

Inline/Closed Suctioning - Clinical Guideline Critical Care RDH & QHB

Reference no.: CG-CRITCARE/4438/24

These are nursing guidelines for use within critical care to support best practice. They are not prescriptive and as with all nursing practice should be utilised in conjunction with the registrant's clinical judgement

Please note a separate clinical guideline for open suctioning is in the Royal Marsden Manual.

1. Introduction

Suctioning is a fundamental procedure required by patients with an artificial airway to maintain the patency of the tube, especially in mechanically ventilated patients and this allows removal of secretions (Yilmaz et al 2021). Blakemore et al (2022) recommend suctioning should only be performed if clinically required and not performed routinely.

2. Aim and Purpose

To provide safe and effective suctioning whilst using an inline/closed suction system on patients with an artificial airway receiving mechanical ventilation.

3. Main body of Guidelines

Indications for Suctioning

- Noisy and or Moist Respirations
- Increased Respiratory Effort
- Reduced Oxygen saturations
- Prolonged expiratory breath sounds
- Restlessness
- Increased or ineffective coughing
- Increase use of intercostal muscles
- Patient Request
- Signs of airway obstruction such as hypoxia and cardiovascular changes.
- Visual secretions in the artificial airway

- Sawtooth pattern on the ventilator waveform

Reference: NTSP (2013), Blakeman et al (2022)

Contraindications for inline/closed Suctioning:

- Bronchial Perforation
- Incorrect catheter size selection
- Caution if risk of bleeding

Reference: Iannuzzi et al (2009), Pennsylvania Patient Safety Advisory (2006)

Complications of Suctioning:

- Hypoxemia
- Bronchospasm
- Cardiac arrhythmias
- Bradycardia and Cardiovascular compromise
- Trauma
- Atelectasis and Alveolar Collapse
- Infection
- Bleeding
- Tracheal mucosal damage
- Inability to pass a suction catheter is a red flag and may indicate airway problems.
- Pain
- Raised intracranial pressure.

Reference: Blakeman et al (2022), NTSP (2013), Intensive Care Society (2020), Royal Marsden Manual (2020).

Procedure

- Explain the procedure to the patient, ensuring the patient is informed and gain consent (Nursing Midwifery Council 2018, Royal Marsden 2020).
- Ensure the correct size inline/closed suction is selected and connected the patient (See appendix one) (NTSP 2013, Intersurgical Limited 2022b) to reduce the risk of harm and prevention of hypoxia to the patient if the suction catheter is too large

(NTSP 2013). If the suction catheter is too small, this may inhibit the removal of thick secretions and require repeated suctioning attempts (NTSP 2013).

- Check that the connected inline suction system is in date, currently UHDB use TrachSeal™ which can be used for up to 72 hours as per manufactures recommendations (Intersurgical Limited 2024, Royal Marsden Manual 2020, NTSP 2013).
- Ensure the inline suction is labelled to ensure staff can identify when the inline suctioning tubing should be changed (Intersurgical Limited 2022b, Royal Marsden Manual 2020).
- Ensure the suction tubing which connects the canister to the inline suction is changed every 24 hours as per manufacturers recommendations (Royal Marsden Manual 2020).
- Check the tubing to minimise the risk of disconnection due to it being accidental caught (NTSP 2013).
- Suction canisters should be changed in between patients or if $\frac{3}{4}$ full.
- Ensure the Suction unit is set to the correct pressure up to -150mmHg or -20kPa and check that on vacuum occlusion the recommended pressure is not exceeded, and the machine is functioning properly (NTSP 2013, Royal Marsden Manual 2020). High Suction pressures can cause hypoxia, mucosal trauma, and atelectasis (Royal Marsden Manual 2020).
- Ensure the right length of Closed Suction is selected which will depend on the type of artificial airway, a shorter length is required for a tracheostomy tube. If a endotracheal system is used on a tracheostomy tube harm/trauma may occur to the patient (Intensive Care Society 2020) However, if a shorter tracheostomy system is used on a endotracheal tube a cough reflex is unlikely to occur and you may be unable to obtain any secretions. If it is an extended length tracheostomy a longer length inline suction catheter will be required.
- When providing suctioning via a tracheostomy, ensure the correct inner cannula in place, not a fenestrated inner tube as this can cause trauma to the tracheal wall or the inability to pass a suction catheter (NTSP 2013, Intensive Care Society 2020).
- Perform hand hygiene as per standard infection control precautions and apply personal protective equipment (PPE) as necessary to reduce the risk of transmitting infections to patients (NHS England 2023, Blakeman et al 2022).
- Consider pre oxygenating the patient to minimise the risk of hypoxia (NTSP 2013, Blakeman et al 2022).
- Ensure the isolation valve is open on the inline suction (Intersurgical Limited 2022b).
- Pass the suction catheter down the artificial airway, until a cough response is stimulated, or you feel resistance, if resistance is felt withdraw the catheter 1-2cm

