Care of Adult Patients with a Tracheostomy Tube

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Policy Statement

A patient with a tracheostomy tube 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.

Safety Alert

All due care must be taken when repositioning a patient with an artificial airway. During the immediate postoperative period, a patient is at great risk of dislodgement if the tracheostomy is not well secured or supported. When a patient is being turned or repositioned, ONE person must be designated solely to support the tracheostomy tube with no less than 3 staff are required to perform a turn or reposition. The person holding the tracheostomy, should stand at the head of the bed and be responsible for making the call when turning. Whilst holding the tracheostomy tube, pressure must be applied to the patient’s torso by the butt of the hand. This enables you to maintain a firm hold on the tracheostomy particularly if the patient coughs or moves unexpectedly.

If the tracheostomy tube becomes dislodged never blindly reinsert the tube, but seek assistance which may mean re-establishing the airway with an endo-tracheal tube.

Purpose

The purpose of this procedure is to provide evidence based guidance for the general care of a patient with a tracheostomy. This procedure has incorporated latest practice guidelines set out by the NSW Agency for Clinical Innovation. It will cover the various practice issues in relation to caring for a patient with a tracheostomy.

Intended Audience

Registered Nurse
Medical Officer
Physiotherapist
Speech Pathologist
Student Nurse under Supervision
Enrolled Nurses under Supervision

Expected outcomes

The expected outcome is that patients with a tracheostomy will be cared for by staff who understand the need for tracheostomy insertion and who are aware of how to best care for a tracheostomy.
Definitions

Endotracheal tube (ETT): An artificial airway inserted into the trachea for the purpose of mechanical ventilation

Tracheostomy: An artificial opening (stoma) into the trachea to facilitate ventilation

Tracheostomy tube: A tube which holds the stoma open

Ventilator – A mechanical device utilised to deliver and support patient’s respiratory effort via an artificial airway

Fenestration- Hole / opening in the middle of the upper aspect of the tracheostomy tube

Oxygen Saturation Probes – Monitoring device reading patient's oxygen saturation levels.

Extubation – Removal of an artificial airway.

Passy Muir speaking valve – (PMV) Aqua speaking valve that can be used for both ventilator and non-ventilator dependent tracheostomy patients to facilitate speech in select patients who meet a specific criteria.

Tracheostomy MDT – A group at Nepean hospital that meets to discuss ward based tracheostomy patients. This group includes ENT, CNCs, SP, PT, ICU MO’s, Anaesthetics and other medical professionals where relevant

What is a tracheostomy?

A tracheostomy is the formation of an opening into the front of the trachea usually between the first and second or second and third rings of cartilage to facilitate ventilation.

The tracheostomy may be temporary, long term or permanent.

A temporary tracheostomy can be formed when a patient requires short term respiratory support. The tracheostomy tube will be inserted to maintain the patency of the airway. This can be removed when the patient recovers. A temporary tracheostomy may become long term if the patient’s condition requires this.
A long term tracheostomy is when the underlying condition is chronic or progressive and the patient is unable to be decannulated. This chronic respiratory support or long term airway protection requires a long term tracheostomy.

A permanent tracheostomy (more typically known as a laryngectomy) is performed where the trachea is brought out to the surface of the skin and sutured to the neck wall. This stoma is kept open by the rigidity of the tracheal cartilage. The patient will breathe through this stoma for the remainder of his/her life. As a result, there is no connection between the nasal passages and the trachea. These patients have no natural humidification as the nasal passage is bypassed and when they are unwell and receiving oxygen often need close monitoring of secretions as they are at high risk of sputum plugs. They also may have unique communication and stoma care needs.

Laryngectomy patients should be clearly identified on the ward/ICU as they cannot be orally intubated. Ideally these patients should be referred to the ICU Liaison nurse service to ensure adequate ward education.

Indications for insertion of a tracheostomy
There are a number of indications for a tracheostomy tube including:
- Maintenance of airway patency for patients with mechanical obstruction of the upper airways (e.g. bilateral vocal fold palsy)
- Prophylactic insertion during head and neck/ENT surgery where airway is likely to be temporarily compromised by post-surgery oedema
- As a weaning step from the ventilator in patients with respiratory failure
- To protect the airway from secretions entering the lungs in patients with a compromised swallow and/or impaired airway protection
- To allow access to bronchial secretions (respiratory toileting) when a patient is unable to cough effectively

Features of Tracheostomy Tubes
Tracheostomy tubes have different features depending on their intended use. There are a large variety of tubes available which provide some or all of these features.

Introducers/Obturator
An Obturator can be used when inserting a tracheostomy tube to prevent damaging the trachea during insertion of the tube. It rounds off the end of the tube. Once the tracheostomy tube has been inserted the introducer should be removed and disposed of.

Cuffs
Some tracheostomy tubes have a cuff which, when inflated, provides an airtight seal which facilitates artificial ventilation. It can also prevent macro aspiration of secretions however micro aspiration is not prevented as there is often a gap between the tracheal wall and the cuff.

There is a common misconception that feeding a patient with the cuff up is safer and aspiration is prevented. This is not the case. Patients should be fed with full cuff deflation unless a Speech Pathologist recommends otherwise.

Inner tubes (cannulae)
Tracheostomy tubes with inner tubes consist of an outer tube, which remains in situ, through which a smaller, inner tube is inserted. The inner tube has an extension at its upper aspect that can be connected to other equipment. It can be removed for cleaning and when weaning.
the patient. A replacement non-fenestrated inner tube must be kept at the patient’s bedside at all times. Not all tracheostomy tubes have inner cannula.

Where possible a patient leaving ICU to the ward should have a tracheostomy with an inner cannula.

**Fenestrations**
Fenestrated tracheostomy tubes have a fenestration (hole) in the middle of the upper aspect of the tube. This will allow the passage of air and secretions into the mouth and nose in the normal way rather than directing them out via the tracheostomy tube. These tubes will always have a non-fenestrated inner tube, which must be inserted if the patient requires further respiratory support or suctioning so the catheter does not pass through the fenestration instead of into the airway.

