**10.E TRACHEOSTOMY MANAGEMENT**

1. STANDARD
2. OUTCOMES
3. VARIANCE MANAGEMENT
4. CROSS REFERENCES
5. BACKGROUND INFORMATION
6. POST OPERATIVE MANAGEMENT
7. TRACHEOSTOMY EMERGENCY PROCEDURES
8. GENERAL TRACHEOSTOMY PROCEDURES
  8.1 TYPES OF TRACHEOSTOMY TUBES
  8.2 CUFF MANAGEMENT
    8.2.1 CUFF PRESSURE
    8.2.2 PROCEDURE FOR CHECKING CUFF PRESSURE
    8.2.3 CUFF DEFLATION
  8.3 CLEANING INNER TUBES
  8.4 HUMIDIFICATION
  8.5 SUCTIONING
  8.6 STOMA MANAGEMENT
    8.6.1 TRACHEOSTOMY TUBE DRESSING
    8.6.3 PROCEDURE
    8.6.4 POST DECANNULATION DRESSING
  8.7 SECURING THE TRACHEOSTOMY TUBE
  8.8 CHANGING THE TRACHEOSTOMY OUTER TUBE
    8.8.1 CLASSICAL METHOD
  8.9 SWALLOWING AND ASPIRATION
    8.9.1 DEFINITIONS
    8.9.2 RISK FACTORS FOR DYSPHAGIA AND/OR ASPIRATION
    8.9.3 BLUE DYE TESTING
  8.10 TRACHEOSTOMY DECANNULATION
    8.10.1 DECANNULATION PROCESS
    8.10.2 OBSERVATIONS DURING AND AFTER THE PROCESS
    8.10.3 CUFF DEFLATION
    8.10.4 OCCLUSION
    8.10.5 REMOVAL OF TRACHEOSTOMY TUBE
  8.11 MANAGEMENT OF SPEAKING VALVES
9. COMMUNICATION
10. ALTERED BODY IMAGE & GENERAL CARE
11. COMMUNITY CARE
12. REFERENCES
10.E TRACHEOSTOMY MANAGEMENT

1 STANDARD

1.1 This standard applies to all clinical staff involved in the care of patients with a tracheostomy, and who have been assessed and deemed competent in relevant aspects of tracheostomy care, by a designated assessor.

1.2 This is an extended skill for Enrolled Nurses (EN) - refer to Section 16 of this manual.

1.3 Appropriate patient care is based on holistic, individualised care plans, scientific evidence and collaboration between the patient and the health care team.

2 OUTCOMES

Standardised tracheostomy care is provided in a safe and effective manner, and patient discomfort is minimised, from insertion to either home care or decannulation.

Standard precautions are maintained throughout all interventions.

3 VARIANCE MANAGEMENT

Where it is recognised that tracheostomy care is not being provided in accordance with this standard the staff member(s) concerned will be provided with remedial education by a CNC/CNE/NE/CNS who has received appropriate training in tracheostomy management. If the patient's airway becomes compromised appropriate interventions are provided and emergency procedures initiated where necessary.

4 CROSS REFERENCES


5 BACKGROUND INFORMATION

5.1 Definition:

A tracheostomy is a surgically performed artificial airway consisting of a surgically inserted plastic tube, which sits just below the larynx in the trachea, bypassing the mouth and upper airway. The surgical procedure that creates this artificial airway is called a tracheotomy and is usually made into the 2nd or 3rd tracheal ring below the cricoid cartilage.

5.2 Indications for Insertion \(^1,3,4,5\)

- Airway maintenance
- Prevention of aspiration
- Laryngeal or tracheal injury
- Extended periods of ventilation
- Airway obstruction eg tumor, foreign body
- Soft tissue swelling
- Secretion removal

5.3 Implications for the patient: \(^1,3,4,\)

- Altered/Impaired ability to communicate
- Decreased cough strength, “huffing” cough
- Irritation and dryness of mucosal lining
- Constipation secondary to inability to strain
- Reduced ability to clear airway
- Decreased sense of smell
- Increased secretion production
- Loss of intra-thoracic pressure
- Unable to blow nose - dripping nose
- Altered/impaired swallow
- Altered body image

\(^1\) Reproduced with permission - Serra, A. 2000 Tracheostomy care.
6 POST OPERATIVE MANAGEMENT

6.1 Potential Postoperative Complications: 1,5,6

- Subcutaneous emphysema (air in subcutaneous tissue caused by surgery)
- Tracheal displacement
- Infection
- Aspiration
- Tracheal necrosis
- Bleeding
- Tracheostomy tube blockage
- Tracheal stenosis
- Pneumothorax (early)

6.2 Post Operative Nursing Care

6.2.1 Prior to receiving the patient from theatre/recovery:

- Ensure emergency equipment is available and functional at the bedside (see paragraph 7.1). The size of the replacement tracheostomy tubes will be determined on arrival of the patient to the ward/unit.

6.2.2 On return to ward/recovery area 1,7

- Assess patency of patient’s (inner cannulae) airway
- Suction as required (refer to paragraph 8.5)
- Observe and record baseline vital signs ie respiratory rate, blood pressure, pulse temperature. Repeat hourly for 4 hours then 4 hourly if stable.
- Monitor SpO2 continuously for 24 hours, following which the need for continuous SpO2 monitoring is reviewed and is dictated by the patient's clinical condition.
- Check stoma site for any bleeding/ooze and document type and amount in patient’s continuation notes. Notify RMO if bleeding is excessive as per paragraph 7.2.
- Assess adequacy and type of humidification utilised and document in patient’s continuation notes.
- Ensure normal saline nebulisers are charted (minimum 4/24) and administer as per orders
- Complete tracheostomy care chart and file in the patient’s bedside chart
- Document the size, brand, and type of tracheostomy tube and reason for insertion ie airway maintenance, secretion management in patient’s continuation notes.
- Ensure adequate fluid intake (1500-2000mL/day) if not contraindicated. 1,8,11
- Removal of sutures is based on individual patient assessment but are generally removed day 4 to 7. 11

Paragraph 7.4.1 describes signs and symptoms of airway compromise and inadequate gas exchange.

