GUIDELINES
FOR
TRACHEOSTOMY MANAGEMENT

APPROVED BY HEAD AND NECK NSSG 11 JUNE 2012
FOR REVIEW JUNE 2014
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A tracheostomy is an artificial opening in the anterior wall of the trachea usually between the second and third tracheal rings (Allan, 1987, Casey, 1989).

There are two main types of tracheostomy:

- Surgical: the thyroid isthmus is dissected and part of the third tracheal ring removed to make an opening
- Percutaneous: a dilational technique above or below the second tracheal ring

A tracheostomy may be performed under a general or local anaesthetic and may be long or short term. The stoma is kept patent by the means of a tracheostomy tube.

- A laryngectomy is usually performed for cancer of the larynx. It involves the removal of the larynx, hyoid, thyroid and cricoid cartilages and several tracheal rings. When these are removed, the pharynx is left open from the base of the tongue to the mouth of the oesophagus and is repaired in layers to form a new gullet. The upper airway is detached from the lower airway by the removal of the larynx and there is no way of joining them up again. The trachea is therefore brought out onto the surface as a permanent tracheostomy. The stoma will never close and does not need a tube to keep it open. (Logan and Turner, 1988).

Reasons for a Tracheostomy

1. Laryngeal pathology or dysfunction:-
   a. Laryngeal tumours
   b. Foreign bodies
   c. Trauma from surgery or accidents
   d. Inflammation
   e. Vocal cord paralysis

2. For long-term ventilation of the lungs
3. To facilitate weaning from artificial ventilation
4. To enable bronchial secretions to be aspirated.
5. To prevent aspiration if the patient is unable to protect their airway e.g. neurological reasons
Anatomy of the trachea

1. The trachea is a fibromuscular tube supported by 20 “C” shaped hyaline cartilages, which are opened posteriorly.
2. The soft tissue posterior wall is in contact with the oesophagus.
3. Three layers of tissue clothe the cartilages:
   a. A fibrous elastic outer layer.
   b. A middle layer of cartilage and bands of smooth muscle that wind around the trachea. There is some tissue containing blood and lymph vessels and autonomic nerves.
   c. An inner lining consisting of delicate ciliated columnar epithelium containing mucous secreting goblet cells. The blood supply is primarily supported by the brachiocephalic artery and through the inferior thyroid and bronchial arteries.
4. The nerve supply is by parasympathetic and sympathetic fibres. The sympathetic system acts in the flight or fight response stimulated by adrenaline. It causes an increase in heart rate and relaxes the bronchi and muscle of the gut wall. The parasympathetic supply to the trachea is by the recurrent laryngeal nerve – a branch of the vagus nerve – it can slow the heart rate, increase the acidity to the stomach and constrict the bronchi. (Brunt, (1986), p33-34)
Position

1. The trachea begins just below the larynx at approximately the 6\textsuperscript{th} cervical vertebra.

2. It is flexible to accommodate varying depths of ventilation, coughing and speech. The length and width is continually changing to accommodate head, neck and diaphragmatic movements.

3. In adults it is 12-16 cm long and 13-16 mm wide in women and 16-20 mm wide in men. (Minsley and Wren 1996)

4. It is slightly to the right of the midline and divides at the carina into the right and left bronchi.

5. The carina lies under the junction of the sternum at the level of the 4\textsuperscript{th} thoracic vertebra (Kumar and Clark, 1994 p 631)

**DEFENCE MECHANISM OF THE RESPIRATORY TRACT**

1. **HUMIDIFICATION** – prevents dehydration of the epithelium. The nose is normally the first respiratory passage through which air passes and it plays an important role in warming and moistening air. (Minsley and Wrenn, 1996). Breathing cold and dry air straight into the trachea results in drying of the tracheal secretions and paralysis of the cilia. Secretions can therefore become thick and dry and can form crusts or plugs, which can predispose to infection or block the trachea, (Serra, 1986). If the temperatures of the more distal airways drop, bronchial constriction and wheezing can result (Minsley and Wrenn 1996).

2. **PARTICLE REMOVAL** – over 90\% of particles greater than 10 μm are removed by the nostril or nasopharynx, (Kumar and Clark, 1994), but the cilia of the trachea has an important role to play beating synchronously to move foreign material and micro-organisms up the trachea; (Rhoades and Pflanzer, 1989).

3. **PARTICLE EXPULSION** by coughing, sneezing or gagging. The cough reflex can be negatively affected as the result of a shortened respiratory tract, (Minsley and Wrenn, 1996).

4. **IMMUNO GLOBULINS**, enzymes and antibacterials are all found in the tracheo-bronchial secretions, (Kumar and Clark, 1994).

5. **RESPIRATORY TRACT SECRETIONS** – the mucus of the respiratory tract consists of a 5 μm gel layer that is relatively impermeable to water. This floats on a liquid layer that is present around the cilia of the epithelial cells (pericilial layer). Tracheo-bronchial clearance of the secretions is normally 10 mls over 24 hours and is dependent on the condition of the secretions – anything which interferes with the composition of the secretions e.g. mechanically e.g. by a tube or chemically induced inflammation or disease will greatly reduce the motility of the cilia and their ability to clear the respiratory tract, (Minsley and Wrenn, 1996). The body does adapt to a tracheostomy, the columnar epithelium in the
proximal part of the remaining trachea becomes stratified with no cilia and a decrease in secretion producing cells, *(Minsley and Wrenn, 1996).*

### TRACHEOSTOMY TUBES

All tracheostomy tubes consist of a main shaft and a neck plate or flange. The flange rests between the clavicles. Holes on each side allow you to attach tracheostomy ties to secure the tube in place.

Tubes are made of semi-flexible plastic, rigid plastic or metal. Semi-flexible plastic tubes conform to the patients’ anatomy during movement – good for patients with tracheal deviations. Rigid tubes are typically used when neck swelling is a problem.

Plastic tubes have a built-in 15mm adaptor that extends from the neck plate. This allows respiratory equipment e.g. an ambubag, a T piece oxygen delivery system or a mechanical ventilator, to be attached. In adults they have an internal diameter of 7-10 mm. *(Allan, 1987)*

**Cuffed Tracheostomy Tubes**

Inflatable cuffs are used when an air-tight seal is required around the tube. **The cuff is not to hold the tube in position** – it is usually required:

1. When the patient is unable to breathe independently and requires artificial respiration. An air-tight seal around the tube prevents loss of air being blown into the lungs by the ventilator.

   Or

2. When a seal is necessary to prevent blood, vomit, oral secretions passing down the sides of the tracheostomy tube into the lungs. (Not an absolute barrier)

**Figure 2** Diagram of a Tracheostomy tube

Cuffed tubes have an inflation line leading to the cuff and pilot balloon that inflates when the cuff contains air, giving an indication of the volume of air in the cuff.
What the pilot balloon does not tell you how much air pressure is in the cuff.

