

# Clinical Guidance

## ***Paediatric Tracheostomy Management Guidelines for Health Care Professionals***

### Summary

*This guideline is for health care professionals caring for a child with a tracheostomy which includes suctioning, changing tapes and dressing, tube change, emergency tube, and discharge planning. This includes information sheets and checklists needed to look after these patients in a health care setting as well as in the community.*

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May 2016	Improved information regarding community management. Updated references throughout. More detailed information about complications. Updated checklists and paperwork for in hospital use.	Evelina London's clinical governance group - 2016



# **Paediatric Tracheostomy Management Guidelines for Health Care Professionals**

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## **Introduction**

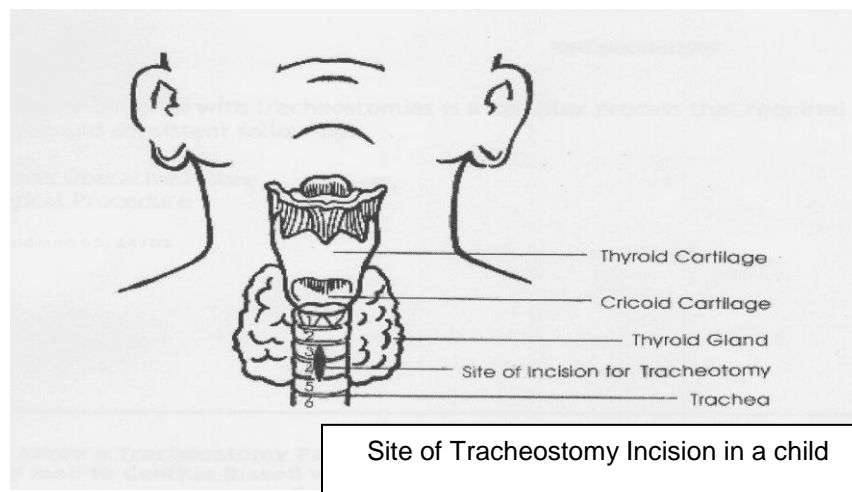
This guideline provides an evidence-based practice for professionals caring for children with tracheostomies in a hospital environment. It is intended to serve as a guide to good practice and promote a consistent and cohesive approach to care. There is an accompanying DVD to illustrate the practical elements called 'Paediatric Tracheostomy Care and Management'. This DVD is produced for the Evelina London Children's Hospital for healthcare professionals in Guy's and St Thomas' Trust and is also for use by tertiary centres that care for our children with a tracheostomy. It has short video demonstrations of the practical elements of tracheostomy care and a parent's perspective.

'Trachea' means windpipe, 'ostomy' means hole. A tracheostomy is a hole in the windpipe low down at the front of the neck. It bypasses a blockage of the breathing passageway higher up.

**Children with a tracheostomy completely depend on them for breathing. The child needs direct continuous observation twenty-four hours a day by someone who is proficient in paediatric tracheostomy management and who has completed competency skills in tracheostomy care.** This is because if the tube blocks or falls out it needs to be suctioned or replaced immediately. A person who is defined as 'proficient' is an individual who has been trained and is signed off as competent in paediatric tracheostomy care.

## **What is a Tracheostomy?**

The surgical opening in the trachea is most often between the second and fourth tracheal ring. The tracheostomy tube is inserted into this opening to assist a child's breathing allowing the passage of air and removal of secretions. The child will now be breathing through the tracheostomy tube instead of breathing through their nose and mouth.



## **Reasons for a Tracheostomy**

### **Airway blockage above the level of tracheostomy**

- Subglottic stenosis
- Vocal cord paralysis
- Tracheomalacia
- Subglottic web
- Large tongue or small jaw that blocks the airway
- Treacher Collins syndrome (a symptom being a very small jaw), and Pierre Robin syndrome (symptoms includes a large tongue with difficulty in breathing).
- Congenital abnormalities of the airway
- Obstructive sleep apnoea
- Infection, such as epiglottitis or croup
- Laryngectomy
- Tumours, such as cystic hygroma
- Laryngeal injury or spasms
- Severe neck or mouth injuries
- Airway burns from corrosive material, smoke or steam
- Foreign body obstruction
- Facial surgery and facial burns
- Failure to wean off ventilation or to extubate off ventilation.

### **Lung problems requiring long term ventilation**

- Need for prolonged respiratory support, such as bronchopulmonary dysplasia
- Chronic pulmonary disease to reduce anatomic dead space
- Chest wall injury
- Diaphragm dysfunction
- Neuromuscular diseases paralysing or weakening chest muscles and diaphragm
- Fracture of cervical vertebrae with spinal cord injury
- Long-term of unconsciousness or coma
- Disorders of respiratory control such as congenital central hypoventilation or central apnoea

### **Aspiration problems requiring airway protection**

- Aspiration related to muscle or sensory problems in the throat

## Types of Tracheostomy Tubes

There are many types of tracheostomy tubes available (see below). They can be made from plastic and/or metal, may be cuffed, uncuffed or fenestrated (i.e. a hole or holes in the cannula that permits airflow, this may also allow the child to vocalise and cough more effectively). A child's cartilages, muscles, mucous membranes and tissues of the neck are softer and pliable than adults. The lumen of a child's trachea is narrow and therefore cuffed tubes should be avoided because of the risk of the cause of stenosis (further narrowing of the trachea)<sup>3</sup>.

A Shiley uncuffed tube



A Shiley air filled cuffed tube

Evelina London mainly use Shiley uncuffed tracheostomy tubes made by Medtronics and Bivona tubes.

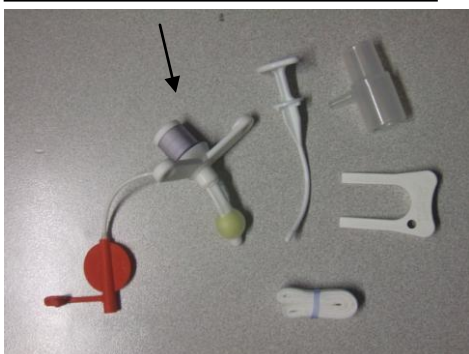
The Shiley tubes are sterile. They are intended for once only use and are changed weekly. The cuffed version is air filled by the side port and is less commonly used in paediatrics.

Shiley tubes are available in paediatric and neonatal designs. The smallest size is 3.0mm and range to the largest size of 6.5mm. Paediatric and neonatal tubes of the same size have the same internal and external diameters, but paediatric tubes differ slightly in the shape of the neck flange and the angle/length of the cannula.

A Bivona Flextend Tube



A Bivona 'fome-cuf' Tube

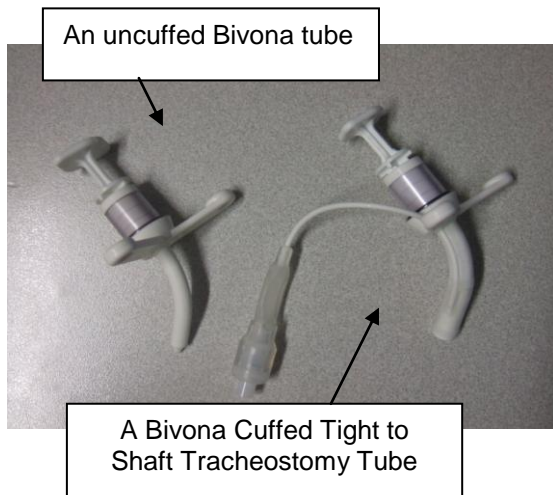


Bivona is also another brand made by the company Smiths Medical. These come uncuffed, cuffed and flextend versions.

A flextend version is ideal for use with children on long-term ventilation which prevents pulling on the tube and pressure areas around the tracheostomy stoma site. It also benefits an infant who has a small neck to prevent the tube rubbing under their chin.

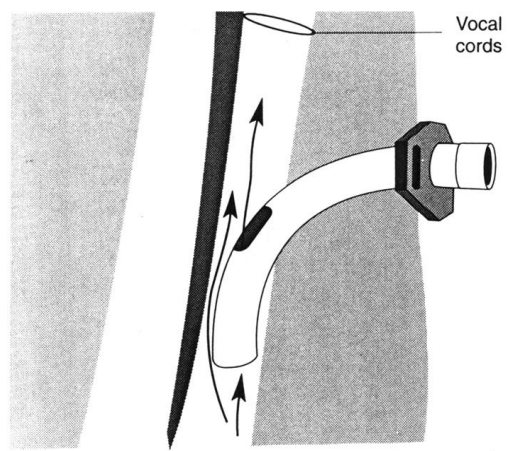
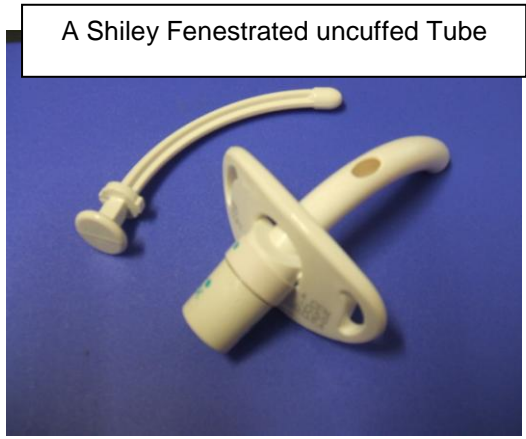
Bivona tubes can be changed monthly or more frequently depending on secretion viscosity. These are more expensive than shiley tubes but are more cost effective in the long run. These tubes also contain metal so cautions must be taken when having an MRI scan, CT scan or an x-ray. For these procedures you can temporary change to a Shiley tube or consult with the ENT nurse specialist.

The fome-cuf version is rarely used in paediatrics as when deflated the bulk of the foam remains around the shaft of the tube. This may cause mucosal trauma and discomfort when the tube is changed. However it reduces tracheal scarring as it is a high volume-low pressure cuff.

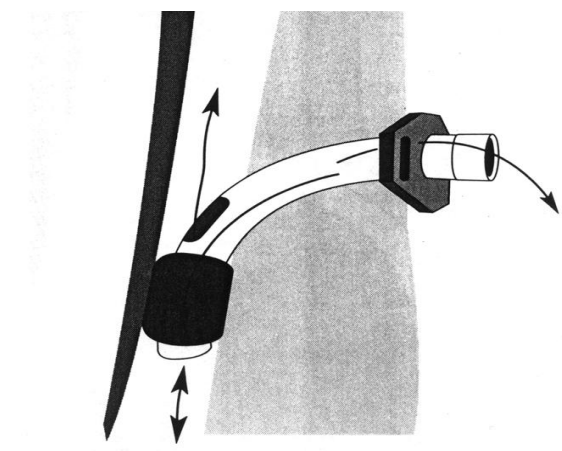


Cuffed tight to shaft tubes is inflated using 0.9% of sodium chloride. The amount inserted depends on the individual patient and should prevent a leak around the shaft of the tube so it does not cause any discomfort when changed and are commonly used for children on long term ventilation. However, long term use in children is not recommended as cuffed tubes can cause tracheal scarring and trauma

A fenestrated tube has a hole in the middle of the upper part of the tube to allow air flow and secretions into the mouth and nose to enhance voice and/or swallowing (see pictures below). There is a risk of mucosal trauma and granulations occurring at the site of the fenestration. These tubes should have a non-fenestrated inner tube for suctioning to be carried out.



