

GUIDELINE TITLE: TRACHEOSTOMY CARE- SUCTIONING A SELF-VENTILATING CHILD WITH A TRACHEOSTOMY	Document No: pending Version No: 1
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1.0 GUIDELINE STATEMENT

The purpose of this guideline is to provide an educational and evidence-based practice resource for nursing staff involved in the care of a child who has a tracheostomy. This document is intended to outline to the reader, the procedure of suctioning a tracheostomy tube on a self-ventilating child. Tracheostomy suctioning is an integral part of the nursing care of a child with a tracheostomy.

2.0 SCOPE

Employees

All full-time, part-time and fixed term employees employed by Children's Health Ireland are covered by this policy.

Agents

Agents may be employees of suppliers, volunteers, students on placement or any other individuals associated with Children's Health Ireland. All such agents are covered by this policy.

3.0 PROCEDURES

Suctioning of a tracheostomy is necessary to maintain a patent airway where a child cannot cough and clear their own secretions effectively. An effective cough requires an adequate intrathoracic pressure, which is achieved when closure then reopening of the glottis occurs. Closure of the glottis is compromised when a child/infant has a tracheostomy tube in situ and so they are often unable to generate a cough, which is strong enough to clear secretions (Lister *et al* 2020). The goal of tracheal suctioning is to have maximum secretion removal with minimal hypoxia and tissue damage. One of the functions of the upper airway is to humidify heat and filter inspired air. The presence of a tracheostomy tube bypasses these functions, this may result in secretions becoming dry and thick which may compromise the patient's airway. Children's airways are small; therefore, a small decrease in the airway diameter caused by secretions can greatly increase airway resistance and work of breathing. There are many associated risks and

complications with suctioning, therefore a sound knowledge of the procedure and its effects are a pre-requisite prior to undertaking the process. Suctioning is only performed when there is a clear indication for it and not on a routine basis (Lister *et al* 2020). The majority of children who have a tracheotomy tube in CHI are nursed in room air; occasionally children are nursed on oxygen.

4.0 OBJECTIVES OF THE GUIDELINE

- To standardise the procedure of suctioning a self-ventilating child who has a tracheostomy
- To ensure and maintain patient safely when suctioning a self-ventilating child who has a tracheostomy
- To ensure research-based knowledge underpins nursing practice
- To ensure safety of a) the child's airway, b) the child, c) the tracheostomy tube
- To promote the comfort and wellbeing of the child
- To prevent infection

Indications for suctioning a self-ventilating child nursed who has a tracheostomy tube

- Inability to clear secretions effectively
- Sound of mucous bubbling in the tracheostomy tube
- Visible secretions at the tracheostomy port
- Secretions felt on palpation of thorax
- Increased work of breathing
- Restlessness /Agitation
- Child's request
- Change of colour (cyanosis, pallor)
- Mucus plug
- Decreased oxygen saturation levels if monitored

Complications: The correct suctioning technique will assist in the prevention of complications, these can include: -

- Hypoxia
- Bronchospasm
- Bradycardia or arrhythmias
- Vasovagal response
- Cross Infection
- Mucosal trauma
- Atelectasis
- Anxiety & fear

5.0 EQUIPMENT AND SUPPLIES

Equipment And Supplies
PPE for aerosol generating procedures (please refer to local PPE guidelines)
Suction Unit (Wall mounted or Portable unit with variable vacuum control)
Connection Tubing and appropriately sized suction catheters
Sterile water and gallipot (for flushing suction connection tubing)
Pre-measured suction guide (measuring tape marked with the depth for suctioning)
Tracheostomy Bed Head sign which has been completed with the child's tracheostomy details
Waste bag
Clean humidification device
A Trachi-Case or emergency bag, which contains the supplies necessary for an emergency tube change.
Oxygen supply with oxygen attachment for a tracheostomy tube, if indicated.