before applying suction to reduce the risk of trauma (Royal Marsden Manual 2020, Greenwood and Winters 2014).

- The entire procedure should not exceed 10-15 seconds (Blakeman et al 2022, Intersurgical Limited 2022b, NTSP 2013), Repeat as clinical indicated but no more than three suction in a row to allow the patient time to recover.
- Ensure that suctioning is only applied on removal of the suction catheter to minimise the risk of mucosal trauma (NTSP 2013).
- Repeat the process until the airway is clear but no more than 3 passes of the suction catheter during an episode of suctioning (unless an airway emergency), allow the patient time to recover between each suction (NTSP 2013, Royal Marsden Manual 2020).
- Ensure the patients observations especially are monitored throughout the procedure to identify any deterioration in the patient's condition, ensuring any concerns are escalated and procedure is abandoned immediately (Irajpour et al 2014).
- Ensure the suction catheter is withdrawn until the black marker is visible (Intersurgical limited 2022 and NTSP 2024), a click is felt, and the isolation valve is locked on the Trachseal™ 72 hour product (Intersurgical Limited 2022).
- Ensure the inline suction catheter is cleaned with the sterile water for suctioning ampoules to reduce the risk of secretions adhering to the inside of the suction tubing (Intersurgical Limited 2022b, NTSP 2013) and that the suctioning valve lock is in place to avoid continuous suction being applied (NTSP 2013, Intersurgical Limited 2022b).
- Remove personal protective equipment and wash hands to maintain infection control standards (NHS England 2023).
- Document on the observation chart that inline/closed suction has been performed, including the strength of cough, volume of secretion, colour and consistency thus ensuring clear (Hinman 2023) and accurate records are maintained (Nursing Midwifery Council 2018).

4. Definitions, Keywords

Artificial Airway - These are either an Endotracheal tube or Tracheostomy tube (Sole et al 2015)

Shallow Suction - Passing the suction catheter to the tip of the artificial airway National Tracheostomy safety project (NTSP)(2013).

Deep Suctioning - Passing the suction catheter further than the tip of the artificial airway until resistance is met (carina) and ensuring the catheter is withdrawn slightly before applying suction to reduce mucosal damage (NTSP 2013, Royal Marsden Manual 2020, Greenwood and Winters 2014).

Inline/Closed suctioning - The suction catheter is enclosed in a sealed plastic cover (The Royal Marsden 2020), enabling the practitioner to reuse the same catheter (Yazdannik et al

2019) This allows the practitioner to remove secretions from the lungs without compromising ventilation and reducing the risk of contamination for both the patient and the hospital staff (Intersurgical Limited 2022a).

Equipment

- Clean Gloves as per local policy
- Protective eyewear
- Correctly sized inline/closed suction catheter
- Sodium Chloride ampoules
- Oxygen therapy
- Oxygen saturation probe for monitoring the patient.
- Wall mounted suction unit (unless portable suction is required) and associated disposable equipment.

Reference: NTSP (2013)

5. References (including any links to NICE Guidance etc.)

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Intersurgical Limited (2022a) Information sheet: Intersurgical TrachSeal™ Closed suction system Issue 8

Intersurgical Limited (2022b) Using the Trachseal™ Closed Suction System issue 2

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6. Documentation Controls (these go at the end of the document but before any appendices)

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7. Appendices

Appendix One - ET/Tracheostomy recommended Trachealseal Size

Reference: Intersurgical Limited (2022b)

Select the appropriate TrachSeal for the ET/ tracheostomy tube being used from the table.

	ET tube size	TrachSeal
●	5.0	F10
●	5.5	F10
○	6.0	F12
○	6.5	F12
●	7.0	F14
●	7.5	F14
●	8.0 and above	F16