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Open and Close Suctioning Study Module

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Purpose:

The purpose of this module is to provide the NICU/PICU nurses of KAAUH a comprehensive information about Endotracheal Tube Closed and Open Suctioning.

Objectives:

UPON COMPLETION OF THE READING MATERIAL, THE NURSE WILL BE ABLE TO:

1. Differentiate the Closed and Open Suctioning.
2. Define the Indications of Closed and Open Suctioning.
3. Briefly describe the Risk associated with ET Suctioning.
4. Describe actions to be taken to prevent and/or minimize the complications of suctioning.
5. List the Equipment and Supplies needed for both open and closed suctioning.
6. Describe how to determine the effectiveness of the suctioning (outcome).
7. List and describe the monitoring requirements during the suctioning procedure.
8. List the equipment required for suctioning with a closed-system catheter.

OVERVIEW

When a child/neonate suffers from respiratory distress, supporting his or her respiratory function in many cases requires the insertion of an ET tube and ventilator support. Intubation causes an increase in the production of secretions, which neonates/Children are unable to clear. The purpose of suctioning the ET tube is to remove secretions that may accumulate and to maintain a patent airway. Successful removal of secretions helps promote oxygenation and ventilation. The technique used and frequency of suctioning are determined according to each patient's needs.

Closed suctioning involves insertion of a Y-connector into the ventilator circuit without disconnection from the ventilator. Closed suction technique uses a specially designed, multiple-use catheter that is enclosed in a sterile plastic sleeve and attaches to suction tubing that is connected to a suction regulator. The catheter is placed in-line between the ventilator circuit and the ET tube. The closed suctioning technique minimizes interference with ventilation and better maintains the set positive end-expiratory pressure during suctioning. Evidence suggests that ET suctioning without disconnection from the ventilator (closed technique) reduces immediate adverse effects; however, the strength of the evidence is not sufficiently clinically significant to recommend the closed technique for all neonates.

ET suctioning is a noxious procedure that may stress vulnerable neonates and should not be a routinely scheduled intervention. Suctioning is appropriate when a clinical assessment of the neonate/child indicates secretions are obstructing the airway. Indications for suctioning include audible or visible secretions in the ET tube, coarse breath sounds, coughing, and increased work of breathing, oxygen desaturation, and bradycardia.

An exception to suctioning when secretions are visible in the ET tube or breath sounds are coarse is the length of time following the instillation of artificial surfactant. To ensure maximal benefit from the artificial surfactant, tracheal suctioning is avoided immediately following surfactant administration if ventilation is adequately maintained. It is preferable to avoid suctioning for 1 to 6 hours following surfactant delivery unless ventilation or oxygenation are compromised.

INDICATIONS FOR USE OF CLOSED SUCTIONING TECHNIQUES

- High ventilator requirements:
 - Positive end-expiratory pressure ≥ 10 cm H₂O
 - Mean airway pressure ≥ 20 cm H₂O
 - Inspiratory time ≥ 1.5 seconds
 - Fraction of inspired oxygen ≥ 0.60
- Mechanically ventilated patients receiving frequent suctioning (≥ 6 /day)
- Hemodynamically instability associated with ventilator disconnection
- Mechanically ventilated patients with active tuberculosis
- Patients receiving inhaled agents that cannot be interrupted by ventilator disconnection (e.g., nitric oxide, helium/oxygen mixture)

The following are additional indications for suctioning:

- Agitation and restlessness
- Apnea
- Changes in blood gas values
- Coarse or decreased breath sounds
- Color changes (pale, dusky, or cyanotic)
- Decreased chest wiggle for neonates on high-frequency ventilators
- Desaturation
- Increased work of breathing (increased respiratory rate, retractions, nasal flaring, grunting)
- Increasing oxygen requirements
- Loss of or poor chest wall excursion with ventilator breaths
- Pattern change in ventilator graphics
- Tachycardia or bradycardia

One strategy to minimize the risks associated with suctioning is to control the depth of insertion of the catheter. Deep suctioning occurs when the catheter is inserted until resistance is met. Shallow suctioning

occurs when the catheter is inserted no farther than 1 cm more than the sum of the ET tube length and adapter. Current evidence suggests that deep suctioning may be harmful to the trachea and bronchi; therefore, shallow suctioning is recommended.

Suctioning may result in hypo-oxygenation or hyper oxygenation. There is no evidence available to suggest that preoxygenation is a safe practice with premature neonates. Current evidence suggests that increasing the inspired oxygen concentration prior to suctioning must be individualized based on the neonate's response and should not be a routine intervention. Monitoring oxygen saturation levels and routinely increasing the oxygen saturation by no more than 10% is essential to protect the neonate from hypoxia and hyperoxia.