Airflow through the single fenestration of an uncuffed tube



Airflow moving through the fenestration of a cuffed tube

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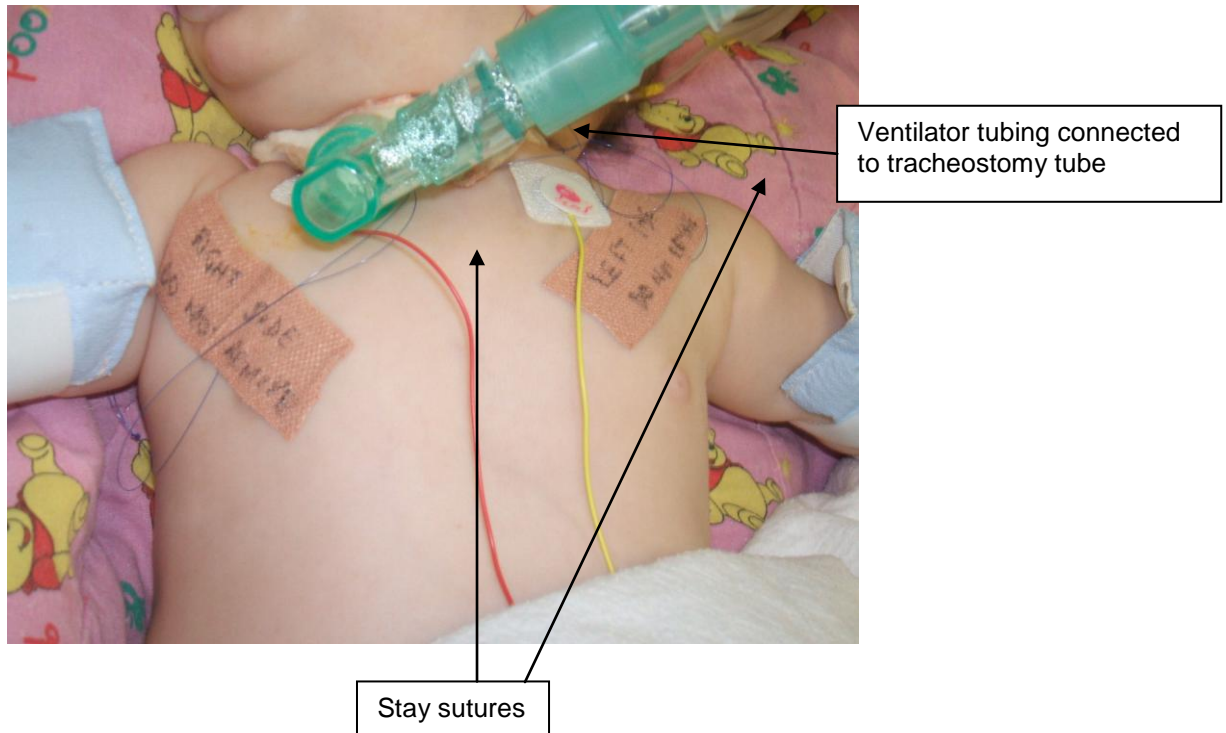
The selection of a tracheostomy tube for a child is dependent upon the child's presenting upper airway anatomy, physiological requirements and body size 5. The type and size of the tracheostomy tube is selected at the time of insertion by the Paediatric ENT surgeon. If the standard size of a type of tube is not appropriate for a particular patient then a customised tracheostomy tube can be ordered where you can select the length of a tube; the internal diameter; change the angle of the neck flange and make it cuffed, uncuffed or fenestrated. Templates must be used which are available online via company websites. While awaiting delivery of a customised tracheostomy tube the ENT surgeon will insert a temporary tracheostomy tube.



## Newly formed tracheostomies

Before transfer to a ward, children with newly formed tracheostomies must spend the initial post-operative period in the paediatric/neonatal intensive care unit (overnight) where they are cared for by a nurse who is tracheostomy trained.

A newly formed tracheostomy will have 'stay sutures' which are taped to a child's chest (see picture below). These 'stay sutures' are to put traction on the opening of the stoma site if an **emergency** tube change is required within the first week. These 'stay sutures' **must not** be removed until the first tube change (day 7).



In the first week Marpac cotton twill ties will be used to secure the tube. These **must not** be changed unless assessed by a Paediatric ENT Nurse Specialist or an ENT doctor.



All children with newly formed tracheostomies must be referred to: -

- Paediatric ENT Nurse Specialist
- Speech & Language Therapist
- Dietician (if appropriate).

It is important in the first week of a child having a tracheostomy that the discharge process is followed (see discharge planning).



## **Equipment required at the child's bedside**

### **Rationale**

In case of accidental displacement of the tracheostomy tube, and for tracheal suction and irrigation, the following equipment is required at the bedside of all children in hospital with a tracheostomy:

- Tracheostomy tube x 2 (same size and type as already in situ)
- Shiley Tracheostomy tube 0.5mm smaller than above x1 (required in case unable to insert same tube size as the child has insitu)
- Paediatric tracheal dilators
- Bivona Disconnection Wedge (only if child has a Bivona tube in situ)
- Scissors
- Appropriate size and make of tracheostomy tapes
- Working wall suction +/- portable suction
- Appropriate size suction catheters
- Oxygen point with oxygen tracheostomy mask and connector
- Nebuliser pot
- Oxygen delivery set which connects onto the Swedish nose
- Spare towel/blanket (available as neck roll)
- Spare blanket to wrap child if needed
- 1ml syringes
- 0.9% sodium chloride ampoules
- Swedish noses
- Goggles, aprons and gloves
- Gauze
- Yellow hazard bag in a solid bin
- A saturation monitor

A child with a tracheostomy must be cared for by a person who is proficient in paediatric tracheostomy management. If a child requires isolation in a cubicle there must be a person proficient in paediatric tracheostomy in the cubicle with them.

**On every shift when a nurse is caring for a child with a tracheostomy they must complete the tracheostomy checklist (Appendix 1a). The tracheostomy information sheet (Appendix 1b or Appendix 1c) and tracheostomy care and progress record (Appendix 1d) must also be filled in to maintain current information and care for the child.**

**If a child is going to theatre please ensure that the tracheostomy checklist for theatre is completed by all accountable professionals caring for the child (See appendix 2).**

## **Suctioning**

### **Rationale**

The aim of suction is to maintain a patent airway, quickly and effectively avoiding potential hazards of hypoxia, trauma and infection 3.

### **Indications for suctioning:**

- Visible bubbles of mucous in the tube opening
- Rattling mucus sounds from the tracheostomy
- Dry raspy breathing or a whistling noise from the tracheostomy
- Signs of respiratory distress e.g. increased respiratory rate, signs of recession
- Decreased respiratory rate
- No sound coming from the tracheostomy tube (also may indicate tube blockage)

**Suction should only be performed when necessary/clinically indicated. The amount of secretions varies with each infant/child.**

**Always** assess the need for suction and need for irrigation (0.9% sodium chloride instillation).

**Always** ensure universal precautions to meet trust infection control guidelines. Clean gloves and new sterile suction catheter of appropriate size for each insertion. This can prevent tracheal damage during suction so ensure that the suction catheter is not too large. A large suction catheter can occlude the tracheostomy tube which may cause hypoxia and if too small it will not be adequate to remove secretions 6. To obtain the correct suction catheter size for paediatric and neonatal tracheostomy tubes it is double the tracheostomy tube size (please note this does not apply to adult tracheostomy tubes). For example, if the tracheostomy tube is a size 3.5mm then you use a size 7 French gauge suction catheter. If the suction catheter size is not available such as you have a size 4.5mm tracheostomy tube. You should be using a size 9 French gauge suction catheter but as these are not available you should go down a size and use a size 8 French gauge suction catheter.

**Always** use a **pre-measured technique**. The suction catheter should be inserted to no more than 0.5cm below the length of the tracheostomy tube to avoid epithelial damage, however it is best practice to only suction to the end of the tube itself, and no further. If the catheter is not inserted to the end of the tube then inadequate secretion clearance can occur 7.

Suctioning at a negative pressure of **80-120 mmHg (10-16 kPa) for adolescent, 80-100 mmHg (10-13 kPa) for children and 60-80 mmHg (8-10 kPa) for neonates** are effective in most clinical situations. Incorrect use of pressures can be directly related to tracheal damage. If pressure is too low, clearing a patient's airway will be ineffective. However, if the pressure is too high, it may cause alveolar collapse, mucosal damage or catheter collapse 8.

Each suction episode should only last **5-10 seconds** to clear the tracheostomy tube of secretions without compromising the child's respiratory status 7.

### **Method**

- Wash and dry hands
- Connect appropriate size suction catheter, and check suction pressures
- Apply gloves and apron and goggles.
- Gently insert catheter **WITHOUT** suction into the tracheostomy tube to the appropriate length
- Apply suction, using a gentle circular motion as you withdraw catheter out of the tube
- Dispose of catheter and gloves into yellow clinical waste bin
- Replace new suction catheter and wash hands

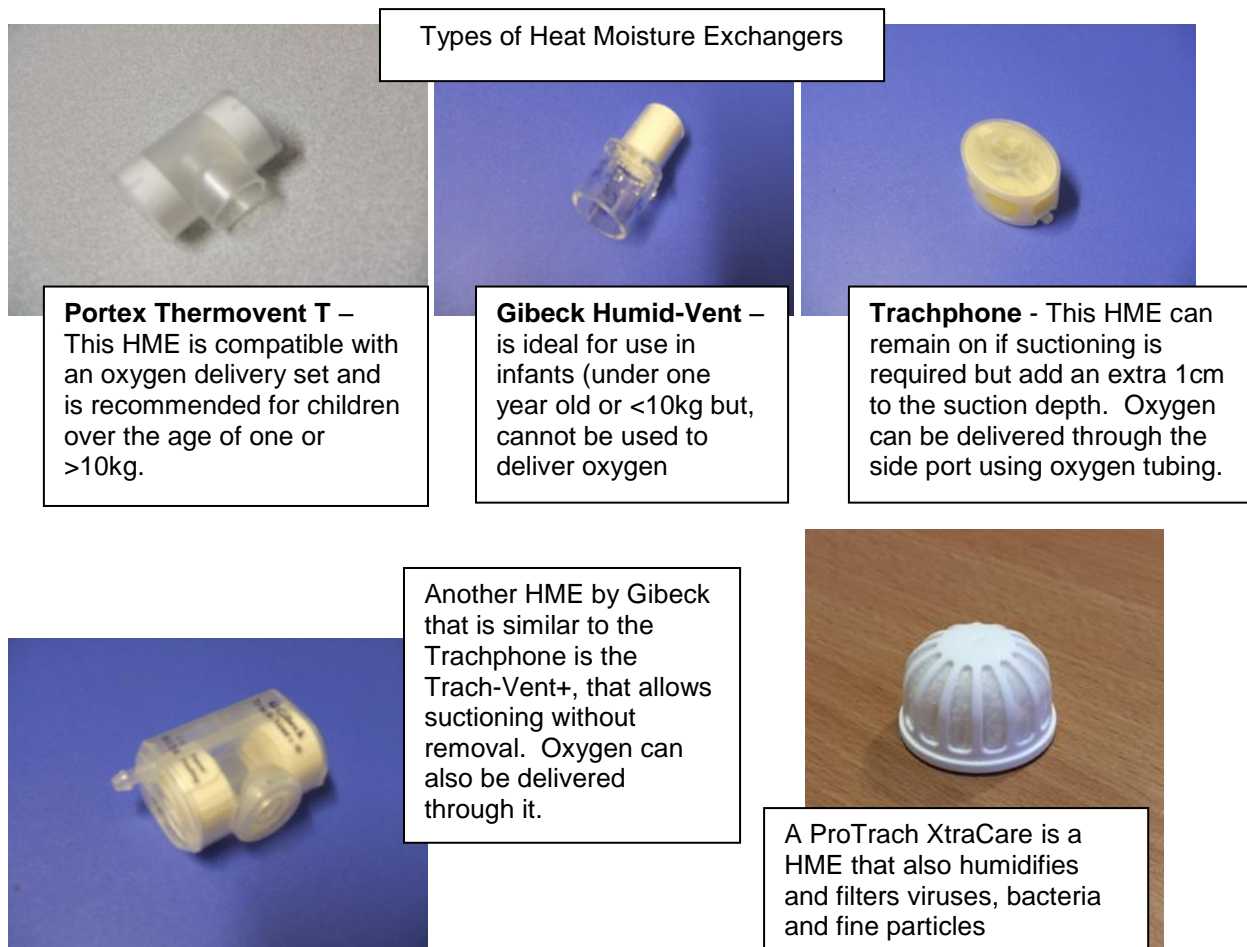
If suction needs to be repeated a clean suction catheter should be used each time.

