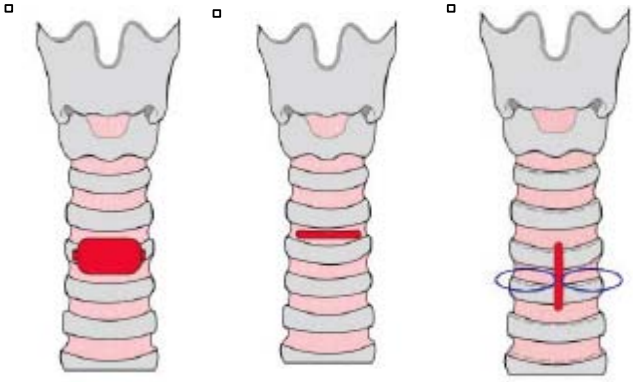
- **Percutaneous tracheostomy** is the most commonly used technique in critical care as it is simple, relatively quick and can be performed at the bedside using anaesthetic sedation and local anaesthetic. Moving critically ill patients to the operating theatre can be challenging, so a safe, bedside procedure often makes this 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 series of progressively larger dilators over the wire until the stoma is large enough to fit a suitable tube (Seldinger technique). The tube is then secured by cloth ties, sutures or a holder. The procedure is performed under fibreoptic endoscopic guidance.



Percutaneous tracheostomies set

Percutaneous tracheostomies simulation

- **Surgical tracheostomy:** this technique is usually carried out in an operating theatre where conditions are sterile and lighting is good. It is possible to perform a surgical tracheostomy at the bedside in the ICU. General anaesthesia is commonly used, however surgical tracheostomies can also be carried out under local anaesthetic. A surgical opening is made into the skin and the tissues of the neck are dissected down to the trachea. The trachea is entered by forming a slit or a window into which a tube is placed. Historical techniques such as the Bjork flap are no longer used. The tube may then be sutured to the skin and/or secured with cloth ties or a foam and Velcro holder. There may be "rescue sutures" placed at the time of the surgical procedure. These temporary sutures are placed around a ring of tracheal on either side of the tracheal opening with the aim of helping recover the airway should the tube become displaced. In an emergency they can be gently pulled on and they will aid in bringing the tracheal opening towards the skin opening. These sutures should be affixed to the skin and clearly marked with an 'L' or an 'R' to indicate if they are on the left or right of the trachea respectively. They can be removed after establishment of a stable stoma. Surgical tracheostomies may be formed as part of ENT or Maxillofacial surgical procedures, usually during face and neck dissections for tumour removal or where subsequent swelling may compromise the safety of the airway or the swallow.



Surgical tracheostomies: Window, Horizontal incision and vertical incision with stay sutures

- **Laryngectomy** is a very different procedure. This major operation is performed by ENT Head and Neck surgeons mainly for treatment of advanced laryngeal cancer. It may be performed in associated with a flap reconstruction. The larynx is either partly or more commonly totally removed and the airway is disconnected from the GI tract and mouth. Acutely they are managed according to the Trust's guidelines (separate document). However, patients with established laryngeal stomas will present to other specialties and the management of the stoma needs staff with adequate knowledge and training. There are specific issues related to patency of the stoma and management of a laryngeal speech valve which are addressed later in this document.

Tracheostomy Indications

A tracheostomy tube may be inserted for many reasons by either a surgical or a percutaneous procedure:

- To secure and clear an airway in upper respiratory tract obstruction
- To facilitate the removal of bronchial secretions
- To facilitate long term ventilation
- To enable weaning from positive pressure ventilation in patients with respiratory failure
- To protect/minimise aspiration in the absence of laryngeal reflexes
- To obtain an airway in patients with injuries or following surgery to the head and neck. This includes patients who require a laryngectomy and may not have tracheostomy tube.
- Laryngectomy is indicated when the removal of the larynx and diversion of the lower trachea to a permanent stoma on the lower neck is needed for cases of advanced laryngeal cancer which cannot be controlled with radiation therapy.

A tracheostomy provides another significant advantage to patients such as reducing the anatomical dead space by approximately 150mls. This means a reduction on the work of breathing which will help facilitate weaning from mechanical ventilation in patients with resolving respiratory failure.

There are also a number of disadvantages of having tracheostomies that require management, such as the reduction in the filtration, warming humidification of gases and the subsequent risk of tube occlusion.

There is no convincing data that can guide clinicians as to the timing of tracheostomy in critical care. For specific circumstances, such as extensive elective head and neck surgery, the decision is straightforward. However, balancing the risks of managing an airway with prolonged endotracheal tube (ETT) intubation versus the risks of tracheostomy (procedural and post-placement) is difficult and must be made on an individual basis.

Risks of prolonged endotracheal intubation:	Risks of tracheostomy:
• Unpleasant to tolerate • Prolonged sedation required • Difficult to re-institute respiratory support without re-intubation • Upper airway trauma • Damage to vocal cords • Breaches larynx, risks aspiration • Blockage and displacement	• Invasive procedure • Bleeding and airway loss during procedure • Stoma infection or breakdown • Scarring, tracheomalacia, stenosis • Blockage and displacement • Damage to adjacent structures

Tracheostomy Complications

Complications can be divided into those associated with insertion of the tracheostomy (surgical or percutaneous) or those which arise following the procedure (usually blocked or displaced tracheostomy tubes). Both can be serious and sometimes fatal.

These complications are usually grouped as follows.

1. Immediate Complications (intra-operative period)

- Bleeding
- Tracheal laceration
- Tracheoesophageal laceration
- Tube malposition, either complete removal or displacement into a false tract leading to the mediastinum
- Recurrent laryngeal nerve injury
- Pneumothorax
- Pneumomediastinum (air leaks from the lung inside the parietal pleura and extends along the bronchial walls)

2. Delayed Complications (post-operative period < 7 days)

- Tube blockage with secretions or blood.

May be sudden or gradual onset. Inserting a tracheostomy tube bypasses the natural mechanisms to moisten and warm inhaled air which mean the lungs will receive cool, dry air. Dry air entering the lungs may reduce the motility of the secretions within the lungs and may reduce the function of the cilia. In addition, the patient may not be able to cough and/or clear the secretions from their airways through the tracheostomy. This may cause the tracheostomy to become blocked by these thick or dry secretions. Blocked tracheostomy tubes can be minimised by careful humidification, tracheal suction and inner tube care. However, it is necessary to keep emergency equipment at hand at all times as a blocked tube may lead to respiratory arrest.

- Partial or complete tube displacement.

The tracheostomy tube can be displaced partially or completely and come out of the stoma or out of the trachea into the soft tissue of the neck. If not properly secured, 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 the tracheostomy is not patent. In order to keep tracheostomy tubes in position they must be secured carefully and any concerns raised by the patient or nursing staff must be promptly investigated.

- Infection of the stoma site.

There is a risk of site infection caused by introduction of organisms from the sputum. Careful observation and dressing of the site will reduce this. A stoma should be treated as a surgical wound and cared for appropriately. As the stoma is an open wound opening directly into the respiratory tract there is potential for the lower respiratory tract to become infected. Poor suction technique with inadequate infection, prevention and control measures also increase the incidence of infection.

- Infection of the bronchial tree – pneumonia.

A build-up of secretions may also lead to consolidation and lung collapse, and this may lead to pneumonia. This can also be minimised by careful humidification, tracheal suction and inner tube care, and may be helped by suctioning above the cuff with specific subglottic suction tubes.

Aspiration of gastric contents may also lead to pneumonia. This can occur with patients who are unable to swallow safely. Any patient who you suspect may have aspirated will need to have a SALT (Speech and Language Team) assessment, be kept NBM and referred to a dietician to facilitate NG feeding.

- Haemorrhage - local tissue trauma or erosion through blood vessels.

It is common for some bleeding to occur after a tracheostomy has been performed. This usually settles with a few days. Rarely bleeding can occasionally be significant or even catastrophic. Bleeding can be from the trachea, stoma or surrounding tissues and can be due to direct trauma of the tissues, puncture or injury to adjacent blood vessels or the tube or cuff eroding into surrounding tissues or vessels over time. Bleeding can also come from the lungs themselves and become evident through tracheal suction. These problems are compounded in a patient with a coagulopathy. If a patient with a cuffed tracheostomy in situ starts to bleed, then it is recommended that the cuff is inflated as this may have a tamponade effect on the bleeding point. Clinical and endoscopic examination is urgently required by a healthcare professional with the correct competence.

- Ulceration, and/or necrosis of trachea.

Damage to the trachea may be caused by cuff pressure on the mucosa or by poor tracheal suctioning techniques. Most tracheostomy tubes now have low pressure cuffs, however over-inflation should still be avoided. The pressure in the cuff should be just adequate to prevent air leakage. Please refer to tracheal cuff pressure guidance. Mucosal ulceration by tube migration. Can result due to loose tapes or patient intervention

- Risk of occlusion of the tracheostomy tube in patients who have difficulty extending their neck. This patient population tends to be the obese or fatigues.

- Tracheo-oesophageal fistula formation.

3. Late Complications

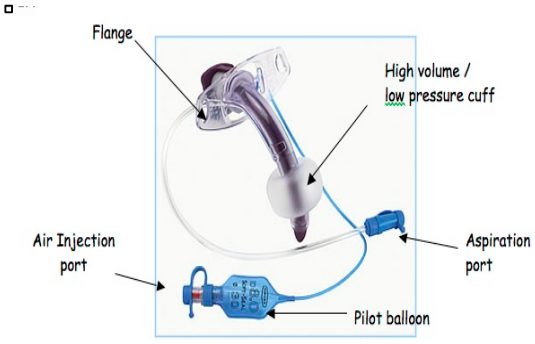
- Tracheal stenosis, narrowing of the tracheal lumen attributable to scar tissue at the level of the stoma, the cuff or tube tip
- Tracheoesophageal fistula (opening between the trachea and the oesophagus attributable to pressure necrosis caused by the tracheostomy tube)
- Tracheo-cutaneous fistula (opening between trachea and skin usually when a stoma fails to close following removal of the tracheostomy tube)
- Tracheo-innominate artery fistula (opening between trachea and innominate artery causing haemorrhage)
- Tracheomalacia (weakness of the tracheal wall and supporting cartilage usually resulting from ischaemia that damages the tracheal wall)
- Fractured tracheal cartilage rings
- Mucosal ulceration
- Granulomata of the trachea may cause respiratory difficulty when the tracheostomy tube is removed.
- Blocked tubes may occur at any time, especially if secretions become thick, the secretions are not suctioned appropriately and humidification is not used.

Tracheostomy Tubes

There are a variety of tracheostomy tubes and devices uses across South Tees Hospitals depending on which was the original indication for tracheostomy tube and the progression of the patient, and the particular preferences of the surgeon.

It is important that the staff involved with care of tracheostomy patients are kept informed and up to date of the all tracheostomy different tubes used. There is also a need for formal announcements when new equipment and devices are introduced to be cascade to relevant staff.

The main components of a tracheostomy tube are universal across the range of designs. The tube shaft is arc shaped and designed as either a single cannula or dual cannula (inner and outer) tracheostomy tube. It may have a cuff to provide an airtight seal, to facilitate positive pressure ventilation and reduce the risk of aspiration. For ease of insertion it is supplied with an obturator. The neck flange helps secure the tracheostomy tube to the skin of the neck and stabilise its position.



Parts of tracheostomy tube with subglottic suction

Single and dual cannula tracheostomy tubes

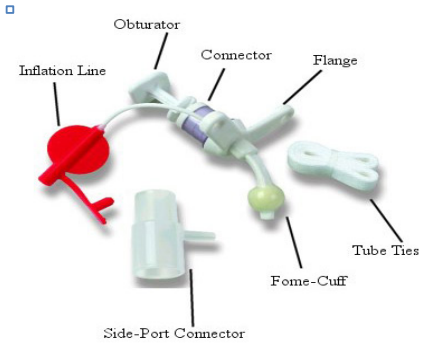
Dual cannula tubes are inherently safer as the inner cannula may be removed quickly in the event of obstruction and are therefore preferred for patients who continue to require a tracheostomy tube after discharge from the Critical Care Unit. Staff caring for these patients should be knowledgeable about the design and function of these tubes. The type and size of a tracheostomy tube should be reviewed continuously as a patient's condition changes. A wide range of specialised tubes are employed to optimise vocalization and comfort.

A dual cannula tube should be placed in every situation unless there is an overriding and compelling reason not to, due to the greatly increased risks of using a single cannula tube. Should a single cannula tube be used, the operating clinician must make this fact clear to all the attending clinical staff.

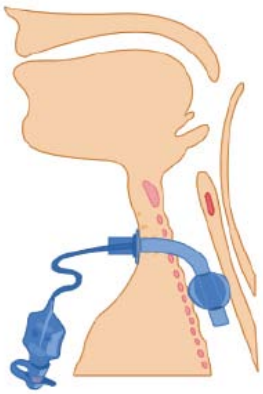
Cuffed tracheostomy tubes

To reduce the risk of tracheal injury, cuff management should include careful inflation technique to the minimal occlusion volume (MOV), followed by monitoring of inflation volume and cuff pressure. The cuff pressure should be maintained between 25-34 cmH2O, but preferably at the bottom end of this range, in order to minimize the risks of both tracheal wall injury and aspiration.

The cuff on the tracheostomy tubes are usually made of plastic and filled with air with a syringe via the pilot tube. There are specialised tubes in the market with self expanding foam cuff and tubes with cuff to be filled with water. It is important to be aware of the specific tracheostomy tube that the patient is using and to utilise communication tools such as bed signs to inform and alert health professionals of the characteristics of the tracheostomy tube used.



Examples of simple cuffed tracheostomy tube and specialised tube with foam cuff

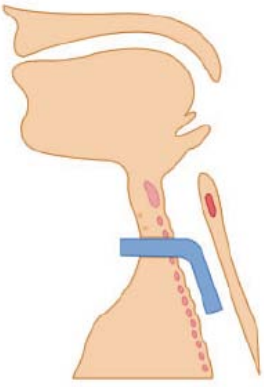


Cuffed tracheostomy tube with cuff inflated

Non-cuffed (cuffless) tracheostomy tubes

These tubes are usually used for patients who can protect their own airway, have an adequate cough reflex and most importantly can manage their own secretions. They remove the risk of tracheal damage caused by inflation of the cuff, may aid swallowing and communication with the concomitant use of a speaking valve. However, a speaking valve can only be used in patients who have airflow through their pharynx into their nose and mouth.

Non fenestrated non-cuffed tracheostomy tube, showing two inner tubes and obturator



Non-cuffed tracheostomy tube

Non-fenestrated tracheostomy tubes

Almost universally the tracheostomy tubes that are first inserted are non-fenestrated.

Non-fenestrated tracheostomy tubes are also favoured increasingly by some clinicians for the longer term. There is some evidence that the use of fenestrations increase the formation of granulation tissue which could come embedded into the fenestrations. This would increase the risk of bleeding and trauma when changing the tracheostomy tube.

Fenestrated tracheostomy tubes

Fenestrated tubes may be considered for patients undergoing weaning from ventilation or for patients with surgical tracheostomies where appropriate, as they facilitate speech and reduce the work of breathing in comparison to non-fenestrated tubes. Fenestrated tubes should not be used on ventilated patients requiring high pressures. Fiberoptic inspection through the upper airway may help the to confirm alignment of fenestrations within the tracheal lumen. Caution should be exerted when changing fenestrated tracheostomy tubes as there is a possibility that granulation tissue may have come embedded into the fenestrations. This could cause bleeding when removing the fenestrated tracheostomy tubes.

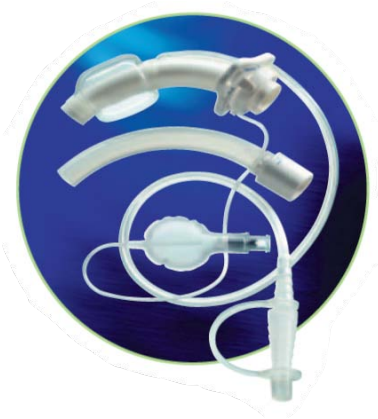
Staff should be aware that two types of inner cannulae are supplied with fenestrated tubes; one with a fenestration to promote air flow and speech; and one without a fenestration for suctioning and generally this is also used at night when speech is not required.

Fenestrated non-cuffed tracheostomy tube, showing one fenestrated and one non-fenestrated inner tubes and obturator

Subglottic suction tubes

Tubes are now available from various manufacturers which will allow continuous or intermittent suction from any material that accumulated above the inflated cuff of a tracheostomy tube. There is some evidence related to endotracheal tubes that subglottic suction may reduce the incidence of a ventilator associated pneumonia occurring in those patients who require mechanical ventilation.

It is good practice to change the tracheostomy tubes with subglottic suction to simpler tubes with no subglottic port or no cuff on discharge from critical care areas to minimize complications and confusion with ports.



Cuffed non fenestrated tracheostomy tube with subglottic suction line

Standard, extra lengths and variable flanges tracheostomy tubes

Tracheostomy tubes are available in both standard and longer lengths. Standard length tubes are generally designed to accommodate patients with normal airway anatomy. However, the length and angulation of standard design tracheostomy tubes may be too short and unsuitable for some patients, risking complications. The use of an appropriate length tube has been specifically highlighted in the NICE guidelines for tracheostomy.

Extra length cuffed fenestrated tracheostomy tube (Tracoe® twist Plus)

Longer tracheostomy tubes are available with a fixed or adjustable flange (fixed or adjustable length). Fixed longer length tubes may be elongated in either the proximal portion (between the stoma and the trachea) or the distal portion of the tube (within the trachea).

Extra proximal length is needed for patients with deep set tracheas i.e. large neck due to obesity, trauma or neck mass. Extra distal length is needed for patients with tracheal problems but normal neck anatomy, i.e., tracheomalacia, tracheal stenosis.