Performing suctioning of a tracheostomy tube is an aerosol generating procedure, use the Point of Care Risk Assessment Tool to determine what PPE (Personal Protective Equipment) is recommended

<https://www.hpsc.ie/a-z/microbiologyantimicrobialresistance/infectioncontrolandhai/posters/A3%20Poster%20Resist.final%20online%20version.pdf>

6.0 PREPARATION FOR PROCEDURE

PREPARATION FOR PROCEDURE	RATIONALE/REFERENCE
The nurse performs hand hygiene and dons personal protective equipment (PPE) as per local guidelines.	This procedure is aerosol generating. The use of PPE ensures protection of staff, child and family (Health Service Executive, Ireland 2023).
The nurse ensures that all of the equipment and supplies are available.	To be efficient during the procedure (Walsh 2019).
The nurse introduces her/himself, explains the procedure to the child / parents/ carer and gains their consent to proceed (if appropriate)	To ensure that the child/parents/carer feels at ease; understands the procedure and gives their valid consent (NMBI 2021)
Determine if need for distraction measures need to be implemented with the child to enhance cooperation during the procedure.	Promotes distraction and comfort (Bowden & Smith Greenberg 2016).
Suctioning can be performed when the child is lying, sitting or standing.	To ensure the child's comfort
All efforts must be made to protect the privacy and dignity of the child during the procedure	To protect the child's best interest (NMBI 2021).
Ensure that all emergency equipment is readily available	In case of accidental dislodgement of the tube during the procedure (Lister <i>et al</i> 2020).
This is an Aseptic Non-Touch Technique (ANTT)	To ensure the child's safety (Bowden & Smith Greenberg 2016).
In children with no evidence of secretions, suctioning needs to be performed a minimum of once per shift.	To ensure tube patency (Lister <i>et al</i> 2020).
If a fenestrated tube is insitu, a non-fenestrated inner cannula needs to be inserted prior to suctioning.	To prevent the catheter going through the fenestration and causing trauma to the posterior tracheal wall (Lister <i>et al</i> 2020).

<p>Pressure Selection</p> <p>Prior to the procedure turn the suction unit on, check the vacuum pressure and set to the appropriate level, according to the child's age.</p> <ul style="list-style-type: none"> • Neonate up to four weeks (minimum 60mmhg – maximum 80mmhg) • Infant/Child 4 weeks – 3yrs (minimum 80mmhg – maximum 100mmhg) • Child > 3 years / Young person (minimum 100mmhg – maximum 120mmhg) 	<p>Excessively high pressure can damage the tracheal mucosa and may induce hypoxia. If the suction pressure is too low, it will be ineffective (Walsh 2019).</p>
<p>Catheter Selection</p> <p>The correct size suction catheter must be selected and attached to the suction connection tubing. The suction catheter must not exceed more than 50% of the internal diameter of the airway.</p>	<p>To enable gas flow between the suction catheter and the tracheostomy tube, thus minimising hypoxia and reducing the risk of atelectasis (Walsh 2019).</p> <p>A catheter that has too small a diameter may not be effective at removing secretions. A catheter that is too big may occlude the tube causing distress and tube occlusion. (Lister <i>et al</i> 2020).</p>
<p>Suction Depth</p> <p>The suction depth is determined prior to the suction procedure. The catheter is advanced to approximately 0.5cm beyond the tip of the tracheostomy tube, so that it passes the lateral and distal holes</p>	<p>Premeasured technique is critical to avoid epithelial damage (Lawrence et al 2021).</p> <p>Refer to the CHI Suction Guide CHI (2023) in the appendix of this document</p>

Decontaminate hands	To adhere to infection control universal precautions and to prevent cross infection (CHI Hand Hygiene Policy 2019).
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7.0 ASSESS THE NEED FOR SUCTIONING

Assess The Need For Suctioning	Rationale & Reference
<p>Perform a comprehensive respiratory assessment and document in the child's nursing notes.</p> <p>The assessment should include:</p> <ul style="list-style-type: none"> • Whether the child can cough and clear their own secretions • The location of the secretions • Whether the secretions can be cleared by suctioning • How detrimental these secretions might be for the child • Effort - Respiratory Rate, recession, grunting, accessory muscles and nasal flaring • Efficacy - Breath sounds, chest expansion • Effects of inadequate respirations – Heart Rate, Oxygen saturations, skin colour and mental status • Presence and type of secretions and cough 	<p>Suctioning is performed based on clinical assessment (Lister <i>et al</i> 2020).</p> <p>To identify a baseline to which further observation can be compared against and to determine the need to perform tracheostomy suctioning</p> <p>To loosen secretions. (Lister <i>et al</i> 2020).</p>

<ul style="list-style-type: none">• If the secretions are thick and tenacious, consider administering a 0.9% sodium chloride nebuliser	
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8.0 PERFORMING THE SUCTION