Care must be taken when suctioning a fenestrated tube, as it is possible to insert the suction catheter through the fenestration (hole) causing damage to the tracheal wall. If there is a fenestrated outer tube insitu you should always insert a **non fenestrated inner tube** for suction 8.

If a child is on medications such as Glycopyrronium Bromide (Glycopyrrolate) or Hyoscine Hydrobromide (Scopolamine Hydrobromide) that control or reduce secretions, please be aware that these medications can dry out secretions potentially causing a tracheostomy tube to become blocked more easily.

## Humidification

Humidification **must be** provided to keep secretions thin and avoid mucus plugs forming. The tracheostomy tube bypasses the nose and nasopharynx's natural mechanisms of warming, moistening and filtering of the air. It is therefore essential to use a 'Swedish nose' (heat moisture exchanger - HME) at all times. The HME selection will be guided by the Paediatric ENT Nurse Specialist and must be changed at least once a day. Please ensure when you are removing a HME that you twist first.



**Nebulisers:** the use of 2.5ml-5ml of 0.9% sodium chloride nebulisers may be prescribed to loosen secretions and to keep secretions moist. This will help a child who has thick and dry secretions. It can be given when it is required for the child (particularly when a child wakes up) or at regular intervals for example every four hours.

**Irrigation** - Indications that irrigation of the tube prior to suction **may be** necessary include thick tenacious secretions, and/or difficulty/inability to pass a suction catheter.

- Irrigation involves instilling no more than 0.5mls of 0.9% sodium chloride into the tracheostomy tube **immediately** before performing suction. **This is a potentially hazardous procedure and must be undertaken with care** 9.

## **Stoma Care**

### **Rationale**

A tracheostomy incision is a surgical wound where prevention of infection is paramount <sup>10</sup>. The aim of stoma care is to reduce the risk of skin irritation and infection. It is therefore essential to keep the area clean and dry.

Regular stoma site inspection is important to observe for any signs of infection.

Signs of infections are:-

- skin discolouration
- foul odour
- swelling
- experiencing pain
- oozing discharge
- cellulitis

Please take a swab of the site and send it to the laboratory for testing before cleaning to determine if a course of antibiotic treatment is necessary.

Stoma site cleaning needs to be performed at least daily. More frequent cleaning is required if the site appears or smells infected. A clean technique for stoma cleaning is advocated <sup>12</sup>.

The stoma can become over granulated, and further treatment to remove granulations will be carried out by the Paediatric ENT Nurse Specialist or ENT team.

It is essential while children with tracheostomies are in hospital they should have Methicillin resistant staphylococcus aureus (MRSA) screening on a weekly basis, as they are more susceptible to infections.

### **Method**

- Wash and dry hands
- Open 2 packets of gauze
- Empty ampoule of 0.9% sodium chloride onto 1 packet of opened gauze
- Apply gloves, apron and goggles
- Use 1 piece of gauze saturated in the 0.9% sodium chloride and fold into a triangle
- Wipe in one direction underneath the flange of the tracheostomy tube (wipe away from the stoma site)
- Dispose of gauze as per trust policy in solid bin and repeat the procedure as many times as necessary
- Finally dry around the stoma site with a dry piece of gauze
- Dispose of gloves as per trust policy and wash hands

The use of tracheostomy dressings such as a trachi-dress is often unnecessary as it provides an ideal environment for bacterial colonisation <sup>8</sup>. In some circumstances dressings may be recommended by the ENT surgeon and/or Paediatric ENT Nurse Specialist to prevent the tube from rubbing onto the stoma site. Dressings can also be used to collect secretions if a patient has lots of secretions and must be changed at least once a day, more so if soiled by copious secretions <sup>13</sup>. Sometimes barrier film or creams such as cavilon, medihoney barrier cream or proshield can be used to protect the skin.

- **Securing/changing tapes**
- **Rationale**
- **A tracheostomy tube is held in place with tapes around the neck and this is a key principle for the maintenance of a safe airway. Securing tracheostomy tapes is essential to prevent a tracheostomy tube from becoming dislodged or removed altogether** 6, 10. Paediatric patients provide a variety of challenges in achieving this as with accidental decannulation can occur at any time 11.
- **Tapes should be changed daily** (only after day 7 of first tube change), but it may be necessary to change them more frequently if they become soiled with vomit or copious amounts of secretions.
- At the Evelina London we use either cotton twill ties or Velcro tapes.
- **After day 7** of a newly formed tracheostomy, tapes will be changed to either cotton twills or Velcro tapes. The type of tapes or ties your child will use is assessed by the Paediatric ENT team on an individual basis.
- **Cotton ties:**
  - These are used when children can undo velcro with ease
  - These may be used in children who frequently self decannulate
  - These may be used when velcro tapes do not correctly fit a child's neck (e.g. a very small baby) as these tapes can be adjusted and made smaller.
  - These may be used in children that have a sore neck from other types of tapes.
- **Velcro Tapes:**
  - These should not be used if there is a risk of the child undoing their own tapes
  - Velcro tapes must only be used once as there is a risk of them stretching when wet.
  - These may be used in children that have a sore neck from other types of ties.
  - These may be used for single parents or carers as they can be secured by one person, after appropriate training - if this is required for an individual family.
- **Method when using Mallinckrodt (Covidien) Blue Velcro Tapes (one piece)**
- **NB There is an accompanying DVD to illustrate this method**
- This procedure requires 2 people (one person **must be** proficient in paediatric tracheostomy management).
  - Ensure a second person can assist, and determine your roles
  - Both people to wash and dry hands, apply gloves and aprons and wear goggles
  - Ensure suction catheter is connected and within easy reach
  - Person A to take new tape and shape the Velcro into a diagonal making it easier to thread through the tracheostomy wings
  - Open both packets of gauze and saline sachets. Divide gauze into 2 piles and wet 1 of the piles with 0.9% of sodium chloride solution.
  - If required secure the child with a blanket leaving the shoulders exposed
  - Person B to **secure** the tracheostomy by resting their first and middle fingers over the wings of the tracheostomy
  - Person A to cut off the old tracheostomy tape, and to dispose of it in yellow hazard bag in solid bin.
  - Person A to clean the neck (not the stoma) with the wet gauze and then to dry it, sitting up the child if necessary, but always ensuring Person B remains securing the tracheostomy
  - Person A to thread new tape through one wing of the tracheostomy and to secure Velcro down, then to thread through the other side. The child may be needed to be sat up at this point if able to. If not, to roll the child onto their side. Ensure the Velcro parts do not overlap each other at the back, by making sure one Velcro piece is on the top and the other on the bottom.

- Person A to ensure the tape is secure by placing their little finger tip between the tape and the child's neck.
- Once secure Person B can stop securing the tracheostomy now
- Person A to use remaining gauze to clean around the stoma site (wipe away from stoma site) and to ensure they have dried the area with clean gauze. At this stage a dressing can be applied if required
- Person B to unwrap child and give them a cuddle (if securing child)
- Person A to dispose of rubbish in yellow hazard bag in solid bin, tidy up and replace stock

\* If suction required during procedure person A to perform.

### **Method when using White Trachi-Hold (Kapitex) Velcro Tapes (two pieces)**

#### **NB There is an accompanying DVD to illustrate this method**

This procedure requires 2 people (one person **must be** proficient in paediatric tracheostomy management).

- Ensure a second person can assist, and determine your roles
- Both people to wash and dry hands, apply gloves and aprons and wear goggles
- Ensure suction catheter is connected and within easy reach
- Person A to take new tape and shape the Velcro into a diagonal making it easier to thread through the tracheostomy wings. Do this for both pieces.
- Open both packets of gauze and saline sachets. Divide gauze into 2 piles and wet 1 of the piles with 0.9% sodium chloride solution.
- If required secure the child with a blanket leaving the shoulders exposed
- Person B to **secure** the tracheostomy by resting their first and middle fingers over the wings of the tracheostomy
- Person A to cut off the old tracheostomy tape, and to dispose of it in yellow hazard bag in a solid bin.
- Person A to clean the neck (not the stoma) with the wet gauze and then dry it, sitting up the child if necessary, but always ensuring Person B remains securing the tracheostomy
- Person A to take one piece of the Velcro tape and to thread through one wing of the tracheostomy tube and to secure Velcro down. Take the second piece of the Velcro tape and thread through the other wing side. Pull longer piece of tape around the neck and secure on top the shorter piece. You may need to trim the longer piece of tape if it is too long.
- Person A to ensure the tape is secure by placing their little finger tip between the tape and the child's neck. The child may be sat up at this point if able to if not, to roll the child onto their side.
- Once secure Person B can stop holding the tracheostomy now
- Person A to use remaining gauze to clean around the stoma site (wipe away from stoma site) and to ensure they have dried the area with clean gauze. At this stage a dressing can be applied if required
- Person B to unwrap child and give them a cuddle (if securing child)
- Person A to dispose of rubbish in yellow hazard bag in solid bin, tidy up and replace stock

\*If suction required during procedure person A to perform

### **Method when using Marpac cotton twill ties:**

#### **NB There is an accompanying DVD to illustrate this method**

This procedure requires 2 people (one person **must be** proficient in paediatric tracheostomy management).

- Wash hands / put gloves on.
- Ensure suction catheter is connected and within easy reach.
- Person A to take new tape and measure the length of the padded section around the child's neck, ensuring the foam pad ends touch each side of the tracheostomy wings.



- There should be a gap of 1cm either side of the flanges for the tying of the twill. If the pad is too long then cut it to the correct size. Thread the ties through the slit in the pad. There is a choice of slits.
- Open both packets of gauze, and sodium chloride 0.9% ampoules. Divide gauze into 2 piles, and wet 1 pile with the sodium chloride 0.9%.
- Ensure second person is ready to assist and secure your child with a blanket, leaving their shoulders exposed.
- Person B to secure the tracheostomy by placing their first and middle fingers over the wings of the tracheostomy tube.
- Person A to cut off the old tracheostomy ties. Cut through the loop, being careful not to cut or touch the flange, then dispose of it.
- Person A to clean the neck with the wet gauze and then dry it, sitting the child up if necessary, or using a neck roll, always ensuring person B remains securing the tube.
- Person A to thread new tape through one wing of the tracheostomy tube, then tie a knot, 3 times. Tie the knots making sure that they are away from the eyelet (if too close to the wing and eyelet, this can be difficult to remove in an emergency)
- Thread the pad around the back of the neck making sure the soft padded side is against the skin, again your child may be needed to sit up at this point.\*
- Thread the other end of the twill through the opposite eyelet and then tie a bow.
- Person A to ensure the tape is secure, and that they can place their little finger between the tape and the child's neck, please check the back and both side of the child's neck.
- If the ties are not tight enough, person A to undo the bow and re tie
- When Person A is happy that the ties are the correct tightness, pull the loops of your bow through so that you are left with a knot, do this twice more.
- Person A to cut the excess twill tie away.
- Person B can stop securing the tracheostomy tube when person A says so.
- Person A to use remaining gauze to clean around the stoma. And if a dressing is required, this can applied at this stage.
- Person B to unwrap child, and give them a cuddle.
- Person A to dispose of rubbish, tidy up and replace stock.