You can confirm the correct inflation by listening for air leak or by measuring intracuff pressure with a manometer, (Weilitz and Dettenmeir, 1994). When deflating ensure tracheal suction is performed to prevent aspiration of secretions from above balloon. The presence of an air leak may indicate that the cuff is inadequately inflated. Measurement of cuff pressure should be checked once per shift / each time the cuff is inflated. (St.George’s Healthcare NHS Trust Guidelines 2000).

Figure 3 Example of a manometer to check cuff pressures

Disadvantages of Cuffed Tubes
1. Traditionally single tubes with no inner tubes were used, however these could easily become blocked and we therefore now use inner cannula as standard.

2. The cuff exerts a pressure on the surrounding tissues when it is inflated. In time, this pressure can cause damage to the tissues, resulting in necrosis, a fistula or stenosis in the trachea. To overcome the problem high volume low pressure cuffs were introduced and cuff site injury in now thought to be less severe and frequent. Over inflation of low pressure cuffs, even by the addition of only a few mls of air above the minimal occluding volume can dramatically raise intracuff pressures, (Regan, 1988). A seal must be achieved with a pressure exertion of less than 20 cm H2O, (Mackenzie, 1983, Crosby and Parsons, 1974). Caruna (1990) recommends pressures of between 15-25 cm H2O. If an adequate seal cannot be obtained with such pressures it may be necessary to switch to a larger sized tracheostomy. An accurate way of checking the pressure is to use a manometer (Caruna 1990).

3. The patient cannot speak when the cuff is inflated as no air can go past the vocal cords – this has a massive psychological impact on the patient. (If a patient with a cuffed tube can speak it could be a sign that the tube is displaced, or the cuff inadequately inflated.)

4. Secretions can collect on the top of the cuff which can become infected and then drain down into the lungs. Some tubes have an additional port to enable the aspiration of these
secretions. When the cuff is deflated suction should be carried out simultaneously to collect these secretions.

**Uncuffed Tubes**

These tubes are used in patients who are not in danger of aspiration. It is essential that patient has an effective cough and gag reflex to protect them from aspiration. These tubes are rarely used in acute care. They are used in patients who need long term protection of airway.

**Note:** inner cannula used to prevent tube blockage

**Figure 4** Example of an uncuffed tube and inner cannula

![Example of an uncuffed tube and inner cannula](image)

**Disadvantages of uncuffed tube:**

1. In emergency situations it is not possible to create a seal around the tracheostomy tube for ventilation.

**Inner Cannula**

Best practice in the management of tracheostomies requires the use of an inner tube / cannula. This is a removable tube that fits inside the outer cannula and acts as an added safety feature. All non ventilated patients have an inner tube in situ, except the adjustable flange tube must have an inner cannula. The inner cannula in the will reduce the diameter of the inner lumen by approx 0.5mm depending on manufacturer.

Secretions can adhere to the inside of the tracheostomy and therefore periodically replacing or cleaning the inner cannula keeps the tube patent *Burns et al (1998)*, discuss how yet there are no clear practice standards based on research relating to the changing of inner cannulae. A disposable inner cannula should be changed if it becomes kinked, bent or damaged, in which case it should be disposed of and replaced with a new inner cannula. The tracheostomy kit comes with 2 inner cannula and a brush.
Care of the Inner Tube

- Ensure that you select the correct size inner tube for the tracheostomy tube in use
- Cleaning of the inner cannula is recommended at least once a shift or whenever the inner tube becomes contaminated by mucous or secretions. This period of time will vary according to individual patient needs. Inner tube changes and cleaning should be noted in the nursing records
- The inner cannula should be removed using the ring pull
- The soiled inner tube should be cleaned and rinsed using sterile saline, care should be taken not to contaminate clean areas during this process.
- Inner tubes must not be left to soak, they should be re-inserted after cleaning, or replaced if damaged.
- Care should be taken to ensure that inner tubes do not become kinked or damaged during cleaning, and that no kinked or damaged inner tubes are re-inserted into the tracheostomy tube.

Fenestrated Tube

These are single or multiple holed tubes that provide airflow to the larynx to enable speech. A degree of phonation (talking) by the patient improves communication and may improve cough so assist weaning. The holes are situated along the shaft of the outer and inner cannulae (red) It is recommended that tubes with multiple fenestrations are used, to prevent granulation tissue growing over and blocking the holes. The fenestrated tubes may be cuffed or uncuffed.

Fenestrated tubes should not be used with a patient who has a history of aspiration as they increase the risk of oral or gastric contents entering the lungs. (Weillitz and Dettenmier, 1994).

There are many different types of fenestrated tube, some with a speaking valve adaptor, the practitioner should be familiar with the type of tube and how the speaking valve is connected, also how to change the inner tube – advice and training should be sought for all unfamiliar tubes encountered.
Adjustable Flange Tracheostomy

Adjustable flange tubes are suitable for patients with:

1. deep-set tracheas.
2. large necks, oedematous patients
3. spinal abnormalities such as kyphosis
4. abnormal anatomy

The adjustable flange means that the tracheostomy tube can be altered in length for those patients with an abnormally large distance from their skin to trachea, where a standard tube would not fit properly. These tubes do now have an inner cannula and so follow same guidelines as per tracheostomy with inner cannula.

N.B. BEFORE SUCTIONING A PATIENT WITH A FENESTRATED TUBE, THE FENESTRATED INNER CANNULA (RED) MUST BE CHANGED TO AN UNFENESTRATED INNER CANNULA,(WHITE) SO THAT THE SUCTION CATHETER DOES NOT PASS THROUGH THE FENESTRATION(S) AND INJURE THE TRACHEAL WALL.

Figure 5 Example of a Fenestrated cuffed tracheostomy tube

Figure 6 An example of an adjustable flange tracheostomy with inner cannula
MINI TRACHEOSTOMY
A mini tracheostomy is occasionally used in patients as a means of clearing secretions.

Figure 7 An example of a mini tracheostomy
The mini tracheotomy tube can be used in the prevention and management of sputum retention
The tube has no cuff and the diameter is small, so a size 10 or below catheter must be used for suction.

Advantages
- It does not impair speech and cough.
- It gives access to the trachea, without impairment of laryngeal function
- Frequent clearance of bronchial secretions possible.
- Minimal scarring

Disadvantages
Due to the smaller catheter size this tracheostomy is ineffective with sticky viscous secretions
Pre transfer information required for tracheostomy patient

1. What type and size of tracheostomy tube is in situ? Inner tube in situ?
2. Is the cuff inflated or deflated?
3. When the tracheostomy was inserted and were there any complications / difficulties associated with the insertion?
4. What is the percentage of oxygen required by the patient?
5. How much suctioning is required, type and quantity of secretions?
6. Are there any sutures in situ i.e.
   a) at the incision site (formal tracheostomy)
   b) tracheostomy tube sutured to the neck (formal and percutaneous).