7 TRACHEOSTOMY EMERGENCY PROCEDURES

7.1 Emergency Equipment

This equipment must be available at the patient's bedside at all times 4,7,8,9

- Tracheal Dilators (eg Bowlby)
- Spare cuffed tubes x 2 - size smaller and same size
- Oxygen
- Tracheostomy mask (eg Oxyvent)
- Nebuliser equipment
- Suction and suction catheters
- Scissors
- 10ml Syringe

In transit / transferring

When in transit the emergency equipment must accompany the patient. Substitute piped oxygen and suction with size C portable oxygen cylinder with regulator and twin-o-vac.
7.2 Abnormal Bleeding

7.2.1 Slight Blood Smears from the tracheostomy stoma are not unusual after surgery and usually subside within twenty-four (24) hours.\textsuperscript{1,3,6}

7.2.2 Constant Oozing is not expected and may signal a bleeding vessel requiring intervention.\textbf{Action}: Request an early review by the ENT team.\textsuperscript{1,3,6}

7.2.3 Massive Bleeding suggests rupture of the innominate artery. This is a life-threatening emergency.\textsuperscript{1,6,7} \textbf{Action}: Call 777, report a 'Code Blue' (refer to Standard 17A Basic Life Support) and check for cuff inflation to protect airway.

7.3 Tube Dislodgment

Dislodgment of a tracheostomy tube is more common in patients with a full neck\textsuperscript{20} and can be dislodged:

- completely and visibly from the stoma\textsuperscript{7}
- from the trachea into the pre-tracheal tissues\textsuperscript{7}
- accidentally by excessive manipulation or suctioning which may produce vigorous coughing that displaces the tube from the stoma\textsuperscript{1}

\textbf{NB} Dislodgement of a tracheostomy tube within the first forty-eight (48) hours after surgical insertion is a medical emergency as the tract is not fully formed and can close easily.\textsuperscript{1,3,6}

\textbf{ACTION:}

- \textit{Call 777 and report a Code Blue}
- If assessed as competent to do so, the stoma can be held open with tracheal dilators and the spare tracheostomy tube inserted\textsuperscript{20}. Ensure tube is secured in position.\textsuperscript{20}
- If not assessed as competent call for assistance immediately and provide oxygen via tracheostomy mask.\textsuperscript{20}

7.4 Obstructed Airway

A mucus plug or a build-up of secretions can block the tube and cause an obstruction, thereby reducing or completely stopping airflow.\textsuperscript{7,9}

7.4.1 Indications of problems with airway clearance and impaired gas exchange:\textsuperscript{1,3,10}

- Difficulty breathing
- Noisy breathing / wet gurgly vocal quality
- Restlessness and / or confusion
- Crackles
- Difficulty in inserting suction catheter
- Increased pulse
- Increased respiratory rate
- Increased peak airway pressures on the ventilator
- Audible wheeze / stridor
- \(\text{SpO}_2\) less than 90\% (important to consider the patients usual oxygen saturation levels)
- Alteration in level of consciousness

7.5 Airway Resuscitation via Tracheostomy

7.5.1 \textbf{NON-EMERGENCY} (Noisy breathing, but patient not distressed & maintains \(\text{O}_2\) saturation)\textsuperscript{11}

- If tube in situ, remove and check inner tube, insert clean inner tube
- Assess for need to suction
- Administer normal saline nebuliser
- Monitor \(\text{O}_2\) saturation.
- Stay with patient until airway clear
- Contact medical staff to review if required
7.5.2 EMERGENCY (Patient unable to breathe)

The position and steps taken for resuscitation are the same as for any patient with an impaired / altered airway. Refer to Standard 17.A.

- Call 777 and report 'Code Blue'
- Commence emergency procedures.

- If a tracheostomy tube is in situ expired air resuscitation is delivered using a one-way valve and filter.
- Total laryngectomy patients have an open tracheal stoma with no tube in situ whereby they breathe through a 'hole in their neck'. A pocket mask can be used to ventilate over the stoma if a good seal is achieved.
- If unable to get a good seal high flow oxygen can be administered via a tracheostomy mask.
- A bag valve unit (resuscitator bag) can be used to ventilate directly via a tracheostomy tube.

**NB:** Use of a bag valve unit is only permitted by clinicians who have completed a competency assessment

8. GENERAL TRACHEOSTOMY PROCEDURES

8.1 Types of Tracheostomy Tubes (Refer to Appendix 1 for tube size chart)

Tube selection is dependent on the specific needs of the patient and is determined initially by an MO. Tracheostomy tubes may be classified according to brand, type, size and/or tube characteristics.

8.1.1 Brands

Portex and Shiley are the two commonest brands of tracheostomy tubes in use at this hospital. Most standard tubes manufactured by Portex and Shiley have both an inner and outer tube.

- Portex - Fenestrated inner tubes are RED and have five small holes, plain inner tubes are clear with a ring pull top.
- Shiley - Fenestrated inner tubes have a GREEN top, and have one hole. Plain inner tubes have a white top and are removed in a twist action.

8.1.2 Standard tubes

A. **Un-cuffed:** A plain tracheostomy tube without a cuff or fenestration/s.
B. **Cuffed (diagram 2):** A tube with a low pressure-high volume cuff attached to the distal end of the tracheostomy tube. It is used for ventilator dependent patients and for patients on the wards to assist in the prevention of aspiration.
C. **Fenestrated (diagram 3):** A tube with either one hole or a group of holes in its lower section. The purpose of the holes/openings is to permit passage of air from the lungs up through the vocal cords and out through the nose / mouth to enable the patient to vocalise.

**Diagram 2. Cuffed, non-fenestrated tube.**

![Diagram 2. Cuffed, non-fenestrated tube.](Reproduced with permission. Mallinckrodt Inc (2000))

**Diagram 3. Cuffless, fenestrated tube**

D. **Cuffed-Fenestrated:** A low pressure cuffed tube with a fenestration/s.
8.1.3 Non-Standard Tubes
Patients with non-standard tubes in place should not be managed in general wards, except in special circumstances. Refer to resource personnel such as Otolaryngology CNC or physiotherapy for specific instructions for management of these tubes.

A. **Adjustable Flange Tubes**: The flange can be moved along the length of the tracheostomy tube to allow for alterations in neck anatomy. As these tubes do not have an inner tube, management of secretions and appropriate humidification is essential to minimise the potential of tube occlusion or blockage.