\* If suction required during procedure person A to perform.

## **Medical safety alert issued in September 2012**

### “Silicone tracheostomy tubes - eyelets of silicone tracheostomy tubes damaged by holder”

This alert involved tracheostomy tubes that were held in position using neck ties or tapes. The tapes, as mentioned above, are attached by being threaded through the eyelets on the flanges of the tracheostomy tube. This alert was raised when the ties damaged the eyelets and led to the eventual dislodgement of the tube with subsequent risk of airway loss, and included various manufacturers and models of silicone tracheostomy tubes.

The Medicines and Healthcare products Regulatory Agency (MHRA) was aware of several incidents where the eyelets of tracheostomy tubes appear to have been damaged by the holder.

Following this alert NHS trusts and organisations were asked to:

- Check the instructions for use for both the tracheostomy tube and the holder to ensure that they are compatible.
- Be aware that some manufacturers have recently updated their instructions for use to include a warning to users not to use their tracheostomy tubes with sharp-edged holders, for example some types of Velcro or metal edged holders.
- Ensure that the instructions for use are followed for both the tracheostomy tube and the holder.

**As a trust following this alert, the use of silicone tracheostomy tubes and Kapitex Velcro tapes were discontinued. All Velcro tapes that are used now have soft material that sits in the flanges (i.e. Velcro does NOT sit directly in the eyelet of the flange) and therefore, in turn, are not at risk of damaging the tube.**

## Changing a tracheostomy tube

### Rationale

Tube changes must take place regularly to prevent gradual build up of mucous which can block the tube, rendering suctioning impossible and causing respiratory distress to the child, resulting in the need for an emergency tube change 3. **Shiley tubes to be changed weekly and are single use only. Bivona tubes are changed 2-4 weekly and can be reused up to five times after sterilisation in an electric steam steriliser or in the sterilisation machine in Evelina Paediatric Intensive Care Unit.**

ENT Consultant or Paediatric ENT Nurse Specialist performs the first tube change.

Tube changing will irritate the child's stoma site and airway, this can lead to vomiting. Therefore, it is advisable to perform the tube change before a meal/feed or at least one hour after eating/drinking.

### Method

#### **NB There is an accompanying DVD to illustrate this method**

This procedure requires 2 people (one person **must be** proficient in paediatric tracheostomy management).

- Ensure a second person can assist, and determine your roles
- Both people to wash and dry hands, apply gloves, aprons and goggles
- Person A: Prepare equipment (including new tape) and place within easy reach: -
- Open new tracheostomy tube and feed one side of tape through one wing of the tracheostomy tube (if using blue Velcro tapes). If using the white trachi-hold (Kapitex) Velcro tapes, thread one piece through one wing hole and the other piece through the other wing hole. Ensure you do not touch the part of the tracheostomy tube that needs to be inserted into the stoma site otherwise it will not be sterile.
- Place the introducer into the new tube. Ensure that it can be easily removed.
- Prepare the gauze and 0.9% sodium chloride solution into one wet pile and one dry pile.
- Take smaller tracheostomy out of the box and rest on top of the box; do not break seal of inner packet (as unlikely to need it)
- Ensure tracheal dilators and scissors are within easy reach
- Check the suction is functioning appropriately and connect catheter
- Person B to secure the child and place neck roll in (extend neck by tilting chin up ensuring head is in line with body)
- Consider the need for pre-oxygenation (only if clinically appropriate)
- Person B to then secure the tracheostomy with their first and middle finger resting on each wing of the tracheostomy
- Person A to cut off old tape and dispose in yellow hazard bag in solid bin, then clean the neck (not stoma), sitting the child up if necessary, ensuring person B remains securing the tracheostomy throughout
- Person A to remove Swedish nose
- Person A to suction the tracheostomy tube, then reconnect a new catheter
- Person A to check that child is secured adequately
- Person A to hold the new tracheostomy tube within close range of the child and say '1 2 3 and OUT' (see picture below).
- On 'OUT' Person B to take old tube out with one hand and tilt the child's chin with the other hand
- Person A to insert new tube **immediately** and take out the introducer with other hand
- Person B to remind Person A to take out the introducer if not done so already
- Person A to continue securing tube in
- Person B to thread tape through the other side of tracheostomy wing (if you are using blue (one piece) Velcro tapes). Secure it ensuring that your little finger tip can fit in between the child's neck and the tape. If you are using the white trachi-hold (Kapitex) tapes secure them together at the back of the child's neck. Check that the tapes are secure by inserting your little fingertip in between the child's neck and the tape.

- Person B to clean and dry the stoma and replace Swedish nose.
- One person to unwrap the child and give a cuddle, and the second person to dispose of rubbish in yellow hazard bag in solid bin and restock equipment
- \*You can suction the child at any stage of the above process; however always ensure that one person is securing the tracheostomy if the tapes are not secured.

#### Inserting New Tracheostomy Tube



1

### Emergency Tube Change

#### Rationale

**There is a risk at anytime that a tube may become blocked, dislodged or removed completely**, or that the child's condition may deteriorate <sup>10</sup>. It is therefore important that a qualified nurse is able to perform an emergency tube change to prevent a respiratory arrest.

Accidental dislodgement can occur during routine cares or at times when the infant/child moves energetically. They can even pull at their tube or hook out the tube with their fingers. It is essential that a new tracheostomy tube is immediately reinserted. If a tube is not reinserted this can result in respiratory distress.

The signs and symptoms of a blocked tube are:-

- Agitation or restlessness of an infant/child
- Decreasing oxygen saturations
- Increase work of breathing
- Decrease respiratory rate
- Recession
- Cyanosis
- Absent or reduced expired air from tracheostomy tube
- Stridor
- Inability to insert suction catheter down at premeasured suction depth <sup>10</sup>

When a tracheostomy tube is blocked, suction immediately to establish airway patency. If suctioning does not unblock the tube, then the tube must be changed with a new tube (the same size tracheostomy tube the infant/child has in).

If you are unable to insert the same size tracheostomy tube then, attempt to insert the 0.5mm smaller Shiley tracheostomy tube into the stoma. Failure to insert the smaller tube, then attempt inserting a tube with tracheal dilators <sup>12</sup>. The tracheal dilators are inserted into the stoma closed (please ensure only just the tip is inserted into the stoma and not the whole curve). Squeeze the dilator arms together until the tip

opens the stoma opening, enough that a tracheostomy tube can be inserted. Once the tube is inserted remove dilators from stoma.



Insert the tip of tracheal dilators into the stoma opening by squeezing the dilator arms together

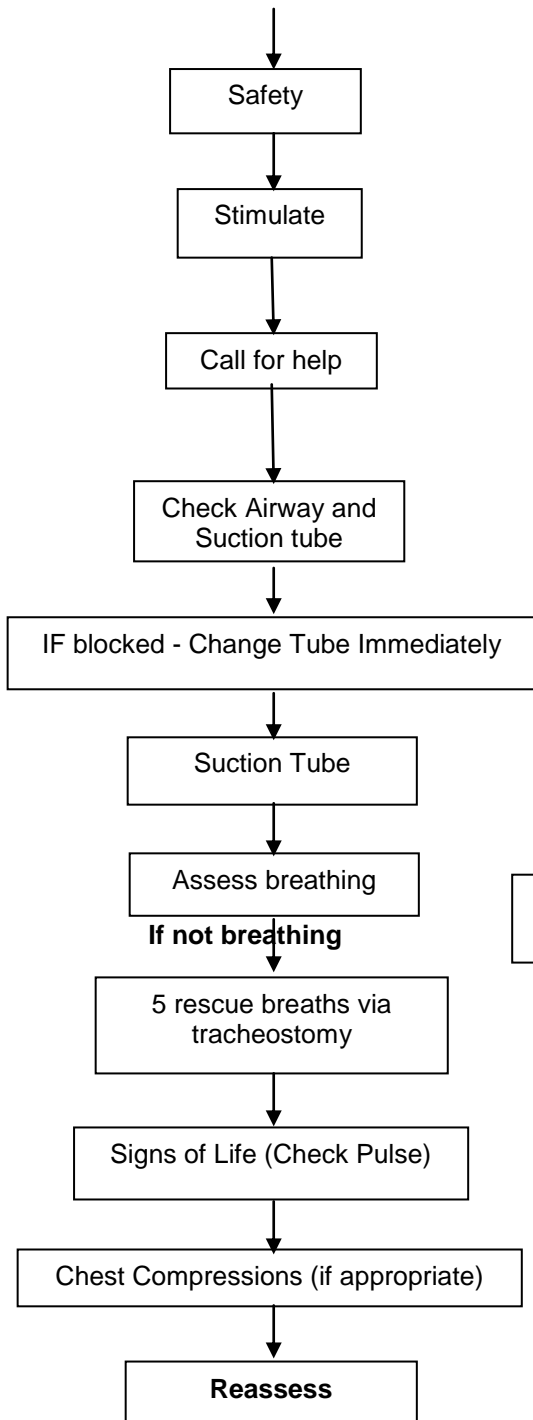
If you have not been trained to use tracheal dilators then you can use the 'Seldinger technique'.



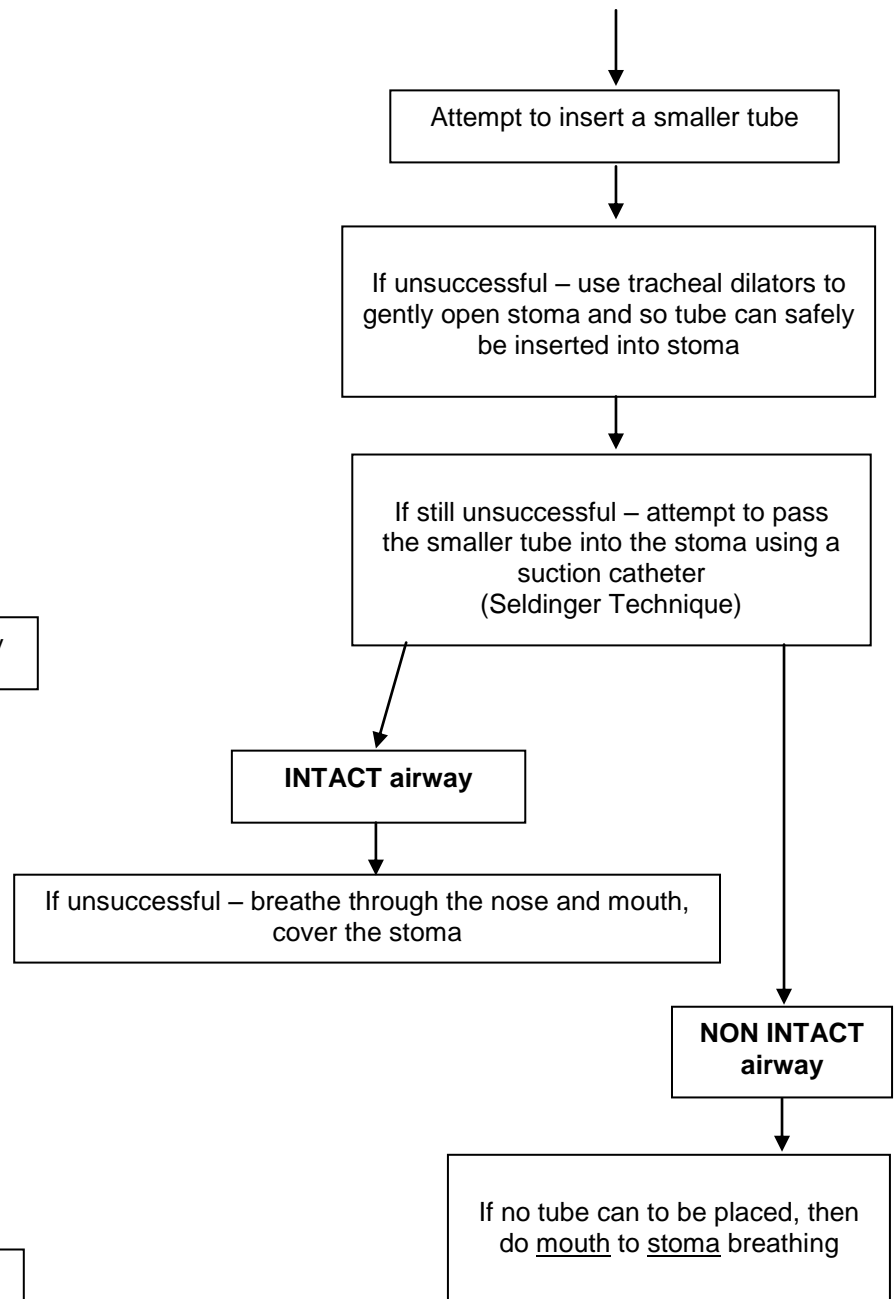
The 'Seldinger technique' is when a suction catheter is passed through the smaller size shiley tracheostomy tube. The suction catheter tip is first inserted into the stoma, and then the tracheostomy tube is guided over the suction catheter into the stoma. Once the tracheostomy tube is in place then remove the suction catheter.