A flexible (reinforced) tracheostomy tube with an adjustable flange can be used in any of the above patients, although the locking mechanism of the neck flange may prove cumbersome for the patient, making it less suitable for long term use. In these cases, a dual cannula fixed longer length tube with the appropriate proximal or distal extension for the patient's anatomy may be more comfortable.

It is imperative that if an adjustable flange tube is placed the staff managing the tube are aware of the type of tube used, how it works and at what length it is set. These facts need clearly documenting and communicating at each handover due to the increase in risks caused by using this more complex type of tube in a patient with abnormal neck anatomy.

Reinforced cuffed tracheostomy tube with inner tube (dark blue ring) and adjustable flange

Cuffed tracheostomy tube with inner tube (outside) and adjustable flange

Silver tracheostomy tubes

Specialised long term tracheostomy tubes are used in some patients. These are made of silver because the metal is inert and does not irritate the tissues. The most commonly used silver tube is the Silver-Negus. Silver tubes are often seen as an economical long term tube, and has the benefit of allowing maximum airflow into the airway due to ultra thin walls.

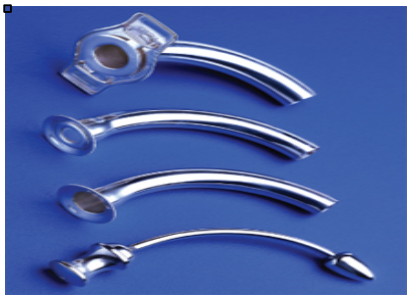
The sizes of the tubes for adults vary from 26-40 FG. The letters FG stand for French gauge. The number represents the circumference of the inner tube measured in millimetres. As a rough guide, the FG size is 4 times the standard tracheostomy tube size.

Silver tracheostomy tubes will need an adaptor or changing to standard tubes in case of emergency needing to connect to a resuscitation self-inflating ambu bag. If a patient has a long term silver tracheostomy tube and is admitted to hospital as an elective or emergency case, there is no need to routinely replace the usual silver tube of the patient for a standard one with a connector just in case of an emergency.

Patients with silver tracheostomy tubes should have:

- clear documentation of the reason for the long term tracheostomy
- a bedside warning sign for tracheostomy with patent upper airway (green) or laryngectomy sign (pink)
- an emergency tracheostomy box by the bed side which will contain a size 7 and a size 8 cuffed tracheostomy tubes for case of an emergency

The signs and the emergency tracheostomy boxes can be obtained by contacting critical care outreach (bleep 7000 JCUH, bleep 784 FHN).



Silver negus tube with inner tube and introducer

Silicone tracheostomy tubes

In some specific cases, the use of silicone tracheostomy tube may be indicated. The tube could be a silicone cuffed (Bivona TTS) or non-cuffed (Bivona or Tracoe Moore). Silicone has special characteristics that makes the tubes softer and less sticky.

For those silicone tubes with a cuff, the cuff is usually filled with water, due to the porous characteristic of silicone to air and they are usually low volume high pressure cuffs. Great care should be taken to not overinflate the cuff.

Bivona TTS

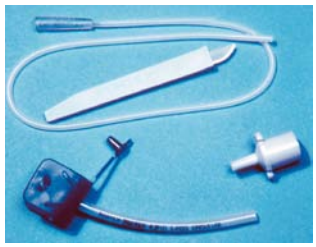
Foam-cuffed tracheostomy tubes

Occasionally used for ventilated patients. The cuff is made of foam and it is usually inflated, needing a syringe to deflate. There is also a connexion to the ventilator tubing to keep the pressure in the cuff at a constant level.

Mini-tracheostomy tubes

The mini-tracheostomy tube is another type of non-cuffed tube. These tubes are typically 4 mm internal diameter. They are primarily designed to allow airway toilet (suction). They are used sometimes prior to decannulation. If the patient has thick secretions they tend to block easily and they become less efficient as only size 10 suction catheters can fit through.

They are too small to provide any ventilation or removal of carbon dioxide. They can only be considered an emergency method of oxygenation until more definite airway is achieved.



Mini-tracheostomy tube kit

There are numerous companies in the market producing a number of specialised tracheotomy tubes with different characteristics. Some tubes are also custom built for specific individual needs.

It is very important to document the specific characteristics of the tracheostomy tube used by each individual patient in the clinical notes and follow the instructions of care specific to the tracheostomy tube used.

3. ROUTINE CARE OF THE PATIENT WITH A TRACHEOSTOMY

The Tracheostomy Care Bundle (6 Elements)

I. Humidification
II. Suctioning
III. Cleaning of the tracheostomy inner tube
IV. Stoma care
V. Cuff pressure
VI. Emergency equipment

I. Humidification

A tracheostomy bypasses the normal upper airway mechanisms for humidification, filtration and warming of inspired gases. It is vital that a method of artificial humidification is utilised when a tracheostomy tube is in situ or in patients who have a laryngectomy.

Inadequate humidification may lead to:

- impaired mucociliary transport
- retained secretions
- inflammation of epithelium
- keratinisation and ulceration of the tracheal mucosa
- atelectasis/pneumonia
- impaired gas exchange
- potential life-threatening blockage of the tracheostomy with tenacious sputum

The provision of adequate humidification of inspired gases is therefore essential in all tracheostomy/laryngectomy patients.

There are various methods to provide supplementary humidification according to patient's individual needs, however it is most important to ensure the patient has adequate systemic hydration. If the patient has been assessed as having a competent swallow they may be able to maintain some or all of their own hydration through drinking, otherwise hydration should be ensured via enteral or parenteral route.

Humidification can be classed as active or passive. Active humidification is adding a humidifier (cold or heated) to the inspired gases e.g. Fischer Paykel. Passive humidification is preventing the loss of humidified air from the tracheobronchial tree e.g. HME. The ability of any device, regardless of operation, to prevent drying of secretions depends on delivered gas temperature and relative humidity. However, the device should help to maintain body temperature, be convenient and cost effective and suited to the patient. However assessing the adequacy of humidification is very difficult. Therefore observation of adequacy of humidification should include:

- evidence of airway obstruction
- increased need to clean inner cannulae
- need for oxygen
- respiratory rate
- ability to cough
- need for suctioning
- tenacity of secretions

Those with pre-existing respiratory disease - COPD, CF, bronchiectasis etc, who have a tracheostomy are at an increased risk of thick tenacious secretions and should be closely monitored for respiratory deterioration. Ideally active heated humidification for these patients should be available at all times.

Methods of humidification for tracheostomy ventilated patients (critical care areas)

Action	Rationale
All patients receive humidified circuit with Fisher & Paykel™ water system.	Warmed water carries a greater relative humidity.
For patients with thick secretions, ensure 4 -6 hourly prescription of saline nebulisers.	To loosen secretions, to prevent atelectasis and sputum thickening.
In patients with very difficult to clear secretions, use nebulisers and mucolytics as indicated: • Mucokinetics (Hypertonic Saline >2.7%) • Mucolytics (acetylcysteine, DNA-ase) • Bronchodilators	To improve mobility of secretions, loosen secretions, to prevent atelectasis and sputum thickening and improve expiratory flow.
Ensure adequate systemic hydration via oral, enteral or parenteral route	To prevent dehydration and decrease thickening of secretions

Self - ventilating patients tracheostomy requiring oxygen therapy

Action	Rationale
All patients to receive humidification via Fisher & Paykel™ circuit.	Warmed water carries a greater relative humidity.
For patients with thick secretions, ensure 4-6 hourly prescription of saline nebulisers.	To loosen and thin secretions, to prevent atelectasis and sputum consolidation.
In patients with very difficult to clear secretions, use nebulisers and mucolytics as indicated: • Mucokinetics (Hypertonic Saline >2.7%) • Mucolytics (acetylcysteine, DNA-ase) • Bronchodilators • Oral carbocysteine	To improve mobility of secretions, loosen secretions, to prevent atelectasis and sputum thickening and improve expiratory flow.
Ensure adequate systemic hydration via oral, enteral or parenteral route	To prevent dehydration and decrease thickening of secretions

Self-ventilating patients not requiring oxygen therapy

Action	Rationale
For all patients with loose or no evidence of secretions use a HME. The Swedish nose protector should be used.	To moisten inspired gases by trapping and rebreathing humidity, to prevent inhalation of particulate matter.
Replace HME 24 hourly or more frequently if contaminated by secretions.	To maintain effectiveness and reduce infection risk.
For patients with thick / dry secretions, ensure 4-6 hourly prescription of saline nebulisers.	To loosen and thin secretions, to prevent atelectasis and sputum consolidation.
Review need daily	To highlight problem and introduce early intervention where required.
In patients with very difficult to clear secretions, use nebulisers and mucolytics as indicated: • Mucokinetics (Hypertonic Saline >2.7%) • Mucolytics (acetylcysteine, DNA-ase) • Bronchodilators • Oral carbocysteine	To improve mobility of secretions, loosen secretions, to prevent atelectasis and sputum thickening and improve expiratory flow.
Ensure adequate systemic hydration via oral, enteral or parenteral route	To prevent dehydration and decrease thickening of secretions

Types of Humidification

Listed below are the types of humidification available within South Tees Hospitals FT.

1. Active Heated Humidification

- **Fisher & Paykel™ MR 880** - Aims to provide optimal humidity for invasive ventilation, noninvasive ventilation, Humidified High Flow Oxygen Therapy

These devices increase the heat and water vapour of inspired gas closer to body temeprature. In tracheostomy patients, the ideal humidifier temperature is 37 degrees (where close to 100% relative humidity is achieved) but this is often only achieved in sealed ventilatory circuits i.e. mechanically ventilated patients.

- **Fisher & Paykel™ MR 810** - Simple System for Non-invasive and Oxygen Therapy Applications. Not for invasive ventilation.

Fisher & Paykel™ Airvo

For delivering high-flow therapy to patients with integrate ygen delivery system. For self ventilating patients.

Kendall™ Aerodyne 15904/Respiflo

Nebulised warm water for self-ventilating patients.

2. Cold Water Humidification

These devices bubble gas through cold water at ambient temperatures and thus deliver only 50% relative humidity. For effective humidification, wide bore/"elephant" tubing must be utilised. Please note "bubble through" humidifiers e.g. Respiflo with green oxygen tubing DO NOT provide adequate humidification for tracheostomy patients and should not be used.

3. Heat and Moisture Exchanger (HME)

These products contain a condenser element to conserve heat and moisture on expiration. They can be placed directly on the tracheostomy e.g. Portex thermovent or in a breathing circuit e.g. flexicare HME. They need to be regular checked for secretions and damage and must be changed every 24 hours. Some can be used to deliver oxygen.

Flexicare Ventilator Circuit HME

ATOX Trachphone

Portex Thermovent "Swedish nose"

4. Nebulisers

These convert a liquid (saline, bronchodilators etc) into a supersaturated aerosol which penetrate the lung and moisten the airway. They can be used in ventilated and self ventilating patients and a flow rate of 6-8 lpm from a gas source (usually oxygen) is required to drive the nebuliser. The nebuliser must be delivered to the trachesotomy via an appropriate tracheostomy mask (as shown) or via a T-piece in the ventilator circuit on the inspiratory limb.

Tracheostomy mask

5. Bibs

These are largely used for long-term tracheostomy patients and laryngectomy patients. They contain a foam layer which absorbs moisture from expired gases, similar to an HME, but are more conspicuous and less bulky and thus are better tolerated

Buchanan bib

Other methods of improving secretion management

Mobilisation of patients (regular position change, sitting upright, transferring to a chair, mobilising with assistance or independently) will aid in secretion movement and clearance and should be considered alongside humidification with all tracheostomy patients. Safety precautions should always be undertaken to ensure stability of the tracheostomy tube, particularly in mechanically ventilated patients and recent tracheal surgery.

Instilled Saline: patients with thick, tenacious secretions that cannot be removed with adequate humidification, nebulisation and suction, instillation of 2-5 mls of 0.9% saline may be beneficial to prevent airway occlusion and stimulate a cough. However, it is stressed that this should not be done routinely and should only be undertaken by those experienced in management of tracheostomy patients.

II. Suctioning

Suctioning the airway is an essential part of routine care of a tracheostomy. The health of the lower respiratory tract is usually maintained by a mucus blanket which is transported up to the larynx by the ciliated mucosa of the trachea. The mucus blanket is disturbed following a 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 mechanism

This usually results in the tracheal mucus collecting at the lower end of the tracheostomy tube. Although some patients may be able to project the mucus through the tube by forced expirations/coughing, it will often need removal by suctioning.

Patient assessment

Suctioning is not a benign process and may cause:

- Hypoxia
- Cardiac arrhythmias
- Trauma
- Atelectasis
- Infection

It is therefore essential for the practitioner to assess whether the patient requires suctioning. Indications that the patient may require suctioning include:

- Noisy respirations
- Palpable fremitus
- Increased respiratory rate
- Restlessness
- Reduced oxygen saturation levels/ deteriorating paO2 on ABG.
- Increased or ineffective coughing
- Increased use of accessory muscles
- Patient request
- Later signs may include cardiovascular instability

Sedated or ventilated patients may have deep secretions which may not be immediately obvious. These secretions may need to be mobilised by physiotherapy and require additional humidification before suctioning is effective.

With an awake, co-operative patient, it will often be possible to encourage them to cough up the secretions, thereby reducing the need for excessive suction.

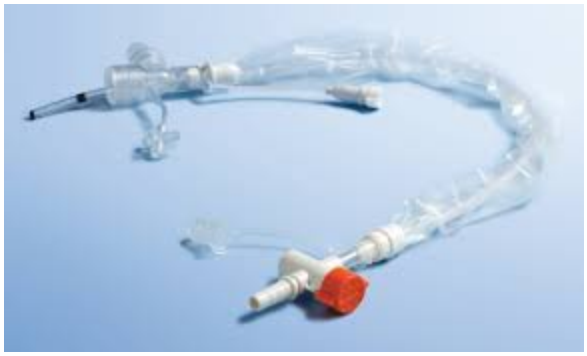
Types of Tracheal Suctioning

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.

In patients requiring a tracheostomy for ventilator weaning 'deep' suction past the end of the tracheostomy tube may be necessary in order to effectively clear secretions. This deeper suction however can paralyse the cilia, aggravate the issue of retained secretions and cause possible trauma. In order to minimise this, patients who are able to cough secretions into the tracheostomy tube, should be encouraged to do this and shallow suction should only be performed (to the end of the tracheostomy tube). In some long-term tracheostomy patients there may indeed be specific instructions to only suction to a certain catheter depth in order to minimise permanent damage.

Suctioning systems can be 'open' or 'closed'. Open suction involves using single-use catheters inserted via the open end of the tracheostomy tube, whilst closed suction systems allow the same catheter to be used multiple times. Closed systems are especially useful in the critical care setting where repeated disconnection of the circuit could be detrimental (e.g. in patients with high FiO2 requirements and high ventilator pressures) or in patients with copious secretions.

Closed suction systems should be cleaned following use with sterile saline to reduce risk of occluding the catheter and also permit more accurate estimation of secretion volume. The systems should be changed every 72 hours, unless contraindicated by the patient's clinical condition. Although the closed systems have several clinical advantages, they do add a degree of weight to the breathing circuit and a risk of getting caught accidentally, which may lead to inadvertent disconnection or tube displacement.



Closed suction system

Different Colour coded different sized open suction catheters

Suction catheter selection

Tracheal damage and hypoxia during tracheal suction can be minimised by using the appropriate sized suction catheter. If the catheter is too large the suction it creates can cause damage and may also partially occlude the tracheal tube leading to hypoxaemia. It has been recommended that the diameter of the catheter should be no more than half the internal diameter of the tracheal tube. If the catheter is too small however it will be inadequate to remove secretions.

A guide to choosing the correct size of catheter was proposed by Odell and others (1993):

(Size of endotracheal or tracheostomy tube – 2) x 2 = Correct French gauge

The table below illustrates this.

Inner diameter of tracheostomy tube (mm)	Suction catheter size (French Gauge or mm)	
	FG	(mm)
10mm	14	(4.5)
9mm	12	(4.0)
8mm	12	(4.0)
7mm	12*	(4.0)
6mm	10	(3.3)
5mm	8	(2.6)

* It is more appropriate to use a size 12 catheter as, although it is slightly larger than ½ diameter, it is more effective for secretion removal.

The frequency of suctioning

There is no clear consensus on how frequently a patient should receive suction and will depend upon the individual. Attempting tracheal suction at least once per 8 hours strikes a reasonable practical balance and will ensure that the tube remains patent. Failure to pass a suction catheter is a 'Red Flag' warning that the tube may be blocked or displaced and should be promptly assessed by an appropriately trained individual.

The pressures for suctioning

Choosing the correct pressure is a balance of effectiveness of clearing secretions against limiting the potential for damage, either by directly traumatising the tissues or by aspirating oxygen from the trachea and contributing to hypoxia. Pressures used effectively in the literature range from as little as -80 mmHg to -300mmHg. Most would agree that a pressure of no greater than -150 mmHg (-20kPa) is appropriate for most patients.

The table below summarises key actions related to suctioning and their rationales (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
Ensure that an appropriate non-fenestrated inner tube is in place	Larger fenestrations allow the suction catheter to pass through causing trauma totracheal wall or giving the false impression that the catheter will not pass
Consider pre-oxygenation if receiving oxygen or ventilated	To prevent hypoxaemia
Remove tracheostomy devices prior to open 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 aide 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

Action	Rationale
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 10 seconds	To reduce risk of mucosal damage and hypoxaemia
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 O2 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	To limit side effects and maximise recovery period
If O2 delivery was increased, review for return to previous level.	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. Wash hands.	To minimise the risk of infection
If the patient needs further suction, repeat the above actions using new glove & a new catheter	

Difficulties in suctioning tenacious mucus may be due to inadequate humidification. Try a more effective humidifier and consider the use of nebulizer, mucolytics and concurrent physiotherapy. Saline instillation may be useful in some situations such as deep bronchial suction and bronchial lavage.