BED AREA PREPARATIONS: Please ensure patient is visible from nurses station (preferably not in side room)

Red Box

1. Spare inner cannula
2. Spare tracheostomy tubes – same size and one smaller size
3. 10 ml syringe
4. Sterile tracheal dilators, Tilley forceps -use with caution
5. Non re-breathe mask
6. Stitch Cutter
7. Lubricating Jelly

Bedside Equipment:

1. Bed head notice – emergency algorithm – Tracheostomy or Laryngectomy as appropriate
2. Suction catheters- Yankuer sucker and suction catheters of a suitable size
3. Sterile gloves
4. Humidification
5. Suction working and clean, with new receptacle and suction tubing
6. Sterile water- labelled for suction (for cleaning suction tubing after use)
7. Nurse call bell, emergency airway alarm
8. Tracheostomy Care Plan
9. Mouth-care pack
10. Pen torch
11. Nebuliser equipment
12. Cuff manometer
Figure 8 Equipment on a tracheostomy trolley - NEW

EMERGENCY BOX PICTURE
TRACHEOBRONCHIAL SUCTION GUIDELINES

INDICATIONS
1. To maintain patency and integrity of the artificial airway
2. Patients with sputum retention and absent/ineffective cough
3. Suspected aspiration with deflated cuff
4. Audible or visible secretions in the airway
5. To stimulate a cough in an unconscious patient

DESCRIPTION
The insertion of a suction catheter into the trachea to remove secretions from the patient’s chest.

Routes of Entry:
1. Endo-Tracheal/Tracheostomy tube
2. Mini-tracheostomy
3. Laryngectomy

TECHNIQUE

Equipment Necessary
- Suction.
- Correct size of catheter. The catheter should be no more than 50% of the tracheostomy lumen diameter (Bersten et al 2003, A.A.R.C guidelines) – see below for sizing
- Suction control 70 – 150mmHg (9.3 – 20kPa). Ashurst (1997) recommends a setting of 120 mm/hg (16kPa)
- Clean plastic disposable gloves, individually wrapped in paper
- Clean latex gloves or suitable alternative if latex allergy
- Bottle of sterile water labelled with date and time opened, to be changed every 24 hours
- Bag for disposable objects
- 02 supply with tracheostomy mask

Table 1 Step by Step guide to Performing Suctioning
<table>
<thead>
<tr>
<th>STEP</th>
<th>RATIONALE</th>
</tr>
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<tbody>
<tr>
<td>1. Introduce yourself and explain procedure</td>
<td>Avoid unnecessary interventions</td>
</tr>
<tr>
<td>2. Assess patient to ensure suction is necessary</td>
<td>Gain informed consent</td>
</tr>
<tr>
<td>3. Position patient</td>
<td>To allow effective cough</td>
</tr>
<tr>
<td>4. Apply oxygen saturation probe</td>
<td>To evaluate patient’s oxygenation</td>
</tr>
<tr>
<td>6. Wash hands</td>
<td>Reduce cross infection</td>
</tr>
<tr>
<td>7. Put on disposable apron and clean latex gloves</td>
<td>Reduce cross infection</td>
</tr>
<tr>
<td>8. Connect suction catheter to suction tubing</td>
<td>To allow suction to begin</td>
</tr>
<tr>
<td>9. Use sterile glove on hand manipulating catheter</td>
<td>Reduce cross infection</td>
</tr>
<tr>
<td>10. Withdraw catheter from sleeve with sterile gloved hand</td>
<td>Reduce cross infection</td>
</tr>
<tr>
<td>11. Advance catheter gently until cough stimulated or resistance felt <em>(do not apply suction)</em></td>
<td>Minimize mucosal trauma</td>
</tr>
<tr>
<td>12. Withdraw catheter about 1cm and apply suction. Withdraw gently. <em>(procedure not to last more than 15 seconds- Woodrow 2000, Day 2000)</em></td>
<td>Reduce potential complications</td>
</tr>
<tr>
<td>13. Dispose of catheter and gloves</td>
<td>Reduce cross infection</td>
</tr>
<tr>
<td>14. Rinse suction tubing with sterile water to ensure tubing sputum free</td>
<td></td>
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<tr>
<td>15. Repeat as necessary</td>
<td></td>
</tr>
<tr>
<td>16. Clear oral secretions</td>
<td>Maintain patient comfort</td>
</tr>
</tbody>
</table>
REMEMBER:
* Each suction catheter should be used once only.
* Do not rotate or move the catheter up and down.

Points to note:
- Catheter size:
  - for mini-tracheostomy size 10 (bulbous tip catheters are NOT suitable)
  - for endo-tracheal/tracheostomy size 10-14
- **N.B.** catheter size should not exceed ½ diameter of airway Tracheostomy size minus 2 and times by two (Size 8 tracheostomy, 8 - 2, x 2 = Size 12 catheter
- **Ensure documentation of frequency of suction, type of secretions etc.**

Table 2 Recommended suction catheter sizes

<table>
<thead>
<tr>
<th>E.T. Tube (Internal Diameter)</th>
<th>Recommended catheter (CH)</th>
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</thead>
<tbody>
<tr>
<td>2.0 – 3.0</td>
<td>04 - children</td>
</tr>
<tr>
<td>3.5</td>
<td>05 - children</td>
</tr>
<tr>
<td>4.0 - 4.5</td>
<td>06 - children</td>
</tr>
<tr>
<td>5.0 – 6.0</td>
<td>08 - children</td>
</tr>
<tr>
<td>6.5 – 7.0</td>
<td>10</td>
</tr>
<tr>
<td>7.5 – 8.0</td>
<td>12</td>
</tr>
<tr>
<td>8.5 – 9.0</td>
<td>14</td>
</tr>
</tbody>
</table>

CLOSED SUCTION
Patients requiring invasive ventilation who need frequent suctioning will have a closed circuit suction so allowing the ventilation circuit to remain attached and prevent the loss of PEEP. It also reduces the risk of infection
**Table 3- Closed suction procedure**