Please see the following flowcharts to assist you in an emergency event.

## Action when Tube is blocked or displaced



## Action to take when tube will NOT go back in



**It is vital that a child's emergency equipment is with them at all times.**

If clinically indicated that if the tube is blocked, then there should be **no delay** in inserting a new tracheostomy tube. One person can carry out the emergency tube change; the tapes can be secured once extra help arrives. The child's condition should improve with a patent airway. If there is no improvement follow resuscitation guidelines (see following flowchart).

## Resuscitation

### Basic Life Support Flowchart for children with Tracheostomies– Health care professionals

<b>Check for danger – safe approach</b>
<b>Check for response</b>
<b>If no response – shout for help</b>
<b>Gently place one finger under chin and tilt upwards then Check for signs of breathing – look listen and feel for 10 seconds</b>
<b>If no signs of breathing - suction tracheostomy tube &amp; send help to phone cardiac arret team 2222 or 999 for an ambulance</b>
<b>If still no breathing, change tracheostomy tube immediately and suction</b>
<b>If still no breathing, give 5 rescue breaths using Ambu bag through tracheostomy tube</b>
<b>Check again for signs of life – pulse, breathing, swallowing, flickering of eye lashes, moving arms or legs</b>
<b>If no signs of life, place one hand (for child) or two fingers (for infant) in the centre of the chest and compress 15 times followed by two breaths with Ambu bag through tracheostomy tube</b>
<b>Repeat 15 compressions to 2 breaths until cardiac arrest team/ambulance arrives or if any signs of life</b>



## **Complications of having a tracheostomy**

Complications can occur in the early post op period as well as later on. These include granulation tissue formation, tracheitis, suprastomal collapse, accidental decannulation, mucus plugging and death 15.

### **Accidental decannulation:**

This can occur at any time as mentioned above. It may be prevented by the appropriate tube and tape selection. All nurses and care givers have appropriate training about what to do if accidental decannulation was to occur.

### **Blockage of tracheostomy tube:**

This is the most common tracheostomy associated complications, and this has an increased risk of occurring in premature and small babies as they tend to have much smaller tubes insitu. This can be avoided by suctioning and humidification of secretions.

### **Infection:**

Mild infections are usually treated with a short course of antibiotics. Sometimes however in children with long term tracheostomies, colonisation of staphylococcus aureus, haemophilus influenza, pseudomonas aeruginosa and streptococcus is seen. Without signs of infection, antibiotics are not routinely prescribed.

Children who are deemed at risk, such as premature babies or those with chronic lung disease may be given the palivuzimab and influenza vaccine along with other routine immunisations.

### **Bleeding:**

Sometimes the tip of the tracheostomy tube may exert pressure on the tracheal wall causing some local irritation or inflammation which may cause some bleeding. Any bleeding noticed from the tracheostomy should be taken seriously and the medical team or clinical nurse specialists should be informed.

### **Granuloma formation:**

The majority of granulomas are small and unproblematic. They are most likely to grow just by the internal stoma site as a result of the rubbing of the tube and the skin. Treatment of the granuloma depends on the size and position. Firstly we would try a topical ointment – which is mupirocin for 2 weeks, 3 times a day. If this does not work, then silver nitrate cautery sticks may be used to reduce down the granuloma – this will be done by the ENT team.

Some granulomas may also grow internally on the tracheal wall and these potentially could become more problematic to the patient. These can obstruct the end of a tracheostomy tube leading to the child having respiratory distress or symptoms mimicking a blocked tracheostomy tube. Large granulomas may also grow and obstruct the stoma during a tube change. It may cause bleeding during a tube change – and these may need to be surgically removed for the child's safety. If when carrying out a tracheostomy change and it feels different from previous tube changes, then please inform the ENT team as next time, you may have difficulty inserting the tube.

### **Suprastomal collapse:**

Pressure on the trachea cartilages from the tracheostomy tube may cause weakening to the cartilage resulting in some suprastomal collapse – and often this may coincide with the formation of some granualomas.

## **Feeding**

### **Rationale**

The presence of a tracheostomy alters the way feeding and swallowing is assessed and managed. In some cases tracheostomy placement may have an effect on a child's ability to accept and swallow food and/or drink safely and therefore cause respiratory deterioration, malnutrition or dehydration. Parents have questions and concerns about how the tracheostomy will impact on feeding at the time when they are required to give consent for the tracheostomy surgery. The likelihood is that the primary diagnosis or cause for airway obstruction plays a more significant role in causing a child with a tracheostomy to have a feeding difficulty.

Difficulties related solely to the tracheostomy may manifest as follows, or a combination of the following:

1. Behavioural feeding difficulties related to hospitalisation and numerous negative medical procedures such as tube changes, tape changes, suctioning. These children may refuse to eat and drink <sup>17</sup>.
2. Sensory feeding difficulties related to a lack or reduction of airflow via the larynx, pharynx, and mouth/nose. It is thought that the lack of airflow may hinder smell and taste due to dampened sensation <sup>18</sup>.
3. Pharyngeal stage difficulties caused by the tracheostomy itself which increase aspiration risk <sup>10, 20</sup>. The child may not be able to achieve a suitable, safe head position for feeding due to head extension caused by the tracheostomy tube, HME and ventilation equipment. The child may not be able to clear residue in the pharynx efficiently due to the lack of or reduction in expiratory airflow. Laryngeal elevation may be hindered by tethering caused by the tube. These difficulties are probably more likely to occur if a cuffed tube is in-situ. Cuffed tubes are rarely used in the field of paediatrics.
4. Silent aspiration as, due to the lack of or reduction in airflow and difficulties generating subglottic pressure, the child may not be able to generate an effective reflexive cough response.

### **Action Points**

All children for whom a tracheostomy is indicated are referred (pre-operatively where possible) to a Specialist Speech and Language Therapist (SLT) with post graduate level training in tracheostomy. New referrals will be accepted via telephone, email or letter. The response time for new inpatient referrals is two working days.

Oral hygiene is maintained by nursing staff/ parent on a regular basis.

The SLT assesses the child's feeding pre-operatively, where appropriate. Post-operatively, oral intake is introduced if indicated by the SLT. If the child has not been seen pre-operatively by an SLT, the child should be referred to SLT prior to introducing oral intake post tracheostomy.

SLT assessment includes:-

1. A detailed case history from the health record, multidisciplinary and parent report
2. Assessment of the child using clinically available tools.

The SLT *may or may not* carry out a green dye assessment to obtain further information about the child's swallow mechanism.

Clinical signs of aspiration at bedside are the same as with any child (i.e. coughing, choking, eye tearing, change in colour, desaturation, fever, respiratory tract infections or respiratory difficulties). The child with a tracheostomy may, in addition present with food/ drink escape from the tracheostomy hub itself.

Children are monitored during oral feeding by a nurse/ parent. Care is taken not to spill food/drink into the tracheostomy hub. Particular attention is given to the shade of tracheal secretions during oral feeding. *If food and/ or drink is consistently detected escaping from the tracheostomy hub, oral intake is discontinued and an alternative feeding route is used.* Urgent SLT assessment is requested by the ward.

Green dye assessment is not used to assess all children with a tracheostomy due to its reduced reliability and risk of parent/ carer dependency on the results. Green dye assessment is carried out jointly by the SLT and, child's delegated nurse. The delegated nurse is required to suction during the assessment and monitor the shade of tracheal secretions for some time after (as decided by the SLT). Green dye assessment is only used by the SLT.

VFSS is not indicated for all children with a tracheostomy. The SLT will decide on whether it is required following clinical assessment.

To optimise a safe head position in the infant when feeding, a flexible end tracheostomy tube (flextend) maybe helpful as it takes the hub away from the neck space. A mini-vent HME is indicated for infants without an oxygen requirement as it allows for optimal head positioning during feeding. A trachphone HME is ideal for infants with an oxygen requirement. The HME selection will be guided by the ENT nurse specialist.

A child with an inflated cuffed tracheostomy tube is not a candidate for oral feeding. The child will need to tolerate regular periods of cuff deflation before oral feeding can be assessed by the SLT. The decision to trial cuff deflation is made by the multi-disciplinary team so that cuff deflation/ inflation, suction +/- modification of ventilation settings can be considered. If periods of cuff deflation are indicated, a cuff deflation plan will be provided for the bedside. In some cases where an inflated cuffed tracheostomy tube is long term, oral feeding may be considered following SLT assessment, with agreement from the child's Consultant and Parent/s.

The SLT will make an entry in the health record after all contacts, and may in addition provide a bedside plan.

The SLT will refer the child to their community SLT service on discharge from hospital. In addition, the child's ENT Consultant may refer the child to the tertiary SLT Airway Clinic.

## **Communication**

### **Rationale**

If a child has an age appropriate uncuffed tracheostomy tube (Figure 1), or an inflated cuff tube in-situ all expiratory air flow will pass out via the tracheostomy, by-passing the larynx. These children will be aphonic, unable to produce a voice. In some cases the child may develop oral click sounds or 'buccal speech' 21, a highly unintelligible way of communicating. These children may benefit from alternative and augmentative communication options e.g. voice output communication aid, signing, symbol support, electro larynx. If the child has a smaller than age equivalent uncuffed tube (Figure 2), some expired air can pass around the tracheostomy tube up through the larynx allowing them produce leak voice. Leak voice is quieter, requires more effort and may not be sufficient to support words and sentences. These children may be suitable for a one-way speaking valve 22.