B. **Mallinckrodt TracheSoft Evac**: A tube with a suction port above the cuff which allows removal of secretions from above the cuff without deflating the cuff.

C. **Rusch tubes (Single or double lumen)**: Characterised by a flexible metal spiral embedded in the PVC tube wall

D. **Mini Trach Tubes**: Cuffless tube used for the removal of tracheal secretions only.

E. **TracheoSoft Reinforced Tubes**: Reinforced tracheostomy tube with adjustable flange and no inner tubes.

8.2 CUFF MANAGEMENT
A cuffed tube is used to seal the airway and assist in the prevention of aspiration of oral or gastric secretions. The cuff seals the space around the tracheostomy tube, directing air through the tube, thereby allowing artificial ventilation.1,2,11,12

8.2.1 Cuff Pressure
- Cuff pressures are monitored to prevent tracheal injury and air leaks. Cuffs on tracheostomy tubes are now high-volume, low-pressure to minimise tracheal wall injury i.e. perfusion occlusion, tissue necrosis and tracheal stenosis.1,12
- Cuff pressure must be checked a minimum of once per shift and maintained between 14 - 24cm H₂O (10.36 - 17.76mmHg) using the tracheostomy cuff pressure gauge.12,13,14 The GREEN section on the Tracheostomy Cuff Pressure gauge represents this pressure range.
- If cuff pressures cannot be maintained at the recommended level (eg pressures reducing or a leak is suspected) specialist medical / nursing advice must be sought immediately.2,13 As cuff leakage places the patient at an increased risk of aspiration, observe for clinical signs and symptoms of aspiration11,12 (refer to paragraph 7.4.1)

8.2.2 Procedure for checking cuff pressure

<table>
<thead>
<tr>
<th>Skill Level:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Registered Nurses who are deemed competent by a designated assessor.</td>
</tr>
<tr>
<td>Enrolled Nurses who have achieved ‘Extended Practice Skill’ (refer to Section 16.1.2 of this manual) in tracheostomy cuff pressure management and been deemed competent by a designated assessor.</td>
</tr>
</tbody>
</table>

- Prepare for procedure as per section 2. B of this manual
- Attach tracheostomy cuff manometer to pilot balloon of tracheostomy tube, ensuring tight seal.
- Observe pressure reading on manometer
- If the reading is within the acceptable (green) pressure range (14-24cm H₂O ) and there is no evidence of cuff leak disconnect the pressure gauge and document the pressure reading on the tracheostomy care chart
- If the reading is below the acceptable (green) pressure range, insert additional air into the cuff by gently pumping the bulb of the pressure gauge until the correct pressure is obtained. Disconnect the pressure gauge and record the pressure reading on the tracheostomy care chart.
- If the reading is above the acceptable range withdraw air from the cuff by gently pressing the red button on the side of the manometer/pressure gauge until the correct pressure is obtained. Disconnect the manometer/pressure gauge and record the pressure reading on the tracheostomy chart.

NB: If the cuff pressure reading is lower than the acceptable range, inflate the cuff as described above and reassess within the hour to detect/confirm a cuff leak.
8.2.3 Cuff Deflation
Routine cuff deflation is not recommended as it does not significantly affect tracheal wall pressure and only increases the risk of aspiration and hypoxia.\(^8\),\(^12\) It may also result in over inflation of the cuff and damage to the pilot valve with frequent use.\(^12\) Cuff deflation may however be required in select patient groups.\(^8\),\(^12\) Confirm indication for deflations with the members of the multidisciplinary team (includes Medical officers, CNC’s, Speech Pathologists, and appropriate others) before deflating the cuff of any tracheostomy tube.

8.3 CLEANING INNER TUBES

**Skill Level:**
- Registered Nurses and Physiotherapists who have been appropriately assessed and deemed competent by a designated assessor.
- Enrolled Nurses who have achieved ‘Extended Practice Skill’ in cleaning tracheostomy inner tubes and been deemed competent by a designated assessor.

8.3.1 General Information
- Cleaning of the inner tube must be based on individual patient assessment.\(^8\),\(^11\) To ensure tube patency the inner tube must be checked and cleaned at least fourth hourly and more often if required.\(^7\),\(^11\),\(^14\) It must be replaced without delay.\(^11\)
- All patients transferred to general wards with a tracheostomy must have a double lumen tracheostomy tube insitu to minimise the risk of tube blockage with secretions and to reduce the need for frequent outer tube changes.\(^11\)
- For capped tubes and tubes using speaking valves please refer to paragraph 8.10.7

N.B. Care must be taken not to scratch the inner tube or to tear the fragile plastic between the tube fenestrations as this can cause additional adhesion of secretions and potentiate tube occlusion.

8.3.2 Equipment:
- Clean dry replacement inner tube
- Tracheostomy cleansing pack
- Non-sterile gloves, faceshield or mask and protective eyewear
- Impervious gown or plastic apron
- Bottle of sterile water
- Emergency equipment as per paragraph 7.1

8.3.3 Procedure:
- Carry out applicable general preparation (Refer to 2.B of this manual)
- Wash hands
- Don gloves
- Open tracheostomy cleansing pack using clean technique.
- Pour sterile water into kidney dish
- Remove dirty inner tube and place in kidney dish
- Insert spare clean, dry inner tube
- Use pipe cleaners to remove all secretions from inner tube.
- Place clean inner tube in container with lid e.g. denture pot for next use
- Discard water from kidney dish and recover with wrapping
- Terminate procedure in accordance with policy 2.C Termination of a clinical procedure
- **Discard cleaning pack at the end of each shift.** (Infection Control POWH 2002)

NB: A temporary inner tube is available from Shiley. This tube has a red 15mm mount and is shorter in length than the regular inner tube. It must only be used for a maximum of ten (10) minutes, as per product instructions.
8.4 HUMIDIFICATION

Patients with a tracheostomy tube within the hospital MUST always have a Heat Moisture Exchanger (Swedish nose) in place unless otherwise indicated.  