Fenestrated tubes have clinical risks including the risk of granulation formation.

**Sub-glottic suction**
Blue Line tracheostomy tube from Portex will allow suctioning of the airway above the cuff. This feature will allow the user to remove excessive upper airway secretions that could accumulate above the cuff and flow into the patient’s airway. Intermittent suctioning via this outlet has been shown to decrease the incidence of ventilator-associated pneumonia.

**Tracheostomy Tubes commonly used at Nepean Blue Mountains LHD Hospitals**

**Portex, Shiley (Mallinckrodt) cuffed tracheostomy tubes**
A disposable, plastic tube, with an introducer and cuff. The Shiley tubes have an inner cannula whilst the Portex tubes can be fitted with an inner cannula. Used for patients who require a short-term airway support e.g. post-operatively, or for artificial ventilation

**Shiley cuffed/ uncuffed fenestrated tracheostomy tube**
A disposable plastic tube with an introducer, cuff and two inner tubes (one permanent, this has a white top; one fenestrated inner tube, this has a green top). In addition, a spare non-fenestrated inner tube (which has a red top) is also available. This is used to replace the white top inner tube when this is cleaned.

This tube may be used in the following ways:

- With the inner tube (white top) insitu and the cuff inflated when the patient requires full ventilatory support.
- With the inner tube (white top) removed and the cuff deflated. This can be used as the final stage in the process of weaning the patient from using the tracheostomy. By covering the external end of the tube with a one-way valve or decannulation plug, the patient will be able to breathe through their nose and mouth in the normal way. It is more difficult to breathe through this system than it is to breathe normally as the tube causes some obstruction, and this must be considered when assessing the patient.

**Adjustable Flange Tracheostomy Tubes**
These tubes are used in patients who have an abnormally large distance from their skin to their trachea, and a standard tube would not fit properly. The flange adjusts to accommodate either a very long neck or a fairly large neck.
The decision to use a specific tracheostomy tube is best made with input from numerous people including medical staff, nursing staff, physiotherapy and speech pathology and if appropriate, the patient.

**Day to day Management of Tracheostomies**

**Patient assessment**

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

- Why does the patient have a tracheostomy?
- When was the tracheostomy performed? Was it surgical or percutaneous (may have implications for ease of re-insertion) and does the patient have a larynx? (i.e. do they have a communication between the oral airway and the lungs?)
- Type and size of tracheostomy tube & availability of spare & emergency equipment
- Cough effort, Sputum characteristics (Colour, Volume, Consistency, and Odour). Is the physiotherapist aware of this patient?
- Ability to swallow. has speech pathology been notified of this patient?
- Check and change inner cannula for any build-up of secretions
- Check tracheostomy holder is secure and clean
- Check stoma dressing is clean
- Routine observations

Results of this assessment should be documented in the patients’ medical records.

**Essential Equipment**

To facilitate optimal clinical care and intervention under emergency circumstances, the following equipment should be available WITHIN the patient’s bed space AND must be checked on a shift-by-shift basis to ensure availability:

- suction equipment including size appropriate suction catheters and oral suction equipment
- oxygen supply and attachments to apply oxygen to both tracheostomy and face
- cuff manometer and 10 mL syringe (where a cuffed tracheostomy is in use)
- personal protective equipment for standard precautions including: gloves, aprons/gowns, goggles and fluid-resistant mask, or full-face visor. The type of mask required may vary if patient under droplet or airborne precautions
- humidification devices as appropriate
- appropriate waste receptacles for general and clinical waste
- bottle of sterile water to clean suction tubing after use (labelled with date and changed daily)
- spare inner cannula (where dual lumen tracheostomy tubes are in use)

Units may choose to keep some equipment on an emergency trolley, which is located within the immediate ward rather than in the patient’s bed space:

- two spare tracheostomy tubes (one the same size as tube insitu, and one a smaller size). Sites may consider a cuffed tracheostomy tube is required in case of emergency tracheal dilators may also be considered

**Maintaining the tracheostomy tube in position**

Maintaining the optimal position of the tracheostomy tube within the trachea is vital.
To minimise damage to the tracheal wall by the distal end of the tracheostomy tube, the tube has to be maintained in a central position, avoiding angling and contact between tracheal mucosa and tube. Traction as well as unnecessary movement of the tube should be avoided.

1. Two clinicians must always be present to change the method of securing the tracheostomy tube. One clinician changes the tapes while the other holds the tracheostomy in position.

2. Of the two clinicians changing the tracheostomy tube securement, at least one clinician must be experienced in tracheostomy care.

3. Due to the risks of TT dislodgment, the tracheostomy tube tapes MUST not be changed for 24 hrs. after insertion or as specified by the team.

4. Careful consideration should be given to the method chosen for securing the tracheostomy tube. A combination of techniques may be required by some patients.

5. **Sutures** may be appropriate where there is
   - Oedema formation secondary to interruption of venous and lymph drainage
   - Increased intra-cranial hypertension as venous flow from the head may be impaired by ties around the patient’s neck
   - Complete loss of the airway if the tracheostomy was to be displaced
   - Patients who have undergone micro vascular reconstruction (flap) to the head/neck area

   Where sutures are used, these should be reviewed daily. Sutures should be removed by Day 7-10.

6. **Cotton tapes** secured with a double knot are appropriate for newly formed tracheostomy stomas (<one week old) as these are less likely to become loose. In certain circumstances it may be necessary to use Velcro tapes before 7 days in patients who are at risk of developing a pressure injury from the white tapes. These situations must be discussed with a senior medical officer.

7. Manufactured tapes using **Velcro** should only be used for tracheostomy tubes > 7 days old and patients unlikely to self-extubate.

8. Tracheostomy tapes should be changed when they become wet or soiled (except within the first 24 hrs.)
   - Ensure tapes are not too loose or too tight.
   - Being able to insert one digit between tapes and skin is adequate.