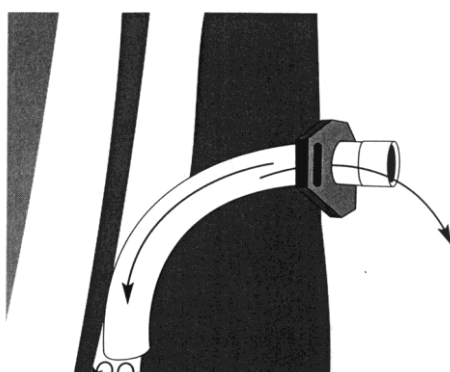


Figure 1 – A tracheostomy tube filling the entire tracheal lumen 4 en.

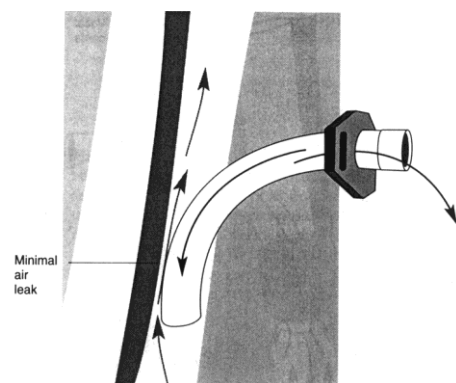
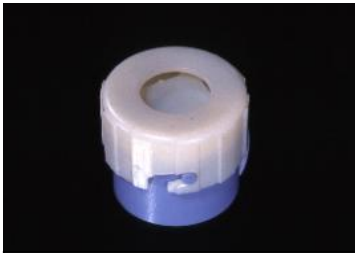


Figure 2 – Reduction of airflow following placement of a tracheostomy tube 4

A one-way speaking valve trial is indicated if the child has an uncuffed tube or a deflated *Bivona tight to shaft tube* (speaking valves are contraindicated with all other cuffed tubes whether they are inflated or

deflated), a tube which is smaller than age appropriate (see Appendix 4) and, a less severe degree of airway obstruction which allows the passage of airflow via the larynx, pharynx, nose/mouth. Some children present with behavioural or sensory intolerance of the valve due to the altered sensation of airflow or refusal behaviour. Finger occlusion on the expiratory breath may enable vocalisation for children who do not tolerate a speaking valve. Finger occlusion must only be trialled with guidance from the SLT.



**A Rusch one way speaking valve** – whereby an audible click is heard with expiration and is not compatible with oxygen.



**A Passy Muir Valve** which is available in clear and purple. There is an oxygen adaptor for oxygen delivery if required and is used by a child who consistently tolerates a one way speaking valve.

Apart from the physiological effects, tracheostomy placement has also been associated with: oro-motor difficulties 23, 24, impaired social skills 25, 26, delayed receptive and expressive language 26 and speech difficulties 24, 26, 28.

Parents often have queries and concerns about not being able to hear their child cry or talk.

### **Actions**

Professionals working with children with tracheostomies understand that tracheostomy placement hinders voice production.

All children are referred to a SLT with post graduate training in tracheostomy, pre-operatively where possible. New referrals will be accepted via telephone/bleep/ e mail or letter. The response time for inpatient referrals is two working days.

The SLT will assess the child's communication pre-operatively where possible. The parents/carers will be educated about why the tracheostomy has an impact on communication and, communicative options available as the child gets older.

SLT assessment includes: - a detailed case history from the health record, MDT and parent report and, assessment of the child using clinically available tools, and observation of parent/ child interaction. The following communication options will be considered and implemented as appropriate, taking into account the child's developmental and cognitive level, physical ability, longevity of tracheostomy placement and child/ parent preference: voice output communication aid, electro larynx, symbol support and, signing and, one-way speaking valve.

Not all children with a tracheostomy are suitable candidates for a one-way speaking valve. One-way speaking valves are implemented with a child following SLT assessment, with the agreement of the ENT Surgeon. Contraindications to speaking valve assessment are as follows: foam/ air filled cuffed tracheostomy tube (inflated or deflated), inflated tight to shaft water filled cuffed tracheostomy tube infants, an infant under 6 months of age, severe airway obstruction, larger than age appropriate tracheostomy tube. The SLT will gather information about the child prior to deciding if a trial of a speaking valve is appropriate. Children who are ventilated via tracheostomy will be considered for a *Passy Muir Aqua* in-line speaking valve collaboratively with the multi-disciplinary team. Speaking valve assessment will not be carried out within 48 hours post MLB or airway surgery. Children can be assessed for a speaking valve as an outpatient and should be referred by the ENT Consultant to the SLT Airway Clinic.

While an inpatient, the child is regularly reviewed by the SLT in line with growth and changes to airway management.

The SLT will make an entry in the health record after all contacts, and may in addition provide a bedside plan.

The SLT will refer the child to their community SLT service on discharge from hospital.

## **Discharge Planning**

The support for a family is vital and must be commenced as early as possible. Funding for care packages takes considerable time to obtain because the child and their home will need to be assessed by a continuing care professional. Sometimes education and training for carers needs to be established to provide the care package. Therefore, referrals to the children community nursing team and their local hospital are essential 29.

## **Recommendations**

- Do not consider discharging a child with a new tracheostomy back to their local hospital until:
  1. The first tracheostomy tube change has been completed by the ENT team or by the Paediatric ENT Nurse Specialist.
  2. The child's local hospital has nurses that are tracheostomy trained and that they are proficient to teach the family tracheostomy care. Also they must have appropriate tracheostomy equipment.
- Ensure Home Care Team and local hospital have a list of equipment (see appendix 3) faxed to them (please note, it can take up to two weeks for required equipment to be delivered).
- Ensure local referrals are made to multidisciplinary teams i.e. speech and language therapy.
- Consider arranging a multidisciplinary meeting so that all disciplines are involved. Topics to consider:
  1. Respite care/ support for family
  2. Financial support for family for example, benefits
  3. Equipment issues
  4. Is present housing suitable?
  5. Feeding issues
  6. Residency status (if required)
- If a family is taught tracheostomy care at the Evelina London, then follow the teaching package on suction techniques, tape changes and tube changes. Set a provisional discharge date for the family and local services to work towards, the aim should be for 4 weeks.
- Ensure family receive Tracheostomy Resuscitation training prior to discharge home or if child is transferred to make certain their local hospital can provide this.
- For a nurse to take family out of the ward/hospital so they can get used to carrying necessary equipment and performing suctioning in public. As their confidence increases and once they have completed at least 4 tube changes, encourage them to take their child out by themselves, Please ensure they always have a mobile phone on them at all times and their emergency bag. Their emergency bag should contain spare tubes, dilators, scissors, tape, suction catheter, nappy sack (for disposing dirty catheters), hand gel, neck roll and blanket (if required to secure child), 0.9% sodium chloride ampoules, 1ml syringes and portable suction. **\*Please note that the carer or parent should have tracheostomy paediatric basic life support training before they independently take their child out on their own.**
- Once the family are more confident with tracheostomy care and their provisional discharge date is nearing, aim for them to 'room in' with their child in a cubicle for 48 hours with minimal nursing input to assess how they cope. Ideally this should be arranged for over a weekend

with the aim the family can be discharged on the Monday/Tuesday. This could be completed at their local hospital if more suitable.

- The child and family should be transferred back to their local hospital before going home so that 'Direct Access' to the ward can be obtained if a problem should arise.
- Give family/carers advice on Tracheostomy Support Groups e.g. ACT (Action for Children with Tracheostomies) and parent/carer advice booklet.
- Ensure the family have a date or a provisional date for their child's next MLB (Microlaryngoscopy and Bronchoscopy).
- Discharge **should not** be considered until the family are confident with all aspects of tracheostomy care and that the local support is in place. Ensure home equipment has also been delivered and set up.
- It is important that an infant/child with a tracheostomy is discharged home safely and with on-going support from their multi professional team members because it is a challenging process and puts a number of stressors on the family unit. There is also no reason why they cannot attend nursery or school as long as there is a one to one level of support by a person who is also tracheostomy care trained. This is usually facilitated by the school and their community team with the support of the ENT nurse specialist.

### **Care of a Tracheostomy in the Community**

All children with a tracheostomy require highly skilled care to ensure their safety in the community. This would be achieved by:

- Comprehensive pre discharge planning
- Appropriate care package to support family
- Support for the family post discharge
- Training for staff and carers and support staff.

### **Pre- discharge Planning**

The acute hospital caring for the child should inform the Continuing Care team immediately after a tracheostomy is inserted. They should contact the team by telephone followed up with a written referral. Details of the equipment and disposables required should be sent via email once the tube size is established – usually after the first tube change. The Continuing Care Nurse will carry out a Continuing Health Care Assessment prior to discharge. This will take place in the Hospital where they will meet the child and family. This will be presented at the Continuing Health Care Panel to determine the care package required.

A risk assessment of the home will also be carried out. It is recommended that this is a joint visit with the Children's Community Nursing Team or social care.

- Children referred must have a General Practitioner (GP) within the boroughs of Lambeth or Southwark.
- Children and Young People referred must be between the ages of birth and 16 or up to 19 years for young people with special needs and still in full time education.

### **Discharge planning meeting:**

This is essential to allow for specific issues to be discussed and so that the family/carers can meet the community teams who will be involved in caring for their child.

### **Other referrals to local health professionals as required:**

These should be made as soon as possible for easier transition from hospital to community services.



### **Equipment and prescription supplies:**

The hospital should provide the child's emergency tracheostomy box. *The emergency bag should contain spare tubes, dilators, scissors, tape, suction catheter, nappy sack (for disposing dirty catheters), hand gel, neck roll and blanket (if required to secure child), 0.9% sodium chloride ampoules and 1ml syringes.* The child should have their portable suction machine in hospital prior to discharge to allow parents/carers to become familiar with it. Other equipment and disposables should be ordered and ready at home before discharge. The child should have a 2 week supply of prescribed medication to go home with to allow General Practitioner (GP) time to make out prescription and for local pharmacy to obtain supplies.

### **Tracheal dilators:**

During an emergency when it is not possible to replace a tube, Tracheal dilators may be used to open the stoma. **Please note:** Tracheal dilators should only be used by trained health care professionals, or personnel who have been trained and assessed as competent.

The approach taught in the community in an emergency, is the '**Seldinger Technique**'. The suction catheter is placed through the smaller size shiley tracheostomy tube and then passed through the tracheostomy stoma. The tracheostomy tube is passed, easing it over the suction catheter. In an emergency, water based lubricant can be used to ease the tube into place. Remember to remove the suction catheter once the tracheostomy tube is in place. Its position is confirmed by the suctioning of tracheal secretions.

### **Care Package:**

The Care package is agreed with the local Care Commissioning Group (CCG). The Continuing Care nurse will carry out a holistic assessment of the child's needs in line with the National Framework for Children and Young People Continuing Care 2016. 31

They will act as an advocate for the family ensuring they are receiving the most appropriate service to meet their needs. This may include services from social care and voluntary organisations.

### **Support for Family:**

- Coordinate Care Package
- Support discharge planning process
- Monitoring staff provided by care provider
- Support with accessing local services
- Linking with support networks
- Joint visits with other professionals
- Advising when to call the Doctor
- Liaise with local education authorities for children and young people in school

### **Training for parents/carers**

- The family/carers, and the child if indicated, should have received training in **all** aspects of the tracheostomy management before discharge. This would include going off the ward unsupervised with their child to build up their confidence.
- Parents and carers must have received resuscitation training before being discharged home. This should include carrying out emergency tube changes. All emergency techniques should be practised prior to discharge home and the family/carers should have completed a competency document whilst the child is still an inpatient.
- Copies of training and competency documents should be supplied for Community records prior to discharge.