Risks associated with ET suctioning include the following:

- Atelectasis
- Bradycardia
- Bronchospasms
- Hypoxemia
- Increased intracranial pressure (ICP)
- Infection
- Tachycardia
- Trauma

The following additional knowledge is required:

- Suctioning is a traumatic experience for neonate and pediatric patient. Comfort measures should be given prior the procedure i.e. pacifier with sucrose to suck on prior suctioning, placing infant in comfortable position and allow infant/child to grab on an object like blanket or toy for balance. As much as possible suctioning of infant/child should be with a second person to assist with comfort measures and assisting with the alarms of monitor and ventilator.(RT or second nurse could assist)
- Instilling sterile normal saline solution as a routine procedure to facilitate suctioning of secretions is not recommended and may, in fact, contribute to bacterial colonization of the lower airway and impaired oxygenation.
- Negative pressure exerted on the ET tube should be the lowest possible that removes the secretions. Suction should not exceed 100 mm Hg.
- There is no evidence that intermittent application of negative pressure, rotation of the catheter, or turning the head from side to side is beneficial. The neonate's head should be maintained in the midline position to prevent increased ICP, particularly in a preterm neonate.
- To reduce the risk of hypoxemia, a duration of no more than 5 to 10 seconds per suction pass is recommended. Longer duration is associated with increased risk.

- The size of the suction catheter should not exceed half the internal diameter of the ET tube size. This allows air to continue to enter the lungs during suctioning and limits mucosal trauma.
- Insertion depth should be limited to the length of the ET tube plus adapter and not to exceed 1 cm more than measurement.
- Catheter passes should be limited to only the number of times required to remove secretions. If more than one catheter pass is required, then the neonate must be allowed recovery time between passes.
- Suction should be applied only as the catheter is removed. Suction applied while inserting the suction catheter does not aid in removal of secretions and may increase the negative effects associated with suctioning (e.g., desaturation and bradycardia).

Equipment and Supplies Needed:

- Bag and mask (appropriate size) connected to oxygen source
- Gloves; personal protective equipment (mask, eye protection, gown optional), if applicable
- Closed suction kit (appropriate size)
- Oxygen saturation and cardiopulmonary monitors
- Sterile normal saline solution
- Stethoscope
- Suction canister with vacuum to wall suction and connecting tubing
- Suction catheter (appropriate size)

FAMILY EDUCATION

- As time permits, explain the procedure and what to expect (including the purpose, steps, and rationale).
- Explain to the family that suctioning may be uncomfortable and may cause coughing or shortness of breath for a brief time.
- Encourage questions, and answer them as they arise.

ASSESSMENT AND PREPARATION

Assessment

1. Perform hand hygiene before patient contact.
2. Verify the correct neonate using two identifiers.
3. Assess signs and symptoms of airway secretions and inadequate oxygenation and ventilation, including visible secretions in the airway, inspiratory wheezes, expiratory crackles, restlessness, ineffective coughing, decreased level of consciousness, diminished breath sounds, tachypnea, tachycardia or bradycardia, cyanosis, hypertension or hypotension, and shallow respirations.

Rationale: The decision to suction a neonate should be made on the basis of individual assessment and clinical signs.

Suction only as needed.

Preparation

1. Prepare the closed suction system using the following catheter sizes:
 - a. 5 Fr for 2.0 ET tube
 - b. 5 Fr or 6 Fr for 2.5 ET tube
 - c. 6 Fr or 8 Fr for 3.0 ET tube
 - d. 8 Fr for 3.5 ET tube
 - e. 8 Fr or 10 Fr for 4.0 ET tube

For Pediatric Patients:

- a. 6 Fr for 2.5 ET tube
- b. 6-8 Fr for 3.0-3.5 ET tube
- c. 8-10 Fr for 4.0-4.5 ET tube
- d. 10-12 Fr for 5-6 ET tube
- e. 14 Fr for 6.5-8 ET tube

Or quickly determine the proper size suction catheter by doubling the ET tube size and choosing the suction catheter size closest to the calculation.

The size of the suction catheter should not exceed 70% of the ET tube diameter. This allows air to continue to enter the lungs during suctioning and limits mucosal trauma.

2. Set suction control at 80 to 100 mm Hg for single suction.
3. Prepare sterile normal saline solution for rinsing the catheter.

Sterile normal saline solution is only for rinsing the catheter. Instilling sterile normal saline solution as a routine procedure to facilitate suctioning of secretions is not recommended, may lead to impaired oxygenation, and contributes to bacterial colonization of the lower airway.