9. Where an adjustable flange tracheostomy tube is used, the position of the flange relative to the tube must be
   - marked permanently
   - inspected at least each shift and
   - documented to identify tube migration.
Cuff Management

It is usual that the initial tracheostomy tube to be inserted will be a cuffed tube. The cuff provides a sealed airway. A cuffed tube is usually a temporary measure until a patient is weaned from a ventilator and the patient can control their own secretions, but may be required long term if the underlying condition does not improve sufficiently.

Recommendations suggest that the cuff pressure should be kept between 20-30 cmH2O to ensure adequate seal for ventilation, and to prevent potential tracheal trauma. Regular cuff pressure checks are carried out every 8 hour shift. Infectious patients should have their own cuff manometer. In most cases patients transferred to the ward from ICU should be discharged with an uncuffed tube.

Humidification

The insertion of a tracheostomy tube bypasses the normal humidifying function of the upper airway. It is therefore essential that artificial humidification is applied to maintain effective respiratory function and prevent secondary complications. Failure to adequately humidify could result in tube or stoma blockage as secretions become dry and viscous, forming a crust within the tracheostomy tube.

The type of humidification a patient will need will be dictated by their individual needs. Patients who are at high risk include those with reduced or thickened secretions and those with a longer length and/or single lumen tube. These patients should be cared for with extra vigilance in order to minimize the risk of tube blockage.

Various methods of humidification include
- active humidification
- heat moisture exchange (HME)
- nebulised Saline

Nebulised Saline

The nebuliser unit (right) converts saline into a supersaturated aerosol of liquid droplets which penetrates the lung moistening the airways. It may be indicated in tracheostomy patients who are mechanically ventilated, receiving oxygen therapy or self-ventilating on air.

Saline nebulisers help to reduce the viscosity of secretions which makes them easier to remove by suction or cough. Saline nebulising involves administration of 5 to 10mls 0.9% sterile normal saline into the nebuliser unit 2-4 hourly or as required. Nebulisers must be connected to a gas source with a flow rate of 6-8 litres/minute (or follow manufacturer's guidelines). Remember if the patient is requiring supplemental oxygen, then the gas driving the nebuliser should be oxygen and not air. Ensure nebulisation is given via the tracheostomy (not the face mask!). A nebuliser can be attached to tracheostomy mask or T-piece circuit.

Heat Moisture Exchanger (HMEs)

HME’s consists of rolls of metal gauze or a condenser element like propylene sponge/fibre sheet/corrugated paper. These products are placed either directly onto the end of the tracheostomy tube or can be placed into a breathing circuit. They conserve heat and moisture on expiration via tube. They need to be checked regularly to ensure they are not occluded by
secretions which may obstruct the airway. They require checking regularly and must be changed at least every 24 hours. Some product ranges also offer oxygen delivery inlets, suction ports. Heat moisture devices are available as small cylinder or nozzles which attach directly to tracheostomy tubes allowing for patient mobility and may have speaking valves incorporated in them.

HME’s are suitable for patients with all of the following:
- Stable respiratory function
- Volume of secretions is moderate or less
- Double lumen tracheostomy tube
- FiO2 < 40%

Heated Humidification (Active Humidification)
Heated Humidification operates actively by increasing the heat and water vapour content of inspired gas. Gas can be delivered fully saturated at core temperature, depending on the system used. This type of humidification is more effective than HME filters for those patients receiving artificial ventilation and should be used if the HME is not adequate. At Nepean the Airvo Humidification unit is used (link to policy).

Active humidification should be considered for adult patients with:
- Hypothermia
- FiO2 ≥ 0.4%
- Thermal injury to airway
- Single lumen, adjustable flange or foam tracheostomy tubes
- Large volume or purulent secretions
- Irritable airways
- Airway bleeding
- Where a speaking valve is in place for longer than 30 minutes as the speaking valve does not provide humidification
- As clinically indicated

Hydration
Ensuring that the patient is adequately hydrated is essential in managing the secretion load of a patient. This can be enteral, intravenous or even subcutaneous.

- Inspired gases must be humidified to maintain effective mucocilliary function and gas exchange and prevent complications.
- Patient’s systemic hydration must be assessed and maintained to reduce the viscosity of sputum and prevent complications
- Where active humidification is used, the temperature of inspired gases must be 37° to ensure 100% relative humidity
- Only sterile water-for-irrigation can be used in water-bath humidifiers

Humidification circuit must be lower than the level of the TT at all times to prevent aspiration of condensation from the tube (rain out)
Suctioning a patient with a tracheostomy

Suctioning the airway is an essential part of routine care of the patient with a tracheostomy. Due to the potential for adverse effects, suctioning should only be performed when clinically indicated, and not on a routine basis. A thorough assessment should be carried out before making the decision to suction. If a patient has an infection or the sputum load increases, there is an increased risk of the secretions causing problems such as airway obstruction of consolidation in the lung. These problems are compounded if the patient cannot cough effectively, the inhaled gases are not adequately humidified, the patient is on a ventilator or the presence of a tracheostomy compromises the bodies’ ability to deal with the secretions.

Suctioning systems can be ‘open’ or ‘closed’. Open suction involves using single-use catheters inserted via the open end of the tracheostomy tube. Closed suction systems are attached to the tracheostomy and allow the same catheter to be used multiple times. Closed systems are cleaned following use with sterile saline and the systems are usually changed every 72 hours, or according to manufacturer’s instructions. They do add a degree of weight to the breathing circuit and may increase the risk of inadvertent disconnection or tube displacement.

Indications that the patient may require suctioning include:

- Noisy and or moist respirations
- Increased respiratory effort
- Prolonged expiratory breath sounds
- Restlessness
- Reduced oxygen saturation levels
- Increased or ineffective coughing
- Increased use of intercostal muscles
- Patient request
- More sinister signs of airway obstruction such as hypoxia and cardiovascular changes

Sedated or ventilated patients may have deep secretions which may not lead to some of the signs described above. These secretions may need to be mobilised by physiotherapy and attention to humidification before suctioning becomes effective.

Suction catheter selection

Tracheal damage and hypoxia may be caused during tracheal suction. This can be minimised by using the appropriate sized suction catheter. If the catheter is too large the suction it creates can cause damage. A large catheter will also occlude the tracheal tube which may cause hypoxia. 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 it will not be adequate to remove secretions so repeated attempts will be necessary which have also been shown to damage the trachea.