### **Training for Nursing Staff**

- A Named Nurse will act as lead in tracheostomy care. Nursing staff providing care for children and young people with tracheostomies will receive annual updates and a review of their competencies from the specialist nurses at the Evelina London children's hospital. Staff competencies will be reviewed at the annual Performance Development Review process, or before if required. Nursing staff will not be permitted to train if this standard has not been achieved.
- This training and competencies will be included in the induction programme for new staff.
- All staff will be compliant with the Trust Mandatory training in Basic Life Support.

### **Training for Non Qualified Support staff**

- The complex needs school nurse Team Leader will undertake to ensure that support staff, within special schools, receives competency based tracheostomy training and Basic Life Support which includes an annual update. It is the responsibility of the paediatric outreach nurse to undertake this role within nurseries and schools in the boroughs of Lambeth and Southwark. A minimum of 3 support staff will be trained for each child. It is the Head Teachers responsibility to identify support staff for training. If possible, this should be done in the term prior to the child starting school.
- **Any support staff that have had no previous experience in caring for a child with a tracheostomy will :**
  - I. Receive theory training
  - II. BLS Training
  - III. Competency based training that will include:
    - a) A minimum of 2 tracheostomy tube changes for the named child
    - b) A single handed tube change
- **Any support staff that have had previous experience (within a 12 month period) in caring for a child with a tracheostomy will :**
  - I. Receive theory training
  - II. BLS Training
  - III. Competency based training that will include:
    - a) A single handed tracheostomy tube change with the named child

If the non qualified staff does not demonstrate the required level of skill, they will be re trained as having no previous experience.

All non qualified support staff who has achieved their competency will undertake **6 monthly** tracheostomy tube changes on the named child in order to maintain their skills. This will be supported by the named nurse and with parental consent.

### **Continuing Care**

- The continuing care nurse will ensure all support staff is trained and competent prior to the child being discharged from hospital. However it is the appointed care providers' responsibility to ensure their staff is trained and competent.
- If this is not the case, trained alternative staffing should be sought.
- If the identified support staff have not received training or reached the required standard, they will not be signed off as competent. Therefore, trained alternative staffing will be sought and

funding provided through the CCG until such time the support staff have completed training and achieved competency.(This is usually for an agreed period of time)

**If a parent is not following the recommended standard for tracheostomy care:**

- I. Support will be offered to the parent/carer
- II. Additional training will be offered
- III. Referral to the specialist nursing team
- IV. If the child is deemed at risk of harm, safeguarding procedures will be followed.

**Decannulation**

Decannulation is a process of permanently removing the tracheostomy tube in a controlled environment. A MLB is completed by the ENT consultant in order to determine if the child is ready for decannulation. To reach the stage of decannulation a process of weaning needs to be undertaken. Weaning times may vary due to the underlying cause and reason for the insertion of the tracheostomy 32.

Prior to weaning of the tracheostomy it must be established that the primary cause of the tracheostomy has been resolved and that the following is achieved: -

1. That the child has an assessment of their swallow by a speech and language therapist.
2. That the child has stable oxygen saturation levels and requires minimal oxygen therapy.
3. That the child is prepared for the procedure and that they are psychologically ready.

The tracheostomy tube will need to be downsized by gradients of 0.5mm. Reduce the size on a daily basis until you reach a size 3.0mm tracheostomy tube. The type of tube either paediatric or neonatal tube needs to remain consistent, do not swap to neonatal if the child has a paediatric tube. Downsizing allows the child to acclimatise to breathing through their natural upper airway. For small infants /children, weighing less than 12 kg, where a tracheostomy tube with a 3.0mm internal diameter will occupy much of their airway, the decannulation process will be different. This will include downsizing the tracheostomy tube to a 2.5 mm (Bivona tracheostomy tube) rather than the 3.0 mm. This will only be done after discussion with the child's consultant. It can be problematic as there is an increased risk of a mucous plug in smaller tubes. A fenestrated tube may be suggested by the consultant to permit airflow through the hole or holes in the tracheostomy tube.

When a child is ready for the weaning process the following things will need to be completed: -

- Fully explain the procedure to the child and their family. Use appropriate language/play/pictures for the cognitive age of the child. Liaise with the play specialist. Parents or legal guardians are often quite anxious when the decannulation process starts, reassure them, encourage to ask questions/express fears and to participate in care.
- Establish a clear written plan of the weaning process for the individual child. This will then ensure that care is individualised and continuity is maintained amongst the team.
- Nurse the child as close to the nurse's station as possible or special the child to allow maximum observation. The nurse must be proficient in tracheostomy care and management.
- Ensure that a saturation monitor is attached to the child at all times.
- Remember to document process and outcomes in the patient's notes.

The following is a guide only, as each child is different and the process may vary. The ENT Nurse Specialist will begin the decannulation process and provide support and advice to the nursing staff, child and family. The nurse caring for the patient will closely observe the child throughout their shift.

The tracheostomy tube is blocked off initially using a sleeked off Swedish nose or a decannulation cap. The ENT Nurse Specialist will unblock immediately if respiratory compromise observed. Distraction techniques should be used as children often panic when first blocked off. During the blocked off session you must try not to suction secretions unless necessary but, do encourage the child to cough whilst blocked off.

- If the child tolerates, keep them blocked off for up to one hour and closely observe them at all times. Once the ENT nurse Specialist has reviewed, continue to keep blocked off for up to 6 hours, then unblock.
- If successful, aim to continue to block off for 12 hours in one session on the following day. Then keep unblocked overnight.
- The following day, aim to be blocked off for 24 hours. Overnight the child should have their saturation monitor connected and be closely monitored.
- If successful keep blocked off for a further 24 hours.
- If successful for 48 hours, the tube is removed by the paediatric ENT nurse specialist or ENT registrar. A dressing such as a hyperfix/mefix dressing, over a small piece of gauze will be placed over the stoma site. The dressing must remain air tight so a tegaderm dressing is placed over the centre of the hyperfix/mefix dressing. If the dressing becomes loose or wet, another dry dressing should be reapplied. The child needs to remain in hospital to be closely monitored for at least another 48 hours. If any respiratory distress occurs once the tracheostomy tube is removed the ENT team must be informed immediately because this is potentially an emergency situation.

Sometimes decannulation fails despite a MLB showing an adequate airway and no obvious pulmonary or neurological abnormalities so it is important to be vigilant in taking regular observations and contact relevant teams if the patient struggles.<sup>16</sup>

A sleep study measuring a patient's oxygen and carbon dioxide levels may also be carried out pre and post decannulation. A study carried out in Cincinnati, published in 2015, found that using a MLB alongside a sleep study increased the predictability of the decannulation process, and suggests that a sleep study has an important part to play in the evaluation process for decannulation, especially in children with complex airway problems.<sup>33</sup>

After decannulation, children require close observation because they are at risk of both airway obstruction and aspiration. Also, they are at risk of other problems such as dysfunctional swallowing, poorly co-ordinated laryngeal closure which may contribute to their increased risk of aspiration.

Most stoma sites will heal spontaneously following decannulation of a tracheostomy. However, in a small percentage of patients, the stoma will fail to close and a surgical closure may be necessary by the surgeon. A surgical closure is unlikely to be considered for nine months to encourage the body's natural healing.

On discharge ensure that a follow-up appointment is made six to eight weeks in the ENT outpatient's clinic. Also contact the home care team about the decannulation so equipment no longer is delivered, and provide advice to keep equipment for one month in case any problems occur when at home. The continuing care package is recommended to remain for two weeks and then weaned down and stopped. This varies depending on the area the child lives in.

## **Summary of Key Points**

- Children with a tracheostomy completely depend on them for breathing. The child needs direct continuous observation twenty-four hours a day by someone who is proficient in paediatric tracheostomy management and who has completed competency skills in tracheostomy care.
- On every shift when a nurse is caring for a child with a tracheostomy they must complete the tracheostomy checklist. The tracheostomy information sheet and tracheostomy progress record must also be filled in to maintain current information and care for the child.
- If a child is going to theatre make sure that the tracheostomy checklist for theatre is completed by all accountable professionals caring for the child.
- Suction should only be performed when necessary/clinically indicated.
- Always use a pre-measured suction technique.
- Humidification must be provided to keep secretions thin and avoid mucus plugs forming.
- Securing tracheostomy tapes is essential to prevent a tracheostomy tube from becoming dislodged or removed altogether.
- Tapes should be changed daily.
- There is a risk at anytime that a tube may become blocked, dislodged or removed completely. Therefore, it is vital that a child's emergency equipment is with them at all times.
- The parent/carer should have paediatric basic life support training before they independently take their child out on their own and/or discharged from hospital.



**Paediatric Tracheostomy Daily Checklist**

Patient Name:

Hospital No.:

**All children with a tracheostomy must have the following items with them at all times and within easy reach.**

Date														
Equipment	AM	NIGHT	AM	NIGHT	AM	NIGHT	AM	NIGHT	AM	NIGHT	AM	NIGHT	AM	NIGHT
Tracheostomy tube:- Type: _____ Size: _____ (NEO/PAED) x2 (Tube size already in situ)														
Please check <b>correct</b> tube insitu														
Tracheostomy tube:- Type: _____ Size: _____ (NEO/PAED) x1 (0.5mm smaller – must be SHILEY)														
Tracheal dilators														
Scissors														
Disconnection Wedge														
Suction catheters size _____														
Tapes Type: _____														
Dressings Type: _____														
Wall/Portable suction working														
Towel/blanket for <u>neck roll</u>														
Towel/blanket to wrap child (if needed)														
1ml syringes														
Swedish noses														
Tracheostomy mask and Nebuliser pot														
Yellow bin & goggles														
Gauze														
Oxygen delivery set														
0.9% Sodium Chloride 10ml ampoules														
Saturation Monitor														
<b>Signature</b>														

**Please tick and sign box if items of equipment are present**





Patient name: \_\_\_\_\_ Hospital No. \_\_\_\_\_

**Tracheostomy Information Sheet**  
Please ensure essential equipment checked each shift

Tracheostomy tube type and size..... PED/NEO (please circle)

Depth of Suction.....cm's.

Size of Catheter.....fr Weight:.....Kg's

**Airway Status: INTACT UPPER AIRWAY / NON-INTACT UPPER AIRWAY**

Date of last tube change:


**Swallowing Status**

Reviewed by SALT    Y / N (please circle)

Safe For Oral Intake:    Fluids / Solids / Both    Y / N (please circle)

Instructions:

Comments:

Attach patient label or  
Name:  
Hospital Number:  
Date of Birth:

**Appendix 1c**



**Tracheostomy Information Sheet**

Please ensure essential equipment is checked each shift

**AIRWAY STATUS:**

INTACT UPPER AIRWAY / NON-INTACT UPPER AIRWAY

Tracheostomy tube type and size.....PAED/NEO (please circle)  
CUFFED / UNCUFFED (please circle)

Depth of suction.....cm

Size of catheter.....fr

Tube	Date inserted	Sterilised x1	Date inserted	Sterilised x2	Date inserted	Sterilised X3	Date inserted	Sterilised X4	Date inserted	Sterilised X5	Date Inserted (DISCARD once removed)

NB:

- **Only to be used with Bivona Tracheostomy tubes. NOT to be used with Shiley or custom made bivona tracheostomies.**
- **Please ensure that the tube inserted is numbered with permanent marker**

**SWALLOWING STATUS:**

**SAFE FOR ORAL INTAKE?      NO / FLUIDS / SOLIDS / BOTH**

Further comments from SALT/Dieticians:

Other comments:

Please Complete or Affix Label	Ward _____
Surname:  Forename: Date of Birth: Hospital No: NHS No:	Sheet No: _____
	To be completed on a weekly basis

**Tracheostomy Care And Progress Record**

Date of Tracheostomy Formation.....