<table>
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<tr>
<td>4. Apply oxygen saturation probe</td>
<td>To evaluate patient’s oxygenation</td>
</tr>
<tr>
<td>5. Pre oxygenate / continue O2 therapy(Clarke et al 1990, A.A.R.C guidelines, Harvey 1996))</td>
<td>Maintain oxygenation</td>
</tr>
<tr>
<td>6. Wash hands</td>
<td>Reduce cross infection</td>
</tr>
<tr>
<td>7. Put on disposable apron and clean latex gloves</td>
<td>Reduce cross infection</td>
</tr>
<tr>
<td>8. Ensure suction applicator unlocked</td>
<td>To allow suction to begin</td>
</tr>
<tr>
<td>9. Insert the closed catheter, while withholding the outer plastic sheath</td>
<td></td>
</tr>
<tr>
<td>10. Advance catheter gently until cough stimulated or resistance felt <em>(do not apply suction)</em></td>
<td>Minimize mucosal trauma</td>
</tr>
<tr>
<td>11. Withdraw catheter about 1cm and apply suction by depressing applicator. Withdraw gently securing the tracheostomy by holding the flange / “T” connection. <em>(procedure not to last more than 15 seconds- Woodrow 2000,, Day 2000)</em></td>
<td>Reduce potential complications</td>
</tr>
<tr>
<td>12. Instill 5-7 mls saline via irrigation port</td>
<td>To clear the suction tubing and prevent blockage</td>
</tr>
<tr>
<td>13. Lock suction applicator</td>
<td>To prevent accidental suction</td>
</tr>
</tbody>
</table>
14. Repeat as necessary

15. Clear oral secretions  Maintain patient comfort

16. Dispose of gloves

Change the closed suction unit every 96 hours

**Complications of Suction** ([Fiorentini 1992](#))

- Hypoxia ([Bersten el al 2003](#))
- Cardiac Arrhythmias ([Wainright and Gould 1996, Bersten el al 2003](#))
- Infection ([Woodrow P 2000](#))
- Stridor
- Atelectasis
- Respiratory Arrhythmias
- Patient anxiety – can be severe and should not be overlooked. An appropriate amount of reassurance and explanation should help to minimise this ([Puntillo KA 1990](#))
- Trauma: tracheal bronchial trauma occurs with passage of catheter alone. Severity of damage increases at higher negative pressures ([Moore 2003](#))
- Pneumothorax
- Increase in intra-cranial pressure

*If there is difficulty passing the suction catheter refer to emergency algorithm.*
HUMIDIFICATION GUIDELINES

During normal breathing the upper respiratory tract warms, humidifies and filters the inspired gases, primarily in the nasopharynx, where gases are exposed to a large area of highly vascular, moist mucus membranes. (Branson, 1999) The isothermic saturation boundary (ISB) is the point at which inspired gases reach 37°C and 100% relative humidity.

The position of the ISB is fairly constant even at extremes of environmental conditions approximately at the level of the 4th/5th generation of bronchi (Branson, 1999). Following intubation the ISB is shifted down the respiratory tract as the normal upper airway heat and moisture exchanging structures are bypassed. This can cause severe losses of heat and moisture from the respiratory mucosa and potential damage to the respiratory epithelium (Branson, 1999 and Casey, 1989 cited in Buglass, 1999).

The level of humidification for a patient with a temporary tracheostomy must reflect the pathology necessitating the tracheostomy and the need to preserve the respiratory mucosa. So its function can be restored once the tracheostomy is closed.

Consequences of under Humidification
Bypassing the normal humidification mechanisms can cause physiological changes as a result of heat loss, moisture loss or altered pulmonary mechanics. Dehydration of the respiratory tract causes epithelial damage particularly in the trachea and upper bronchi;

- Destruction of cilia and damage to mucus glands
- Disorganisation and flattening of epithelium
- Disorganisation of basement membrane
- Cytoplasmic and nuclear degeneration
- Mucosal ulceration
- Reactive hyperaemic following damage. (Shelly et. al, 1988).

These lead to impaired function of the mucociliary escalator, sputum retention and atelectasis. The downward shift in the ISB during ventilation with dry gases alters pulmonary mechanics including decreased functional residual capacity, static compliance, atelectasis and surfactant activity.
Consequences of over Humidification

- Mucosal burning causing oedema
- Degeneration of cilia
- Irregularities in surface of mucus droplets
- Increased volume of secretions due to decreased evaporation, exceeding capacity of mucociliary escalator
- Condensation of water droplets within airways
- Cool water droplets causing mucosal cooling
- Fall in functional residual capacity
- Fall in static compliance
- Decreased surfactant activity

Optimal Humidification Levels.

This should maintain the isothermic saturation boundary (ISB) at its original position, so creating 'normal' conditions within the respiratory tract. Literature guides the reader that if humidification is maintained at 32°C then this should preserve mucociliary function and pulmonary function in most cases. (Shelly et. al, 1988)

Properties of an ideal humidifier.

- Provision adequate humidification
- Maintenance of body temperature
- Safety
- Lack of microbiological risk to patient
- Suitable physical properties
- Convenience
- Economy

Figure 10 Example of humidifier
**Table 4.** Comparison of the properties of different types of humidifier.

*Based on evidence in Shelly et al (1988).*

<table>
<thead>
<tr>
<th>HUMIDIFIER</th>
<th>PATIENT TYPE</th>
<th>INDICATIONS</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>NONE</strong></td>
<td>PERMANENT TRACHEOSTOMY / LARNGECTOMY</td>
<td>Well formed so the tracheal lining has adapted taking on a humidifying role. NB/ most patients will be encouraged to wear a ‘bib’ acting as a heat moisture exchanger and protection from inhaled debris.</td>
</tr>
<tr>
<td><strong>Heat and moisture exchanger - Swedish nose bib</strong></td>
<td>TEMPORARY TRACHEOSTOMY</td>
<td>For patients on room air or who do not require accurate oxygen administration. Humidification and filtration of air, suitable for patients with very little secretion production. (can be used with saline nebulisers)</td>
</tr>
<tr>
<td><strong>Cold water humidifier. (commonly used on ward)</strong></td>
<td>TEMPORARY TRACHEOSTOMY</td>
<td>As with manageable volumes and low viscosity secretions. ( saline nebulisers should be considered)</td>
</tr>
<tr>
<td><strong>Hot water humidifier. (commonly used in critical care) (e.g. Fischer Paykal)</strong></td>
<td>TEMPORARY TRACHEOSTOMY</td>
<td>Copious secretions or smaller volumes of tenacious secretions <em>(Branson, 1999 &amp; Shelly et. al, 1988).</em></td>
</tr>
</tbody>
</table>

**Humidification should always be administered on top of adequate systemic hydration and may be supplemented by regular 2-4 hourly saline nebulisers if required *(Buglass, 1999).*
The tracheostomy is an open wound and to prevent infection all nursing care / wound care should be administered using the principles of ANTT (Aseptic non touch technique) Pritchard (1994) explains that mucociliary clearance of the trachea is reduced; therefore there is an increase in bacteria. A recent tracheostomy will irritate the trachea, increasing the amount of secretions (Harkin 1998). Care must be aseptic and regular swabbing of the site is important. The stoma site should be checked regularly but should only be cleaned when necessary and research suggests that it should be saline that is used to clean the area (Laws, Chapman 1998 and Harkin 1998). Consider a barrier cream eg cavilon, if site irritated. The tracheostomy site is at risk from skin breakdown and pressure damage, therefore a protective dressing should be placed under the flange. It should be absorbent, non-adherent and pre-cut to prevent fibres entering the site. It is also important that the patient should suffer no unpleasant side effects whilst cleaning the tracheostomy site as irritation of the tube can cause the patient to cough. It is also important to be aware that the flange should be flush with the skin and if not get medical advice.