The frequency of suctioning

There is no clear consensus on how frequently a patient should receive suctioning. This will be dictated by the various patient factors related to their ability to spontaneously clear their own secretions. Attempting tracheal suction at least 4hourly or as required seems reasonable. This should ensure that the tube remains patent. Failure to pass a suction catheter is a ‘Red Flag’ warning that that tube may be blocked or displaced and should prompt assessment by an appropriately trained individual.

The depth of suctioning

Passing a suction catheter to the tip of the tracheostomy tube can be considered ‘shallow’ suctioning. This is often all that is required if the patient has reasonably loose secretions which
can be coughed towards the end of the tube. Passing a suction catheter any further than this can be considered as ‘deep’ suctioning and may be required if more shallow suctioning does not clear the secretions adequately. Suction pressure should be set at 100-150mmHg for adults.

**Equipment for suctioning**

Most closed suction systems allow the suction tubing from the wall mounted suction unit to be constantly connected to the catheter assembly. To prevent continuous suction being applied, there is a valve to stop the suction being applied. The tip of the catheter should always be in the withdrawn position when not being used, so that the visible black marker indicates that the tube is withdrawn.

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Rationale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Explain the procedure to the patient</td>
<td>Relieve patient anxieties</td>
</tr>
<tr>
<td>Consider analgesia prior to or following suctioning</td>
<td>Suctioning can be a painful procedure</td>
</tr>
<tr>
<td>Switch suction unit on and check that the suction pressure on circuit occlusion does not exceed-150 mm Hg or 20kPa pressure</td>
<td>To ensure the machine is working correctly. Too great a suction pressure can cause trauma, hypoxaemia and atelectasis</td>
</tr>
<tr>
<td>Wash hands, put on gloves, apron and goggles</td>
<td>Reduce the risk of cross infection</td>
</tr>
<tr>
<td>Ensure that an appropriate non-fenestrated inner tube is in place</td>
<td>Larger fenestrations allow the suction catheter to pass through, causing trauma to tracheal wall or giving the false impression that the catheter will not pass</td>
</tr>
<tr>
<td>Consider pre-oxygenation if receiving oxygen or ventilated</td>
<td>To prevent hypoxaemia</td>
</tr>
<tr>
<td>Remove tracheostomy devices prior to open suctioning</td>
<td>To allow access for sterile suction catheter tip</td>
</tr>
<tr>
<td>Connect suction catheter keeping catheter tip covered (sterile)</td>
<td>To reduce the risk of transferring infection from the hands to the suction tubing.</td>
</tr>
<tr>
<td>Action</td>
<td>Reason</td>
</tr>
<tr>
<td>--------</td>
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</tr>
<tr>
<td>Do not apply suction whilst introducing the catheter, or push against resistance at any time</td>
<td>Suctioning while introducing the catheter causes mucosal irritation, damage &amp; hypoxia</td>
</tr>
<tr>
<td>Occlude suction port with gloved thumb and suction on removal of suction catheter (no need to rotate on removal as catheters have circumferential holes)</td>
<td>Prolonged suctioning can result in hypoxia and trauma</td>
</tr>
<tr>
<td>Period of suction should not exceed 10 seconds</td>
<td>To reduce risk of mucosal damage and hypoxaemia</td>
</tr>
<tr>
<td>Suctioning should be continuous not intermittent</td>
<td>Intermittent suctioning does not reduce trauma and is less effective</td>
</tr>
<tr>
<td>Observe the patient throughout the procedure to ensure their general condition is not affected.</td>
<td>Tracheal suction may cause vagal stimulation leading to bradycardia, hypoxia and may stimulate bronchospasm</td>
</tr>
<tr>
<td>For patients requiring oxygen therapy, reattach O₂ within 10 seconds.</td>
<td>To limit hypoxia</td>
</tr>
<tr>
<td>Remove the glove from the dominant hand by inverting it over the used catheter &amp; dispose clinical waste bag</td>
<td>To minimise the risk of infection</td>
</tr>
<tr>
<td>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.</td>
<td>Suction should be performed only when needed and not as part of a routine, so that damage to the trachea is avoided</td>
</tr>
<tr>
<td>It is recommended that no more than 3 episodes of suctioning are carried out in succession</td>
<td>To limit side effects and maximise recovery period</td>
</tr>
<tr>
<td>If O₂ delivery was increased, review for return to previous level.</td>
<td>To prevent unnecessary oxygen delivery</td>
</tr>
<tr>
<td>Flush through the connection tubing with the clean water.</td>
<td>Empty water receptacle and ensure this is ready for further use.</td>
</tr>
<tr>
<td>Wash hands.</td>
<td>To minimise the risk of infection</td>
</tr>
<tr>
<td>If the patient needs further suction, repeat the above actions using new</td>
<td></td>
</tr>
</tbody>
</table>
Adapted from (NTSP 2013)

Inner Cannula Care

Most tracheostomies are equipped with an inner cannula which aides in maintaining a patent airway. Secretions can adhere to the internal lumen of a tracheostomy tube and severely reduce the inner lumen diameter over time. This potentially can increase the work of breathing and/or obstruct the patient’s airway. Keeping the inner cannula clean is of vital importance. Cleaning an inner tube is a relatively straightforward procedure. It is removed and inspected. If clean, it can simply be replaced, if not it should be cleaned as per instructions below.

There is debate within the literature on the most appropriate cleaning solution to be used in the context of inner cannula care. A wide variety of solutions are used across health care including tap water, sterile water, soap and water and sterile saline. Evidence to support the use of tap, sterile water or other solutions is equivocal and therefore local policies are highly likely to vary in their recommendations.