4. Ensure that an appropriate-size bag and mask are connected to an oxygen source at the bedside.

Rationale: Bag and mask ventilation support is necessary for respiratory intervention if the ET tube becomes dislodged or completely removed.

5. Ensure that the ET tube is secure.
 - a. Ensure minimal tube movement.
 - b. Ensure tape or securement device integrity.

Information

Procedure (if applicable)

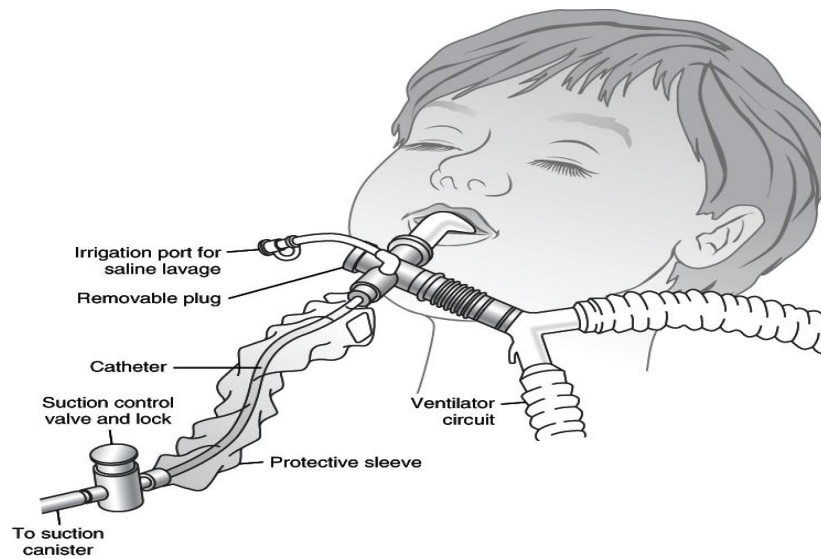
Procedure	Rationale
1. Perform hand hygiene and don gloves plus, if applicable, mask, eye protection, gown (optional).	<ul style="list-style-type: none"> (Note: The catheter is enclosed in a sterile covering; therefore, sterile gloves are not necessary for this procedure.)
2. Verify the correct neonate using two identifiers.	
3. Provide developmentally appropriate containment (e.g., swaddling) for comfort during the procedure.	
4. Reassess lung sounds before suctioning.	<ul style="list-style-type: none"> Auscultation verifies airway patency and provides a basis for comparison post-suctioning.

5. Increase FIO ₂ by a maximum 10%, if needed, to maintain target oxygen saturation levels.	<ul style="list-style-type: none"> Increasing FIO₂ by 10% when clinically indicated may offset hypoxemia related to disruption of ventilation.
6. If the neonate is ventilated with a high-frequency jet ventilator, suction with the ventilator either on or off. If suctioning with the jet on, apply suction while inserting and when withdrawing the catheter.	<ul style="list-style-type: none"> If the jet is on, applying suction during both insertion and withdrawal of the catheter prevents over pressurization of the circuit and alveolar rupture.
7. Secure the suction tubing from the suction source to the closed system suction port per the manufacturer's directions (Figure 1).	