Figure 11 Demonstration of 2 person technique to change tracheostomy tapes

Securing the tracheostomy tube in place is an important aspect of the care. When the tube is untied two nurses are required, to prevent the tube from becoming displaced. It is also important to remember to be careful not to cut the pilot tube. Cotton tape can be used to hold the tracheostomy tube in place but there are velcro holders on the market which are used for patient comfort. The patient does not usually feel too much discomfort from the actual site of the tracheostomy, but if the tapes are too tight or rubbing against the skin then this could cause discomfort. Usually 2 fingers should be able to fit between the tapes and the skin. It is important that the tapes are tight enough to ensure that the tube is stable but not too tight so that there is excess pressure, which could reduce cerebral blood flow and therefore increase inter-cranial pressure. Ensure oral hygiene maintained, as prescribed.
In case of an emergency situation it must be identified as to whether the patient has a laryngectomy and therefore no upper airway or a tracheostomy – the following bedside posters should be utilised to assist this.

Figure 12 Bedside tracheostomy poster- Thanks to www.tracheostomy.org

Figure 13. Bedside laryngectomy poster- Thanks to www.tracheostomy.org
1. HYPOXAEAMIA

Possible cause:
- inadequate oxygen administration (incorrect percentage administration; faulty equipment, break in circuit oxygen tubing)
- inadequate suctioning (too little / too much suctioning)
- blockage of tracheostomy tube (sputum or dislodgement of tube)

Action and prevention:
- remove inner cannula, clean and replace
- check oxygen circuit correct
- check oxygen percentage correct
- check respiratory rate hourly
- check oxygen saturations (SPO2) hourly, report SPO2 less than 94% and increase O2
- refer to physiotherapist
- good suctioning technique (see suction guidelines)
- early reporting of increased viscosity secretions and infection (obtain sputum specimen – may need antibiotics)
- adequate humidification (see humidification guidelines)
- report any difficulty inserting suction catheter into tracheostomy tube
- follow emergency tracheostomy algorithm

2. INFECTION – STOMA

Possible cause:
- collection of secretions (infected) around site
- inadequate nutrition

Action and prevention
- stoma site kept as clean as possible using an aseptic technique
- chest infection treated
- feeding regime asap – refer to dietician

3. INFECTION – CHEST

Possible cause:
- stagnant pooled secretions above cuff
• aspiration of saliva / pooled secretions due to inadequate cuff inflation or poor airway reflexes in the absence of a cuffed tube
• inadequate removal of chest secretions
• poor technique re infection control when suctioning
• inadequate humidification
• colonisation of oxygen tubing/mask with bacteria (absence of cilia in naso-pharynx for "conditioning" of air)
• gastric cross-infection due to increased pH in stomach with feeding
• inadequate mouth care

**Action and prevention:**
• suction inside mouth to remove oral secretions, some tracheostomy tubes have an additional port to allow aspiration of subglottic secretions
• check cuff pressures each shift
• good suction technique
• ensure humidification effective – refer to humidification guidelines
• change oxygen tubing when soiled and clean mask daily
• encourage deep breathing exercises and expectation of secretions
• change position of patient a minimum of 2-3 hourly to move secretions – refer to physiotherapist
• follow enteral feeding regime as per dietician instructions. Ensure 4-6 hours rest period is adhered to (this allows acidity to increase i.e. lowered pH which kills bacteria)
• ensure good oral hygiene- consider use of artificial saliva and mouth care products

4. PNEUMOTHORAX

**Possible cause:**
• apex of lungs at 1\textsuperscript{st} and 2\textsuperscript{nd} intercostal space therefore, if tube sited near this area then increased risk in the short term after insertion

**Action and prevention:**
• observe respiration rate, pattern and colour and report poor chest expansion,
• observe for tracheal deviation
• listening to chest and report poor air entry in any lobe of the lungs
• refer to physiotherapist for assessment daily
• check oxygenation and note reduction in saturations. Consider increasing oxygen to maintain target saturation and refer to medical staff
• good suction technique
• adequate humidification
5. VAGAL STIMULATION RESULTING IN BRADYCARDIA, HYPOTENSION AND PAROXYSMAL COUGHING

Possible cause:
- deep suctioning

Action and prevention:
- report bradycardia/hypotension
- ensure suction technique meets suction guidelines minimising duration and frequency
- preoxygenate prior to suction

6. BLOCKAGE OF TRACHEOSTOMY / LARNGECTOMY TUBE

Possible cause:
- secretions thick and dry due to inadequate humidification
- increasing chest infection with inadequate suctioning
- dislodgement of tube into pre-tracheal fascia
- blocked inner cannula

Action and prevention: see emergency tracheostomy / larngectomy algorithm page
- adequate, effective humidification (see humidification guidelines)
- early detection of increasing infection / viscosity of secretions
- good suctioning technique
- adequate suctioning
- physiotherapy input as appropriate
- early detection of reduction in oxygen saturations by monitoring
- report possible dislodgement promptly for assessment by medical staff – change of tube necessary with medical involvement
- ensure all equipment is quickly accessible for an emergency change

7. BLEEDING

Possible cause:
- a. erosion of innominate artery → haemorrhage
- b. irritation to tracheal wall, ulceration

Action and prevention
- a. pulsating tube to be reported promptly
- bleeding of stoma site reported
- b. bleeding on suctioning reported
- c. check pressure of cuff using manometer
8. LOCALISED SURGICAL EMPHYSEMA

9. TRACHEAL STENOSIS
   • ensure tube secured in place
   • regular monitoring of cuff pressure

10. TRACHEOSOPHAGEAL FISTULA
    • regular monitoring of cuff pressure

11. FALSE PASSAGE FORMATION as a consequence of changing of the tracheostomy tube.

12. DISPLACEMENT OF TUBE (refer to emergency guidelines page 31 and 32) if the following occurs call for urgent review by medical staff to assess position (using fibreoptic scope.) Administer high flow oxygen.
   • difficulty passing suction catheter
   • cuff leak
   • dyspnoea
   • blood on aspiration
Tracheostomy emergencies

Any of the clinical concerns below should be considered as tracheostomy red flags and an assessment of the tracheostomy should be carried out by someone competent to do so. This is particularly important if the patient has any signs or symptoms suggesting that the tracheostomy may be displaced, usually air leaks or vocalizations.

A prompt fibre-optic examination of the tube position is usually required and may allow the clinical situation to be rectified before the tracheostomy becomes completely displaced or blocked.