III. Tracheostomy Inner Tube Cleaning

The aim of cleaning the inner tube is to remove secretions thereby reducing the risk of obstruction and also the risk of infection. Secretions can adhere to the internal lumen of a tracheostomy tube and severely reduce the inner lumen diameter over time. This can potentially increase the work of breathing and/or obstruct the patient's airway.

The inner cannula should be removed and inspected at least every four hours. This may need to be performed more frequently if the patient has excessive secretions or shows signs of respiratory distress such as:

- Sudden increase in respiratory rate
- Fall in oxygen saturations
- Audible secretions in the tracheostomy tube
- Stridor
- Increased work of breathing/ use of accessory muscles

For those patients undergoing mechanical ventilation, it may not be safe to repeatedly disconnect the ventilator circuit and change the inner tube routinely. Cleaning or changing an inner tube should always represent the best balance of risks to the patient. If an inner tube is not changed, then it should be clearly documented and communicated, along with the rationale (National Tracheostomy Safety Project).

Some makes of tracheostomy tube (*Cook™*) have disposable inner cannula and when visibly contaminated these should be thrown away rather than cleaned. Most of the other makes the inner cannulas are re-usable after thorough cleaning following the steps below. The procedure for cleaning of the inner cannula has been reviewed and approved by the Trust Infection and Prevention Control team.

Equipment required

- Clean, disposable gloves, apron and goggles
- Spare clean and dry replacement inner cannula ready for use
- Tracheostomy cleaning swab (*Kapitex trachi-swab™*)
- Dressing pack
- Sterile water (bottle, sachets)
- Self-seal bag to hold the clean and dry spare inner tube

Procedure / Action	Rationale
Explain and discuss procedure with the patient as appropriate	To relieve patient anxieties and gain patient consent and co- operation.
Clean your hands immediately prior to donning, gloves, goggles, and apron	To reduce the risk of cross infection
Perform tracheal suction if necessary	To ensure airway is clear prior to procedure commencing
With one hand stabilise the outside of the tracheostomy tube as per the manufacturer's instructions. This may necessitate firm removal of inner cannula whilst anchoring the tracheostomy tube side flange in a friction locked device, or rotation of the inner cannula to release it in preparation for removal. With the other hand remove the inner cannula in an outward and downward direction.	To aid easy removal of the tube and cause minimal movement of the tube on inner cannula removal
If the inner tube is clean and clear of secretions, reinsert using an upward and forward movement and secure the inner cannula as per the manufacturer's instructions.	Discomfort and trauma are reduced if the inner tube is reinserted following the contour of the outer tracheostomy tube.
If there is difficulty in removing the inner tube call for help from an appropriately trained healthcare professional.	Dry tenacious secretions or granulation may prevent the inner tube from being removed which requires prompt attention
If inner tube requires cleaning, replace with clean/spare inner cannula whilst cleaning is taking place	The tracheostomy tube should always have an inner cannula in place to prevent tube blockage.
If the inner tube is fully or partially blocked with secretions, immerse in sterile water in the disposable bowl provided and if necessary use a tracheostomy cleaning swab to loosen and remove any secretions	To remove debris that may block the tube as this may become a source of infection. Cleaning devices should be used with caution and care not to cause abrasion to inner surface of inner cannula.
If tube is coated with dried- on secretions, it may need to be disposed of and a replacement cannula placed at bedside	Excessive cleaning can damage the cannula and they should not be left to soak, as it is an infection risk.
When clean, still holding it over the bowl rinse the inner cannula through with sterile water from the bottle	To remove secretions and reduce infection risk
Shake excess water off inner cannula, dry with a clean swab and place in the self seal bag	To ensure a clean and dry inner cannula is available for use.

IV. Stoma Care

The management of a tracheostomy stoma depends to some degree on the type of surgical procedure used to create the tracheostomy tract. Traditionally tracheostomy was created through a linear incision in the front of the neck and commonly leads to a larger surface wound compared with percutaneous procedures. The stoma associated with a tracheostomy or laryngectomy can be considered as a full thickness, open wound, but one that is complicated by the moisture and mucus associated with respiratory secretions. When we add a large foreign body which slides about every time the patient moves, the potential for stoma problems is evident.

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 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.

Various types of dressing are available for the stoma. Dressings placed at the tracheostomy site should always be pre-cut by the manufacturers to avoid loose fibres from a cut dressing edge entering into the airway. Thicker dressings will absorb more secretions (e.g. Lyofoam™ Allevyn™) than some of the thinner, less obtrusive varieties available (e.g. Metalline™).

V. Cuff Pressure

These guidelines are suitable for all critical care patients with cuffed endotracheal or tracheostomy tubes in place.

Background

High intra-tracheal cuff pressures are common and may predispose patients to tracheal necrosis and stenosis. Endotracheal and tracheostomy tubes are made with high volume, low-pressure softer cuffs. This should reduce, but not completely eliminate the risk of pressure trauma. These must only be inflated to the minimal desired occlusion volume. Over inflation will cause short and long term consequences to the mucosal wall.

When an inflated cuff is used air should gradually be inserted at 0.2 - 0.5 ml increments with a 10 ml syringe into the endotracheal / tracheostomy tube cuff. Apply a stethoscope to just below the thyroid cartilage and listen for air leaks. When no air leak is heard for greater accuracy withdraw 0.5 - 1.0 ml of air until an air leak is heard and then gradually re-inflate until no air leak is audible.

It is recommended that cuff pressures are measured using a hand pressure manometer. This will measure the pressure exerted by the cuff on the tracheal wall.

The Hi – Lo Hand Pressure Gauge should only be used with tracheal tubes with high volume low pressure cuffs. Before use check the pressure gauge by tightening the screw on the hand pressure gauge, occlude the connecting piece with a finger and inflate the balloon to 120cm H_2O The valve must be constant for 2-3 seconds.

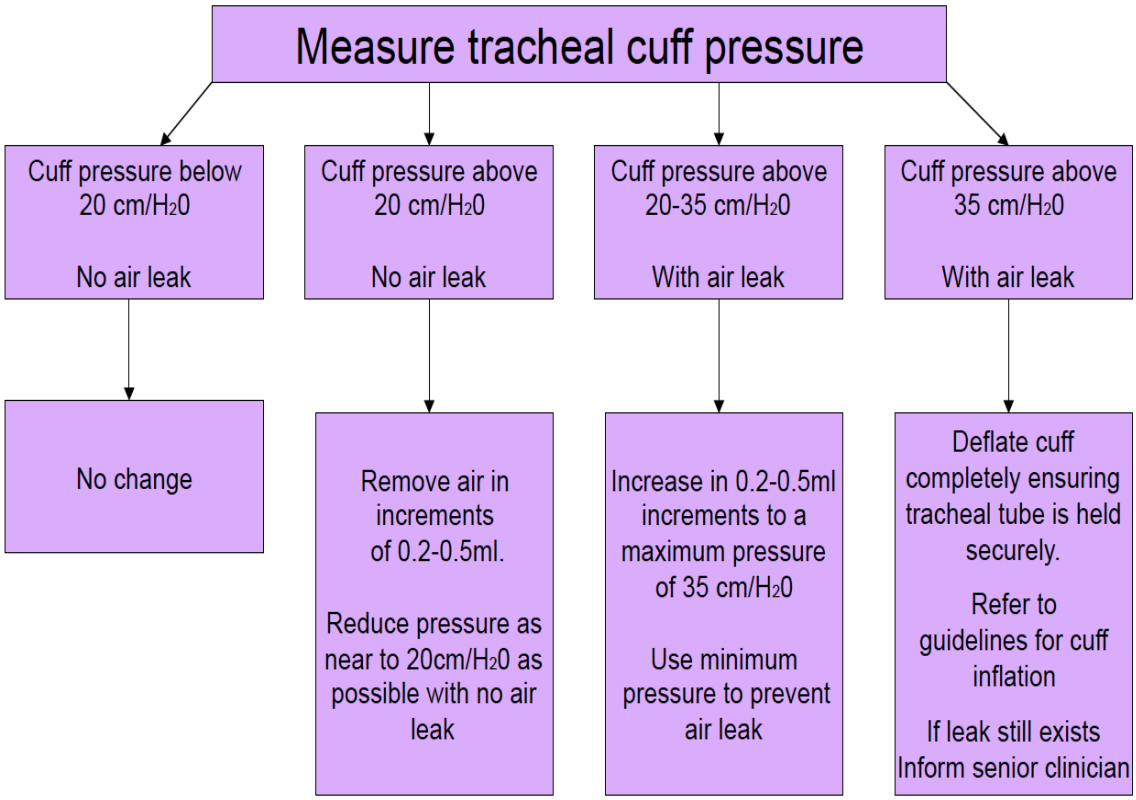
The Minimal Occlusion Volume (MOV) is the smallest volume of air in the tracheal tube cuff to abolish an air leak on inspiration.

Each shift or each time the cuff is re-inflated the cuff pressure should be checked using a hand pressure gauge following the steps below:

- Explain to the patient your intention to measure the cuff pressure.
- Wash your hands and apply a clean pair of gloves.
- All secretions from the back of the patients' mouth should be cleared under direct vision with a soft suction catheter to avoid aspiration.
- Tighten the screw on the hand pressure gauge
- Connect the Hand Pressure Gauge to the inflation line with a three way tap attached.
- Connect the three way tap to the cuff on the endotracheal or tracheostomy tube
- Inflate the cuff by means of an air filled syringe attached to the three way tap in increments of 0.2 - 0.5 ml
- Close the tap to the syringe
- Note the pressure indicated on the gauge.
- The cuff inflation pressures should not exceed 25 mmHg in the expiratory phase and should be maintained between 15 and 25 cm of H20.
- If cuff pressures are equal to the recommended level and an air leak persists, senior medical advice should be sought prior to inserting more air in the cuff.
- Document both the volume of air inserted and the highest cuff pressure on the critical care chart (the measured cuff pressure will vary during the respiratory cycle).

When an inflated cuff is in-situ and an audible leak heard air should gradually be inserted at 0.2 - 0.5 ml increments with a 10 ml syringe into the endotracheal / tracheostomy tube cuff. Apply a stethoscope to just below the thyroid cartilage and listen for air leaks. When no air leak is heard for greater accuracy withdraw 0.5 - 1.0 ml of air until an air leak is heard and then gradually re-inflate until no air leak is audible.

Cuff pressures should be measured following significant changes or procedures, such as re-intubation, tracheostomy, intra or inter hospital transfer, turning supine or prone. The routine checking of tracheal cuff pressures for patients with known airway difficulties should be discussed with senior medical staff prior to commencement. Examples are difficult intubations, patients with head or neck trauma or surgery and facial burns. The manometer should be kept for sole use in individual bed areas. The external parts of the manometer should be cleaned before use with a multi-purpose pre-soaked surface wipe or soapy water.



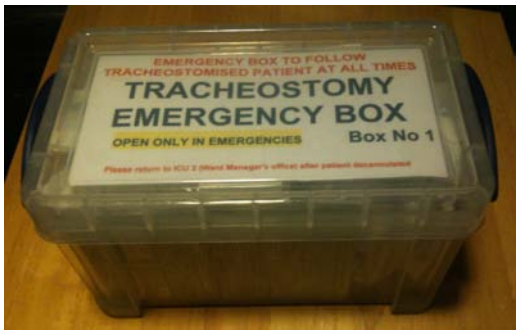
Measuring and managing cuff pressure

VI. Emergency Equipment

The minimum emergency equipment to care for a patient with a tracheostomy should be available at all times by the patient bedside as well as when the patient is not on the ward, for example if patient is transferred to radiology for investigation or procedure.

The emergency equipment comprises the emergency tracheostomy box (see chapter 5 for contents of emergency box), availability of oxygen port (wall or portable oxygen), oxygen delivery system (self-inflated Ambu bag or Mapleson C / Water's circuit with appropriate mask), suction apparatus and suction catheters.

As part of the emergency management of a patient with tracheostomy, the bedside documentation (chapter 5) and emergency management algorithms (chapter 10) should be kept in the area where the patient is.



Emergency tracheostomy care box

Mapleson C circuit "Water's circuit"

Ambu bag

Face mask adult and paediatrics

Changing of tracheostomy tubes

The decision to electively change a tracheostomy tube should be multi-disciplinary. The first elective change should only be performed or supervised by a suitably qualified member of the medical team.

Several important aspects must firstly be reviewed i.e. the reasons for the formation of the patient tracheostomy and when and how the tracheostomy was formed.

Indications to change a tracheostomy tube include:

- The tube has been in situ for the maximum recommended duration, 30 days for double lumen tubes (European Directive 1993) and 7-10 days for single lumen tubes (elective indication)
- To facilitate weaning by inserting a smaller, non-cuffed or fenestrated tube (elective indication)
- The patient needs a general anaesthetic or has deteriorated and requires a cuffed tube for mechanical ventilation (elective/urgent indication)
- To replace a tracheostomy tube that is showing that is either displaced or showing difficult access to suctioning due to build-up of thick and sticky secretions or clots in the outer tube (urgent/emergency indication)

It should be noted that a newly formed tracheostomy can close very quickly, particularly within the first 48 hours. Ideally tubes should be changed at 5 days of the tracheostomy formation as the tubes can get quite sticky and dirty post procedure. On a ventilated patient, the tubes may be left longer initially if patient is unstable and requiring high levels of ventilator support.

In a surgical tracheostomy the first tracheostomy change is considered to be a higher risk procedure as the tract may not be mature. Usually this tube change is performed by experienced medical staff and if satisfactory then the subsequent tube changes can be performed by trained nursing staff.

The first tracheostomy change should be performed with the following equipment

- adequate lighting (a headlight is required)
- the patient in the sniffing the morning air position (to encourage the various dissected tissue layers to line up)
- airway suction catheter
- tracheostomy dilators
- a selection of tracheostomy tubes available

No special preparation is required for the tube change, the patient does not need to be fasted, but should have adequate analgesia prior to the change.

The choice of the tube to be placed should be made dependent on the patient's clinical needs. A non-cuffed tube may be placed in patients with an intact upper airway, a good level of consciousness and those no longer needing a cuff for ventilation or airway protection.

Tube positioning is confirmed by feeling a good flow of air through the tube and with capnography. If concerned a fibreoptic examination of the tracheostomy should be performed by a senior clinician.

The tube change should be documented including type of tube used and quality of the tract and stoma.

Extreme caution should also be taken where the patient has an obstructed upper airway, in those patients with a large neck, those requiring high levels of ventilator support and patients with tumours surrounding the tracheostomy site or those with significant surrounding granulation.

If the change of the tracheostomy tube is urgent or an emergency please ensure adequate facilities for difficult airway are in place as well as adequate personnel trained for advanced airway management, that is a senior intensivist or anaesthetist, senior ENT/Maxillo-facial surgeon and competent trained airway management assistant. In an emergency please refer to the algorithms of management of breathing difficulties for a patient with a tracheostomy and/or laryngectomy.

Contra-indications to an elective tube change may include

- An unstable condition
- Requiring high levels of ventilator support
- Undergoing radiotherapy to the neck region or has completed a course within the last two weeks
- In palliative patients where quality of life will not be improved by a tube change
- If the patient refuses

Equipment required for elective tracheostomy tube change

The basic equipment required is listed below. Depending on the patient condition, tracheostomy type and on the indication of tracheostomy (i.e., fully-ventilated patient) additional equipment and trained staff maybe needed

- Two tracheostomy tubes of appropriate make, one same size and one size smaller
- Tracheostomy tube tape and possibly tracheostomy tube holder
- Dressing Pack
- Normal saline or sterile water to clean stoma
- 10 ml syringe for cuff deflation/ inflation (if cuffed tracheostomy)
- Sterile gloves and protective eye wear
- Water soluble lubricating gel
- Forceps and scissors or stich cutters (if sutured tracheostomy)
- Suction equipment and suction catheters

- An exchange device, guidewire, pre-cut suction catheter, Aintree catheter /Bougie
- Pre-cut keyhole tracheostomy dressing – uncut gauze swabs are not recommended
- Pen torch
- Cuff pressure manometer to check pressure if cuffed tracheostomy tube used
- Stethoscope
- Oxygen and oxygen delivery device
- Continuous oxygen saturation monitoring
- Capnography
- Fibreoptic scope and tracheostomy dilators available nearby (to be used only by trained staff)
- Resuscitation equipment including re-breath bag
- Access to intubation equipment

Action	Rationale
Identify need for tracheostomy tube change and clarify type of tube to be inserted	To ensure tube change is necessary and the correct tube type is selected for current and ongoing patient care needs
Patient preparation may include ensuring Nil by mouth for 4 hours and/or aspirate naso-gastric tube	To limit the risk of aspiration during tube change procedure
Explain the procedure to the patient and obtain verbal consent if appropriate	To ensure the patient understands the procedure
Ensure appropriate staff and equipment are available	To deal appropriately with additional measures to secure an airway.
Set up bedside suction and oxygen equipment	To ensure oxygen and suction are available (when needed)
Prepare new tube (± inflate and check cuff), lubricate outer tube surface (and cuff), insert introducer and attach tapes	To ensure new tube has no faults and is prepared for insertion and application.
Remove any obstructing clothing or equipment	To ensure neck area is accessible for tube change

Position patient for procedure by placing a roll under the patient's shoulders, extending the stable neck. Patient may be placed lying down or sitting upright depending on individual patient assessment.	To bring the trachea closer to the skin and to stretch stoma opening in order to aide tube insertion
If the tracheostomy tube is sutured in-situ, remove all sutures. Skin sutures may be considered for removal if appropriate.	To allow tube removal and to prevent sutures becoming embedded or an infection risk.
Deflate cuff (if present) simultaneously suctioning	To enable existing tube to be removed and for secretions to be cleared.
Untie tapes and remove dressing whilst tube is held firmly in place	To remove old dressings and tapes.
Remove existing tube with a firm out and downwards movement as patient breathes out	To reduce patient coughing.
Observe stoma site and tracheal opening.	To identify signs of infection, granulation tissue and/or bleeding.
Holding the introducer in place, insert new tube into stoma	To pass tube along contour of tract.
Remove introducer	To allow patient to breathe and to allow confirmation of correct tube position

If correct tube position not confirmed

Action	Rationale
• Remove tube and attempt second re-insertion. • Following a failed third attempt, a smaller tube may be considered. • Additional support should be sought for further management or advice.	To safely manage the tracheostomy tube insertion

Post procedure

Action	Rationale
Dispose of equipment in clinical waste	To reduce risk of infection
Ensure bedside equipment is re-stocked with appropriate tube selection	To ensure emergency equipment is replaced or exchanged for new tube.