PERFORMING THE SUCTION	RATIONALE & REFERENCE
If the child is on oxygen, they may require pre – oxygenation prior to an episode of suctioning.	To prevent hypoxia.
Remove the humidification device or speaking valve with the non-dominant hand whilst supporting the tube.	To facilitate the suction catheter to enter the tracheostomy tube
Connect the suction catheter to the connecting tubing if not pre-prepared. Remove the catheter from its sheath, ensuring that the end of the catheter is not touched.	To maintain sterility of the suction catheter (Lister <i>et al</i> 2020). There should be no contact between the suction catheter and anything other than the practitioner’s gloved hands and the child’s tracheostomy.
Identify the suction depth and maintain it by keeping thumb and the index finger at this point.	To ensure accuracy and prevent infection.
Refer to suction depth indicated on the tracheostomy bed head sign and/or the tracheostomy suction guide	To ensure accuracy and prevent tissue trauma
Gently introduce the suction catheter through the tracheostomy tube to the pre-measured depth using the premeasured suction guide.	This may cause mucosal irritation, damage and hypoxia (Walsh 2019).
Do not apply suction during insertion	To minimise the risk of hypoxia (Lister <i>et al</i> 2020).

<p>If appropriate, ask the patient to cough.</p> <p>Apply suction by placing the thumb of the non-dominant hand over the suction port as the catheter is gently withdrawn. Negative pressure should only be applied for the recommended duration:</p> <p>< 5 seconds for neonates</p> <p><10 seconds for infants > 4 weeks/child and young person</p>	<p>Prolonged suction can cause acute hypoxia, cardiac arrhythmias, mucosal trauma and distress for the child. (Lister <i>et al</i> 2020).</p>
<p>The suction catheter should not be rotated on withdrawal.</p>	<p>Suction catheters have distal and lateral holes allowing circumferential suctioning (AARC Guidelines 2010).</p>
<p>Constant observation of the child during suctioning is essential; practitioners should observe the child's respiratory status</p>	<p>To assess for an improvement or deterioration in the child's respiratory status.</p> <p>The need for further suctioning is reevaluated on the child's clinical status (Walsh 2019).</p>
<p>If further suctioning is clinically indicated, the same suction catheter can be used no more than three times. Allow a recovery time between each suction.</p>	<p>To minimise the risk of hypoxia, infection and distress, (Lister <i>et al</i> 2020).</p>
<p>If there are visible secretions on the outside of the suction catheter or the catheter is occluded, change the catheter.</p>	<p>To reduce the risk of cross infection</p>
<p>A sterile suction catheter is used for each suction episode.</p>	<p>To reduce the risk of cross infection Lister <i>et al</i> 2020).</p>

Discard the used suction catheter by coiling the catheter in the gloved hand and inverting the glove over the catheter and removing both. Discard both in the appropriate bin	To comply with precautions for aerosol generating procedures (Health Protection Surveillance Centre, Ireland 2022).
Decontaminate hands	To adhere to infection control universal precautions and to prevent cross infection (Hand Hygiene Policy CHI 2019).
Flush the suction connecting tube with sterile water post procedure	To clear the suction connecting tube of secretions (Lister <i>et al</i> 2020).
Change the sterile water bottle every 24 hours	To prevent the bacterial growth and contamination (Lister <i>et al</i> 2020).

9.0 POST SUCTIONING

POST SUCTIONING	RATIONALE & REFERENCE
Perform a respiratory assessment to identify if the child requires further suction and/or post procedure oxygenation	To evaluate the effectiveness of the procedure. To identify any concerns or deterioration early and escalate in a timely manner (Lister <i>et al</i> 2020).
Re-apply the humidification device or speaking valve as appropriate	
Check that the child is comfortable and praise them	To ensure comfort, dignity and privacy To maintain a trusting relationship between the child and the nurse (Hockenberry <i>et al</i> 2022).
The child's respiratory status is monitored throughout by checking the following: <ul style="list-style-type: none"> No evidence of breathing problems 	To identify any concerns or clinical deterioration early and ensure a timely escalation if required (Lister <i>et al</i> 2020).