- Whistling noise when breathing or any noisy breathing
- Cyanosis (pale, blue colour around lips, nail beds, eyes)
- Restlessness, confusion, agitation, anxiety
- Blood or blood stained secretions via the tracheostomy
- Retractions (pulling in of the skin between the ribs, and below the breast bone, above collar bones or in the hollow of the neck)
- Increased discomfort reported by the patient
- Cuff requires lots of air to remove air leaks

- Apnoea
- Difficulty in breathing observed or reported
- Vocalisation (patient talking or whispering) when airflow should not be via the upper airway (cuff up)
- Increased respiratory rate
- Increased heart rate
- Low O2 saturations
- Grunting, Snoring, Stridor

The bed head sign should be used in order to guide response to the emergency and senior medical should be sought promptly.

The emergency box should be brought to the bed area and the emergency laryngoscope should be available for the medical team to use on their arrival to the bedside to identify the patency or position of the tracheostomy tube.

The first responders to the emergency should follow the algorithm on the bedhead sign until senior medical support arrives.

Thanks to www.tracheostomy.org
Figure 14 Emergency tracheostomy algorithm - Thanks to www.tracheostomy.org

Figure 15. Emergency laryngectomy algorithm - Thanks to www.tracheostomy.org
Management of the laryngectomy patient with breathing difficulties

Apply high flow oxygen to laryngectomy stoma
If any doubt about whether patient has a tracheostomy or a laryngectomy, apply oxygen to face also*
Call for Airway Expert help – Anaesthetics/ITU AND ENT/Max Fax

Look, listen & feel at laryngectomy stoma
There may not be a tube inserted into the stoma
A Waters circuit or capnography may help if available

Assess patency

Is the patient breathing?

Yes

Remove cap (if present)
Remove inner tube (if present)
Attempt tracheal suction

Can you pass a suction catheter?

No

Deflate the cuff (if present)
Look, listen & feel at the laryngectomy

Is the patient improving?
Eg. SpO₂ >90%,

No

REPLACE THE TUBE THAT IS IN THE LARYNGECTOMY (if present)
Look, listen & feel at the laryngectomy stoma. Ensure oxygen re-applied

Call Resuscitation team
Follow ALS algorithm
Emergency oxygenation

Basic emergency oxygenation
Laryngectomy STOMA ventilation
Pediatric face mask applied to neck
LMA applied to neck

No

Yes

Continue ABCDE assessment
Support ventilation as required
Await Airway Expert

The laryngectomy is patent
Consider partial obstruction
Continue ABCDE assessment
1. Some inner tubes need re-inserting to connect to breathing circuits
2. If bleeding from laryngectomy, await expert before deflating cuff

Partial obstruction or displaced
Continue ABCDE assessment
Await Airway Expert

Yes

Is the patient breathing?

Call Resuscitation team
Follow ALS algorithm
Assess LARYNGECTOMY patency

No

Deflate the cuff (if present)
Look, listen & feel at the laryngectomy

Is the patient improving?
Eg. SpO₂ >90%,

No

REPLACE THE TUBE THAT IS IN THE LARYNGECTOMY (if present)
Look, listen & feel at the laryngectomy stoma. Ensure oxygen re-applied

Call Resuscitation team
Follow ALS algorithm
Emergency oxygenation

Basic emergency oxygenation
Laryngectomy STOMA ventilation
Pediatric face mask applied to neck
LMA applied to neck

No

Yes

Continue ABCDE assessment
Support ventilation as required
Await Airway Expert

The laryngectomy is patent
Consider partial obstruction
Continue ABCDE assessment
1. Some inner tubes need re-inserting to connect to breathing circuits
2. If bleeding from laryngectomy, await expert before deflating cuff

Partial obstruction or displaced
Continue ABCDE assessment
Await Airway Expert

www.tracheostomy.org.uk

LARYNGECTOMY patients have an end stoma and CANNOT BE INTUBATED via the mouth.
*Applying oxygen to the face & neck is a default emergency action for all patients with a tracheostomy.
Tracheostomy tubes should be in situ for 7-10 days before changing, to allow a tract to be established for ease of changing.

**When:**
Tracheostomies with an inner cannula must be changed every 30 days

**Who should do it:**
- ENT tracheostomy → ENT doctor representative, Clinical Nurse Specialist
- First change or problematic → anaesthetist or ENT doctor
- Well formed track then competent practitioner i.e. ITU Outreach or Clinical Nurse Specialist

**Equipment required:**
- Suction equipment
- Oxygen supply
- Emergency equipment-nearby
- Replacement tracheostomy tube
- Trache tube- same size and one size smaller
- Cleaning apparatus, dressing and ties
- Syringe
- Tracheal dilators- use with caution only if absolutely necessary
- Sterile lubricant jelly: sachets or sealed tube
- Sterile gloves
- Suction catheters
- Apron
- Saturation monitor
- Protective clothing to be considered

**How is it done:**
- Explain the procedure to the patient
- Patient should be starved as appropriate (determined by local consensus prior to change.)
- NG tube (if present) aspirated at medical staff’s discretion
- Prepare the equipment- check tube and cuff if necessary and lubricate the tube with sachet of sterile lubricant jelly
- Pre- oxygenate patient, ensure saturation monitor available.
- Patient position: semi-recumbent
- Suction via trachea and orally
- Remove dressing and clean as required using aseptic technique
- Use either bougie or suction catheter with the end cut off
- Insert bougie or suction catheter, deflate cuff and remove tracheostomy tube. Insert new tube over suction catheter and inflate tracheostomy cuff
- Suction if required
Reconnect oxygen
Listen to lungs with a stethoscope and secure tapes and apply dressing (Laws- Chapman, 1998)
Maintain oral hygiene.

### REMOVING A TRACHEOSTOMY (DECANNULATION)

**When is the patient ready?**
- The reason for the tracheostomy is resolved
- Tolerance of deflated cuff with no aspiration (recommended time 24 hours)
- Requiring suction less than once a shift
- No chest infection
- Good saturation
- Good cough and able to expectorate into the oral cavity
- A multi disciplinary team decision including Doctor, nurse and physio- ENT surgeon if they placed the tube
- Less than 40% oxygen requirements.

**Who should do it:**
- Doctor, nurse or physio that is competent (see scope of practice)
- Remove the tracheostomy early in the day or when the patient has had rest (good staff support)

**What equipment do you need?**
- Cleaning equipment
- Suction
- Oxygen face mask
- Dressing- an appropriate occlusive dressing eg Granuflex.
- Saturation monitor
Figure 16 - Tracheostomy decannulation plan

**Critical Care Tracheostomy Decannulation Plan**

*To be used prior to removal or when considering tracheostomy removal*

NB, When the answer to all the above questions is yes, the decision to de-cannulate can be considered.