Symptoms of insufficient humidity include:
- Increased, unproductive cough
- A change of mucus from thin to thick, sticky consistency and from clear to a pale yellow
- Shortness of breath and a decrease in oxygen saturation's from mucus-plug obstruction
- Blood-streaked mucous
- Noisy laboured respirations (refer to paragraph 7.4.1)

8.4.1 Equipment

A. Heat Moisture Exchanger (HME): eg Thermovent T (Portex) Ref: 100/570/015
- Limited ability to fully humidify gas; observe patients for thick secretions and possible obstruction (see paragraph 7 Emergency Tracheostomy Procedures)
- Must be changed when soiled or every 24 hours.  
- Not to be used for patients with copious, thick or bloody secretions, as the valve blocks easily increasing the risk of tube occlusion regardless of humidification method. An alternative method of humidification must be used.

B. Hot Water Humidifier: eg Fisher & Paykel, Respiratory humidifier, MR850 AEA
- Used for newly tracheostomised patients, those who have thick secretions and those receiving ventilatory support, except Physio CPAP, which is in place temporarily.
- Gas passes over the water bath, which is heated to body temperature and is then inhaled by the patient. The circuit between the humidifier and patient should also be heated to prevent condensation from appearing in the circuit (this is done automatically by most circuits).
- The chamber MUST contain water at all times.
- Water in the circuit must be avoided as it is a medium for bacterial growth.

C. Nebulisers: eg Medic-Aid Sidestream
- Saline nebulisers must be administered 2-4 hourly and as required to provide fully saturated air with a fine mist of moisture.
- With the Medic-Aid Sidestream nebulisers a minimum of 6-8L of air/O2 is required to nebulise. For other brands please check with product recommendations as it may be lower.

8.5 SUCTIONING

NB. Patients report suctioning to be a painful and anxiety provoking procedure.  
Tracheal suctioning must be based on individual clinical assessment and patient needs and must not be performed as routine. Whenever possible, encourage patients to cough up secretions.

Skill Level:
- Registered Nurses and physiotherapists who have been appropriately assessed and deemed competent by a designated assessor.
- Enrolled Nurses who have achieved ‘Extended Practice Skill’ in suctioning tracheostomy tubes and been deemed competent by a designated assessor.

8.5.1 Indications
- Persistent Coughing
- Respiratory Distress
- Audible or visible secretions
- Worsening O2 Saturations
8.5.2 **Complications**  
- Tracheal trauma
- Suctioning induced hypoxaemia
- Hypertension
- Cardiac arrhythmias
- Raised intracranial pressure.

8.5.3 **Equipment**  
- Wall suction - (use high suction, not low suction connector)  
- Oxygen therapy if required  
- Tap water for cleaning of suction tubing *(not catheter).*  
- Non sterile gloves (non-touch technique used). Sterile gloves are used in critical care areas.  
- Protective face visor  
- Y- Suction catheter

8.5.4 **Suction Catheter Size Chart**  
<table>
<thead>
<tr>
<th>Tracheostomy Tube Size</th>
<th>Suction Catheter Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minitrach</td>
<td>10 fg</td>
</tr>
<tr>
<td>Shiley 6</td>
<td>10 or 12 fg</td>
</tr>
<tr>
<td>Shiley 8</td>
<td>12fg</td>
</tr>
<tr>
<td>Shiley 10</td>
<td>14fg</td>
</tr>
<tr>
<td>Portex 7</td>
<td>10fg</td>
</tr>
<tr>
<td>Portex 8</td>
<td>12fg</td>
</tr>
<tr>
<td>Portex 9</td>
<td>12 fg</td>
</tr>
</tbody>
</table>

8.5.5 **Suction Procedure**  
1. Prepare for procedure as per Standard 2B in this manual.  
2. Check oxygen saturation. If conscious and co-operative, ask patient to take 5 deep breaths. Do not hyperinflate.  
3. Select appropriate catheter size and prepare all equipment, checking suction. Ensure non fenestrated inner cannula in situ if necessary.  
4. Don face visor/ goggles.  
5. Wash hands and don non sterile gloves (use sterile gloves if not competent with non-touch technique)  
6. Turn on wall suction, remove sterile suction catheter from package, hold in dominant hand and, using non-touch technique, attach to tubing.  
7. To avoid trauma, insert catheter without applying suction. Using dominant hand and non-touch technique, introduce the catheter into the tracheostomy tube.  
   Light Suction: Insert catheter to just past the inner most tip of the tracheostomy tube (15cms)\(^{10}\), encourage patient to cough and apply suction.  
   Deep Suction: Insert catheter until resistance is felt (at the carina) or until the patient coughs, remove one inch and apply suction with caution\(^{15}\).  
   **NB Light suction is preferable if the patient is awake with an effective cough and proper assessment is done to ensure all sputum and secretions have been removed. Deep suction must be used with caution as it may cause trauma to the trachea and increase intracranial pressure (ICP).**\(^{19}\)  
8. Gently withdraw catheter using a continuous movement - this is most effective in clearing secretions and minimises trauma to tracheal mucosa. Do not exceed 10 seconds as prolonged suctioning causes hypoxia. Do not rotate the suction catheter.\(^{4}\) Do not oscillate catheter up and down\(^{18}\).  
9. Assess patient for need of further airway clearance and monitor response to suctioning eg Intracranial pressure, HR, BP, SpO\(_2\). NB Allow patient sufficient time to recover between each suction, particularly if oxygen saturation is low. Repeat the procedure, if necessary, using the same catheter and only if the catheter is clean and not contaminated.  
10. If applicable re-apply the patient’s oxygen supply immediately.  
11. To obtain a sputum specimen attach a sputum trap between the suction tube and suction catheter.  
12. Release suction, remove catheter and discard, dispose of equipment appropriately.  
13. Discard suction catheter and clean tubing using tap water. Tap water must not be used to clean for catheter.  
14. Discard gloves and wash hands.  
15. Document amount, colour and consistency of secretions on tracheostomy chart.
8.6 **STOMA MANAGEMENT**

8.6.1 *Tracheostomy Tube Dressing*

<table>
<thead>
<tr>
<th><strong>Skill Level</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Registered Nurses who are deemed competent by a designated assessor.</td>
</tr>
<tr>
<td>Enrolled Nurses who have achieved ‘Extended Practice Skill’ in tracheostomy stoma management and been deemed competent by a designated assessor.</td>
</tr>
</tbody>
</table>