Procedure for cleaning Inner cannula

<table>
<thead>
<tr>
<th>Intervention</th>
<th>Rationale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wash hands.</td>
<td>To minimize cross infection</td>
</tr>
<tr>
<td>Gather and organize equipment</td>
<td></td>
</tr>
<tr>
<td>Explain procedure to patient</td>
<td>To minimize patient anxiety</td>
</tr>
<tr>
<td>Assess patient’s condition</td>
<td>To ensure tolerance for the procedure</td>
</tr>
<tr>
<td>Set up pulse oximeter and attach finger/ear probe to patient</td>
<td>Monitor patient’s level of oxygenation throughout procedure.</td>
</tr>
<tr>
<td>Ensure patient is well oxygenated (SpO2 &gt;95%)</td>
<td>To minimize risk of a hypoxic period</td>
</tr>
<tr>
<td>Don gloves, mask and goggles</td>
<td>To protect self from droplet contamination</td>
</tr>
<tr>
<td>Holding flange in one hand – inner cannula in other, twist inner cannula and roll gently until unlocked. Remove inner cannula and place in kidney dish</td>
<td>To minimize movement of outer cannula to reduce irritation and coughing.</td>
</tr>
<tr>
<td>Insert spare inner cannula into tracheostomy</td>
<td>To prevent build up of secretions in outer cannula.</td>
</tr>
<tr>
<td>Reapply oxygen/ventilator as required</td>
<td></td>
</tr>
<tr>
<td>Inner cannulas must be cleaned in the kidney dish with liquid detergent and water, then rinsed with sterile normal saline/water. Do not use sharp equipment to clean the inner cannula as this can tear the inside and allow micro-organisms to grow along the tear. They are not to be left soaking for more than 15 minutes.</td>
<td>Inner cannula not to be cleaned in bedside sink as this increases the risk of contaminating the beside sinks and the inner cannula</td>
</tr>
</tbody>
</table>
Discard water in dirty utility room.

| Inner tube is removed and cleaned at least three times per day (more frequently as required). | Tubes can become blocked at any time hence regular checking to ensure patency is required |

Communication

Some patients will be able to speak with speaking valves after careful assessment. Please refer to the Nepean Hospital guidelines “Using PMV with patients with non-ventilated tracheostomy patients including humidification” available via the NBMLHD intranet Policies and Procedures icon and “Using Passy Muir valve in ventilated tracheostomy patients in Nepean ICU” (Available on Nepean ICU intranet)

**Safety Alert**

*A speaking valve can only be applied if the patient has been assessed as having a patent airway and the cuff (if present) is completely deflated*

Other patients who cannot have the cuff deflated or who are unable to achieve verbal speech despite cuff deflation (eg. Vocal fold paresis) require a non-verbal communication system. Writing should be encouraged by nursing staff. Mouthing can also be promoted in those who cannot write. The Speech Pathologist can be consulted to assess the most appropriate communication method. Evidence suggests that a communication method allows patients to act in their medical care and prevent feelings of isolation. (ACI 2013)

Guidelines on Weaning and Decannulation

There are various techniques used to wean patients from breathing through a tracheostomy tube. Patients react individually and medical staff favour different techniques. It is important that each individual case is carefully discussed and a clear plan is made with the appropriate medical teams prior to the weaning process commencing. This must be evaluated and documented continuously.

The main criterion for decannulation planning is that the original need for the tracheostomy has resolved. e.g.: pt no longer requires ventilation, managing secretions, no longer has upper airway obstruction.

Preparation for weaning

The decision to remove a patient’s tracheostomy tube should be taken jointly by medical, nursing, physiotherapy and speech pathology staff. The patient must be involved in the discussion if possible and careful explanation of what will happen, how their breathing may
feel, and to notify staff if experiencing difficulties. The patient should have a period of 24hrs of cuff deflation to allow the patient to start using their upper airways. It may be necessary to change to a smaller tube prior to weaning if the patient has difficulty breathing around their tracheostomy tube.

This weaning process may happen more quickly if the patient responds well. It is sometimes better to remove the tube early, as it will cause obstruction to the natural airway and may prevent the patient tolerating the normal respiratory pathway. Every patient is different and weaning should be guided by the patient's progress, i.e., respiratory rate, oxygen saturations, and work of breathing (effort). Assessment of the weaning patient should be continuous and documented on the observation chart.

There are two pathways that can be considered to wean from a tracheostomy tube:

1. Capping - tube downsizing
2. 24-48 hours of continuous cuff deflation with a 5 minute assessment of airway patency via finger occlusion.

A Study by Thompson Ward 2001 determined no difference in recannulation rate with either of these protocols. The non capping protocol was found to be more efficient and lead to earlier decannulation.

Some patients however may lend themselves to one or the other. For example in those with a poor cough, capping is usually preferable. A speaking valve may also be used to facilitate an improved cough. A patients ability to wear a speaking valve for extended periods of time also gives indication of readiness for decannulation.

Capping Protocol

This procedure below is used when patients have a Shiley tracheostomy insitu as a red cap is part of the equipment provided.

Safety Alert

A decannulation cap can only be applied if the patient has been assessed as having a patent airway and after full cuff deflation (if cuff present)