<table>
<thead>
<tr>
<th>Percutaneous</th>
<th>Surgical</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td>Date inserted:</td>
<td></td>
</tr>
<tr>
<td>Has the patient tolerated cuff deflation &gt; 24hrs?</td>
<td>Yes</td>
</tr>
<tr>
<td>Is the patient on &lt;40% O2?</td>
<td>Yes</td>
</tr>
<tr>
<td>Is chest clear from any signs of chest infection?</td>
<td>Yes</td>
</tr>
<tr>
<td>Are signs of increased work of breathing absent?</td>
<td>Yes</td>
</tr>
<tr>
<td>On auscultation is air entry good throughout and is there an absence of added sounds?</td>
<td>Yes</td>
</tr>
<tr>
<td>Can the patient talk with cuff deflated?</td>
<td>Yes</td>
</tr>
<tr>
<td>When cuff deflated, if tracheostomy occluded with gloved finger, does work of breathing remain unchanged?</td>
<td>Yes</td>
</tr>
<tr>
<td>Can patient expectorate to the end of the Tracheostomy / into the mouth?</td>
<td>Yes</td>
</tr>
<tr>
<td>Suction status: The patient is requiring maximum 1 deep suction per shift</td>
<td>Yes</td>
</tr>
</tbody>
</table>

| Assessment date/Time |          |
| Assessed by |          |

**Decannulation Plan**

**How to:**

- Explain in detail to patient what is to happen
- Sit patient upright
- Suction down the tube
- Ensure balloon is totally deflated. A gloved finger over tracheostomy to check phonation and to check for increased work of breathing.
- Withdraw tube on expiration
Clean and cover stoma with Granuflex, if longer term stoma, Transorbant can be used for stomas less that 5 days old, this may reduce scarring
Advise patient to apply pressure/support over dressing when coughing and talking
Encourage deep breathing and expectoration of secretions
Measure patient’s saturation post tracheostomy removal for at least two hours

Complications following decannulation:

**EARLY**
- Sputum retention
- Bronchospasm
- Increase work of breathing
- Bleeding
- Stridor
- Tracheal Malasia

**LATE**
- Scar formation
- Over granulation
- Tracheal stenosis
- Fistula formation
- Tethering

**Who to contact**

*For help and advice regarding the tracheostomy tube and weaning contact the physiotherapist in your area of work or the Outreach Team, bleep 8742/ 2468 / 3867. ICU and ENT doctors and nurses can give advice. In an emergency refer to emergency algorithms.*
When the tracheostomy is performed as an elective procedure, the patient and family will need to be aware of what to expect post-operatively. The patient needs to be informed why a tracheostomy is necessary, where it is sited and the nursing care involved. It is important that the patient is aware they will not be able to speak whilst the tube is in situ. They should be introduced to all the equipment which will be used, i.e. the tracheostomy tubes, suction equipment, etc and become familiar with it. If possible the patient and family should be introduced to the nurses. It should be explained that they will be monitored closely post-operatively and that they will be placed in an observant position on the ward.

The possibility of intravenous infusions, drains, naso-gastric tubes, etc, should also be explained, both to the patient and their family so that they are aware what to expect when they wake up and when the family first visit. Also the patient and their family may find it helpful to be introduced to a patient already with a tracheostomy especially if the patient is having a long-term tracheostomy.

In critical care, temporary tracheostomies are performed to aid respiratory weaning off the ventilator and normally at this time the patient is sedated. Once the patient is beginning to wake a full explanation of the rationale and procedures involved in the tracheostomy should be given. Strategies for communication are vital for maintaining psychological well being (see next chapter on communication difficulties). This information will need to be repeated and updated, and the patient’s questions answered. Involve patient’s family and support services as appropriate.
COMMUNICATION DIFFICULTIES

Communication is vital in the critical care setting; it helps maintain the patient’s identity and enables them to cope psychologically and emotionally with the hospital environment and illness.

Communication with a non-fenestrated & cuffed tracheostomy

- A tracheostomy tube (non-fenestrated & cuffed) causes air to pass through the tube and does not pass up through the larynx so no voice can be produced
- Do not attempt to occlude this type of tracheostomy as this will stop the patient from breathing
- Alternative means of communication will be required by individuals with this type of tracheostomy and will need referral to Speech and Language Therapy for assessment of needs
- Communication needs will be assessed in the following order;
  1. Patient will need to be alert.
  2. Can two reliable movements be used for yes/no responses?
  3. Yes/no responses can be used to establish cognitive levels and oromotor ability.
  4. Selection of systems can be trialled such as; mouthing by the patient, alphabet chart, picture chart, eye pointing, electronic aid connected to a switch.
  5. These systems need to be changed frequently as the patient’s status changes and used concurrently if necessary.
  6. If no evidence of reliable movement a communication system may not be possible at this time.
  7. Communication strategy in an emergency should be discussed with the patient, for example emergency airway alarm

Communication with a fenestrated/cuff deflated tracheostomy

- This type of tracheostomy can be occluded by the patient, nurse, carer or any trained communication partner.
- This occlusion blocks the airflow so air moves through the larynx and over the vocal cords enabling voice if they have intact vocal cord function.
- A fenestrated inner tube can also be used for this purpose which is an interchangeable inner tube that fits inside the tracheostomy directing air up through the larynx allowing voice to be produced.
- A fenestrated inner speaking tube will need to be changed for a non-fenestrated inner tube on suctioning.

One-way tracheostomy speaking valves
Types of valves available commercially (Shiley-Phonate, Portex-Orator, Kapitex-Passy-Muir)

- The valves are placed on the end of the tracheostomy tube; the membrane opens when the patient breathes in and closes when the patient breathes out.
- The valves must not be used with inflated cuffs or sponge cuffs as these prevent air reaching the upper airway.
- Valves such as Passy-Muir valves that do not leak air when the individual is at rest are better for patients with a compromised respiratory system (Zajac et al 1999), and also improve taste and smell senses (Lichtan et al, 1995).
- Only the Passy-Muir aqua #007 size can be used with ventilated patients who must be able to tolerate cuff deflation with ventilator adjustments to compensate for this (increasing tidal volume, FIO$_2$ and adjusting PEEP).

### SWALLOWING DIFFICULTIES

#### Background Information
- A tracheostomy, when combined with critical illness can increase the potential for swallowing problems in both ventilator dependent and non-ventilated patients.
- Prolonged Mechanical ventilation with or without neuromuscular involvement can lead to abnormal swallowing problems.
- Cuff inflation on a tracheostomy tube can impair swallowing for several reasons; contact with the tracheal walls will restrict laryngeal elevation, the cricopharynx will not open as well, the airway will not then be fully closed and the oesophagus may not expand normally. Oral intake with an inflated cuff can lead to food potentially remaining on top of the cuff which can then seep down between the cuff and tracheal wall over time or spill into the airway when the cuff is deflated (Dikeman et al 1995).