- Clean tracheal neck incision site at least daily or more frequently if indicated, particularly in the early post-operative period or if secretions are copious \(^1,3,7\)
- Problems that commonly occur in relation to the stoma include soft-tissue infection, excessive stomal granulation tissue, prolonged or renewed contraction, intratracheal erosions from irritation by the tube itself, and peristomal skin rashes\(^45\). Refer to Standard 6 in this manual and the PHH/POWH Wound Resource Folder for additional information on wound assessment and appropriate dressings.
- The choice of dressing is determined by: \(^3,7,8\)
  - Condition of skin around the stoma eg intact/excoriated
  - Amount of tracheal secretions/exudate
  - Presence of over granulation
  - Type of tube eg rigid/soft and flexible

<table>
<thead>
<tr>
<th><strong>STOMA CHARACTERISTICS</strong></th>
<th><strong>TYPE OF DRESSING</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>Skin intact and minimal secretions</td>
<td>Keyhole (standard dressing used) or gauze</td>
</tr>
<tr>
<td>Excoriated and/or over granulation</td>
<td>Foam (capable of absorbing light to heavy exudate)</td>
</tr>
<tr>
<td>To prevent skin maceration and breakdown</td>
<td>Barrier cream or hydrocolloid</td>
</tr>
<tr>
<td>To prevent maceration - <em>must only be used with a cuffed tube</em> (to prevent aspiration of paste)</td>
<td>BIPP Paste</td>
</tr>
</tbody>
</table>

8.6.2 **Equipment**

- Dressing pack
- Disposable gloves, face-shield or mask and protective eyewear
- Impervious gown/plastic apron
- 0.9% sodium chloride ampoules x 2
- Gauze swabs
- Appropriate dressing
- Cream/paste if appropriate

*NB: Cotton balls or material that has not been precut by manufacturers must never be used to clean around the stoma due to the potential for inhalation of cotton or loose fibers* \(^3,7,11\)

8.6.3 **Procedure**

- Carry out applicable general preparations (Refer to section 2.B of this manual).
- Wash hands and don gloves.
- Remove and dispose of old dressing from under neck flange.
- Inspect stoma site for signs of infection, swelling, bleeding, maceration or excoriation. If any of these signs are present or if the patient is at increased risk of infection (eg immunocompromised, diabetes mellitus, cytotoxic therapy) sterile dressing technique must be used.\(^46,47\)
- Prepare work field and open all equipment.
- Replace gloves.
- Using clean technique, clean around stoma with normal saline soaked gauze. To ensure security of the tube ties must remain in situ throughout the procedure.
- Dry area.
- Assess the need for a further dressing and apply as required.
- Terminate procedure (Refer to section 2.C of this manual).
8.6.4 Post Decannulation Dressing (refer to Paragraph 8.10 for Decannulation Process):
- The dressing must be airtight.\textsuperscript{7,11}
- Encourage the patient to press on the site to provide dressing support when coughing and to prevent air being forced through the fistula.\textsuperscript{7}
- Dressing changes are required daily and PRN until complete wound closure is achieved.\textsuperscript{7} A moist stoma and build up of secretions will displace the dressing necessitating frequent changes.
- The wound may be left exposed when clean and dry and there is no evidence of air leak.\textsuperscript{7}

8.6.5 Equipment
Dressing pack
Disposable gloves
0.9\% sodium chloride ampoules
Gauze swabs
Cotton mouth swabs
Airtight/occlusive dressing eg tegaderm

8.6.6 Procedure
As for stoma dressing in paragraph 8.6.3 above up to dry skin. Then:
- Fold single sheet of gauze into four and place centrally over stoma. DO NOT USE STERILE SURGICAL STRIPS AS THERE IS A RISK OF INHALATION.
- Apply occlusive dressing
- Terminate procedure (Refer to section 2.C of this manual)

NOTE: If the patient is able to support the dressing when coughing an ECG dot placed centrally over the stoma dressing will assist the patient in locating the appropriate area to be supported to assist in the prevention of air leakage.

8.7 SECURING THE TRACHEOSTOMY TUBE

8.7.1 General Information
- The securing of the tracheostomy tube should be attended to daily or when wet or soiled.\textsuperscript{5}
- Velcro ties or cloth tapes are used to secure the tube.\textsuperscript{21} These should be checked for grip prior to use and must be changed daily or when soiled / wet.
- The ends of the cloth tape should always be tied using a double knot.\textsuperscript{21}
- After some neck surgery, pressure is not allowed on any part of the neck. In these cases the tracheostomy tube should be stitched in and a breastplate can be used to secure if indicated.\textsuperscript{5}
- Tapes should be snug enough to ensure tracheostomy tube is securely in place. This should be tested by putting two fingers between the tape and the patient's neck. If more than two fingers can be inserted then the tape is too loose.\textsuperscript{22}

8.7.2 Procedure
Two staff, one of whom is a Registered Nurse, are required to perform this procedure.\textsuperscript{23}
- Check that emergency equipment is available at the bedside (see paragraph 7.1)
- Collect ties or tapes to be used
- Prepare for procedure as per policy 2.b
- Nurse One is responsible for holding onto the tracheostomy tube and ensuring that it does not move during the procedure.
- Nurse Two removes old tapes / ties and discards.
- Nurse Two attaches and ties new tapes / ties

8.8 CHANGING THE TRACHEOSTOMY OUTER TUBE

Skill Level:
This procedure must be performed by an RN who has been deemed competent in changing the tracheostomy outer tube by a designated assessor, assisted by a second RN.
- A MO experienced in airway management must be present on the unit during the procedure.
- Double lumen tracheostomy tubes, ie those with inner tubes, are changed every thirty (30) days\textsuperscript{2,13}
- Single lumen tracheostomy tubes, ie those without inner tubes, are changed every seven (7) to fourteen (14) days to minimise the risk of occlusion with dried secretions.\textsuperscript{2}
An Ear, Nose and Throat (ENT) registrar or the ENT Clinical Nurse Consultant must review the outer tube sooner if there are any concerns about the tube eg persistent chest infection, tube at a non-vertical angle.

Factors which may complicate tube change include: immature tracheostomy tract (10-14 days), obesity, a short neck, anatomical abnormalities, granulation tissue, viscous secretions, peritracheal oedema and an uncooperative patient.

In Community settings, patient is advised to attend the appropriate clinic for changing of tube.