Documentation

Documentation of the procedure in medical and nursing notes should include:

1. Size and type of tube
2. Difficulties experienced with tube change
3. Comments on stoma
4. Patients response to tube change
5. Expected date of next tube change

Assessment and management for decannulation

The act of capping of a tracheostomy tube not only restores phonation but also restores subglottal pressure and improves taste, swallow, cough and the Valsalva manoeuver.

Additionally, the quantity of tracheal secretions tends to diminish after the tracheostomy tube…

Tracheostomy Decannulation Procedure

Tracheostomy removal takes place in a variety of clinical environments and can be performed by various medical and health professional who are trained and assessed as competent at carrying out the procedure.

The best time to consider decannulation is mornings following a physiotherapy session where secretion clearance can be optimized; the patient is rested from sleeping and can be monitored throughout the day.

Failed decannulation can occur for a variety of reasons:

- Unable to clear secretions
- Increased work of breathing
- Structural abnormalities
- Stenosis
- Tracheomalacia

Prior to considering decannulation

- Resolution of original need for tracheostomy insertion
- Minimal secretions – able to clear independently
- Minimal oxygenation requirements
- Able to maintain own airway
- Appropriate conciousness
- Good cough (PCF > 160 providing physiotherapy services involved)

- Present gag reflex
- Optimal nutrition
- Deflated cuff 24 hours
- Speaking valve use
- Occlusion valve tolerated for up to 4 hours (if used)
- CVS stability
- MDT opinions
- Check medical documentation from when tracheostomy was inserted to determine if it was problematic to decide who is best equipped to decannulate the patient
- Ensure availability of staff trained in advanced airway management (critical care or anaesthetist) for possible complications

Equipment

- Dressing pack
- Gauze
- Appropriate dressing
- Sterile normal saline
- Gloves, apron and protective eye wear
- Appropriately sized tracheostomy tube and one a size smaller (available not opened)
- Facemask or nasal specs
- Microbiological swab
- Tracheal dilators
- Functioning suction unit and appropriate sized suction catheters
- Stethoscope
- Resuscitation equipment

Procedure

- Two person technique, clear understanding of roles
- Check emergency equipment
- Explain procedure to patient and gain patient consent where possible
- Position patient in semi-recumbent position
- When required place supplemental oxygen over nose and mouth
- Remove old dressing and tapes and support the tube
- Suction patient
- Remove tube on expiration
- Observe site, swab if required and clean stoma
- Check patient is comfortable
- Use a portion of gauze folded in four and place over stoma
- Apply an appropriate dressing over the gauze over the stoma site
- Advise patient to provide pressure to the stoma site when coughing and talking in the initial stages
- Document the procedure in the case notes and make a final check of the patient

Monitoring of the patient

Monitoring of the patient to assess for possible deterioration needs to be increased post decannulation, initially 15 minutes then hourly and increased to 4 hourly as stability allows. Signs and symptoms that could indicate deterioration are:

- Breathlessness
- Laboured breathing
- Noisy respiration
- Stridor
- Increased respiratory rate
- Increased heart rate
- Excess use of accessory muscles
- Change in respiration pattern
- Change in respiration depth
- Agitation
- Oxygen desaturation

Management of the wound needs to be continued by ward staff until it has completely healed. Close observations should be noted for any signs of infection, excessive scar tissues or failure to heal.

There is a checklist and monitoring document to be used for assessment of decannulation and post procedure review (see Chapter 10, Documentation).

4. MINIMUM STANDARDS FOR TRACHEOSTOMY CARE AND SAFETY ON THE CLINICAL AREAS

One of the main recommendations to come from the NCEPOD (*On the Right Trach*) and from looking at our local patient safety incidents, is to cohort patients together to concentrate staff, skills, equipment and expertise. This should make equipping and training locations that will be designated to care for tracheostomy patients easier.

This approach means that the majority of clinical locations will lose expertise on looking after neck breathing patients which may restrict bed movements in an acute hospital. However, the risks of caring for this cohort in clinical areas without the necessary equipment, training and experience places the patient at an increased risk of airway complications, morbidity and mortality.

One of the key recurring themes in the published critical incident reviews was a lack of equipment and training by staff meaning that routine care was not provided, warning signs and red flags were missed and that emergencies were not managed effectively. Concentrating training, equipment and expertise would be expected to reduce these incidents.

Dedicated tracheostomy teams and tracheostomy ward rounds is another well published approach to reducing tracheostomy-related critical incidents.

Tracheostomy Care Training: Staff Competencies

The designated areas to have after patients with tracheostomies should have at least two members of staff per shift fully trained and competently assessed for tracheostomy care.

The education, training and competencies for tracheostomy care are discussed in another section of this clinical guideline.

At South Tees Hospitals the areas that have staff able to look after patients with tracheostomies are the critical care areas, general critical care, cardiothoracic critical care, spinal high dependency unit, neurosurgical high dependency unit, respiratory wards at both hospitals, the Ear Nose Throat and maxillo-facial trauma wards and the rehabilitation ward at the spinal cord injury unit.

With the arrival of critical care outreach, we anticipate further training to facilitate other clinical areas to achieve competencies to be able to look after tracheostomised patients. The critical care outreach team will also be able to facilitate the follow up and care of the patients with tracheostomies.

Equipment

Equipment for clinical areas for the care of patient with tracheostomies

- Adult bag-valve-mask device with reservoir and tubing (on cardiac arrest trolley)
- Paediatric face mask (on cardiac arrest trolley)
- Selection of appropriate tracheostomy tubes, selection of tracheostomy inner tubes replacements, tracheostomy dressing and tracheostomy ties
- Selection of appropriate suction catheters
- Portable suction
- Tracheostomy wedge (store cupboard)
- Sputum trap (store cupboard)

Bedside equipment for a tracheostomy patient

- Access to an oxygen delivery system that includes a tracheostomy mask, humidification system and elephant tubing in working conditions
- Suction apparatus in working conditions, suction tubing and a selection of suction catheters (size 10fg to 14fg) with fingertip control
- Tracheostomy cuffed tubes for emergency use (one same size as tube in situ, one smaller) as part of the emergency box
- Spare inner tubes. If the inner tubes are not disposable they should be kept cleaned and dried inside the appropriate container (see cleaning of the inner tube)
- Care plan adequately documented
- Bedhead sign completed
- Emergency algorithm
- Emergency box ready to go with patient for transfers (i.e., CT scan room)
- Dressing pack
- Cleaning solution
- Spare Velcro tracheostomy tape

- Tracheostomy dressings
- Soft brushes for inner tube cleaning
- 10 ml syringes (to inflate/deflate cuff)
- Manometer with the appropriate extension to check the cuff pressure
- Water soluble lubricating gel
- Stitch cutter (if sutures present)
- Saline ampules, nebulizer equipment for tracheostomy mask
- Disposable non-sterile gloves (small/medium/large)
- Disposable sterile gloves (small/medium/large)
- Aprons and goggles for eye protection
- Water to rinse tubing
- Non-sterile receivers
- Sterile gauze
- Yellow clinical waste bag
- Tissues
- Yankaeur suction catheter
- Nurse call bell
- Communication aids: the patient may not be able to verbalise

5. RESUSCITATION AND EMERGENCY MANAGEMENT OF THE PATIENT WITH A TRACHEOSTOMY OR LARYNGECTOMY

Emergency Tracheostomy Box

Any clinical area caring for patients with a tracheostomy must have emergency equipment immediately available. Some of the emergency equipment needed should be by the bedside, whilst other emergency equipment should be available on the ward area.

Basic emergency equipment should be stored in a dedicated bag or box that accompanies the patient at all times. In areas where patients are receiving ventilatory support or where the tracheostomy tube is the main airway of the patient, other emergency equipment should be readily available and routinely checked stored in an airway trolley on the ward area. If a patient is transferred to a different location within a hospital then the accompanying staff must ensure that any equipment that may be required in an emergency is available at the destination, and also during the transfer, for example, emergency tracheostomy box and suction equipment. An appropriately trained carer who is competent to use the equipment in an emergency must also accompany them. There are recorded incidents occurring during transfer of patients with tracheostomy, in hospital corridors and remote departments such as X-Ray department, where a blocked or displaced tube could not be managed due to a lack of immediately available equipment.

At South Tees Hospitals all patients outside critical care areas should have an emergency tracheostomy box by the bedside with the following contents:

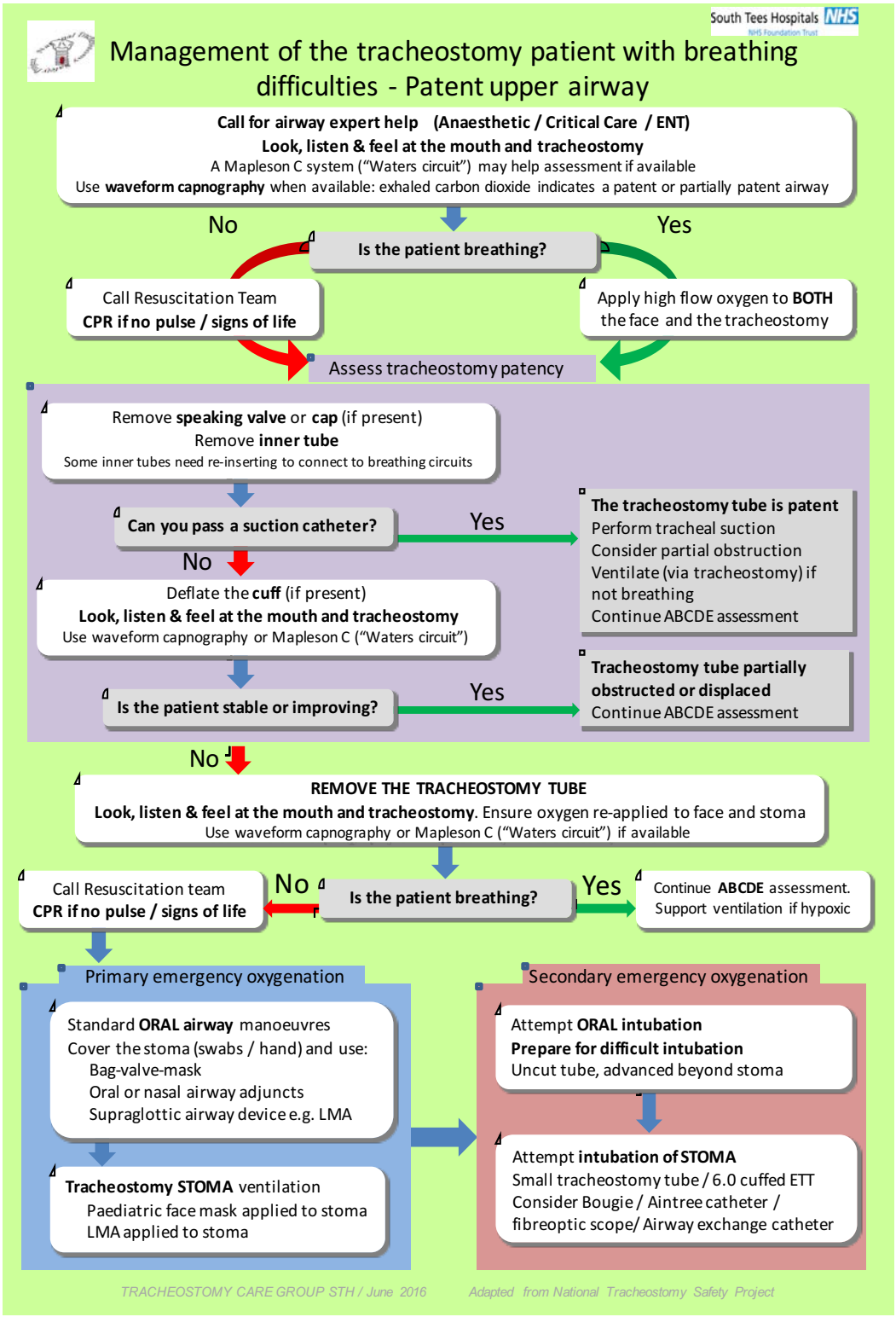
- Cuffed* tracheostomy tube same size patient discharged with**
- Cuffed* tracheostomy tube one size smaller size patient discharged with**
- Spare inner tube (x1) that fits tracheostomy tube patient discharged with
- Suction catheters size 14, 12, 10 (x1)
- 20ml syringe
- Gloves
- Packet of sterile gauze
- Water soluble lubricant jelly
- Scissors

*Cuffed tube to be used in case of emergency even if patient had non-cuffed on discharged

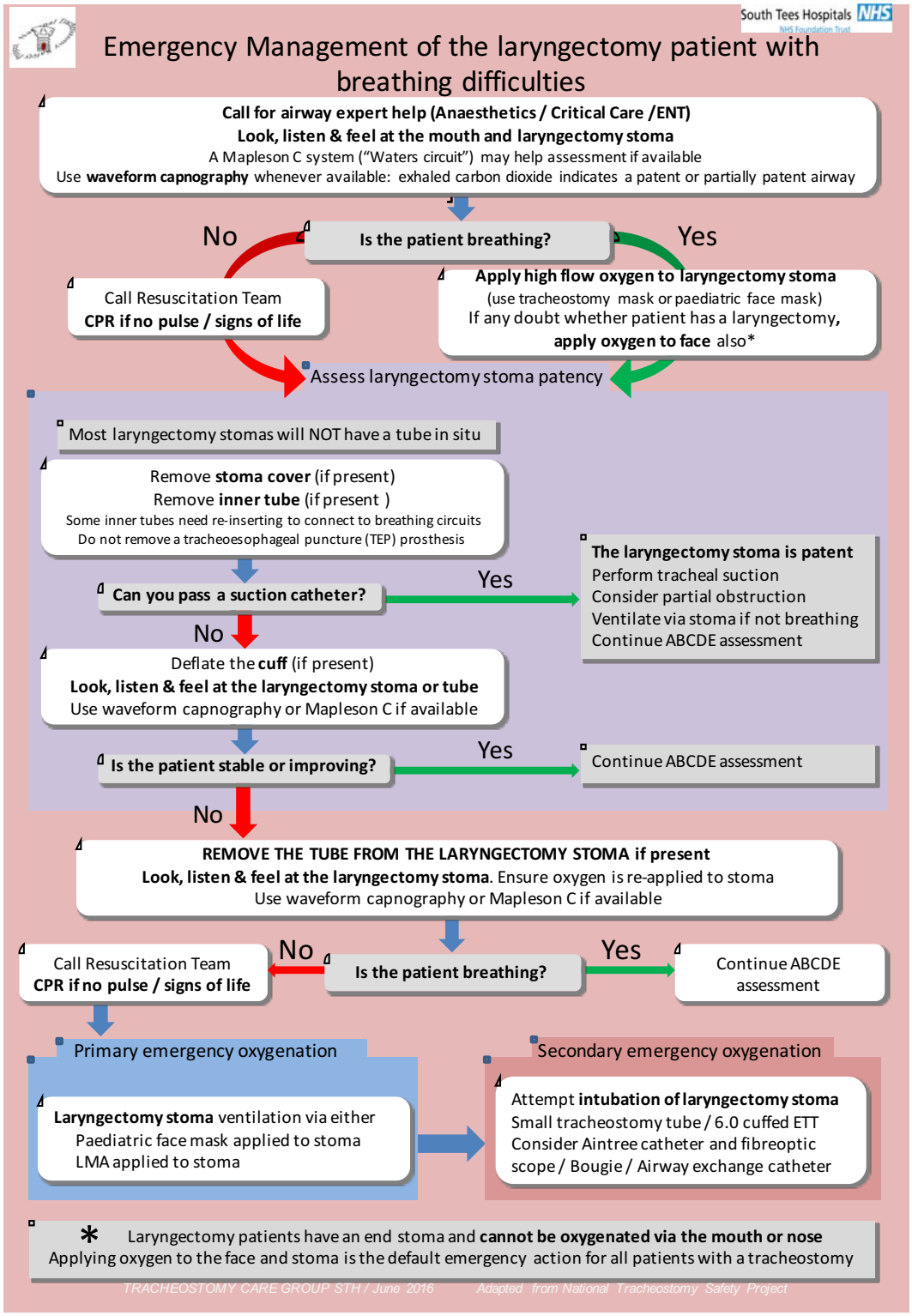
**If patient discharged with variable flange use equivalent size of Tracoe Plus for box

The tracheostomy emergency box should only be used for emergencies and must follow the patient with the tracheostomy.