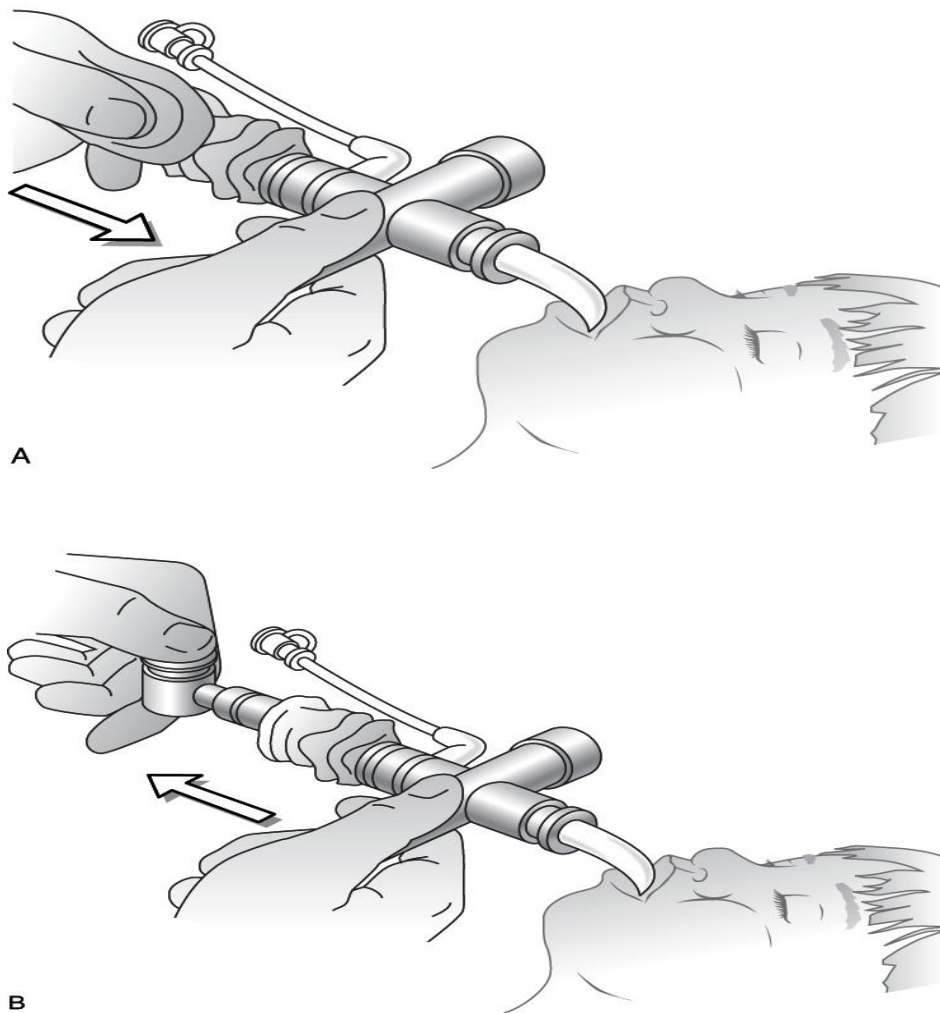
8. Remove the cap and attach the sterile normal saline solution to the irrigation port.	
9. Determine the proper catheter length for suctioning by noting the centimeter marking at the proximal end of the ET tube and adding the length of the adapter. Correlate the measured suction catheter length with the matching measurements on the ET tube. Note this number and, when suctioning, do not advance the catheter beyond the point where this measurement can be seen in the catheter window. (sometimes it is not indicated with numbers but color coding), ensure the measurement color is confirmed with RT or other nurse	If the suction catheter is advanced beyond the end of the ET tube, airway damage may result. Correctly measuring for and adhering to the appropriate catheter depth decreases the risk of damaging the airway.
10. Unlock the suction control valve on the suction catheter by lifting and turning the valve to open position.	
11. Unlock the suction control valve on the suction catheter by lifting and turning the valve to open position. (Figure 2A).	

Figure 1



Closed suctioning technique. (From Verger, J.T., Lebet, R.M. [2008]. *AACN procedure manual for pediatric acute and critical care*. St. Louis: Saunders)

Figure 2



Closed suctioning technique. A. Advance the catheter with the thumb and forefinger with small strokes. B. Withdraw the catheter with continuous suction. (From Verger, J.T., Lebet, R.M. [2008]. *AACN procedure manual for pediatric acute and critical care*. St. Louis: Saunders



12. Suction secretions by depressing the control valve while withdrawing the catheter from the ET tube (Figure 2B). Continue to stabilize the tube.	Do not apply suction for longer than 5 to 10 seconds.
13. Withdraw the black tip of the catheter into the middle of the cleaning chamber.	
14. Depress suction first, then gently squeeze sterile normal saline solution into the chamber to clear secretions from the suction tubing.	
15. Reassess breath sounds.	<ul style="list-style-type: none">• Assessing breath sounds evaluates the effectiveness of suctioning and helps determine if additional passes are needed.
16. After each pass, monitor tolerance of procedure and allow the neonate time to recover (as indicated by his or her oximeter and cardiopulmonary status) by providing positive pressure ventilatory support.	<ul style="list-style-type: none">• Allowing recovery time helps prevent long-term complications associated with hypoxemia.
17. Observe secretions by viewing them in the catheter window. Note the color, amount, and consistency of secretions obtained with each suctioning.	<ul style="list-style-type: none">• Changes in secretions may be a sign of ventilator-associated pneumonia (VAP).
19. Rinse the suction catheter with sterile normal saline solution at completion of suctioning procedure.	
20. Wean oxygen to pre-procedure level as tolerated.	
21. Discard supplies, remove personal protective equipment (PPE), and perform hand hygiene.	
22. Document the procedure in the neonate's record.	



MONITORING AND CARE

1. Monitor the neonate for signs that would indicate suctioning is required (e.g., coarse rhonchi, increased ventilator settings, increased work of breathing, changes in vital signs, visible airway secretion, decreased chest wiggle factor for neonates on high-frequency ventilators, changes in oxygenation or ventilation indices).
2. Monitor oxygenation levels before, during, and after suctioning, and adjust support to prevent extremes of oxygenation.