Status of stoma site: (please tick)

Clean / Dry:	<input type="checkbox"/>
Inflamed:	<input type="checkbox"/>
Excoriation:	<input type="checkbox"/>
Granulation:	<input type="checkbox"/>
Other (please state)	<input type="checkbox"/>

Treatment:

**Discharge Plan Update**

Date Of Planned Discharge: .....

Referral made to Home Care Team? Y / N                      Date referral made.....

Multi Disciplinary Team Meeting Planned? Y / N                      Date of Meeting.....

Equipment List Faxed? Y / N    Date:.....

Local Hospital: .....

Local Hospital Informed Of Planned Discharge Date and Referral Made? Y / N

Date Set For Parents To Room In.....

Date for follow up M.L.B.....

Comments:

**Parental Competency**

Name;  Relationship to Patient:  Can Safely and Confidently provide: (Refer to teaching pack)  Suctioning    Y / N    Date Achieved..... Tape Change    Y / N    Date Achieved..... Tube Change    Y / N    Date Achieved.....  Date Received Resus training.....	Name;  Relationship to Patient:  Can Safely and Confidently provide: (Refer to teaching pack)  Suctioning    Y / N    Date Achieved..... Tape Change    Y / N    Date Achieved..... Tube Change    Y / N    Date Achieved.....  Date Received Resus training.....
--	--

Please Complete or Affix Label	Ward _____
Surname:  Forename: Date of Birth: Hospital No: NHS No:	Sheet No: _____
	Additional instructions:

**Tracheostomy Checklist for Transfer of Paediatric Patients**

**All children with a Tracheostomy must have the following items with them at all times.  
ALL ITEMS MUST BE PRESENT AND WITHIN EASY REACH**

Equipment	Please Tick			
	1	2	3	4
_____ Tracheostomy Tube Size ____ (Neo/Paed) x2 (Same size as already in situ)				
_____ Tracheostomy Tube Size ____ (Neo/Paed) (0.5mm smaller than above)				
Paediatric Tracheal Dilators				
Scissors				
Appropriate size tape ( <i>please indicate _____</i> )				
Appropriate size Suction Catheters ( <i>size _____</i> )				
Portable Suction ( <i>reliable and charged</i> )				
Spare Towel / Blanket ( <i>Available as neck roll</i> )				
Spare Blanket to secure child if needed				
1ml syringe & Sodium Chloride 10ml Ampoule				
Swedish Nose ( <i>spare</i> )				

On completion of checklist please sign below:

	NAME	STATUS	SIGNATURE
1	Nurse transferring child to ward / theatre		
2	S/N / ODP receiving patient into the ward / Anaesthetic room		
3	Recovery Nurse		
4	S/N collecting from theatre to return to ward		

**For transfer of patient between wards sections 1&2 must be signed.**

**For transfer of patient to theatre all of the above sections must be signed.**

**Tracheostomy Equipment List for Discharge Home**

Please order items that are ticked

<p><b>Tracheostomy Tube</b>                  Type _____ Size _____ Neonatal/Paediatric                  Amount Required: To be changed WEEKLY (Single use only)                  Minimum of 3 boxes at all times                  Covidien UK 02030271757 or Smiths Medical International Ltd, Colonial Way, Watford                  01923 246434, <a href="http://www.smiths-medical.com">www.smiths-medical.com</a></p>	
<p><b>Tracheostomy Tube 0.5mm smaller than above tube size</b>                  Type _____ Size _____ Neonatal/Paediatric                  Amount Required: X 3 (1 emergency bag, 1 bedroom and 1 other room)                  Covidien UK 02030271757 or Smiths Medical International Ltd, Colonial Way, Watford                  01923 246434, <a href="http://www.smiths-medical.com">www.smiths-medical.com</a></p>	
<p><b>Tracheostomy Tapes</b>                  Trachi-hold Tracheostomy Tube Holder                  Size: Mini                  Order Code: TR ACC 0030 (10 tapes per box)                  Amount Required: To be changed DAILY                  Kapitex Healthcare Ltd.                  1 Sandbeck Way, Wetherby, West Yorkshire LS22 7GH                  Tel: 01937 580211                  Fax: 01937 580796  <a href="http://www.kapitex.com">www.kapitex.com</a></p> <p style="text-align: center;"><b>OR</b></p> <p>Tracheostomy tube neck tapes (small) – blue Velcro                  Amount Required: To be changed DAILY                  Reference Number: 321-01 (available as a box of 12)                  Covidien UK                  02030271757</p>	
<p><b>Tracheostomy Dressings (If Applicable)</b>                  Trachi-Dress sterile Tracheostomy/cannula dressings                  Amount Required: To be changed DAILY                  Order Number: TR DRE 0001 (small) – 20 per pack                  Kapitex Healthcare Ltd.                  1 Sandbeck Way, Wetherby, West Yorkshire LS22 7GH                  Tel: 01937 580211                  Fax: 01937 580796  <a href="http://www.kapitex.com">www.kapitex.com</a></p> <p style="text-align: center;"><b>OR</b></p> <p>Allevyn Non-Adhesive polyurethane foam film dressing – sterile (5cm x 5cm)                  Amount Required: Will need ____ dressing(s) for each daily dressing change                  Smith &amp; Nephew Healthcare Limited                  Healthcare House                  Goulton Street                  Hull HU3 4DL                  01482 222200  <a href="http://www.smith-nephew.com">www.smith-nephew.com</a>  <a href="http://www.allevyn.com">www.allevyn.com</a></p>	
<p><b>Swedish Nose (HME – Heat Moisture Exchanger / Thermovent T)</b>                  Under 1 year of age – Humid-vent mini (heat and moisture exchanger) a Gibeck product                  Amount Required: To be changed if dirty or soiled with secretions (at least daily)                  Reference Number: 10011</p>	

<p>Teleflex Medical High Wycombe HP12 3ST 01494 532761 www.teleflexmedical.com</p> <p style="text-align: center;"><b>OR</b></p> <p>Over 1 year of age – Portex Thermovent T – heat and moisture exchanger Amount Required: To be changed if dirty or soiled with secretions (at least daily) Reference Number: 100/570/015 Smiths Medical International Ltd Colonial Way, Watford 01923 246434 www.smiths-medical .com</p> <p style="text-align: center;"><b>OR</b></p> <p>TrachPhone Amount Required: To be changed if dirty or soiled with secretions (at least daily) Reference Number: 7704 Atos Medical <a href="mailto:info@atosmedical.com">info@atosmedical.com</a> www.atosmedical.com</p>	
<p><b>Paediatric Tracheostomy Mask</b> Reference Number: 41076 Teleflex Medical High Wycombe HP12 3ST 01494 532761 www.teleflexmedical.com</p>	
<p><b>Portex thermovent 02 – Oxygen attachment for thermovent T</b> Ref: 100/575/010 Smiths Medical International Ltd. Colonial Way, Watford 01923 246434 www.smiths-medical.com</p>	
<p><b>Suction Catheters</b> Type: Suction catheter with vacuum control connector (must also have cm graduations on catheter) Size: _____ Amount Required: For each suction episode (single use)</p>	
<p><b>2 Suction Units</b> 1 Static suction 1 Portable suction</p>	
<b>Nebuliser machine</b>	
<b>Nebuliser pot and oxygen tubing</b>	
<b>Oxygen Saturation Monitor</b>	
<b>1ml Syringes</b>	
<b>Non woven swabs (gauze)</b>	
<b>Gloves</b>	
<b>0.9% sodium chloride ampoules</b>	

Any problems please do not hesitate to contact Samantha Gainfort, Su Man or Vicky Powell, Paediatric ENT Nurse Specialists on 020 7188 7188 bleep 2348 or 07799355837

## Appendix 4

### Sizing Chart for Paediatric Airways

		Preterm-1 month	1-6 months	6-18 months	18 mths - 3 yrs	3-6 years	6-9 years	9-12 years	12-14 years	
	Trachea (Transverse Diameter mm)	5	5-6	6-7	7-8	8-9	9-10	10-13	13	
PLASTIC	Great Ormond Street	ID (mm)	3.0	3.5	4.0	4.5	5.0	5.5	6.0	7.0
		OD (mm)	4.5	5.0	6.0	6.7	7.5	8.0	8.7	10.7
	Shiley	Size	3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5
		ID (mm)	3.0	3.5	4.0	4.5	5.0	5.5	6.0	6.5
		OD (mm)	4.5	5.2	5.9	6.5	7.1	7.7	8.3	9.0
	*Cuffed Tube Available	Length (mm) Neonatal	30	32	34	36				
		Paediatric	39	40	41*	42*	44*	46*		
		Long Paediatric					50*	52*	54*	56*
	Portex (Blue Line)	ID (mm)	3.0	3.5	4.0	4.5	5.0	5.0	6.0	7.0
		OD (mm)	4.2	4.9	5.5	6.2	6.9	6.9	8.3	9.7
	Portex (555)	Size	2.5	3.0	3.5	4.0	4.5	5.0	5.5	
		ID (mm)	2.5	3.0	3.5	4.0	4.5	5.0	5.5	
		OD (mm)	4.5	5.2	5.8	6.5	7.1	7.7	8.3	
		Length (mm) Neonatal	30	32	34	36				
	Bivona	Paediatric	30	36	40	44	48	50	52	
		Size	2.5	3.0	3.5	4.0	4.5	5.0	5.5	
		ID (mm)	2.5	3.0	3.5	4.0	4.5	5.0	5.5	
	All sizes available with Fome Cuff, Aire Cuff & TTS Cuff	OD (mm)	4.0	4.7	5.3	6.0	6.7	7.3	8.0	
		Length (mm) Neonatal	30	32	34	36				
		Paediatric	38	39	40	41	42	44	46	
	Bivona Hyperflex	ID (mm)	2.5	3.0	3.5	4.0	4.5	5.0	5.5	
		Usable Length (mm)	55	60	65	70	75	80	85	
	Bivona Flextend	ID (mm)	2.5	3.0	3.5	4.0	4.5	5.0	5.5	
		Shaft Length (mm)	38	39	40	41	42	44	46	
		Flextend Length (mm)	10	10	15	15	17.5	20	20	
	TracoeMini	ID (mm)	2.5	3.0	3.5	4.0	4.5	5.0	5.5	6.0
		OD (mm)	3.6	4.3	5.0	5.6	6.3	7.0	7.6	8.4
Length (mm) Neonatal (350)		30	32	34	36					
Paediatric (355)		32	36	40	44	48	50	55	62	
Alder Hey	FG		12-14	16	18	20	22	24		
	Negus			16	18	20	22	24	26	28
Chevalier Jackson	FG		14	16	18	20	22	24	26	28
Sheffield	FG		12-14	16	18	20	22	24	26	
	ID (mm)		2.9-3.6	4.2	4.9	6.0	6.3	7.0	7.6	
Cricoid (AP Diameter)	ID (mm)		3.6-4.8	4.8-5.8	5.8-6.5	6.5-7.4	7.4-8.2	8.2-9.0	9.0-10.7	10.7
Bronchoscope (Storz)	Size		2.5	3.0	3.5	4.0	4.5	5.0	6.0	6.0
	ID (mm)		3.5	4.3	5.0	6.0	6.6	7.1	7.5	7.5
	OD (mm)		4.2	5.0	5.7	6.7	7.3	7.8	8.2	8.2
Endotracheal Tube (Portex)	ID (mm)	2.5	3.0	3.5	4.0	4.5	5.0	6.0	7.0	8.0
	OD (mm)	3.4	4.2	4.8	5.4	6.2	6.8	8.2	9.6	10.8

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