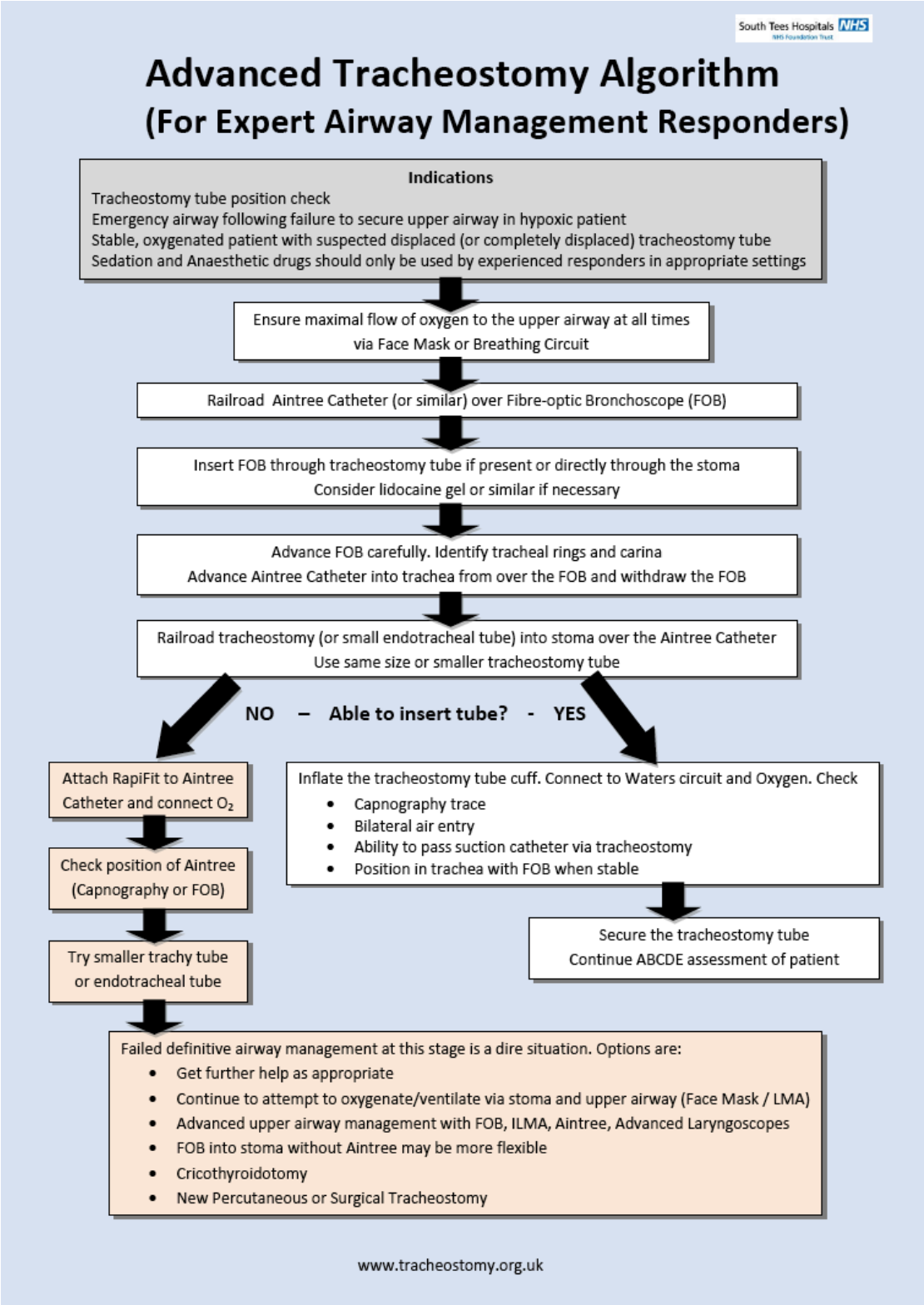
Algorithm 1: Breathing difficulties in the patient with tracheostomy and patent upper airway



Algorithm 2: Breathing difficulties in the patient with laryngectomy



Algorithm 3: Advanced airway management of the patient with a tracheostomy tube



6. THE SURGICAL TRACHEOSTOMY

Tracheostomies may be performed by percutaneous or open surgical techniques for Critical Care indications and have similar care requirements. However surgical tracheostomies may be placed for other indications and this section broadly covers this group of patients. This includes but is not exclusive to:

- Prophylactic airway protection in major head and neck surgery
- Trauma where the airway is likely to be impaired or has become impaired
- Emergency loss of airway due to an obstruction above upper third of the trachea (structural narrowing e.g. subglottic stenosis or functional e.g. infective or a combination or bleeding)
- Prophylactic where non-surgical treatment is likely to result in airway obstruction (e.g. chemo-radiotherapy for a laryngeal tumour which is already partly obstructing the airway)

A surgical tracheostomy is ideally performed in a patient with a safe, secure intubated trachea, however depending on the aetiology this may not be possible.

Other options for performing a tracheostomy are:

- Awake with Local Anaesthesia
- Spontaneously ventilating with Local Anaesthesia (e.g. on a facemask)
- With sedation and local anaesthesia
- In extremis- 'Crash tracheostomy' with a hypoxic unresponsive patient- no anaesthesia

The suitability for these techniques depends on both patient and team factors and should be discussed in advance where-ever possible. In accordance with other types of management of a difficult airway, the whole team should have a primary and several back-up plans in place where possible and these should have been openly discussed and agreed on prior to commencing the procedure.

There are several variations on techniques to perform a surgical tracheostomy. All involve some form of dissection in the midline, between the strap muscles, up to the thyroid isthmus.

- The thyroid isthmus may be not encountered, be retracted up or down or be divided and ligated by either cold steel or a cautery technique
- The trachea is identified and if possible a point below the first ring of the trachea is identified. The first ring of the trachea is not violated to minimise the chance of irritation of the cricoid ring which is felt to be a risk factor for subglottic or suprastomal stenosis of the airway.
- When the trachea is reached the entry into the airway may involve joint working between the anaesthetist and the surgeon if there is an ET tube in place. If this is the case, when the anaesthetist is ready, following pre-oxygenation of the patient, the securing tapes at the mouth are loosened by the anaesthetist and often the cuff will be deflated.

- An entry is made into the airway. A choice of a vertical, horizontal or a window excision is made depending on clinical judgement. A tracheal flap is no longer an acceptable option.
- Once in the airway is entered, the incision is dilated by tracheal dilators and under direct vision, the surgeon verbally directs the anaesthetist to retract the ET tube (if present) until the tip is just above the incision, but still within the larynx. This maintains a tube within the airway at all times. Only when the tracheostomy tube is fully secured is the ET tube finally removed. This provides a back-up airway in case of problems with intubating the trachea surgically.
- Some clinical teams choose to place "stay sutures" or "rescue sutures" around tracheal rings adjacent to the tracheal opening. These are then taped laterally to the chest wall, with identifying labels (Left and Right). These enable gentle traction to be placed on the trachea directly in an emergency to enable the tracheal opening to be visualised (e.g. in an emergency displacement of a non-mature tract). Where placed, they should be clearly labelled and the clinical and nursing staff should have both a written and verbal hand-over about the nature of these sutures.
- Tubes should be secured by both sutures to the skin and tapes (either Velcro or linen).
- With some larger tubes (e.g. adjustable flange tubes) it may be necessary to place sutures adjacent to the body of the tube rather than use the holes in the flange, as there is still a significant amount of motion (pistoning and rotation) that can lead to trauma or displacement if only the lateral holes are used.
- A dressing (e.g. lyofoam) is inserted between the skin and the tracheostomy flange to prevent traumatic ulceration of the soft tissues.
- The tracheostomy may need to be suctioned if there was any ingress of blood into the trachea or bleeding from the incision. A flexible airway sucker is used as necessary.
- A full operative note including clear post-operative instructions should be completed at the time of surgery and there should be a verbal hand over to the appropriate nursing staff from the operating surgeon. Ideally this operative note should be part of a permanent record in the form of a tracheostomy care bundle which follows the patient and includes details of indications and ongoing management plans.
- Patients should be nursed post-operative in a ward area with expertise in the management of a new tracheostomy with an appropriate level of nursing care (2:1 for at least the first 24 hours). These patients should have an algorithm for management of trachestomy emergencies and the necessary rescue equipment should be in a dedicated area next to each patient's bedside, checked and maintained on a daily basis. The tracheostomy care pathway should be placed in the patients nursing notes and be followed.

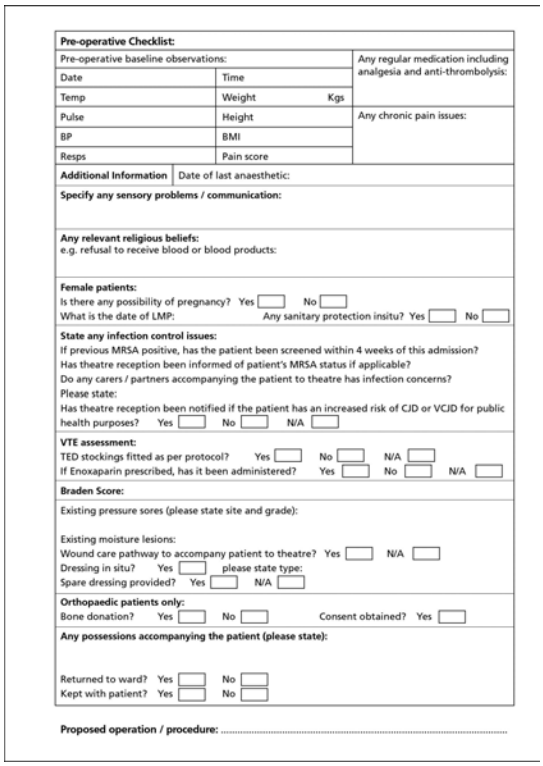
Weaning the chronic tracheostomy

When a tracheostomy has been in place for more than 4 weeks there should be consideration as to whether the patient has developed tracheostomy dependence and this impacts on weaning. Patients may have comorbidities and marginal respiratory reserve so a more delayed stepwise approach is recommended[1]. These patients may be ambulatory outpatients, so they are all admitted for assessment and decannulation. The following stages are undertaken:

1. Confirmation of plan to decannulate
2. Downsized to size 6 non-cuffed, fenestrated tube
3. Tube capped for daylight hours, removed at 22:00
4. If tolerated, then recapped at 08:00 and observed until 08:00 in hospital
5. If tolerated, (no need to remove the cap and no respiratory distress) then tube removed and stoma covered with occlusive dressing
6. Patient discharged with dressings and reviewed in clinics 4-6 weeks. Advice to return immediately if any signs of respiratory distress.

These steps can be followed by nursing staff once step 1 has been confirmed with senior medical staff.

Perioperative Care Pathway



Pre-operative Checklist:

Pre-operative baseline observations:		Any regular medication including analgesia and anti-thrombolysis:
Date	Time	
Temp	Weight Kgs	
Pulse	Height	Any chronic pain issues:
BP	BMI	
Resps	Pain score	
Additional Information	Date of last anaesthetic:	

Specify any sensory problems / communication:

Any relevant religious beliefs:
e.g. refusal to receive blood or blood products:

Female patients:
Is there any possibility of pregnancy? Yes ☐ No ☐
What is the date of LMP: Any sanitary protection insitu? Yes ☐ No ☐

State any infection control issues:
If previous MRSA positive, has the patient been screened within 4 weeks of this admission?
Has theatre reception been informed of patient's MRSA status if applicable?
Do any carers / partners accompanying the patient to theatre has infection concerns?
Please state:
Has theatre reception been notified if the patient has an increased risk of CJD or VCJD for public health purposes? Yes ☐ No ☐ N/A ☐

VTE assessment:
TED stockings fitted as per protocol? Yes ☐ No ☐ N/A ☐
If Enoxaparin prescribed, has it been administered? Yes ☐ No ☐ N/A ☐

Braden Score:

Existing pressure sores (please state site and grade):

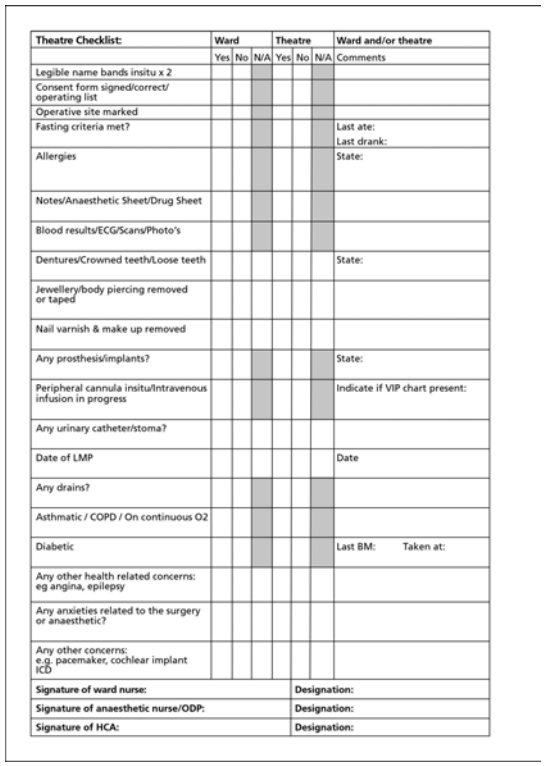
Existing moisture lesions:
Wound care pathway to accompany patient to theatre? Yes ☐ N/A ☐
Dressing in situ? Yes ☐ please state type:
Spare dressing provided? Yes ☐ N/A ☐

Orthopaedic patients only:
Bone donation? Yes ☐ No ☐ Consent obtained? Yes ☐

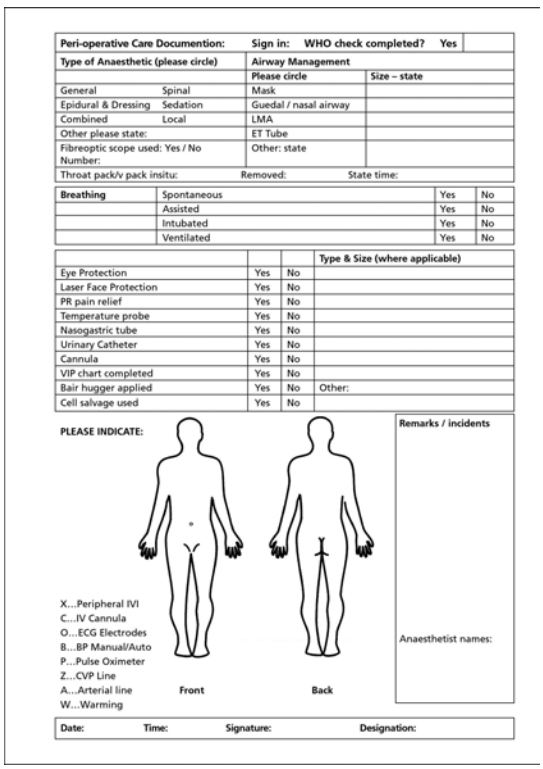
Any possessions accompanying the patient (please state):

Returned to ward? Yes ☐ No ☐
Kept with patient? Yes ☐ No ☐

Proposed operation / procedure: .....



Theatre Checklist:	**Ward**			**Theatre**			**Ward and/or theatre**
	Yes	No	N/A	Yes	No	N/A	Comments
Legible name bands insitu x 2							
Consent form signed/correct/ operating list							
Operative site marked							
Fasting criteria met?							Last ate: Last drank:
Allergies							State:
Notes/Anaesthetic Sheet/Drug Sheet							
Blood results/ECG/Scans/Photo's							
Dentures/Crowned teeth/Loose teeth							State:
Jewellery/body piercing removed or taped							
Nail varnish & make up removed							
Any prosthesis/implants?							State:
Peripheral cannula insitu/Intravenous infusion in progress							Indicate if VIP chart present:
Any urinary catheter/stoma?							
Date of LMP							Date
Any drains?							
Asthmatic / COPD / On continuous O2							
Diabetic							Last BM: Taken at:
Any other health related concerns: eg angina, epilepsy							
Any anxieties related to the surgery or anaesthetic?							
Any other concerns: e.g. pacemaker, cochlear implant ICD							
Signature of ward nurse:				**Designation:**			
Signature of anaesthetic nurse/ODP:				**Designation:**			
Signature of HCA:				**Designation:**			



Peri-operative Care Documention: **Sign in:** **WHO check completed?** **Yes** ☐

Type of Anaesthetic (please circle)		**Airway Management**	
		Please circle	**Size – state**
General	Spinal	Mask	
Epidural & Dressing	Sedation	Guedal / nasal airway	
Combined	Local	LMA	
Other please state:		ET Tube	
Fibreoptic scope used: Yes / No Number:		Other: state	
Throat pack/v pack insitu:		Removed:	State time:

Breathing	Spontaneous	Yes	No
	Assisted	Yes	No
	Intubated	Yes	No
	Ventilated	Yes	No

			Type & Size (where applicable)
Eye Protection	Yes	No	
Laser Face Protection	Yes	No	
PR pain relief	Yes	No	
Temperature probe	Yes	No	
Nasogastric tube	Yes	No	
Urinary Catheter	Yes	No	
Cannula	Yes	No	
VIP chart completed	Yes	No	
Bair hugger applied	Yes	No	Other:
Cell salvage used	Yes	No	

PLEASE INDICATE:

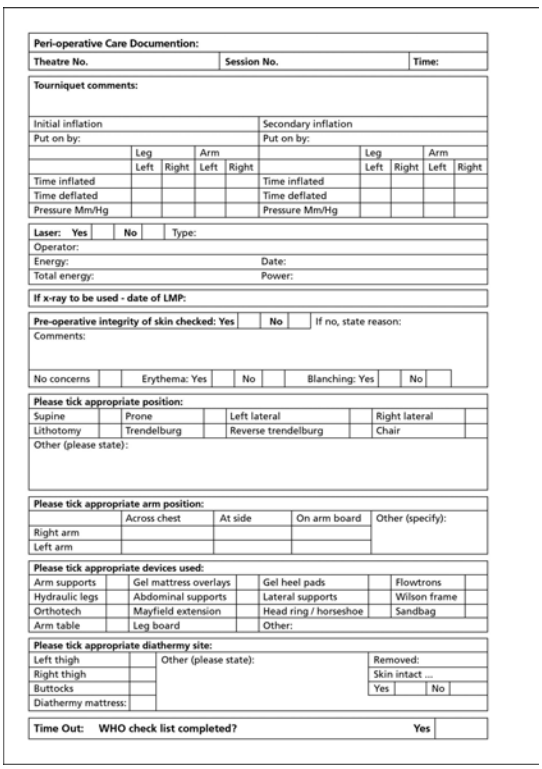
X…Peripheral IVI
C…IV Cannula
O…ECG Electrodes
B…BP Manual/Auto
P…Pulse Oximeter
Z…CVP Line
A…Arterial line
W…Warming