Rationale: Either extreme in oxygen levels may be detrimental to the neonate.

3. Reconfirm security and position of ET tube.
4. Suction ET tube as needed.
5. Discard suction collection tubing and canisters when $\frac{3}{4}$ full. Suction collection tubing and canisters may remain in use for multiple suctioning episodes. (best practice to change once every 48 hours)
6. Assess, treat, and reassess pain.

EXPECTED OUTCOMES

- Adequate removal of secretions from ET tube
- Comfort for the neonate
- Decreased work of breathing
- ET tube remains secure
- Hemodynamic stability
- Improved gas exchange
- Improvement in the symptoms that indicated the need to suction
- No evidence of increased ICP

UNEXPECTED OUTCOMES

- Bradycardia
- Bronchospasm
- Hemodynamic instability
- Hypoxemia
- Inability to clear secretions
- Inadvertent extubation
- Evidence of increased ICP
- Intracranial hemorrhage

- Respiratory instability
- Unmanaged agitation and irritability
- VAP

DOCUMENTATION

- Additional interventions necessary before, during, and after suctioning
- Color, amount, and consistency of secretions
- Comfort assessment and any specific interventions provided
- Date and time of the procedure
- ET tube size and position
- Family education
- FIO₂ administered
- Neonate's tolerance of the procedure
- Neonate's response to suctioning and care, to include breath sounds both pre-suctioning and post suctioning
- Physical assessment findings, including vital signs, breath sounds, and indicators of respiratory distress before and after the procedure
- Unexpected outcomes and related interventions

SPECIAL CONSIDERATIONS

- Preterm neonates are vulnerable to the effects of increased ICP. During closed suctioning, it is important to maintain the neonate's head midline to avoid jugular vein occlusion that may contribute to Intraventricular hemorrhage. * A growing body of evidence suggests that hyperoxemia is associated with major morbidities (e.g., retinopathy of prematurity, chronic lung disease, periventricular leukomalacia).

ENDOTRACHEAL TUBE OPEN SUCTIONING

OVERVIEW

At present, there are two methods of ET tube suctioning: the conventional open-suctioning method and the closed-suctioning method. Open suctioning uses a sterile, single-use catheter and sterile gloves. The catheter attaches to suction tubing that connects to a suction regulator. Open suctioning involves disconnecting the neonate from the ventilator.

Previous theories suggested that open suctioning increased the risk for ventilator-acquired pneumonia (VAP) as compared with closed suctioning. However, a recent meta-analysis indicates that this is untrue. Both suctioning methods increase equally the risk for VAP. The technique used and the frequency of suctioning are two aspects that should be determined according to each neonate's needs and responses to suctioning.

INDICATIONS FOR USE OF OPEN SUCTIONING TECHNIQUES

- Agitation and restlessness
- Apnea
- Changes in blood gas results
- Coarse or decreased breath sounds
- Color changes (pale, dusky, or cyanotic)
- Decreased chest wiggle for neonates on high-frequency ventilators
- Desaturation
- Increased work of breathing (increased respiratory rate, retractions, nasal flaring, or grunting)
- Increasing oxygen requirements
- Loss of or poor chest wall excursion with ventilator breaths
- Pattern change in ventilator graphics
- Tachycardia or bradycardia

One strategy to minimize the risks associated with suctioning is to control the depth of insertion of the catheter. Deep suctioning occurs when the catheter is inserted until resistance is met. Shallow suctioning occurs when the catheter is inserted no farther than the sum of the ET tube length and adapter. Current evidence suggests that deep suctioning may be harmful to the trachea and bronchi; therefore, shallow suctioning is recommended.



Suctioning may result in hypo-oxygenation or hyper oxygenation. There is no evidence available to suggest that pre-oxygenation is a safe practice with premature neonates. Current evidence suggests that increasing the inspired oxygen concentration prior to suctioning must be individualized based on the neonate's response and should not be a routine intervention. Monitoring oxygen saturation levels is essential to protect the neonate from hypoxia and hyperoxia and routinely not increasing the oxygen saturation by more than 10%.

Risks associated with ET tube suctioning include the following:

- Hypoxemia
- Tachycardia
- Bradycardia
- Atelectasis
- Bronchospasms
- Infection
- Trauma
- Increased intracranial pressure (ICP)

Equipment and Supplies Needed:

- Sterile gloves
- Bag and mask (appropriate size) connected to oxygen source
- Oxygen saturation and cardiopulmonary monitors
- Specimen trap (optional for obtaining specimen for culture)
- Sterile normal saline
- Stethoscope
- Suction canister with vacuum to wall suction and connecting tubing
- Suction catheter (appropriate size)
- Sterile gauze found in dressing pack
- Additional sterile drapes to place on patient chest

FAMILY EDUCATION

- As time permits, explain the procedure to the family, including purpose, steps, and rationale.
- Explain that suctioning may be uncomfortable for the child/neonate and may cause coughing or shortness of breath for a brief period.
- Encourage questions, and answer them as they arise.