Equipment required

- Oxygen saturation monitor
- Suction unit
- Decannulation cap
- Facial oxygen supply - mask or nasal cannulae
- Emergency equipment
<table>
<thead>
<tr>
<th>Intervention</th>
<th>Rationale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Check emergency equipment</td>
<td>Maintain patients airway if problem occurs</td>
</tr>
<tr>
<td>Stop NG feeding at least 2 hours before removal - review when to recommence</td>
<td>Prevent aspiration of stomach contents</td>
</tr>
<tr>
<td>with medical team</td>
<td></td>
</tr>
<tr>
<td>Explain procedure to patient</td>
<td>To gain consent and co-operation</td>
</tr>
<tr>
<td>Ensure patient is positioned in an upright, comfortable position.</td>
<td>To optimise respiration</td>
</tr>
<tr>
<td>Carry out tracheal suction</td>
<td>Procedure may cause patient to cough. If secretions are present this may lead to patient distress and cause the procedure to fail. Allow for patient recovery.</td>
</tr>
<tr>
<td>Remove the inner tube - clean and store.</td>
<td>To allow the patient to breathe through the fenestration.</td>
</tr>
<tr>
<td>Cuff deflated and saturations maintained (not all tracheostomy tubes</td>
<td>To allow the patient to breath around the tube</td>
</tr>
<tr>
<td>will have a cuff).</td>
<td></td>
</tr>
<tr>
<td>Apply decannulation cap</td>
<td>The patient now must breathe through their upper airway.</td>
</tr>
<tr>
<td>Apply facial oxygen supply and encourage patient to take deep breaths and</td>
<td>Provide supplementary oxygen and to help them begin to feel the change in breathing and ensure they are strong enough to clear secretions</td>
</tr>
<tr>
<td>cough. Nebulisers can help the patient to cough and clear secretions easier.</td>
<td></td>
</tr>
<tr>
<td>Ensure patient is able to obtain adequate breath via upper airway</td>
<td>Tracheostomy tube may be too large to allow the patient to breathe around it. If so, remove the decannulation cap, allow the patient to breathe through the tracheostomy again, and discuss the need for a smaller tube with medical staff.</td>
</tr>
<tr>
<td>Initially monitor the patient continuously looking for a drop in SpO₂,</td>
<td>Ensure patient is safe and reassured before leaving them</td>
</tr>
<tr>
<td>increased RR or altered respiratory pattern. Stay with the patient until they</td>
<td></td>
</tr>
<tr>
<td>are settled and feel comfortable.</td>
<td></td>
</tr>
<tr>
<td>Continue to monitor respiratory rate and pattern, heart rate and oxygen</td>
<td>Monitor will alarm if patient desaturates</td>
</tr>
<tr>
<td>saturation 1/4 hourly for two hours and then observe patient at least 1/2</td>
<td></td>
</tr>
<tr>
<td>hourly. Document observations. Set alarms on the saturation monitor.</td>
<td></td>
</tr>
<tr>
<td>Provide the patient with a nurse call bell and encourage to call for help at</td>
<td>Reassure patient of safety and get early signs of changes and document</td>
</tr>
<tr>
<td>any time especially if they feel breathless,</td>
<td></td>
</tr>
</tbody>
</table>
### Intervention | Rationale
--- | ---
are unable to cough and clear secretions, or begin to feel tired | This will allow the patient to return to tube breathing.
If patient has difficulty tolerating the decannulation cap, remove cap, replace inner tube to return patient to tracheostomy breathing. | 
Clean and dry decannulation plug and store in clean pot with lid. | Prevent introduction of infection.
Follow agreed weaning regime | Ensure patient makes progress and does not become over tired.
Once capping has been tolerated for at least 24 consecutive hours the decision to remove tracheostomy tube can be made. | Whilst many patients can tolerate continuous wearing of the cap, some find it takes getting used to. Therefore wear time should be increased as tolerated. **IF POSSIBLE, PATIENTS MUST BE TAUGHT TO REMOVE THE CAP THEMSELVES IF THEY EXPERIENCE BREATHING DIFFICULTIES.**

### Tracheostomy Removal
The tracheostomy tube is removed, stoma and edges are observed, and an occlusive dressing is applied over folded up gauze. Dressing should be changed every day or when dirty. Advise the patient to apply pressure to the dressing covering stoma site to increase voice and to re-inforce cough.

Document all observations and nursing actions | Provide ongoing evaluation

### TRACHEOSTOMY EMERGENCY MANAGEMENT (ADULT)

#### Signs of Respiratory Distress
- Increased work of breathing i.e. patient acutely distressed/restless, tachypnoea, stridor, accessory muscles use, diaphoretic, cyanotic
- Decreased/gurgling breath sounds
- High inspiratory airway pressures/low tidal volumes if mechanically ventilated
- Oxygen desaturation
- No breath sounds
- Unable to pass suction catheter or inner cannula

#### Potential Causes
- Airway partially/completely obstructed due to blockage
- Tracheostomy dislodgement
- Persistent cuff leak
- Faulty oxygen source or ventilation device
- Ineffective humidification
- Tracheostomy in false passage
- Consider non-tracheostomy related causes for distress
Immediate Action

- Stay with the patient and provide 100% high flow O2 via tracheostomy and/or face mask and manually ventilate if indicated (it may be necessary to deflate trachea cuff).
- Check oxygen source and connections, cuff inflation, humidifier.
- Check/change the inner cannula if in situ.
- Call for assistance (Rapid Response in Ward if criteria present/Clinical Staff in ICU).
- Check position of patient’s head/neck and tracheostomy tube - realign to midline if necessary.
- Dislodged tracheostomy tube: do not attempt to reintest the tube unless trained in this procedure, maintain a patent oropharyngeal airway with head/neck positioning, jaw thrust and/or artificial oropharyngeal airway as indicated (accredited/skilled staff insert new tracheostomy tube).
- Tracheostomy tube in situ with suspected obstruction: pass suction catheter and apply suction (change inner cannula if present, using non-fenestrated cannula if possible), if tracheostomy tube obstructed then let down cuff (if present and inflated).
- Observe tube patency, secretions and patient response to suctioning.
- If the patient becomes less distressed, airflow is present, unobstructed and oxygenation is satisfactory, then undertake a full clinical assessment to establish the cause of respiratory distress.
- If no airflow around/through tracheostomy tube then insert tracheal dilators around tube into stoma, remove tube, insert bougie or suction catheter and maintain oropharyngeal airway to achieve oxygenation.
- Laryngectomy patients: Concentrate all measures on clearing stoma/trachea, the sole airway access.

PATIENT DISTRESSED WITH TUBE OBSTRUCTED/DISLODGED/CUFF LEAKING

Remember that patients who are on the ward and not ventilated, may be able to breathe without the tracheostomy tube.