Front Back

Remarks / incidents

Anaesthetist names:

Date: **Time:** **Signature:** **Designation:**



Peri-operative Care Documention:

Theatre No.	**Session No.**	**Time:**

Tourniquet comments:

Initial inflation					Secondary inflation				
Put on by:					Put on by:				
	Leg		Arm			Leg		Arm	
	Left	Right	Left	Right		Left	Right	Left	Right
Time inflated					Time inflated				
Time deflated					Time deflated				
Pressure Mm/Hg					Pressure Mm/Hg				

Laser: **Yes** ☐ **No** ☐ Type:
Operator:
Energy: Date:
Total energy: Power:

If x-ray to be used - date of LMP:

Pre-operative integrity of skin checked: Yes ☐ **No** ☐ If no, state reason:
Comments:

No concerns ☐ Erythema: Yes ☐ No ☐ Blanching: Yes ☐ No ☐

Please tick appropriate position:

Supine ☐	Prone ☐	Left lateral ☐	Right lateral ☐
Lithotomy ☐	Trendelburg ☐	Reverse trendelburg ☐	Chair ☐

Other (please state):

Please tick appropriate arm position:

	Across chest	At side	On arm board	Other (specify):
Right arm				
Left arm				

Please tick appropriate devices used:

Arm supports ☐	Gel mattress overlays ☐	Gel heel pads ☐	Flowtrons ☐
Hydraulic legs ☐	Abdominal supports ☐	Lateral supports ☐	Wilson frame ☐
Orthotech ☐	Mayfield extension ☐	Head ring / horseshoe ☐	Sandbag ☐
Arm table ☐	Leg board ☐	Other:	

Please tick appropriate diathermy site:

Left thigh ☐	Other (please state):	Removed:
Right thigh ☐		Skin intact …
Buttocks ☐		Yes ☐ No ☐
Diathermy mattress: ☐		

Time Out: **WHO check list completed?** **Yes** ☐

Peri-operative Care Documention:

Procedure 1	Procedure 2
Surgeon:	Surgeon:
Assistant 1:	Assistant 1:
Assistant 2:	Assistant 2:
Assistant 3:	Assistant 3:
Scrub nurse/ODP 1:	Scrub nurse/ODP 1:
Scrub nurse/ODP 2:	Scrub nurse/ODP 2:
Scrub nurse/ODP 3:	Scrub nurse/ODP 3:
Circulating staff:	Circulating staff:
Circulating staff:	Circulating staff:
Circulating staff:	Circulating staff:

Skin preparation:

Local / wound infiltration:

Specimen taken: Yes / No
Tissues / Organ / Swab
Please state how many of each:
Histology ☐ Bacteriology ☐ Frozen section ☐ Cytology ☐ Other: ..... ☐

	Type	Size	Location
Drains: Sutured Yes / No Drain sticker: Dressing:			
Catheters:			
Packs:			
Autosutures:			

Peri-operative Care Documention:

Skin closure:

Dressings:

Post operative skin integrity check (rashes, broken, or compromised) All areas checked: Yes ☐ No ☐
Comments:

No concerns ☐ Erythma Yes ☐ No ☐ Blanching? Yes ☐ No ☐

If pressure sore present: Grade / Dressing / IRF completed

Swabs / instruments / needles correct:	Procedure 1 Signatures Scrub Sign:	Circulator Sign:	Procedure 2 Signatures Scrub Sign:	Circulator Sign:
Preliminary count				
1st count				
2nd count				
Final count				
No swab count required:				

Swab count incorrect:
Actions taken:
Change of scrub nurse. Instrument check: Yes ☐ Swab check: Yes ☐ Time:
Operation performed:

Sign Out: WHO check list completed? Yes ☐

Finished time: Date:

Recovery care / observations:

Time: (24hr clock)

Blood pressure / Heart rate: 240 230 220 210 200 190 180 170 160 150 140 130 120 110 100 90 80 70 60 50 40

Infusions mls/hr
CVP
Resps
Sao2
Temp
02 L Min
Operation & wound site check (state time)
Dressings/packs PV loss

Time	Amount	I.V. Fluid Oral intake	Bladder Irrigation insitu In	Bladder Irrigation insitu Out	Urine output Hrly	Urine output Total	Wound Drainage Current amount	Vomit/gastric aspirate

Moisture lesion (please state):
Skin integrity (rashes, broken, or compromised) All areas checked: Yes ☐ No ☐
Comments:

If pressure sore present: Grade / Dressing / IRF completed

Signature of recovery nurse/ODP: .....
Signature of recovery nurse/ODP: .....

Documention Recovery Room:

Time into recovery:

Anaesthetic (place tick in box below)

GA	LA	EP	SP	SED	RG	Other

Monitoring Used (place tick in box below)

NIBP	SP02	ECG	CVP	ART	Temp

On arrival: Airways Management (please circle) A V P U

Heat conservation methods used: (please state)

Pain score & analgesia administered in recovery

Conscious Level

Circulation (general and specific please state)

Neurological observations ¼ hourly
Time commenced:

Intraoperative analgesia given (please summarise)

Time	Pain score	Drug given	Amount	Route	Signed
	/10				
	/10				
	/10				
	/10				
	/10				
	/10				
	/10				
	/10				
	/10				
	/10				

PCA: Yes / No EPCA: Yes / No
Level of block on discharge: Painkwell: Yes / No
FLACC score on discharge: /10

Intraoperative anti-emetics given (please summarise)

Nausea and vomiting: (please state if none)

If yes what intervention taken

Diabetic
GKi
BM
Hemacue:

Comments:

Recovery Discharge Criteria: (Adults following General Anaesthesia)			
All patients leaving recovery for the ward should:	Completed	Meets Criteria	N/A
Have protective reflexes – check with head lift, tongue protrusion and squeezing fingers.			
Be able to maintain oxygen saturation of 95% or above (medical condition allowing). If 95% not maintained liaise with anaesthetist, re-continuing oxygen therapy prescribed?			
Have had pulse rate, respirations and blood pressure O_2i/SpO_2 recorded at least three times at 5 minute intervals.			
The cardiovascular observations are stable and within preoperative limits. If not the anaesthetist has been informed and has assessed the patient: Please state Intervention taken:			
Have had any additional observations recorded. Observations recorded are stable.			
Have all IV cannulae been flushed with saline?			
Completed documentation for condition of wound, per-vaginal loss, irrigations etc. Free of excessive bleeding.			
Wound drains vacuumed and draining. Drainage documented. Free of excessive bleeding.			
If urinary catheter insitu, catheter checked for patentcy and urine output documented			
If receiving IV fluids has the patient an accurate fluid balance recorded in the care plan?			
VIP chart completed			
Have had pain assessed and documented. Appropriate interventions taken and documented to relieve pain if required. Best practice would be to aim for a pain score of 4 or less.			
If PCA or EPCA insitu have a completed PCA or EPCA chart with hourly observations documented?			
Is the patients nausea & vomiting controlled?			
Are all IV fluids, analgesia, antibiotics & anti-emetics prescribed as appropriate?			
Have interventions been made and documented to return temperature to normal if necessary. I.e. warming devices or cooling measures.			
Have privacy and dignity protected i.e. covered appropriately.			
Have some degree of orientation to surroundings where mentally capable.			
Are all actual/potential problems on the care plan evaluated, documented and signed?			
If the patient has been in recovery longer than 2 hours has the anaesthetist reviewed the patients condition?			
Have all documents been filed for confidentiality?			
Has skin integrity been assessed?			
Critical care handover documentation			

Tick box as appropriate, do not use shaded boxes

Time out of recovery: Hand over to:

Signature of recovery practitioner: Signature of ward staff:

Recovery / comments continued:

Labels / implants etc:

7. SWALLOWING

Not all patients with a tracheostomy will present with swallowing difficulties. Swallowing difficulties are more often the result of the patient's medical condition rather than the tracheostomy tube itself.

The theoretical evidence around the effects of a tracheostomy tube on swallowing is controversial, but suggests that the following may occur in the presence of a tracheostomy tube:

- Reduction of antero-superior movement of the larynx
- Tracheal irritation at rest and during swallowing
- Reduced laryngeal closure
- Compression of the oesophagus by the tracheostomy tube cuff
- Reduced subglottal air pressure
- Reduction or elimination of airflow through the glottis
- Blunting of the reflexive cough
- Non co-ordination of the glottic closure response
- Reduced laryngeal sensitivity
- Disuse atrophy of the laryngeal muscles

A Speech and Language Therapist (SALT) will assess the swallow function of those patients identified as being at risk of dysphagia. This is to reduce the risk of aspiration which may lead to aspiration pneumonia. Aspiration is the leading cause of pneumonia in the intensive care unit and contributes significantly to the overall morbidity and mortality of the critically ill patient (McClave et al 2002). This complication can cause significantly longer hospital stays, thus increasing the cost of care (Carter-Young et al 1990).

Who to refer to the Speech & Language Therapy department for a swallowing assessment?

A referral would be appropriate for tracheostomised patients with:

- Neurological involvement e.g. bulbar involvement
- Head & Neck surgery
- Evidence of aspiration of food/fluid/oral secretions on tracheal suctioning
- Persistent wet or weak voice when cuff is deflated and speaking valve or decannulation cap in place
- Coughing in relation to oral intake
- Oxygen desaturation in conjunction with oral intake
- Patient anxiety or distress during oral intake.

When to refer to the Speech and Language Therapy department for a swallowing assessment?

The following criteria should be considered **before** referring a patient to the Speech and Language Therapy department for a swallowing assessment.

Pre-Assessment	Rationale
Is the patient sufficiently alert and able to be sat upright?	• This is the optimum position for feeding and digestion. • The airway is protected and it helps to reduce the risk of aspiration.
Is the patient's oral cavity clean and clear?	• To reduce the risk of associated infection and airway occlusion.
Has the patient been trialled with cuff deflation with simultaneous suctioning in conjunction with Trust guidelines?	• To ensure the patient is able to tolerate their secretions prior to proceeding to oral intake • Secretions can pool and sit on top of the inflated cuff. Suctioning at the time of cuff deflation will minimise the risk of these secretions being aspirated.
Can the patient tolerate cuff deflation for the period of the assessment?	• To reduce potential compression of the oesophagus and patient discomfort. • To enable full bedside assessment of the overt clinical risk of aspiration. Without cuff deflation, assessment findings will be limited.
What is the patient's chest status and oxygen requirement? Is regular suctioning required?	• If oxygen requirement is over 35-40% and/ or regular suctioning is required, it is likely to be too early for a swallowing assessment.
If cuff deflation is tolerated, is the patient able to tolerate wearing a speaking valve during the assessment?	• To maximise supraglottic air flow and enable voice quality to be monitored during the swallow assessment (Murray K et al 1998).

Assessment

When dysphagia is suspected, a referral is accepted from any member of the multidisciplinary team once the above criterion has been considered and it is agreed that the patient is appropriate for a swallowing assessment.

The Speech and Language Therapist will complete a bedside evaluation of swallowing. Regular suctioning to maintain a clear airway should be available throughout the assessment by nursing or physiotherapy staff.

Research does not fully support the use of the modified Evans blue dye test (MEBDT) to identify the presence or absence of aspiration due to its high false negative rate i.e. it does not always detect aspiration when it has actually occurred (O'Neil-Pirozzi TM et al, 2003). It may, however, be helpful as a screening tool and should be combined with other patient risk factors and underlying diagnosis. Please note that this should only be carried out by a dysphagia trained Speech and Language Therapist.

Further assessment information may be obtained through administering a video-fluoroscopy. This enables radiographic visualisation of the swallow.

Management of Dysphagia

The findings of the assessment and resulting recommendations will be discussed with the multi-disciplinary team and documented in the patient's medical notes to ensure appropriate and effective care for the individual patient.

The Speech and Language Therapist may recommend the following interventions:

- *Diet/ Fluid Modifications*

The SALT may recommend modified food/ fluid consistencies to optimise swallow safety. This may require liaison with the dietitian.

- *Non-Oral Feeding*

If the SALT recommends that a patient should be nil by mouth or that they can only begin oral trials/ tasters, then the patient may require an alternative form of feeding to maintain nutrition and hydration. A referral to the dietitian will be made in this instance.

- *Dysphagia Therapy*

This includes oral motor control and range of motion exercises to heighten sensory input). Swallow manoeuvers which are designed to place specific aspects of pharyngeal swallow physiology under voluntary control will also be considered. Please note, however, that dysphagia therapy may not be appropriate for all patients.

8. COMMUNICATION

Communication is the sharing of experiences, events, ideas and feelings through verbal (sounds, words) and non-verbal (gesture, tone of voice, facial expression) means. In a medical setting, communication is required in order for the patient to give informed consent about their treatment as well as to participate in social interaction, discussion of feelings and counselling.

There are 3 main causes of communication disorder in the critical care setting:

- Organic communication disorders - Stroke, head injury, damage to oral cavity, pharynx or larynx, spinal cord injury, tumours, etc.
- Concomitant communication disorders - Critical care neuropathy, mechanical ventilation, tracheostomy tubes.
- Psychogenic communication disorders - Critical care psychosis or clinical depression.

By providing timely and ongoing assessment and intervention and providing effective communication strategies and/or aids there may be a reduction in negative emotional responses (fear, anxiety, frustration) and an improvement in the psychological well-being of the patient, family and staff (Dikeman and Kazandjian, 2003; Manzano et al, 1993).

The Role of the Speech and Language Therapist

The role and responsibility of the Speech and Language Therapist is to facilitate communication and to ensure equitable communication for all patients. The Speech and Language Therapist will assess the most appropriate way for the patient to communicate. In addition to the methods below, the nurse call bell should be accessible to the patient at all times.

Non-Verbal Communication

- Exaggerated lip movements - This requires the patient to use short but complete sentences and requires adequate oro-motor ability.
- Facial expression and gestures
- Writing
- Coded Eye Blink or Hand Gesture – E.g. blink once for "yes" and twice for "no" or thumbs up for "yes" and down for "no
- Alphabet Board, Picture Board and Phrase Books - These can be individualised for a patient by the Speech and Language Therapist.

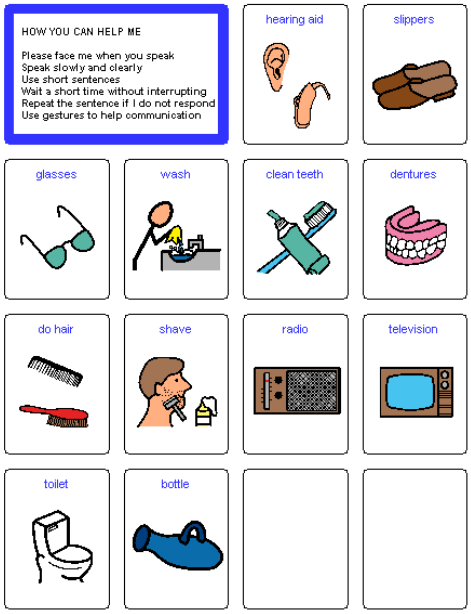
A	B	C	D	E
F	G	H	I	J
K	L	M	N	O
P	Q	R	S	T
U	V	W	X	Y
Z	.	?	!	’

END OF WORD	END OF SENTENCE

YES	NO

1	2	3	4	5
6	7	8	9	0

Alphabet Chart



Picture Board (Boardmaker Symbols)

- Electronic Communication Aids - It is necessary for the Speech and Language Therapist to assess the patient for use of one of these aids, and then, if appropriate, advise the patient, family, carers and staff on its use. Use of these aids requires the patient to develop an adequate level of skill, therefore may not be suitable for short term use.

Tobii PCEye Eye Gaze System

Lightwriter SL40 Connect

Verbal Communication (Manipulation of the Tracheostomy Tube for Communication).

Voice production may be achieved in patients with a tracheostomy tube by using one or more of the following:

- Cuff Deflation - Deflation of the cuff of the tracheostomy tube will allow air to pass into the upper airway on expiration. Phonation will be achieved as air is directed into the larynx, however the strength of the voice may be weaker as some air will pass out of the open tracheostomy-
- Fenestrated Tracheostomy Tube - Use of a fenestrated tracheostomy tube also allows air to pass into the upper airway on expiration, thus producing voice. It is essential to remove a non-fenestrated inner cannula if in-situ. It is important to check that the fenestrations are patent and well aligned in the tracheal lumen.
- Intermittent Finger Occlusion - Intermittently occluding the tracheostomy tube with a gloved finger will allow for effective voicing in many patients. To use this technique, the patient should ideally be able to tolerate cuff deflation, but if not must have a fenestrated tracheostomy tube (with fenestrated inner cannula) in place.
- One Way Speaking Valve - One-way speaking valves can be used very effectively with tracheostomised and ventilator dependent patients. Use of a one-way speaking valve is dependent upon the patient's ability to tolerate cuff deflation and susceptibility to fatigue (due to increased resistance to airflow).