ASSESSMENT AND PREPARATION

Assessment

1. Perform hand hygiene before patient contact.
2. Verify the correct neonate using two identifiers.
3. Assess signs and symptoms of airway secretions and inadequate oxygenation and ventilation, including visible secretion in the airway, inspiratory wheezes, expiratory crackles, restlessness, diminished breath sounds, tachypnea, tachycardia or bradycardia, cyanosis, hypertension or hypotension, and shallow respirations.

Preparation

1. Using one of the following methods, choose the proper size suction catheter:
 - a. Select a recommended suction catheter size:
 - i. 5 Fr for 2.0 ET tube
 - ii. 5 Fr or 6 Fr for 2.5 ET tube
 - iii. 6 Fr or 8 Fr for 3.0 ET tube
 - iv. 8 Fr for 3.5 ET tube
 - v. 8 Fr or 10 Fr for 4.0 ET tube
 - vi. 10 Fr for 4.0-6.0 ET tube
 - vii. 10-12 Fr for 6.0-6.5 ET tube
 - b. Quickly calculate suction catheter size doubling the ET tube size and choosing the suction catheter size closest to calculation.

Rationale: The size of the suction catheter should not exceed 70% of the ET tube diameter. This allows air to continue to enter the lungs during suctioning and limits mucosal trauma.

2. Prepare open suction system.
 - a. Set suction control at 80 to 100 mm Hg. Use the least amount of negative pressure necessary to remove secretions.
 - b. Prepare sterile saline for rinsing the catheter.

Rationale: Instilling normal saline as a routine procedure to facilitate suctioning of secretions is not recommended and may lead to impaired oxygenation and contributes to bacterial colonization of the lower airway.

- c. If a specimen for culture is required, place specimen trap in-line between the suction catheter and the suction tubing that connects to the wall-mounted suction regulator.

3. Ensure that an appropriate-size bag and mask are connected to an oxygen source at the bedside. Ensure that the oxygen source has the capability of being blended to provide a sufficient variety of concentrations of oxygen to meet the neonate's needs.

Rationale: Bag-mask ventilation support must be readily available for respiratory intervention in case the ET tube becomes dislodged or completely removed.

4. Ensure that the ET tube is secure.
 - a. Ensure minimal tube movement.
 - b. Ensure tape or securement device integrity.

PROCEDURE

PROCEDURE	RATIONALE
1. Perform hand hygiene.	
2. Verify the correct child/neonate using two identifiers.	
3. Provide developmentally appropriate containment (e.g., swaddling) for comfort during the procedure	
4. Reassess the child's/ neonate's lung sounds before suctioning.	<ul style="list-style-type: none"> Auscultation verifies airway patency and provides a basis for comparison after suctioning.
5. Increase fraction of inspired oxygen (FIO ₂) by no more than 10% if needed to maintain target oxygen saturation levels.	<ul style="list-style-type: none"> Increasing FIO₂ by no more than 10% may offset hypoxemia related to disruption of ventilation, without resulting in hyperoxia.
6. Determine the proper catheter length for suctioning by measuring the length of the tube plus the adapter. Correlate the desired (measured) suction catheter length with the matching measurements on the ET tube. ➤ Post the calculated catheter measurement at the bedside.	<ul style="list-style-type: none"> If the suction catheter is advanced beyond the end of the ET tube, airway damage may result. Correctly measuring for and adhering to the appropriate catheter depth helps decrease the risk of damaging the airway.
7. Open the suction catheter package using sterile technique.	



