Providence Health Care	Department: **Respiratory Services**	Date Originated: September 1986 Date Reviewed/Revised: **January 2009**
PROCEDURE	Topic: Critical Care – Suction and Instillation Using a Closed (Inline) Catheter System (Respiratory Therapy) Suction and Instillation Using a Closed (Inline) Catheter System (Respiratory Therapy) Number: B-00-12-12015	Related Links:

APPLICABLE SITES:

St. Paul's Hospital
Mount Saint Joseph Hospital

GENERAL INFORMATION:

Suctioning of airways should only be performed if clinically indicated and not as a routine, fixed-schedule therapy. However, the suction catheter should be passed through the artificial airway every 12 hours to assess and ensure patency of the airway.

Suctioning is necessary for patients with artificial airways. When clinical indicators of the need for suctioning are present, there is no absolute contraindication to suctioning.

Hyperoxygenation should always be provided before and after each pass of the suction catheter into the artificial airway.

Secretions in peripheral airways are not directly removed by endotracheal suctioning.

The suction catheter should be no larger than half of the internal diameter of the endotracheal or tracheostomy tube.

Use of a closed (inline) suction catheter system reduces risk of staff exposure to infectious secretions and aerosolized ventilator circuit condensate, as well as decreasing the risk of nosocomial infection to the patient by minimizing circuit disconnects as per VAP protocols.

Inline suction catheter systems also aid in the prevention of lung derecruitment that may occur with suctioning of the airway, particularly for patients receiving high PEEP therapy.

Routine changes of the inline suction catheter system for **ventilated** patients is not required, however a new inline must be used anytime a sputum specimen is to be collected for diagnostic purposes.

The catheter does NOT need to be changed after circuit disconnects (i.e. transfers to Radiology/OR) provided the catheter system is covered with a plastic bag to minimize risk of contamination.

For **non-ventilated** patients the inline catheter must be changed every 24 hours.

INSTILLATION CONSIDERATIONS:

The use of instillation is only indicated for the stimulation of a cough reflex.

Instillation of a bolus of normal saline does **NOT** thin secretions due to the fact that sputum and saline are immiscible, therefore routine or regular instillation is contraindicated.

Instillation may result in decreases to arterial and mixed venous oxygenation, and may contribute to lower airway contamination secondary to the dislodgment of bacteria within the artificial airway or from contamination of saline during instillation.

Adequate systemic hydration and humidification of inhaled gases will assist in thinning secretions.

INDICATIONS FOR SUCTIONING:

- Visible secretions in the artificial airway
- Suspected aspiration of gastric or upper airway secretions
- Inability of patient to generate an effective cough
- Auscultation of adventitious lung sounds over the trachea and/or main stem bronchi
- Increase in peak airway pressures when mechanically ventilated
- Changes in monitored flow or pressure graphics
- Increase in respiratory rate or frequent coughing or both
- Gradual or sudden decrease in PaO_2 or SpO_2
- Sudden onset of respiratory distress
- To obtain a sputum specimen for diagnostic purposes

COMPLICATIONS:

- Respiratory arrest
- Cardiac dysrhythmias
- Cardiac arrest
- Hypertension or hypotension
- Increased intracranial pressure
- Bronchoconstriction/bronchospasm
- Pulmonary hemorrhage or bleeding
- Tissue trauma to the tracheal and/or bronchial mucosa
- Pulmonary atelectasis/alveolar derecruitment
- Hypoxemia/hypoxia
- Nosocomial infections
- Interruption of mechanical ventilation

EQUIPMENT:

- Manual resuscitator with PEEP valve and oxygen source
- Suction canister setup with regulator x2
- Closed (inline) suction catheter system
- Yankeur suction

- Pre-filled normal saline instillation vials
- Sputum trap as required
- Stethoscope
- Personal protective equipment

PROCEDURE:

1. Identify the patient and explain the procedure. Confirm the need for suctioning.

2. Wash hands and don personal protective equipment as appropriate.

3. Place the patient in semi-Fowler position as tolerated.

4. Ensure the manual resuscitator with PEEP valve is functional and attached to an oxygen source, with the PEEP set appropriately.

5. Secure one end of the suction connecting tubing to the suction source, and attach the other end to the suction port of the closed (inline) suction catheter system.

6. Turn on the suction source and set the regulator to 100 – 120 mmHg. Check the level of suction before advancing the catheter by depressing the suction valve and observing the suction regulator.

   NOTE: Maximum vacuum pressure for suctioning should not exceed 120 mmHg.

7. Note the patient's cardiopulmonary status before, during, and after the suctioning period.

8. Hyperoxygenate the patient for at least 30 seconds by using one of the following methods:

   a. Pressing the 100% suction/oxygen button on the ventilator
   b. Increase the baseline FiO_2 of the oxygen delivery device
   c. Attach the manual resuscitator with 100% oxygen to the artificial airway

9. With NO suction applied, gently but quickly advance the inline suction catheter into the artificial airway until resistance is met, then pull back ~1 cm.

10. Depress the suction control valve while withdrawing the catheter until it is no longer within the artificial airway.

    NOTE: Suction time should not exceed 10 – 15 seconds.

    NOTE: Ensure the catheter is fully withdrawn into the plastic sleeve as noted by the black line being visible within the sleeve.

11. Hyperoxygenate the patient for a minimum of three breaths.

12. Additional passes of the suction catheter may be performed as per steps 9 – 11 if secretions remain in the airway and the patient is tolerating the procedure.

    NOTE: If it is deemed necessary to stimulate a cough, 5 – 10 mL of normal saline may be instilled via the instillation port of the suction catheter system. Allow for 2 – 3 breaths post-instillation before advancing the catheter as per step 9.

13. Continue to hyperoxygenate the patient for one minute following the suction procedure. Observe the patient's vital signs and cardiac rhythm to ensure pre-suction limits have returned. Ensure the patient has been returned to their initial therapy and settings.

14. With the catheter remaining in the sleeve, apply suction while instilling normal saline through the instillation port to rinse the catheter clean.

15. Clear the upper airway using the yankeur suction as necessary.

16. Return the patient to their pre-procedure position. Assess for the effectiveness of the suctioning procedure.

17. Remove personal protective equipment and wash hands.

18. Document the procedure and patient response in the Respiratory Flowsheet or Progress Notes of the patient record. Include the colour, consistency, and amount of secretions removed from the airway, as well as an assessment of the patient's cough ability.