- Apply 100% high flow O2 via face mask and manually ventilate if indicated (it may be necessary to deflate the cuff).
- If no tracheostomy tube in place then clean stoma, open and support stoma with forceps, insert new tube, inflate cuff if present, reoxygenate and assess air entry, work of breathing and clinical status.
- If tracheostomy tube in place then prepare for rapid tracheostomy tube exchange/placement (provide brief explanation to patient).
- Assemble and check equipment:
  - Intubation trolley with Laryngeal Mask Airway (LMA), endotracheal tubes, tracheostomy tubes, and tracheal dilators
  - Ensure 1 same size tracheostomy tube plus 1 tracheostomy tube a full size smaller are prepared with lubrication and cuff check
  - Laryngoscope, blades, flexible bougie/introducer and suction equipment
  - Difficult airway and intubation equipment should be immediately accessible if available (usually in ICU)
  - Bronchoscope if available
Ensure oxygen saturation monitoring is applied and where available continuous End Tidal CO2 monitoring.

- Position patient supine with head of bed elevated slightly (ensure no clinical contraindication).
- Consider the need for sedation – this will be indicated based on individual patient assessment and the senior Medical Officer orders.
- Remove pillow and extend neck (ensure no clinical contra-indication).
- Suction oropharynx.
- If tracheostomy tube in place:
  - < 72 hours (early change) clean stoma, loosen ties, hold tube in place, insert bougie into tracheostomy tube, assistant deflates cuff, remove tracheostomy tube over bougie while ensuring bougie is held in situ, immediately slide new tracheostomy tube over bougie into the trachea, hold in place, remove bougie, inflate cuff, reoxygenate and assess air entry, work of breathing and clinical status.
  - >72 hours (formed stoma) clean stoma, loosen ties, hold tube in place, support open stoma with forceps, assistant deflates cuff, remove tracheostomy tube immediately slide new tracheostomy tube into the trachea stoma, hold in place, inflate cuff, reoxygenate and assess air entry, work of breathing and clinical status.
- Correct placement is confirmed by checking air flow, chest auscultation, improved SpO2 and if available ETCO2

<table>
<thead>
<tr>
<th>Successful</th>
<th>Unsuccessful</th>
</tr>
</thead>
</table>
| - Secure tracheostomy tube  
  - Review oxygen and ventilation as required  
  - Reposition patient  
  - Provide education and further reassure the patient and family | - Maintain oxygenation and manually ventilate if required  
  - Prepare for intubation or LMA insertion  
  - Intubate or place LMA  
  - Only use stoma if laryngectomy patient |

**EARLY TRACHEOSTOMY TUBE CHANGE (< 72 HOURS)**

Early tracheostomy tube change may be defined as a change required within 72 hours of the formation of the tracheal stoma. Changing a tracheostomy tube for the first time within the initial 72 hours of insertion may be hazardous, particularly in patients with a history of difficult intubation. The risks associated with tracheotomy change decrease the longer the tracheostomy tube has been in situ.

The major risk associated with early tracheostomy change is failure to re-cannulate the trachea. A newly formed tracheostomy site that has not had time to mature is at risk of the tracheal rings becoming realigned and obstructing the stoma when the tracheostomy tube is removed. Attempts to reinsert the tracheostomy tube may not enter the trachea with a false passage being created in the paratracheal space. The tracheostomy tube will be obstructed. Collapse of the tracheal passage is seen particularly with wire-guided percutaneous tracheostomy, as a surgical stoma has not been created.
In principle, early tracheostomy change (< 72 hours) should be avoided.
Changing a tracheostomy tube for the first time in the first 72 hours should only be considered where it is felt that the patient is at greater risk if the current tube is not changed.
Where practical, all elective tracheostomy tube changes should be performed during normal working hours when senior staff members (medical and nursing) are available.
If unavoidable then appropriately trained senior clinical staff, airway management and intubation equipment, and patient SpO2 monitoring must be immediately accessible.
Where possible difficult intubation equipment including: fibre-optic bronchoscope and End-Tidal CO2 (ETC02) monitoring should also be available.

Guidelines for Changing a Tracheostomy
Tracheostomy tubes may be changed for the following reasons:

- Tube dislodgement
- Tube has become blocked/ or cuff failure
- Downsizing for weaning
- Routine change in long term tracheostomy patients

The first time a tube is changed it must be performed by or under the supervision of an appropriately skilled member of the medical team. Nurses who have had the training may also undertake the procedure.

Equipment required
Desired tracheostomy tube and one size smaller
Dressing pack
Y-suction catheter (cut off at Y end)
Sterile gloves
Sterile scissors
KY jelly
Velcro strap / white tape

Procedure
There are several methods of changing a tracheostomy tube. This depends on the reason the tracheostomy is being changed, the length of time the tracheostomy has been in situ, and the operator’s preference. Two commonly used methods are:

- Using a Y-suction catheter as an introducer (cut off at Y end)
- Using the introducer/obturator supplied in the pack.