#### Swallowing Assessment with Tracheostomised Patients:
- A swallowing assessment can not be carried out if the cuff cannot be deflated. The patient should be kept Nil-By-Mouth and cannot be assessed for swallowing status until the cuff can be partially or fully deflated (Nash 1988).
- The swallowing assessment cannot proceed with an inflated cuff as any aspirated material that occurs on testing will sit on top of the cuff in the airway and not be suctioned out. This will lead to an inaccurate assessment (O'Neil-Pirozzi et al 2003).
- Assessment of swallowing can be carried out once the cuff can be safely deflated.
- A swallowing screening test may be carried out by members of staff who have completed training by Speech and Language Therapy.
- The modified Evans Blue Dye Test can be a useful screening tool in the assessment of dysphagia (Meyers 1995).
- The Blue Dye Test is a screening tool only and should be evaluated within the context of ongoing evaluation in the clinical setting. There is evidence to suggest a high percentage of false negatives with the Blue Dye Test. The blue dye test did not correctly identify 20% of the tracheostomised patients who were aspirating or 38% of the tracheostomised patients who were not aspirating (O'Neil-Pirozzi et al 2003). There are several studies which raise concerns about the Blue Dye Test and recommend results to be considered in the wider context of clinical assessment (Thompson-Henry et al 1995, Tippett et al 1996).
- The Blue Dye test cannot be used with an inflated cuff as any aspirated material that occurs on testing will sit on top of the cuff in the airway and not be suctioned out. This will lead to an inaccurate assessment (O'Neil-Pirozzi et al 2003).
- A patient who fails the swallow screening assessment (including the Blue Dye Test) would need to be kept Nil-By-Mouth and referred for a Speech and Language Therapy assessment.
- A patient who passes the swallow screening assessment (including the Blue Dye Test) can commence on limited oral intake, with monitoring for signs of aspiration. This may include a spiking temperature, increase in upper chest sounds, wet gargly voice and coughing. (Logemann 1998) If any of these signs are evident the patient may need to be put NBM and referred for a Speech and Language Therapy swallowing assessment.
- The Speech and Language Therapy assessment will include a detailed oromotor examination, and a further bedside swallow test with palpation of the oropharyngeal musculature also incorporating the blue dye procedure. Further assessment may include videofluoroscopy or FEES. The Speech and Language Therapist will use the results to advise regarding the patient’s swallow and risk of aspiration, and to suggest compensatory swallow techniques and dietary textures where appropriate.
- A swallowing screening test may be carried out by members of staff who have completed training by Speech and Language Therapy.

Figure 17- post tracheostomy algorithm
**Post Tracheostomy Algorithm**

Does the patient experience difficulty when swallowing?

- **Yes**
  - Nil by mouth and refer to speech therapy for assessment

- **No**
  - Is the patients’ voice quiet and hoarse at 1 month post tracheostomy removal or prior
    - **No**
    - Document and communicate to patient need to discuss with GP and/or follow up sister any subsequent problems upon discharge
    - **Yes**
      - Assess need for ENT referral
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### DECANNULATION PROCEDURE FOR HNSU PATIENTS

<table>
<thead>
<tr>
<th>Action</th>
<th>Rationale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Explain the procedure to the patient and ensure the patient is in upright position, hyper-oxygenate prior to procedure.</td>
<td>Alleviation of anxiety</td>
</tr>
<tr>
<td></td>
<td>Optimum lung expansion</td>
</tr>
<tr>
<td>Connect to Oxygen Saturation monitor, record saturations and respiratory rate and pattern</td>
<td>To detect hypoxia and/or respiratory distress</td>
</tr>
<tr>
<td><strong>Oxygen saturation monitoring must be continuous during weaning attempts</strong></td>
<td></td>
</tr>
<tr>
<td>Suction tracheo and oropharynx – document type of secretions</td>
<td>To remove secretions from trachea</td>
</tr>
<tr>
<td>Remove the inner cannula</td>
<td>Enlargement of the internal lumen of the tracheostomy tube</td>
</tr>
<tr>
<td>Occlude the tracheostomy tube with a gloved finger</td>
<td>Ensure patient can breathe through upper airway</td>
</tr>
<tr>
<td>Place speaking valve over the tube opening</td>
<td>Occluding the tracheostomy opening facilitates natural breathing</td>
</tr>
<tr>
<td>Remain with the patient at first weaning attempt – for 15 minutes observing for respiratory distress If oxygen saturation levels are below 95% and respiratory rate above 20 RPM</td>
<td>To detect hypoxia and/or respiratory distress Prevent hypoxia</td>
</tr>
<tr>
<td><strong>REMOVE THE VALVE IMMEDIATELY</strong></td>
<td></td>
</tr>
<tr>
<td>If the patient is able to tolerate initial weaning, the patient may be left, but should be nursed in an area with maximum view of the nurses station, with a call bell in easy reach</td>
<td>To ensure maximum observation of the patient and allow the patient to summon assistance if necessary</td>
</tr>
<tr>
<td>The initial and subsequent periods/timescyles for weaning should be documented on the ‘Observation Chart for Tracheostomy Weaning’ no more than 24 hours in advance by the appropriate Medical Staff (who must print name and initial instructions on chart)</td>
<td>Increasing the timescales builds up patients confidence and respiratory muscle strength</td>
</tr>
<tr>
<td>The patient should be rested at least 30 minutes inbetween each weaning attempt</td>
<td>To allow the patient to recover</td>
</tr>
<tr>
<td>The toleration period should be extended until the patient can cope with 4 hours or more with the speaking value in-situ without any signs of respiratory distress (Watkinson, 2000)</td>
<td>Gradually increases muscle strength and avoids exertion</td>
</tr>
<tr>
<td>Repeat the above procedure substituting the speaking valve for a decannulation cap</td>
<td>Gradually increases muscle strength and avoids exertion</td>
</tr>
</tbody>
</table>
| Remain with the patient at first weaning attempt – observing for respiratory distress  
If oxygen saturation levels are below 95% and respiratory rate above 2RPM  
REMOVE THE VALUVE IMMEDIATELY | Detection of respiratory distress Prevents hypoxia |
| The cannulation cap should only be left in-situ overnight upon advice of Otolaryngology – Head and Neck Medical Staff – This specific advice should be documented by Medical Staff in the patient’s medical notes | To ensure patient safety |
| The patient must be able to tolerate ‘capping off’ for 24 hours (including a period of sleep as directed by the Medical Staff) (Watkinson, 2000, Roland, McRae & McCombe 2001, Bull 1996 & Maran, 1988) | To ensure tolerance prior to decannulation |
| All procedures should be recorded and initialled on the ‘Observation Chart for Tracheostomy Weaning’ | Accurate documentation of procedure |