### Equipment

- Trolley with waste disposal bag.
- Dressing pack
- Sterile gloves, face shield or mask or protective eyewear
- Impervious gown/plastic apron
- Tracheostomy tube (same size and one size smaller than insitu)
- Suction catheters (see paragraph 8.5.4 for size chart)
- Neck ties / tapes
- 10 mL syringe (cuffed tube only)
- Water soluble lubricant
- Tracheostomy dressing if required
- Suture cutter, if applicable
- Exchange device(s) if indicated eg suction catheter, stiff nasogastric tube.
- Cuff pressure manometer/gauge
- Pulse oximeter

### Procedure

Ensure emergency equipment is functional and available at the bedside (see paragraph 7.1)

Carry out applicable general preparation (refer to Section 2.B. of this manual)

Observe and record baseline respiratory rate and SpO<sub>2</sub>.

Monitor oxygen saturation levels throughout procedure.

If insitu, aspirate nasogastric (NG) tube and suspend feed to prevent inhalation of gastric contents.

Ideally position the patient supine in bed, with a pillow or rolled towel under the shoulders to extend the neck, allowing ease of access to the tracheostomy site.

Check for sutures around stoma securing tube and remove prior to tube replacement.

#### CLASSICAL METHOD

<table>
<thead>
<tr>
<th>Nurse 1</th>
<th>Nurse 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wash hands, prepare work field and open up all equipment, including sterile gloves.</td>
<td>If applicable</td>
</tr>
<tr>
<td>Wash hands (3 min) and don sterile gloves. Organise equipment on sterile field.</td>
<td>- remove dressing</td>
</tr>
<tr>
<td>For cuffed tubes, check replacement tube cuff by inflating with 10mL air &amp; observe cuff for leakage. Remove inner cannula if present &amp; insert introducer. Lubricate tube sparingly with water-soluble lubricant</td>
<td>- suction oropharynx &amp; discard catheter</td>
</tr>
<tr>
<td>Insert new lubricated tube with introducer, rotated 90° from its correct position to engage tracheostomy opening. Then turn tube 90° back to correct position to be inserted in the trachea Remove introducer and insert inner cannula</td>
<td>- deflate cuff</td>
</tr>
<tr>
<td>Clean tracheostomy site with gauze soaked in 0.9% normal saline. Apply dressing.</td>
<td>- suction trachea using new, sterile catheter</td>
</tr>
<tr>
<td>Inflate cuff, if applicable with air using syringe until no audible air leak Check cuff pressure using manometer (14-24cmH₂O) Assess airway and check oxygen saturations Secure tube ties Reconnect patient to oxygen, if applicable Reposition patient. Recommence NG feeds, if applicable</td>
<td></td>
</tr>
</tbody>
</table>

NB: Monitor patients respiratory rate, SpO<sub>2</sub> and observe patient for signs of respiratory distress overnight.
**RAILROAD TECHNIQUE**

The ‘railroad’ technique utilises an exchange device or ‘guiding’ obturator, and is recommended for difficult changes eg immature tract, presence of factors contributing to tube change difficulties.

<table>
<thead>
<tr>
<th>Nurse 1</th>
<th>Nurse 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prepare patient and equipment as for classical method ensuring inclusion of exchange device.</td>
<td>Remove dressing, if applicable</td>
</tr>
<tr>
<td>Remove inner cannula, if applicable</td>
<td>If applicable suction oropharynx</td>
</tr>
<tr>
<td>Insert exchange device through the indwelling tracheostomy tube into the trachea, securing upper end of tube with thumb and index finger.</td>
<td>If applicable deflate cuff</td>
</tr>
<tr>
<td>Insert new tube over exchange device</td>
<td>If applicable performs tracheal suction</td>
</tr>
<tr>
<td>Removes exchange device and inserts inner cannula</td>
<td></td>
</tr>
<tr>
<td>Clean tracheostomy site with 0.9% normal saline soaked gauze. Apply dressing.</td>
<td></td>
</tr>
</tbody>
</table>

**Documentation**

- The nurse responsible for changing the tracheostomy tube must record, in the continuation/progress notes and observation chart(s), the date of tube insertion and the patient's observations and condition during and post procedure.
- If available the coloured sticker, which is included in some tube packaging and indicates tube size, should be placed in the patient’s continuation/progress notes.

### 8.9 SWALLOWING AND ASPIRATION

#### 8.9.1 Definitions:

**Dysphagia** is the term used to describe difficulty swallowing. The presence of a tracheostomy tube can affect swallowing function in patients who previously had no dysphagia and may further impair those who already have neurological or mechanical disorders of swallowing or respiratory compromise. Dysphagia may not improve immediately with the removal of the tracheostomy tube.

**Aspiration** occurs when oropharyngeal secretions, food, drink or gastric secretions pass below the level of the vocal cords. This would normally result in coughing, in an attempt to clear the airway. However, if the cough reflex is impaired or absent “silent aspiration” can occur. This risk is increased by prolonged intratracheal intubation which can desensitize the airway. Clinical consequences of aspiration: transient hypoxaemia, chemical pneumonitis, pulmonary infection or obstruction.

**Patients at risk of dysphagia or aspiration must be referred to Speech Pathology prior to commencing oral intake or cuff deflation.**

#### 8.9.2 Risk factors for dysphagia and/or aspiration:

- Decreased level of consciousness
- Neurological impairment, including cognitive impairment
- Dependence for feeding and oral hygiene
- More than one medical diagnosis
- Age related changes

Refer to paragraphs 7.4 and 7.5 for procedures on management of aspiration and/or obstructed airway.
Blue dye testing is a screening tool for gross aspiration and may be used as part of a range of tests to evaluate oropharyngeal swallowing and airway protection in patients with a tracheostomy. The results must be used with caution when determining future management.\textsuperscript{26,29}

This test must only be performed by Speech Pathologists.\textsuperscript{29}

### 8.10 TRACHEOSTOMY DECANNULATION

#### Skill Level:
Speech Pathologists and RNs who have been deemed competent in tracheostomy decannulation by a designated assessor.

Decannulation is the term used to refer to the weaning process adopted when planning to remove a tracheostomy tube.

For the purposes of avoiding unfavourable outcomes occurring out of hours, in general ward areas the decannulation process should only be attempted before 12md Monday - Friday.