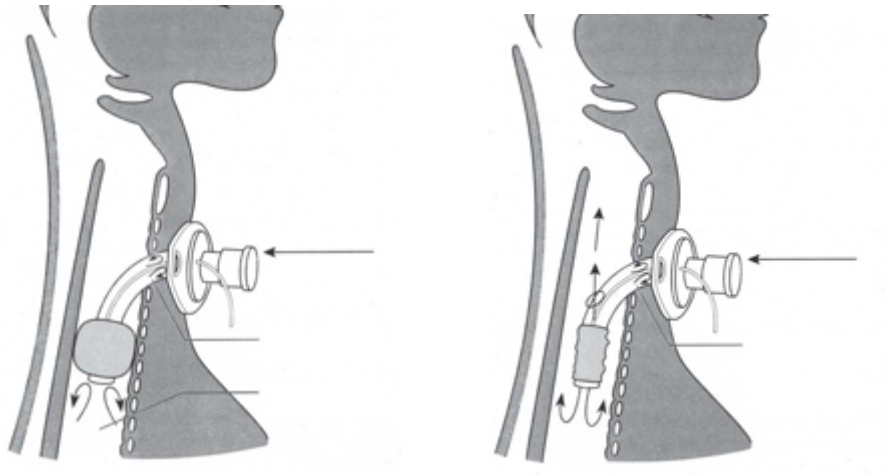
Range of Passy-Muir Speaking Valves

Speaking valves should only be used with **non-cuffed** tracheostomy tubes or with the tracheostomy cuff (if present) **deflated** (in accordance with local policy, the deflation of the cuff should be discussed by the multidisciplinary team). If the cuff is inflated the patient's respiration will be compromised (see diagrams below) as the patient will not be able to breathe out. This could lead to a cardiovascular collapse. If using fenestrated cuffed tubes, please ensure the fenestrations are patent and well-aligned in the tracheal lumen.

It is not recommended to leave a speaking valve on a patient with a deflated cuffed tracheostomy tube unless patient is continuously monitored and the speaking valve is only for a short period of time while testing patient phonation.

**In a small number of patients with a chronic cuffed tracheostomy tube, with full agreement and understanding between a consultant and a competent and trained patient, a speaking valve with the deflated cuffed tracheostomy tube may be permitted in the community.*

Before a speaking valve is used continuously the patient should have been assessed and monitored to check that he/she tolerates the speaking valve.



Incorrect (cuff inflated) ***Correct (cuff deflated)***

Contraindications for speaking valve use include:

- Inability to tolerate full cuff deflation
- Airway obstruction
- Unstable medical/pulmonary status
- Laryngectomy
- Severe anxiety/cognitive dysfunction
- Anarthria
- Severe tracheal/laryngeal stenosis
- End stage pulmonary disease

The Speech and Language Therapist will be able to provide information and advice on achieving the most appropriate communication system for the individual patient.

RCSLT Position Paper

SALT in Adult Critical Care – Key Recommendations

- All people with critical care needs who have communication and swallowing difficulties should have access to a timely and responsive SLT service.
- Commissioners should ensure that SALT services are incorporated in critical care service planning and development. Therefore SALT services should be examined to ensure they are appropriately resourced to provide quality care people with critical care needs. This would include funding for appropriate SALT staff and equipment e.g. communication aids.
- SALT services should provide equal access to intervention for both communication and swallowing difficulties.
- SALT services should be provided within an integrated MDT to ensure the philosophy and goals of intervention are consistent and shared.
- Communication and swallowing are the responsibility of the whole team. The role of the SALT is to empower and educate others as well as providing direct specialist input as appropriate.

9. CARE OF PATIENTS ADMITTED WITH LONG TERM TRACHEOSTOMY

Patients that are admitted to hospital from the community with a long term tracheostomy will need to be located on those areas that have the adequate equipment and trained staff able to look after tracheostomy patient needs.

Some tracheostomy patients may be self-caring while in the community and they may be still self-caring in hospital. However, the reason for admission will need to be taken into account and it may be the case that they are not able to manage their own tracheostomy due to acute illness.

In any case, any patient admitted to hospital with a tracheostomy will have to have the necessary safety and emergency equipment and documentation provided for their care. This includes the poster displaying that the patient has a tracheostomy, with the type of tracheostomy tube documented.

Patients should only be admitted to those areas trained to look after tracheostomy patients, that is:

- All critical care areas
- ENT and Maxillo-Facial ward (Ward 35)
- Respiratory ward (Ward 9 at JCUH and Ainderby Ward at FHN)
- SCI unit HDU and rehabilitation ward

For those patients coming through the Emergency Department or Acute Admission Units, please contact critical care outreach and ask to provide the documentation and emergency tracheostomy box until the patient is moved to the right location.

If a patient with a tracheostomy is admitted to a different location for another reason, e.g., a long term laryngectomy patient going through surgery, the teams involved with the care of the tracheostomised patient should be made aware and critical care outreach should be informed.

When a patient is admitted with a tracheostomy form the community with a tube that is not use in the trust, e.g., a Silver Negus tracheostomy tube, a senior doctor with experience in tracheostomy care should identify a tracheostomy tube of similar diameter and length that could be used for this patient in case of an emergency. The equivalent tracheostomy tube should be kept then in the emergency box.

10. TRACHEOSTOMY CARE DOCUMENTATION

Tracheostomy Observation Chart

Tracheostomy Observation Chart

South Tees Hospitals NHS
NHS Foundation Trust

Date/Time _____

WRITE OR ATTACH ADDRESSOGRAPH
Surname.....
Forenames.....
DOB dd / mm / yyyy Age.....
Hospital number.....
NHS number.....

Frequency of observations _____ **Initials** _____ **NMC/GMC no** _____

Tracheostomy type _____ ☐ Cuffed ☐ Fenestrated

Tracheostomy size _____ ☐ Non -Cuffed ☐ Non-fenestrated

	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	00:00	01:00	02:00	03:00	04:00	05:00	06:00	07:00
Inner tube patency																								
Inner tube cleaned																								
Cuff pressure (write **D** if deflated)																								
Suction assessment																								
Suction performed																								
O_2 percentage																								
SpO_2																								
Humidification																								
Stoma assessment																								
Stoma care																								
Dressing change																								
Safety equipment																								
Nurse's initials																								

Tracheostomy Observation Chart June 2016 *Tracheostomy Care Group*

Tracheostomy Transfer of Care from Critical Care Checklist (JCUH)

South Tees Hospitals NHS
NHS Foundation Trust

Tracheostomy Transfer of Care Checklist

Patient Label	Type of tube		Reason for tracheostomy
	Size		☐ Respiratory support
	☐ Cuffed	☐ Uncuffed	☐ Secretion clearance
	☐ Fenestrated	☐ Unfenestrated	☐ Maintenance of airway
			☐ Other ……..

Tracheostomy performed:	Date of last change:	Date of next review:

Tracheostomy emergency box check list
☐ Cuffed tracheostomy tube* (patients own size)
☐ Cuffed tracheostomy tube* (one size smaller than above)
☐ Inner tube (x1) to fit tracheostomy tube on discharge
☐ Size 14, 12 and 10 suction catheters
☐ 20ml syringe
☐ Gloves
☐ Packet of sterile gauze
☐ Water soluble lubricant jelly
☐ Scissors

Baseline information	
Humidified O_2 percentage	
Humidified O_2 at time of transfer	
Cuff inflation pressure on discharge if indicated	
Suction requirement	
Size of suction catheter	
Frequency of suctioning	
Saline nebulisers required	

*In case of patient discharged with Portex UniPerc variable flange please use standard Cook, Portex or Tracoe PLUS equivalent size

Position of patient	
Swallow ability	
Assessment & care of site	
Nil by mouth	
Cuff deflation tolerance	

Additional Information:

- ☐ **Tracheostomy emergency box checked**
- ☐ **Tracheostomy emergency box with patient**
- ☐ **Tracheostomy awareness form with patient**
- ☐ **Tracheostomy observation chart commenced**

Contact for advice and support Critical Care Services:

ICU/HDU: 52680, 54539, 54898
CCOT bleep: 7000, 7001

ICU nurse signature Print name Date Time

Ward nurse signature Print name Date Time

Return all tracheostomy safety boxes after use to ICU CC Outreach Office

Tracheostomy Discharge Critical Care Checklist June 2016 *Critical Care Services*

Tracheostomy Transfer of Care from Critical Care Checklist (FH)

South Tees Hospitals NHS
NHS Foundation Trust

Tracheostomy Transfer of Care Checklist

Patient Label	Type of tube		Reason for tracheostomy
	Size		☐ Respiratory support
	☐ Cuffed	☐ Uncuffed	☐ Secretion clearance
	☐ Fenestrated	☐ Unfenestrated	☐ Maintenance of airway
			☐ Other ……

Tracheostomy performed:	Date of last change:	Date of next review:

Tracheostomy emergency box check list
☐ Cuffed tracheostomy tube* (patients own size)
☐ Cuffed tracheostomy tube* (one size smaller than above)
☐ Inner tube (x1) to fit tracheostomy tube on discharge
☐ Size 14, 12 and 10 suction catheters
☐ 20ml syringe
☐ Gloves
☐ Packet of sterile gauze
☐ Water soluble lubricant jelly
☐ Scissors

Baseline information	
Humidified O_2 percentage	
Humidified O_2 at time of transfer	
Cuff inflation pressure on discharge if indicated	
Suction requirement	
Size of suction catheter	
Frequency of suctioning	
Saline nebulisers required	

*In case of patient discharged with Portex UniPerc variable flange please use standard Portex,Cook or Tracoe PLUS equivalent size

Position of patient	
Swallow ability	
Assessment & care of site	
Nil by mouth	
Cuff deflation tolerance	

Additional Information:

- ☐ **Tracheostomy emergency box checked**
- ☐ **Tracheostomy emergency box with patient**
- ☐ **Tracheostomy awareness form filled**
- ☐ **Tracheostomy observation chart commenced**

Contact for advice and support
Critical Care Services:

CCOT bleep: 784 **ICU:** 64011

ICU nurse signature	Print name	Date	Time
Ward nurse signature	Print name	Date	Time

Return all tracheostomy safety boxes after use to ICU (FAO Sisters Office)

Tracheostomy Discharge Critical Care Checklist June 2016 *Critical Care Services*

Tracheostomy Patient Awareness Bed Sign

South Tees Hospitals NHS
NHS Foundation Trust

This document should be kept by the patient bedside at all times and filed on HCR on discharge from hospital

This patient has a

TRACHEOSTOMY

There is a potentially patent upper airway (Intubation may be difficult)

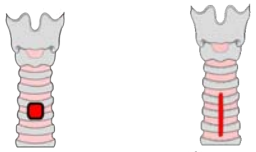
WRITE OR ATTACH ADDRESSOGRAPH
Surname.....
Forenames..... DOB
dd / mm / yyyy Age.....
Hospital number.....
NHS number.....

☐ New tracheostomy (this admission)

☐ Long term tracheostomy

Surgical / Percutaneous

Indicate tracheostomy type by circling the relevant figure



Percutaneous Slit type

Performed on (date)_____

Tracheostomy Tube size_____

Tracheostomy Tube changed ☐, please see back of form

- Indicate location and function of any sutures inserted_____
- Laryngoscopy grade and notes on managing upper airway _____
  _____
- Any problems with this tracheostomy (continue on back of form)_____
  _____

Emergency Call James Cook University Hospital: ICU Emergency bleep 1005 Anaesthetist SpR on call bleep 4598, CCOT bleep 7000
Emergency Call Friarage Hospital: ICU phone 64011, Anaesthetist on call bleep 161, CCOT bleep 784

CARDIAC ARREST CALL 2222

Tracheostomy Care Group South Tees Hospitals / June 2016 *Adapted from www.tracheostomy.org.uk*

Laryngectomy Patient Awareness Bed Sign

South Tees Hospitals NHS
NHS Foundation Trust

This document should be kept by the patient bedside at all times and filed on HCR on discharge from hospital

This patient has a

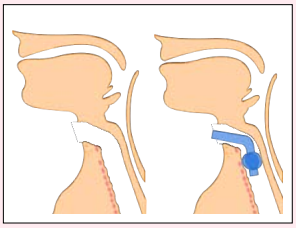
LARYNGECTOMY

and CANNOT be intubated via the mouth

Follow the **LARYNGECTOMY** guideline for breathing difficulties

WRITE OR ATTACH ADDRESSOGRAPH
Surname.....
Forenames.....
DOB dd / mm / yyyy Age.....
Hospital number.....
NHS number.....

Note: There may not be a tracheostomy tube in place. **The trachea (wind pipe) ends at the stoma**



Performed on (date)_____

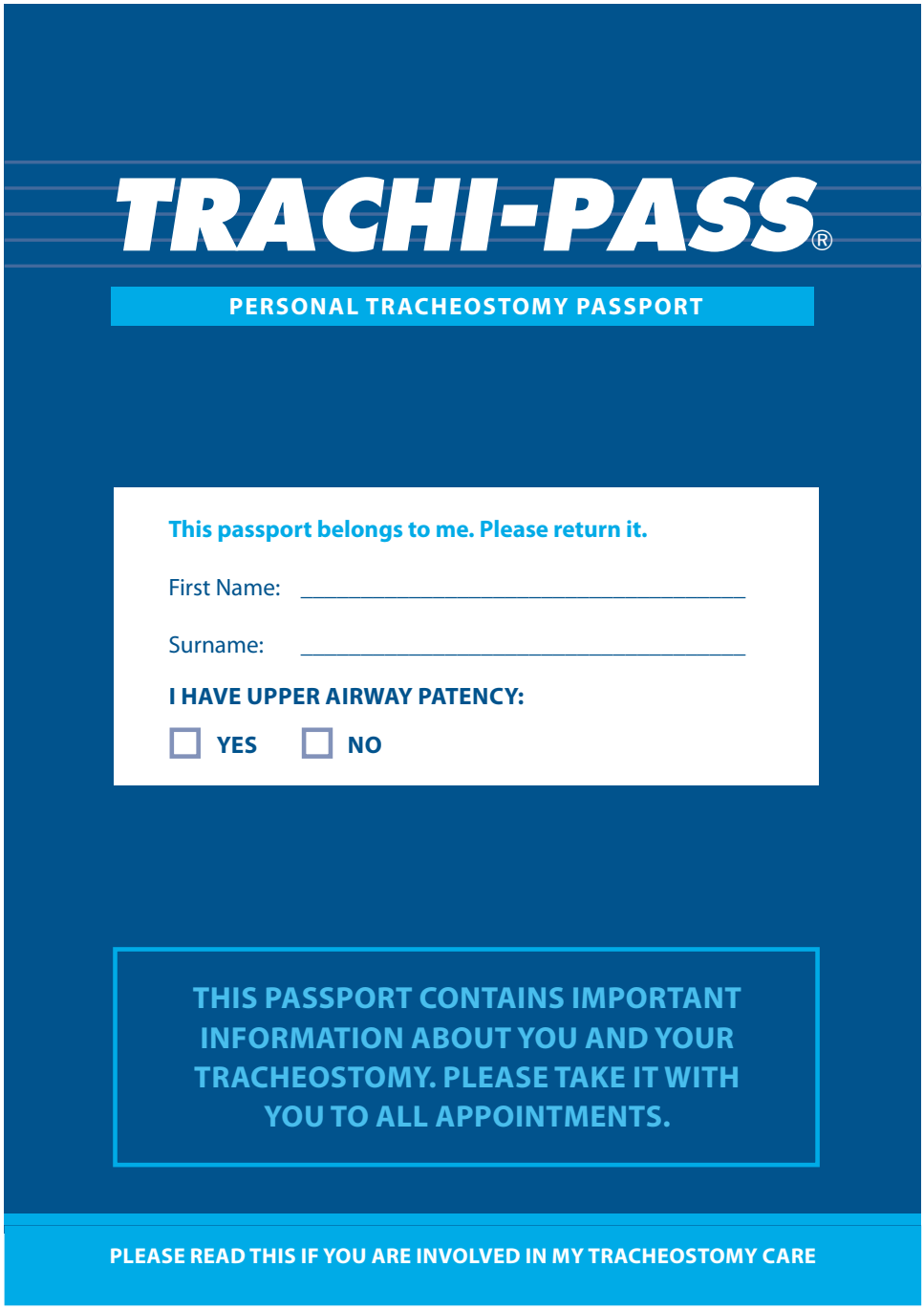
Tracheostomy Tube size (if present) _____

Emergency Call James Cook University Hospital: ICU Emergency bleep 1005, Anaesthetist SpR on call bleep 4598, CCOT bleep 7000
Emergency Call Friarage Hospital: ICU phone 64011, Anaesthetist on call bleep 161, CCOT bleep 784

CARDIAC ARREST CALL 2222

Tracheostomy Care Group South Tees Hospitals / June 2016 *Adapted from www.tracheostomy.org.uk*

Tracheostomy Passport



Laryngectomy Passport

Critical Care Tracheostomy Patient Information Leaflet

South Tees Hospitals NHS
NHS Foundation Trust

Tracheostomy

Information for patients & their relatives

Percutaneous Tracheostomy Consent Form (4)

Responsible Health Professional……

Title……

South Tees Hospitals NHS
NHS Foundation Trust

Patient details / label

Surname …… First name ……
Address ……
……
DoB …… D No. ……
NHS No …… M ☐… F ☐

Consent Form

4

Name of Proposed Procedure or Course of Treatment

PERCUTANEOUS DILATATIONAL TRACHEOSTOMY

Statement of Health Professional (to be filled in by health professional with appropriate knowledge of proposed procedure, as specified in consent policy)

I have explained the procedure to the patient's next of kin. In particular, I have explained:

- **Purpose of percutaneous tracheostomy:**

To facilitate ventilation and weaning from mechanical ventilation, more comfortable airway, secretions management, other: ……..