8. Pour a small amount of sterile normal saline in the sterile container.	
9. Prepare the sterile suction catheter.	
a. Perform hand hygiene and don sterile gloves. Keep one hand sterile to handle the catheter. Keep the other hand clean. b. With the clean hand, grasp the tubing coming from the vacuum source, and connect it to the suction catheter. c. Place sterile gauze find in dressing pack, on patients eyes to prevent secretions entering with sterile hand	
10. Suction a small amount of the normal saline from the container.	<ul style="list-style-type: none"> Suctioning a small amount of fluid through the catheter confirms that the suction and the equipment are functioning properly.
11. As an assistant stabilizes the ET tube, maintain sterile technique while inserting and advancing the catheter to the predetermined length without applying suction.	<ul style="list-style-type: none"> Suction should be applied only as the catheter is removed. Suction applied while inserting the suction catheter does not aid in removal of secretions and may increase the negative effects associated with suctioning such as desaturation and bradycardia.
12. Suction secretions by depressing the control valve while withdrawing the catheter from the ET tube. Ensure that the neonate's head remains in a midline position and that the ET tube remains stabilized. Do not apply suction for longer than 10 to 15 seconds.	<ul style="list-style-type: none"> There is no evidence that intermittent application of negative pressure, rotation of the catheter, or turning the neonate's head from side to side is beneficial and may increase the negative effects associated with suctioning such as desaturation and bradycardia.
13. Reassess breath sounds. 14. This could be done with RT or second nurse that is assisting with suctioning.	<ul style="list-style-type: none"> Reassessing breath sounds evaluates effectiveness of suctioning and helps determine whether the neonate needs additional passes. Catheter passes should be limited to only the number of times required to remove secretions
15. After each pass, allow the neonate time to recover (as indicated by oximetry and the cardiopulmonary monitor) by providing positive pressure ventilatory support.	<ul style="list-style-type: none"> Allowing recovery time helps prevent long-term complications associated with hypoxemia.



16. Note the color, amount, and consistency of secretions removed.	
17. As needed, flush and rinse the catheter with normal saline.	<ul style="list-style-type: none">• Flushing helps maintain catheter patency.
18. Wean oxygen to pre-procedure level, as tolerated.	
19. Discard supplies, remove gloves, and perform hand hygiene.	
20. Document the procedure in the neonate's record.	

MONITORING AND CARE

1. Monitor the neonate for signs indicating that suctioning is required (e.g., coarse rhonchi, increased ventilator settings, increased work of breathing, changes in vital signs, visible airway secretion, decreased chest wiggle factor [for neonates on high-frequency ventilators], changes in oxygenation or ventilation indices).
2. Monitor oxygenation levels before, during, and after suctioning, and adjust support to prevent extremes of oxygenation.

Rationale: Oxygen levels at either extreme (too high or too low) may be detrimental to the neonate.

3. Monitor cardiac and respiratory stability during suctioning.
4. Assess breath sounds and chest excursion before, during, and after each suctioning.
5. Note the color, amount, and consistency of secretions obtained with each suctioning.
6. Reconfirm security and position of ET tube.
7. Suction the ET tube as needed.
8. Monitor the neonate's tolerance of the procedure.
9. Assess, treat, and reassess pain.



EXPECTED OUTCOMES

- Adequate removal of secretions from ET tube
- Comfort for the neonate
- Decreased work of breathing
- ET tube remains secure
- Hemodynamic stability
- Improved gas exchange
- Improvement in the symptoms that indicated the need to suction
- No evidence of increased ICP

UNEXPECTED OUTCOMES

- Bradycardia
- Bronchospasm
- Hemodynamic instability
- Hypoxemia
- Inability to clear secretions
- Inadvertent extubation
- Evidence of increased ICP
- Intracranial hemorrhage
- Respiratory instability
- Unmanaged agitation and irritability
- VAP

DOCUMENTATION

- Family education
- Additional interventions necessary before, during, and after suctioning
- Color, amount, and consistency of secretions
- Comfort assessment and any specific interventions provided
- Date and time of the procedure
- ET tube size and position
- FIO₂ administered

- Neonate's tolerance of the procedure
- Neonate's response to suctioning and care, including breath sounds both presuctioning and post suctioning
- Physical assessment findings, including vital signs, breath sounds, and indicators of respiratory distress before and after the procedure
- Unexpected outcomes and related interventions

SPECIAL CONSIDERATIONS

- Preterm neonates are vulnerable to the effects of increased ICP. During suctioning, the neonate's head should remain midline to avoid jugular vein occlusion that may contribute to Intraventricular hemorrhage.

A growing body of evidence suggests that hyperoxemia is associated with major morbidities (e.g., retinopathy of prematurity, chronic lung disease, periventricular leukomalacia)