#### 8.10.1 Decannulation Process

This is a progressive, ongoing process. Successful deflation must be achieved prior to occlusion.\textsuperscript{7,11}

Before the weaning process is commenced the patient must demonstrate the following:\textsuperscript{30,37}

- Adequate protective mechanisms - ability to cough and clear airway secretions
- Ability to breathe normally without using accessory muscles to assist when at rest.
- Tolerating an established feeding regimen.
- Reversal of the medical condition that originally necessitated intubation
- Patent upper airway eg absence of oedema, no obstructions
- Absence of respiratory infection

If the indication for intubation was respiratory failure the patient should be off mechanical ventilation for 24-48 hours to avoid re-intubation secondary to respiratory muscle fatigue or secretions.\textsuperscript{30,31}

NB Because patients may tire with the work of breathing and the effort of independent secretion removal, a longer period of weaning is indicated where there has been/is:

- Oedema of the upper airways
- Severe muscle weakness\textsuperscript{32}
- Neurological deficits\textsuperscript{32}

#### 8.10.2 Observations During and After the Process

- Check baseline observations (respiratory rate, pulse, blood pressure and SpO\textsubscript{2}).
- Stay with the patient for 15 mins post decannulation.
- Recheck observations ever 15 mins for 1 hour.
- In special circumstances closer observations may be indicated eg patients with spinal injuries.

#### 8.10.3 Cuff deflation

Cuff deflation is performed to assess a patient’s suitability for commencing the weaning process. Record patients’ vital observations and clinical response to cuff deflation. If observations fall outside of the following criteria the cuff must be reinflated to the same pressure as it was prior to deflation.

**Criteria indicating successful cuff deflation:**\textsuperscript{33}

- SpO\textsubscript{2} maintained at or above 90% or within 5% of baseline
- Respiratory rate should not exceed 10 breaths/minute from the baseline. If respiration rate drops below 8 breaths/min treat as an unsuccessful cuff deflation and contact MO to review patient.
- BP & Heart rate should not increase or decrease 10% from baseline
- Breathing - no shortness of breath
- Cough - no constant uncontrollable coughing after 5 mins post deflation

#### 8.10.4 Occlusion

Not all patients benefit from tube occlusion (or capping); each patient must be evaluated individually to determine its effectiveness during the decannulation process.\textsuperscript{34,35}

Benefits of occlusion include:\textsuperscript{36}

- Reducing upper airway secretions
- Better clearing of residue - by enabling an effective cough
- Enhanced olfaction
- Vocalisation/speech
**IMPORTANT INFORMATION**
- Tube occlusion is based on individual patient assessment and is a multidisciplinary team decision.
- Ensure the cuff is completely deflated before the tube is occluded.
- When occluding a tube for the first time, stay with and observe the patient for a minimum of 15 minutes following occlusion.
- Ensure the patient’s oxygen saturation (SpO$_2$) is monitored continuously.
- Do not administer nebulisers via a tracheostomy whilst capped.

**IF ANY OF THE FOLLOWING OCCUR DURING TUBE OCCLUSION / CAPPING, REMOVE CAP IMMEDIATELY AND ALERT MEDICAL TEAM. CALL 777 & REPORRT CODE BLUE IF RESPIRATORY ARREST OCCURS** (REFER PARAGRAPH 7: EMERGENCY PROCEDURES):
- Increase in heart rate
- Decrease in oxygen saturation
- Any signs of respiratory distress
- Irritation, confusion or agitation
- Cyanosis

If occlusion (capping) is performed it must be tolerated for a minimum of 4 hours without signs of distress before removal is considered. Longer capping periods may be required and extra monitoring indicated in special patient populations such as those with:
- Respiratory impairment
- Spinal injuries
- Neurological deficits

**8.10.5 Removal of Tracheostomy Tube:**

**Skill Level:**
An RN who has been specifically trained, assessed and deemed competent by a designated assessor in tracheostomy tube removal. Ensure a second person is available in case of emergency.

**Procedure:**
*Removal of a tracheostomy tube must only be attempted after successful cuff deflation (and/or occlusion depending on individual circumstances).*
- Ensure emergency equipment is available (refer to paragraph 7.1).
- Prepare for procedure as per Standard 2.B in this manual.
- Observe and record baseline observations (Pulse, BP, RR & SpO$_2$).
- Wash hands (15 seconds)
- Cut ties and/or sutures if appropriate.
- Deflate cuff and assess for suction requirements or encourage cough.
- Wash hands (3 minutes)
- Remove tube by gently pulling tube, following contours of the tube, and angling towards chest/sternum.
- Suction as required.
- Apply dressing as per paragraph 8.6.4.
- Monitor vital signs (Pulse, BP, RR, SpO$_2$) immediately following removal of tube, then 15 minutely for 1 hour and then 4 hourly (see paragraph 8.10.2 above).
- SpO$_2$ must be monitored continuously for the first 24 hours post tube removal.
- Emergency equipment must remain at the bedside for 24 hours post tube removal.
- Refer to paragraph 7 for procedures in the event of complications and/or emergency.
- Refer to paragraph 8.6.4. for post decannulation dressing procedure.

**8.11 MANAGEMENT OF SPEAKING VALVES (eg Passy-Muir)**
The following relates to non-ventilated patients (for ventilated patients refer to ICU Clinical Practice Guidelines)

**Skill Level:**
Speech Pathologist or RN who has been specifically trained, assessed and deemed competent in this skill by a designated assessor.
A speaking valve allows a patient with a tracheostomy tube to vocalise.

- Fenestrated tracheostomy tube is preferred (but may not be required)
- The cuff must be deflated on a cuffed tracheostomy tube prior to attaching the speaking valve. Refer to paragraph 8.10 for cuff deflation procedure.
- A Speech Pathology assessment is required to assess the ability to vocalise and evaluate other potential communication options. The Speech Pathologist is responsible for establishing phonation and evaluating voice quality.
- Remove valve during sleep or rest periods. It must only be used when the patient wishes to talk.
- To deliver nebulisers remove the speaking valve and deliver via the tracheostomy tube using a tracheostomy mask and nebuliser reservoir.