- **Complications of a tracheostomy:**
  - **Immediate complications (peri-operative)**

☐ Bleeding from damage of vessels in the neck (minor <5%, major <0.5%)
☐ Malposition of tracheostomy tube (0.5%)
☐ Significant deterioration in respiratory function / collapsed lung (2%)
☐ Pneumothorax or pneumomediastinum (air trapping) (<0.5%)
☐ Damage to the nerves in the neck (<1%)
☐ Death (<0.2%)

  - **Delayed complications**

☐ Tube blockage or displacement
☐ Infection and / or ulceration of stoma site
☐ Bleeding due to tube erosion of blood vessels or local tissue trauma

  - **Late complications**

☐ Significant scarring requiring revision
☐ Granulomata of the trachea
☐ Possible change in voice
☐ Tracheal stenosis (3-4%)

- **Any extra procedures which may become necessary following the procedure:**

☐ Blood Transfusion ☐ Emergency Surgery (for the complications stated above)

The following leaflet has been provided – Tracheostomy Patient Information Leaflet ☐
Special Requirements: e.g. communication, translator……

Signature …… Date……
Name (PRINT) …… Job title……
Signature …… Date……
Name (PRINT) …… Job title……
Signature …… Date ……
Name (PRINT) …… Relation to patient……
Verbal assent by phone from…… Relation to patient……

PDT CONSENT 4 / CCS / STH / June 2016

Percutaneous Tracheostomy Operating Procedure

PERCUTANEOUS DILATATIONAL TRACHEOSTOMY

Patient details/label

Surname ..... First name .....
Address .....
.....
DoB ..... D No. .....
NHS No ..... M ☐... F ☐

Date……

Time……

Location……..

Anaesthetist……
(Signature, GMC no, Print name and title)

Surgeon…..……...
(Signature, GMC no, Print name and title)

Supervising consultant…..……...
(Signature, GMC no, Print name and title)

Local anaesthetic……..

Sedation…….. Analgesia…….Relaxant……...

Throat pack used: ☐ Yes, if yes how many…….. ☐ No

Asepsis: Gown, Mask, Gloves, 2% Chlorhexidine / 70% Alcohol prep ☐

Technique: Landmark ☐ Ultrasound ☐ Direct bronchoscopy ☐

Incision……..

Trachea located, number of passes……..……

Tracheostomy set ……

Tracheostomy tube ……
……...
……...
……...

Tracheostomy set / tube sticker

☐ Instruments checked and returned

Comments……
……
……
……

Difficulties and Complications
……
……
……

Post Insertion CXR ☐ NO ☐ YES ……

If **Throat Pack** used: Removed ☐ Yes ……(number of throat packs removed)

PDT CONSENT 4 / CCS / STH / June 2016

Percutaneous Tracheostomy Procedure WHO Checklist

WRITE OR ATTACH ADDRESSOGRAPH
Surname.....
Forenames.....
DOB dd / mm / yyyy Age.....
Hospital number.....
NHS number.....

South Tees Hospitals NHS
NHS Foundation Trust

Percutaneous Tracheostomy Checklist

Critical Care Time-outs

Date_____Time_____

Time-out 1: Pre procedure (before operator scrubs)

- ❑ Is there assent?_____Assent obtained and form 4 completed
- ❑ Any contraindications considered?_____C-spine, anatomy, coagulopathy and drug allergies
- ❑ Feed? Insulin stopped?_____Plans regarding enteral feeding and risk of hypoglycaemia understood
- ❑ Roles agreed _____Operator, anaesthetist, nurse and runner roles delegated
- ❑ Tracheostomy tube for case ready_____Tracheostomy tube type and size considered and available
- ❑ Equipment ready_____Tracheostomy trolley complete and airway equipment to hand

The team agree tracheostomy is in the best interest of the patient and it is safe to proceed

Time-out 2: Prior to incision (operator scrubbed)

The team agree:

- ❑ The patient is anaesthetised, paralysed and adequately ventilated.
- ❑ The patient is optimally positioned, the neck is clean and local anaesthetic has been infiltrated.
- ❑ No one has any unvoiced concerns.

Time-out 3: Post procedure (operator confirms airway is secured)

The team agree:

- ❑ Need for chest X-ray discussed
- ❑ Throat pack(s) if present removed_____ (please specify number of throat packs removed).
- ❑ Documentation completed: operation chart, tracheostomy sign, audit form (if relevant).
- ❑ Scope cleaned and sent for decontamination. Scope documentation (sticker x2) completed.
- ❑ Non-disposable instruments on tracheostomy tray checked and sent to CSSD. All sharps disposed safely in sharp bin.
- ❑ Feed to be recommenced ± insulin infusion.
- ❑ No one has any unvoiced concerns.

Percutaneous Tracheostomy WHO Checklist / Critical Care Services / June 2016

Tracheostomy Decannulation Checklist

- Critical Care tracheostomies

WRITE OR ATTACH ADDRESSOGRAPH

Surname.....

Forenames..... DOB

dd / mm / yyyy Age.....

Hospital number

South Tees Hospitals NHS
NHS Foundation Trust

PERSON COMPLETING CHECKLIST

Tick below	DECANNULATION CHECKLIST
	Resolution of original need for tracheostomy insertion
	No planned intervention that will need artificial airway within 2 weeks
	Appropriate conscious level, able to maintain open airway. Patient will need to be observed for signs of airway obstruction post-decannulation
	Minimal oxygenation requirements last 24 hours, i.e., FiO2<40%
	Minimal secretions (PCF > 160 L/min). If cough effort insufficient
	Able to clear independently or if cough effort insufficient (PCF < 180 L/min) established used of cough assist device via mouth well tolerated by patient
	Patient tolerating cuff deflation for 24 hours
	If occlusion cap or speaking valve used, it should be tolerated for up to 4 hours
	CVS stability
	MDT (physiotherapist , SLT, specialist consultant, ward nurse, CCOT) informed and agreed
	Staff trained in advanced airway management (critical care or anaesthetist) for possible complications available nearby or by the bedside if known previous problems with patient's tracheostomy

Equipment	Procedure
Dressing pack and gauze Appropriate dressing Sterile water Gloves, apron and protective eye wear Appropriately sized tracheostomy tube and one a size smaller (available not opened) Oxygen, facemask or nasal specs Functioning suction unit and appropriate sized suction catheters Stethoscope Microbiological swab Resuscitation equipment available on the ward	Two person technique, clear understanding of roles Check emergency equipment availability Explain procedure to patient and gain patient consent where possible Position patient in semi-recumbent position When required place supplemental oxygen over nose/ mouth Remove old dressing and tapes and support the tube Suction patient Remove tube on expiration Observe stoma site, swab if required and clean stoma Check patient is comfortable Apply an appropriate dressing over the stoma site Advise patient to provide pressure to the stoma site when coughing and talking in the initial stages Document the procedure in the case notes and make a final check of the patient

Tracheostomy Decannulation Document / June 2016 Tracheostomy Care Group / South Tees Hospitals

DECANNULATION

DATE_____ TIME_____ LOCATION_____

OPERATOR (Name and GMC/RCN no.) _____

COMMENTS_____

Monitoring of the patient post decannulation

Assess for possible deterioration post decannulation.

End of bed assessment by experience nurse and perform NEWS initially at least every 15 minutes for first hour, then hourly for next 2 hours and increase to 4 hourly as stability allows.

Signs and symptoms that could indicate deterioration are:

- Breathlessness
- Laboured breathing
- Noisy respiration
- Stridor
- Increased respiratory rate
- Increased heart rate
- Excess use of accessory muscles
- Change in respiration pattern
- Change in respiration depth
- Agitation
- Oxygen desaturation

PLEASE INFORM WARD DOCTOR IF CONCERN.

IF AIRWAY PROBLEM OR RAPID DETERIORATION OF BREATHING PLEASE INFORM CRITICAL CARE OUTREACH (BLEEP 7000 JCUH AND XXXX AT FHN) AND SENIOR CRITICAL CARE DOCTOR / ANAESTHETIST (BLEEP 1005 JCUH, BLEEP 195 FHN)

CONSIDER CARDIAC ARREST CALL 2222 IF VERY URGENT

Tracheostomy Decannulation Document / June 2016 Tracheostomy Care Group / South Tees Hospitals

- ENT and Maxillo-Facial tracheostomies (Ward 35):

Criteria for Decannulation of Adult tracheostomy

Name:	
D.O.B:	
Address: Post code:	
Hospital Number: NHS Number:	

Date tracheostomy inserted: ...../...../.....

Consultant decides medically/surgically appropriate for decannulation:

Consultant..... Date.....Time.....

Consider downsize of tracheostomy to a smaller tube e.g. size 6 cuffless fenestrated tube (Please use extreme caution in capping off a tube over the size of 7)

If any respiratory concerns please contact physio for assessment.

Section 1: Patients with tracheostomies under 3 months for decannulation:

IF THE PATIENT DOES NOT MEET THE BELOW CRITERIA DO NOT PROCEED WITH DECANNULATION AND SEEK MEDICAL ADVICE

	Yes	No	N/A
If any chest concerns contact physio for assessment: Patient meets physio criteria for decannulation?			
Is the patient able to obey commands?			
Is the patient able to clear secretions effectively and independently? (The patient should have minimal secretions)			
Is the patient cardiovascularly stable?			
Can the patient maintain their oxygen saturations on air/ minimal oxygen requirement?			
Can the patient tolerate an uncuffed/deflated tube?			
If appropriate is the patient able to swallow safely?			
Can the patient tolerate a speech valve?			
Can the patient tolerate the decannulation cap for a minimum of 6 up to 24hours? (With no increased breathing effort or cardiovascular instability) With capping: • Please ensure the patient is closely monitored • Recommended minimal observation: • Every 15 minutes for 1hour, hourly for 3 hours			
If the patient meets these criteria then remove tube and apply dressing. Patient can be discharged same day after 2 hours observation. Instruct patient to apply digital pressure to dry dressing over tracheostomy site when phonating, and of care of wound site.			
Arrange follow up in outpatient clinic in 3-4 weeks to check that fistula is closing			

Section 2: Patients with longstanding tracheostomies (over 3 months) for decannulation:

IF THE PATIENT DOES NOT MEET THE BELOW CRITERIA DO NOT PROCEED WITH DECANNULATION AND SEEK MEDICAL ADVICE

	Yes	No	N/A
Has a consultant decided that the patient is suitable for decannulation (safe airway)?			
Does the patient have a safe swallow (either doesn't aspirate on eating or is nil by mouth and has alternative feeding route)?			
Is the patient aware that they are in hospital to have their tracheostomy removed permanently?			
Does the patient have a size 6 or smaller fenestrated tube in? (If not then change tube before proceeding)			
Can the patient tolerate 24 hours with a decannulation cap without it being removed? (With no increased breathing effort or cardiovascular instability) With capping: • Please ensure the patient is closely monitored • Recommended minimal observations: • Every 15 minutes for 1hour, hourly for 3 hours			
If the patient meets these criteria then remove tube and apply dressing. Patient can be discharged same day after 2 hours observation. Instruct patient to apply digital pressure to dry dressing over tracheostomy site when phonating, and of care of wound site.			
Arrange follow up in outpatient clinic in 3-4 weeks to check that fistula is closing			

Name..... Signature.....

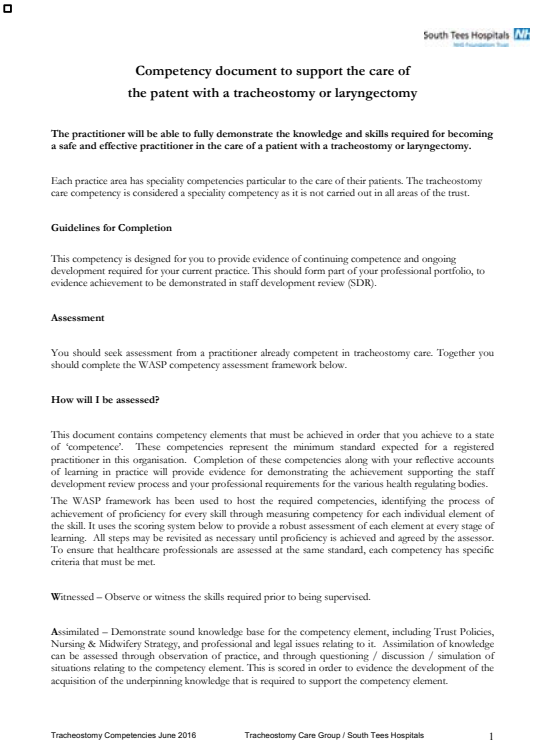
Job title..... Date.....

NMC registration.....

11. TRACHEOSTOMY EDUCATION AND COMPETENCIES

There is a separate document for the assessment and maintenance of competencies for the care of tracheostomised patients for nurses and AHP and another one for the care of tracheostomy patients by health care workers and community carers.

There are also regular training days for the care of the tracheostomy patients.



South Tees Hospitals NHS

Competency document to support the care of the patent with a tracheostomy or laryngectomy

The practitioner will be able to fully demonstrate the knowledge and skills required for becoming a safe and effective practitioner in the care of a patient with a tracheostomy or laryngectomy.

Each practice area has speciality competencies particular to the care of their patients. The tracheostomy care competency is considered a speciality competency as it is not carried out in all areas of the trust.

Guidelines for Completion

This competency is designed for you to provide evidence of continuing competence and ongoing development required for your current practice. This should form part of your professional portfolio, to evidence achievement to be demonstrated in staff development review (SDR).

Assessment

You should seek assessment from a practitioner already competent in tracheostomy care. Together you should complete the WASP competency assessment framework below.

How will I be assessed?

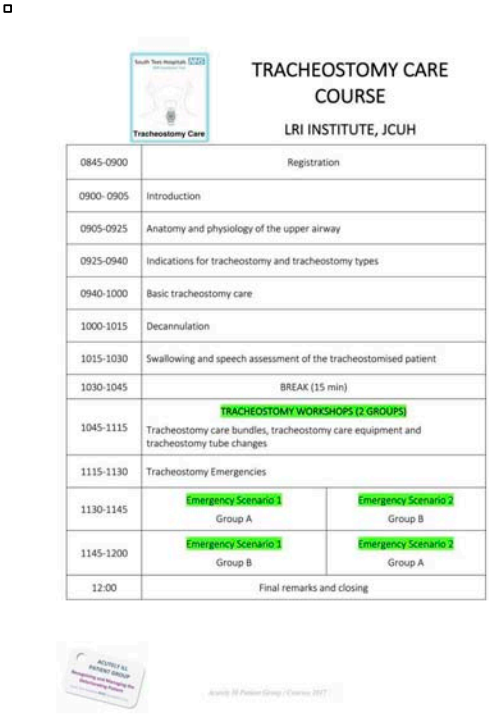
This document contains competency elements that must be achieved in order that you achieve to a state of 'competence'. These competencies represent the minimum standard expected for a registered practitioner in this organisation. Completion of these competencies along with your reflective accounts of learning in practice will provide evidence for demonstrating the achievement supporting the staff development review process and your professional requirements for the various health regulating bodies.

The WASP framework has been used to host the required competencies, identifying the process of achievement of proficiency for every skill through measuring competency for each individual element of the skill. It uses the scoring system below to provide a robust assessment of each element at every stage of learning. All steps may be revisited as necessary until proficiency is achieved and agreed by the assessor. To ensure that healthcare professionals are assessed at the same standard, each competency has specific criteria that must be met.

Witnessed – Observe or witness the skills required prior to being supervised.

Assimilated – Demonstrate sound knowledge base for the competency element, including Trust Policies, Nursing & Midwifery Strategy, and professional and legal issues relating to it. Assimilation of knowledge can be assessed through observation of practice, and through questioning / discussion / simulation of situations relating to the competency element. This is scored in order to evidence the development of the acquisition of the underpinning knowledge that is required to support the competency element.

Tracheostomy Competencies June 2016 Tracheostomy Care Group / South Tees Hospitals 1



TRACHEOSTOMY CARE COURSE

LRI INSTITUTE, JCUH

0845-0900	Registration	
0900- 0905	Introduction	
0905-0925	Anatomy and physiology of the upper airway	
0925-0940	Indications for tracheostomy and tracheostomy types	
0940-1000	Basic tracheostomy care	
1000-1015	Decannulation	
1015-1030	Swallowing and speech assessment of the tracheostomised patient	
1030-1045	BREAK (15 min)	
1045-1115	TRACHEOSTOMY WORKSHOPS (2 GROUPS) Tracheostomy care bundles, tracheostomy care equipment and tracheostomy tube changes	
1115-1130	Tracheostomy Emergencies	
1130-1145	Emergency Scenario 1 Group A	Emergency Scenario 2 Group B
1145-1200	Emergency Scenario 1 Group B	Emergency Scenario 2 Group A
12:00	Final remarks and closing	

For further information about tracheostomy care education and competencies please contact the Tracheostomy Care Group via the Senior Educator team in the Trust.

12. TRACHEOSTOMY CARE CLINICAL GOVERNANCE

Audit of Tracheostomy Care

The care of the tracheostomy patient must be audited regularly against the standards for tracheostomy care.

Any of the tracheostomy care interventions can be assess for compliance. It is recommended that a compliance audit for the tracheostomy care bundle is done at least yearly. The results of these audits should be made available to the relevant teams and to the tracheostomy care group.

Some examples of audits are:

- Compliance with the Tracheostomy Care Bundle
- Tracheostomy equipment availability on the areas looking after tracheostomy patients
- Tracheostomy-related documentation completion
- Compliance with training and competency for tracheostomy care
- Audit of timing and compliance with standards for tracheostomy tube changes
- Audit of compliance with standards for decannulation

Tracheostomy-related Critical Incidents

Any critical incident related to a tracheostomy patient must trigger a completion of the incident report system (DATIX). These incidents should be reviewed by the local teams as well as by the tracheostomy care group regularly.

We are aware that these incidents are under-reported and all the areas looking after tracheostomy patients and all the members of the multidisciplinary team should be encouraged to report and review any incident related to tracheostomy care.

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