The method described in these guidelines uses the Y suction catheter.
<table>
<thead>
<tr>
<th>Intervention</th>
<th>Rationale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Check the emergency equipment</td>
<td>To maintain an airway if problems occur</td>
</tr>
<tr>
<td><strong>Two people are required to carry out this procedure</strong></td>
<td>Ensure good communication between operators. Ensure patient is well oxygenated prior to procedure</td>
</tr>
<tr>
<td>Stop NG feeding at least 2 hours prior to procedure.</td>
<td>To prevent aspiration of stomach contents</td>
</tr>
<tr>
<td>Explain the procedure to the patient</td>
<td>To obtain patient consent &amp; co-operation</td>
</tr>
<tr>
<td>Position patient sitting upright with neck supported with pillows, ensuring neck is slightly extended.</td>
<td>To ensure privacy &amp; the least discomfort to the patient. To assist in the changing of the tube by slightly extending the neck.</td>
</tr>
<tr>
<td>Wash hands &amp; put on protective eye wear &amp; face mask</td>
<td>To reduce the risk of cross infection and for personal protection.</td>
</tr>
<tr>
<td>Gloves &amp; protective gown to be worn by both nurses throughout this procedure</td>
<td>To comply with Standard Precautions</td>
</tr>
<tr>
<td>Prepare equipment - If a cuffed tube, test the new cuff for leakage &amp; ensure that cuff is fully deflated. Lubricate the tube.</td>
<td>To ensure that all parts fit together correctly before insertion into the trachea.</td>
</tr>
<tr>
<td>If the patient is oxygen dependent or cardiovascularly unstable, it may be necessary to pre oxygenate prior to procedure</td>
<td>Delivery of oxygen will be compromised during the procedure.</td>
</tr>
<tr>
<td>Turn on the suction unit. Clear oral secretions if necessary. Perform tracheal suction.</td>
<td>To have airway maintenance equipment functioning and ready &amp; to ensure airway is clear prior to procedure.</td>
</tr>
<tr>
<td>With one person supporting the tracheostomy, remove tubing, humidification/oxygen mask, dressing and tapes</td>
<td>To facilitate removal of the tube and to secure the path of the airway.</td>
</tr>
<tr>
<td>If indicated, clean around the stoma with normal saline &amp; dry gently. If present, deflate tracheostomy cuff. Insert cut off Y suction catheter into trachea and remove old tracheostomy holding on to the suction catheter at the level of the stoma.</td>
<td>To remove superficial crusts. Skin should not be left moist as this leaves an ideal medium for the growth of micro-organisms. Insert Y suction catheter to maintain the correct airway tract.</td>
</tr>
<tr>
<td>Remove the soiled tube from the patient’s neck in a curved downward movement, while asking the patient to breathe out.</td>
<td>Conscious expiration relaxes the patient &amp; reduces the risk of coughing.</td>
</tr>
<tr>
<td>Insert a clean tube over the y suction catheter using an ‘up and over’ action. Remove the y suction catheter introducer immediately</td>
<td>Introduction of the tube is less traumatic if directed along the contour of the trachea.</td>
</tr>
<tr>
<td>Intervention</td>
<td>Rationale</td>
</tr>
<tr>
<td>--------------------------------------------------</td>
<td>---------------------------------------------------------------------------</td>
</tr>
<tr>
<td>If cuff is present, use a syringe to inflate</td>
<td>To protect airway but prevent trauma to the trachea. If the cuff is</td>
</tr>
<tr>
<td>the cuff of the tube with air until a seal is</td>
<td>adequately inflated the patient should <strong>not</strong> be able to speak.</td>
</tr>
<tr>
<td>achieved.</td>
<td></td>
</tr>
<tr>
<td>Insert inner tube.</td>
<td>To maintain the airway</td>
</tr>
<tr>
<td>Replace tubung,humidifier/oxygen.</td>
<td>To maintain oxygenation and moisten airway.</td>
</tr>
<tr>
<td>Secure the tube. If using white tape cut off</td>
<td>Ensure tapes are not too loose as the tube may become dislodged. However</td>
</tr>
<tr>
<td>excess tape.</td>
<td>also ensure tapes are not too tight as pressure areas can occur. The</td>
</tr>
<tr>
<td></td>
<td>tapes should accommodate two fingers.</td>
</tr>
<tr>
<td>Apply clean dressing</td>
<td></td>
</tr>
<tr>
<td>Ensure air is passing through the tracheostomy.</td>
<td>To ensure tube is in correct position</td>
</tr>
<tr>
<td>Observe the patient’s respiratory pattern. The</td>
<td></td>
</tr>
<tr>
<td>patient should look comfortable.</td>
<td></td>
</tr>
<tr>
<td>Discard old tube appropriately</td>
<td>These tubes are disposable</td>
</tr>
<tr>
<td>Document the procedure in the patient’s notes</td>
<td>For future reference</td>
</tr>
</tbody>
</table>

**Risk Rating**

Medium

**Risks of Non-Compliance**

Care of patients with a tracheostomy could be compromised.

**Implementation Plan**

Policy available on the intranet for staff to view
PowerPoint presentation will accompany this procedure
Tracheostomy workshops held 3 x year to reinforce concepts in this procedure

**Education Notes**

Education notes included throughout the document to allow improved flow of information.

**References and Related Policies**

**References**


12. NSW Health Policy directive PD2010_066 (November 2010) Tracheostomy clinical Management (Adult)


14. St James’s Hospital / Royal Victoria Eye and Ear Hospital, Tracheostomy Care Guidelines, 2000

15. The Royal Free Hampstead NHS Trust, Guidelines for Care of Patients with a Tracheostomy, 2002


17. UK National Tracheostomy Safety Project, 2013 www.tracheostomy.org.uk/

## Version History

<table>
<thead>
<tr>
<th>Date of Issue</th>
<th>Document Version</th>
<th>Change Details</th>
<th>Author</th>
</tr>
</thead>
<tbody>
<tr>
<td>January 2015</td>
<td>Version 11</td>
<td>Incorporated ACI and UK NTSP guidelines</td>
<td>Hailey Carpen</td>
</tr>
<tr>
<td>December 2011</td>
<td>Version 10:</td>
<td>Fine tune of feed back and incorporation of PD2010_066</td>
<td>Hailey Carpen</td>
</tr>
<tr>
<td>February 2011</td>
<td>Version 9:</td>
<td>Incorporated changes from Westmead and Blacktown hospitals</td>
<td>Hailey Carpen, Angela Berry, Karen Willis</td>
</tr>
<tr>
<td>October 2010</td>
<td>Version 8</td>
<td>Attempting to formulate an area wide policy to incorporate local differences</td>
<td>Hailey Carpen, Angela Berry, Karen Willis</td>
</tr>
<tr>
<td>September 2010</td>
<td>Version 7</td>
<td>Major change to include cleaning of inner cannula practice in Blacktown Mount Druitt Hospitals</td>
<td>Hailey Carpen, Angela Berry, Karen Willis</td>
</tr>
<tr>
<td>January 2009</td>
<td>Version 6</td>
<td>Inclusion of PD2006_098 Guidelines for Unavoidable Tracheostomy Tube Change (&lt;72 hours) in the Adult Patient and Minor grammatical and punctuation changes.</td>
<td>Hailey Carpen</td>
</tr>
<tr>
<td>May 2005</td>
<td>Version 5</td>
<td>First final completed guideline.</td>
<td>Hailey Carpen</td>
</tr>
</tbody>
</table>