**Candidates must meet the following criteria for a speaking-valve:**

- Awake, oriented and motivated to vocalise
- Intact vocal cords (as per fiberoptic evaluation)
- Able to tolerate cuff deflation for extended periods
- Ability to protect upper airway
- Medically stable

**Benefits:**

- Improved vocalisation
- Reduced potential for infection (when compared with digital occlusion)
- Possible improvement of secretion management

**Contraindications**

- Upper airway obstruction/oedema
- Medical instability
- Severe aspiration or copious secretions
- Severe dysarthria (speech musculature weakness)
- Unconscious patients

**Observations:**

As the speaking valve can increase the work of breathing when in situ the following must be monitored at baseline, every 15 minutes for the first hour, then 4th hourly.

- Vital signs (Pulse, BP, RR, SpO₂)
- Respiratory pattern and work of breathing (refer to paragraph 7.4.1 for indications of problems in airway clearance and impaired gas exchange)

**9 COMMUNICATION**

Communication changes and needs should be discussed with the patient pre-operatively as circumstances allow. Pre-written boards are available in other languages from the ENT ward. For further options contact speech pathology.

**10 ALTERED BODY IMAGE AND GENERAL CARE**

Adapting to breathing through a tracheostomy tube / stoma is often a challenge both for the patient and their family / significant others that requires time and support.

Acceptance of the physical and functional changes may affect the patient's self-image.

General care and hygiene must be attended as follows:

- A high standard of frequent oral hygiene is required for patients with a tracheostomy to prevent dry, sore mucus membranes and lips. Refer to Section 9.A Oral Hygiene standard, in this manual for appropriate procedures. Topical products should be used as prescribed to prevent/treat infections in and around the oral cavity.
- Male patients should be shaved as usual with care around the tracheostomy tube not to dislodge it, introduce water or soap/shaving cream, or cut securing tapes.
- Showering or bathing is permitted provided care is taken not to introduce water into the tube.
- Encourage and assist patient to sit out of bed as their clinical condition permits them to do so.
- Assist patient with disguising the stoma using a scarf, high neckline, bib etc, being careful not to occlude air passage.
- Referral to a social worker should be made early in the process if there are concerns about their adaptation and acceptance of the stoma.
11 COMMUNITY CARE

Patients discharged home with a tracheostomy need education, as outlined below, and referral to appropriate agencies (eg. Aged Care Assessment and Rehabilitation Team - ACART).

- Provide appropriate education and training prior to discharge and encourage patient, where possible, to care for their own tracheostomy tube. A plan, which is initiated as soon as the decision to discharge the patient with a new tracheostomy is made, should include the following:19,40,42
  - Assessment of patient/carer knowledge deficits.
  - Provision of instructions/information to correct these deficits.
  - Development of immediate post discharge care plan.
  - Arrangements for essential supplies and equipment.
- Provide information on attendance at appropriate clinics for the purpose of changing the tube.
- If the patient requires full time care at home, appropriate arrangements must be made by the family/significant others. Options include a private nurse or a full-time family member if available. Assistance and information on organising such care can be provided by the Occupational Therapy and Social Work Departments. Carers NSW - 1800 242 636 or 02 9280 4744 - will provide information and support for carers.
- Community nurses are available on a daily basis if required to assist with and advise on care, equipment and all other aspects of community care. The need for community care must be assessed and arrangements made prior to discharge by contacting D/C Planning CNC.
- Tracheostomy management knowledge and ability to be assessed prior to discharge must include:
  - Tracheostomy stoma and tube care including cleaning and dressing.42
  - Humidification and filtration of inspired air.41
  - Indications for suctioning and technique (refer to paragraph 8.7).1,39. The procedure need not be sterile in the home where there is no risk of patient cross contamination, however, clean gloves must be worn.22,40
  - Signs and symptoms to report to GP* or immediate intervention#.
    - Unexplained dyspnoea²
    - Severe coughing
    - Bleeding around tracheostomy site
    - Haemoptysis
    - Changes in consistency and colour of secretions
    - Erythema or soreness around stoma
    - Pulsing of tracheostomy tube (danger of eroding into innominate artery)#
    - Inability to pass suction catheter down tracheotomy tube (instruct patient/carer to deflate cuff and have tracheostomy tube replaced)#
  - Appropriate methods for communication eg writing, sign language, communication aids and augmentative communication devices.42
- Equipment and supplies to be used for suctioning at home may include.41
  - Suction machine and tubing.
  - Suction catheters (refer to paragraph 7)
  - Clean water to flush the suction tubing.
  - Non sterile gloves
  - Protective face visor (for carer)
  - Humidification devices42 and/or vapourizer43 if indicated
  - Manual resuscitation bag if indicated
  - Extra tracheostomy tubes
  - Cotton tip applicators
  - Sterile saline solution
  - Tracheostomy ties or tube holder
  - Appropriate dressings as indicated by wound characteristics
  - Oxygen source if required
- Educate the patient about protective measures such as:
  - Avoid crowds and contact with visitors or others who have active viral or bacterial infections, airborne or those spread by direct contact.40,42 Seek recommendation from GP on flu shots.42
  - Avoid very cold or very dry (eg air conditioned) environments.42,43
  - Encourage clear airway by doing deep breathing and coughing, and ensure adequate fluid intake, if not contraindicated, to help liquefy secretions.42
- Proper handwashing, clean suctioning technique, equipment cleaning, storage and disposal.  
- Avoid swimming, and shower with care to prevent water entering the tracheostomy tube.  
- Maintain a well-balanced diet.  
- Advise patients to take a travel kit with them when going out of the home. This should include:  
  - Portable suction and suction catheters  
  - Same size tracheostomy tube and one size smaller with introducer and ties  
  - Spare heat moisture exchangers  
  - Tissues  
  - List of emergency numbers  
- Provide information on supportive resources such as Carers NSW.  
- Prepare carers for possibility of emergency.  
  - Learn mouth to stoma CPR  
  - Wear identification stating that wearer breathes through neck.  
  - Keep extra tracheostomy tubes on hand.

12 REFERENCES

<table>
<thead>
<tr>
<th>Citation</th>
<th>Source</th>
<th>Level of Evidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>St George's Healthcare NHS Trust (2000) Guidelines for the Care of Patients with Tracheostomy Tubes</td>
<td>1D1</td>
</tr>
<tr>
<td>8</td>
<td>Joanna Briggs Institute for Evidence Based Nursing and Midwifery (2002) Tracheostomy tube care - literature review. Clinical Practice Manuals</td>
<td>1A3</td>
</tr>
</tbody>
</table>