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COMPETENCY-BASED CHECK OFF

TITLE: Endotracheal tube suctioning				
COMPETENCY STATEMENT: The nurse demonstrates competence in Endotracheal Tube Open Suctioning				
JCIA Standard: Access and Continuity of care				
Patient assessment Care of patients Quality, safety and environment Patient and Family Education				
PERFORMANCE CRITERIA:	4	3	2	1
Communication and Interpersonal Skills				
1. Displays effective verbal and non-verbal communication:				
a. Acknowledge the patient (Privacy, Dignity, Culturally sensitive caring, aware on patients' Bill of Rights)				
b. Introduce her/himself to the patient				
c. Verbalize the reason for the procedure/intervention				
d. Explain the duration and outcome of the procedure				
e. Educates patient and family / caregiver (where appropriate)				
Psychomotor Skill				
2. Identify the patient (Verified the correct neonate/child using two identifiers.)				
3. Demonstrate hand hygiene as per the 5 moments throughout the procedure				
4. Verbalizes the indications for suctioning and the requirement for suction is based on individual signs and symptoms and not task or routine orientated.				
5. Assemble equipment's/materials				
6. Using one of the following methods, chose the proper size suction catheter by one of the following methods (closed or open suctioning)				
a. Selected a recommended suction catheter size				
b. Calculated suction catheter size by doubling the ET tube size and choosing the suction catheter size closest to the calculation				
c. Set suction control at 80 to 100 mm Hg for single suction.(verbalizes the complications of using higher suction strength				
7. Prepared open suction system.				

<ul style="list-style-type: none"> a. Set suction control at 80 to 100 mm Hg. Used the least amount of negative pressure necessary to remove secretions. b. Prepared sterile saline for rinsing the catheter. c. If a specimen for culture was required, placed specimen trap in-line between the suction catheter and the suction tubing that connect to the wall-mounted suction regulator 				
8. Ensured that an appropriate-size bag and mask were connected to an oxygen source at the bedside. Ensured that the oxygen source had the capability of being blended to provide a sufficient variety of concentrations of oxygen to meet the neonate's/child needs				
9. Ensured that the ET tube was secure. <ul style="list-style-type: none"> a) Ensured minimal tube movement. b) Ensured tape or securement device integrity 				
10. Performed hand hygiene.				
11. Provided developmentally appropriate containment for comfort during the procedure. Verbalizes the benefit of having a second nurse or (RT) during the procedure				
12. Reassessed the neonate's lung sounds before suctioning.				
13. Increased FIO ₂ by no more than 10% if needed to maintain target oxygen saturation levels.				
14. Determined the proper catheter length for suctioning by measuring the length of the tube plus the adapter. Correlated the desired (measured) suction catheter length with the matching measurements on the ET tube.				
15. Opened the suction catheter package using sterile technique.				
16. Poured a small amount of sterile normal saline in the sterile container (or uses sterile syringe)				
17. Prepared the sterile suction catheter. <ul style="list-style-type: none"> a) Performed hand hygiene and donned sterile gloves. Kept one hand sterile to handle the catheter. Kept the other hand clean. b) With the clean hand, grasped the tubing coming from the vacuum source and connected it to the suction catheter using the sterile gauze 				
18. Suctioned a small amount of the normal saline from the container.				
19. Ask an assistant stabilized the ET tube, maintained sterile technique while inserting and advancing the catheter to the predetermined length without applying suction, <i>unless the neonate was ventilated with a high-frequency ventilator- the circuit should not be interrupted for bagging</i>				
20. Suctioned secretions by depressing the control valve while withdrawing the catheter from the ET tube. Ensured that the neonate's head remained in a midline position and ET tube remained stabilized. Did not apply suction for longer than 10 to 15 seconds.				
21. Reassessed breath sounds.				



22. After each pass, allowed the neonate time to recover (as indicated by oximetry and the cardiopulmonary monitor) by providing positive pressure ventilatory support.				
23. Noted the color, amount, and consistency of secretions removed.				
24. As needed, flushed and rinsed the catheter with normal saline.				
25. Monitored oxygenation levels before, during, and after suctioning, and adjusted support to prevent extremes of oxygenation.				
26. Assessed breath sounds and chest excursion before, during, and after each suctioning as appropriate				
27. Reconfirmed security and position of ET tube, and depth of previous measurement				
28. Suctioned the mouth and nostrils with different sterile catheter				
29. Monitored the neonate's tolerance of the procedure.				
30. Assessed, treated, and reassessed pain.				
31. Discarded supplies, removed gloves, and performed hand hygiene.				
32. Weaned oxygen to pre-procedure level, as tolerated.				
33. Documented the procedure in the neonate's record.				
Critical Thinking				
34. Responds appropriately to scenario and questions presented				
35. Explains the concept of holistic care as related to the patient				
Documentation				
36. Documents appropriately and inform the physician of any abnormality				

COMMENTS:

RN Signature: _____ **ID#** _____ **Date:** _____

Evaluators Signature: _____ **ID#** _____ **Date:** _____

Note:

During 'orientation' the Competency Based Check off is used as a reference only. When the competency is successfully completed the Assessor signs the Mandatory Competency Assessment Record (MCAR) and places it in the employee's file.

Should a learner be found not competent the learner will repeat the Competency Based Check Off and "Competency Not Met" forms are completed and placed in the employee's Portfolio.



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