<ul style="list-style-type: none"> • Bilateral chest movement • Exhaled air felt through the tracheostomy tube • Air entry heard on auscultation • Suction catheter can pass through the tube 	
Discard used supplies appropriately	Infection Control Universal Precautions. CHI (2019)
Doff PPE and discard in an appropriate waste bag.	Infection Control Universal Precautions. CHI (2019)
Perform hand hygiene	Adhere to standard infection control precautions and prevent the cross of infection (Hand Hygiene Policy CHI 2019).
<p>Document how the procedure was tolerated. Record and report to the ENT team if abnormalities or difficulties were experienced for example:</p> <ul style="list-style-type: none"> • The colour, amount, odour and consistency of secretions • Discomfort / distress for the child 	<p>To maintain an accurate record of nursing care and to facilitate communication. Good recording is keeping part of the professional and legal accountability of registered nurses and midwives. (NMBI 2015).</p> <p>To identify any concerns or clinical deterioration early and escalate in a timely manner if required (Lister <i>et al</i> 2020).</p>

10.0 GLOSSARY OF ACRONYMS, TERMS AND DEFINITIONS

Suctioning is the mechanical aspiration of pulmonary secretions from a patient with an artificial airway. (American Association of Respiratory Care (AARC) 2010).

11.0 MONITORING, AUDIT AND EVALUATION

This PPPG will be reviewed and updated at least every three years by the document author/owner, or earlier if required due to updated guidance, evidence or legislation. Compliance with key principles or procedures described within this PPPG should be audited on an annual basis.

12.0 KEY STAKEHOLDERS

The following key stakeholders were involved in developing and/or reviewing this document:

Name	Title	Department
Siobhan Fitzgerald	CNS	Airway Management/ENT
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13.0 COMMUNICATION AND TRAINING

All approved PPPGs will be available on the Qpulse system. Heads of Department and Line Managers must ensure that their staff are aware of all PPGs relevant to their role and have access to same. Where required, training should be provided on the contents of this PPPG. *If specific training required for this PPPG please give details here.*

14.0 REFERENCES

All references should be in Harvard style.

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SHILEY TRACHEOSTOMY TUBE

NEF			PEF		
Tube I.D	Catheter Size	Insertion Depth	Tube I.D	Catheter Size	Insertion Depth
3.0	6	5.5cm	3.0	6	6.5cm
3.5	7	6.0cm	3.5	7	6.8cm
4.0	8	6.0cm	4.0	8	7.0cm
4.5	8	6.3cm	4.5	8 - 10	7.0cm
			5.0	10	7.2cm
			5.5	10	7.5cm

BIVONA TRACHEOSTOMY TUBE (Cuffed + Uncuffed)

NEO			PED		
Tube I.D.	Catheter Size	Insertion Depth	Tube I.D.	Catheter Size	Insertion Depth
2.5	5	6.3cm	2.5	5	7.0cm
3.0	6	6.5cm	3.0	6	7.2cm
3.5	7	6.8cm	3.5	7	7.3cm
4.0	8	7.0cm	4.0	8	7.5cm
			4.5	8- 10	7.5cm
			5.0	10	7.8cm
			5.5	10	8.0cm

APPENDIX 1 - TRACHEOSTOMY SUCTION GUIDE

BIVONA FLEXTEND TRACHEOSTOMY TUBE-STANDARD

NEO			PED		
Tube I.D	Catheter Size	Insertion Depth	Tube I.D	Catheter Size	Insertion Depth
3.0	6	9.5	3.0	6	10cm
3.5	7	9.5	3.5	7	10cm
4.0	8	9.5	4.0	8	10cm
			4.5	8- 10	11cm
			5.0	10	11.5cm

SHILEY WITH DISPOSABLE INNER CANNULA (DCFN)

Tube	Inner Cannula I.D	Catheter Size	Insertion Depth
4DCFN	5.0	8 - 10	10cm
6DCFN	6.4	10 - 12	11.5cm

SHILEY CUFFED ADULT FLEXIBLE TRACHEOSTOMY TUBE WITH DISPOSABLE INNER CANNULA

SHILEY UNCUFFED ADULT FLEXIBLE TRACHEOSTOMY TUBE WITH DISPOSABLE INNER CANNULA

Tube code	Inner Cannula I.D	Catheter Size	Insertion Depth
4CN65A	5.5	10	10cm

4UN65A			
5CN70A 5UN70A	6.0	12	10.5cm
6UN75A 6CN75A	7.5	12	11cms