

SASKATOON HEALTH REGION

# **EMERGENCY AIRWAY MANAGEMENT**

**ADDED SKILL**

**LEARNING PACKAGE**

LPN – ADDED SKILL

Licensed Practical Nurses and Graduate Licensed Practical Nurses identified by their Manager will be certified to provide basic airway management in a crisis situation.

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## 1.0 GENERAL INFORMATION/INTRODUCTION

1.1 The nursing staff will recertify every year in BLS 'Health Care Provider' and review Emergency Airway Management and Code Blue procedures.

- The nursing staff will review the learning package
- Complete quiz with 80% success
- Demonstrate maneuvers for opening airways.
- Demonstrate the insertion of oral and nasopharyngeal airways as per scope of practice.
- Demonstrate use of Manual Ventilation Device.
- Review their role in a Code Blue situation.

## 2.0 PREREQUISITES

- Certification in BLS 'Health Care Provider'.

## 3.0 OBJECTIVES

3.1 Upon the Completion of this Package, the nursing staff should be able to:

- Identify the difference between adult and child respiratory systems.
- Perform a respiratory assessment of the patient.
- List the signs & symptoms of respiratory distress and airway obstruction.
- Identify the maneuvers used to open and maintain the airway.
- Describe and demonstrate the use of a manual ventilation device.

## 4.0 THEORY

For brief review of Respiratory Anatomy and Physiology, see Appendix A

### 4.1 Children are Different

The respiratory system in young children and infants differs from that of older children and adults, contributing to the increased risk of respiratory failure. In addition, the majority of cardiac arrests in children are respiratory-related.

The main anatomical differences between adult and pediatric airway:

Anatomy	Clinical significance
Smaller airway diameter	Airway resistance increased exponentially with any airway obstruction
Young infants are obligate nose breathers	Nasal obstruction (secretions, choanal atresia) may result in significant respiratory distress or failure
Tongue occupies relatively larger portion of oral cavity. Large occiput may cause flexion of airway and tongue to fall against posterior pharynx when child placed supine	Sniffing position opens airway. Place small towel under shoulders to prevent neck flexion.
Tracheal opening higher relative to cervical vertebrae (C-1 in infancy; C4-5 in 7 year old.)	Straight laryngoscope blade preferred over curved blade to displace distensible anatomy, enabling visualization of larynx Increased risk of aspiration as glottic opening higher in airway
Cricoid ring is narrowest portion of child's trachea (compared to vocal cords in adult)	Uncuffed ETT may provide adequate seal as can fit snugly at cricoid ring Use of excessively large ETT may cause tracheal injury
Mucous membranes in airway more loosely attached	Small amounts of inflammation or edema significantly increases airway obstruction and work of breathing.
Oxygen demands higher related to increased metabolic rate. Fewer alveoli.	Limited reserve capacities. Respiratory distress and failure more quickly than adults. Initial response with tachypnea and tachycardia but may progress to bradypnea or apnea and bradycardia rapidly.
Ribs more horizontal and chest wall more more compliant (more cartilage)	Limited ability to increase chest expansion. Pliable chest wall results in in-drawing with increased negative Inspiratory effort.
Diaphragm main muscle of respiration	Impediment of diaphragmatic movement (gastric distension) limits gas exchange

## 4.2 Assessment of Signs of Respiratory Distress

### 4.2.1 LOOK

- Shortness of Breath as expressed by the patient
- Mental Status Changes:
  - Restlessness, confusion, agitation, altered levels of consciousness, or unusual behaviors can be early signs of hypoxemia.
  - Increased carbon dioxide level in the blood (hypercarbia) as evidenced by decreased levels of consciousness.
- Respiratory pattern
  - Bradypnea – abnormally slow rate of ventilation.
  - Tachypnea – rapid rate of ventilation.
  - Hyperpnea – increase in depth and rate of ventilation.
  - Apnea – complete or intermittent cessation of ventilation.
  - Biot’s breathing – two or three short breaths with long irregular periods of apnea.
  - Cheyne-stokes – periods of increased ventilation, followed by progressive shallow ventilation until apnea occurs. Pattern typically repeats itself. May be seen in a normal sleeping person or may indicate CNS disease or heart failure.
  - Chest Wall Splinting – as in rib fractures or thoracic surgery. Painful inspiration causes inadequate chest wall expansion leading to respiratory compromise.
  - Flail chest – paradoxical movement of chest wall due to a complete separation of a section of the ribcage due to fractures.
  - Sighing – normal breathing with frequently sighs may be a symptom of hyperventilation syndrome.
  - Kussmaul respirations – deep rapid respirations often seen in diabetic ketoacidosis / coma.
- Increased Effort and Work of Breathing
  - Accessory muscle use
  - Unequal or minimal chest expansion
  - Paradoxical chest / abdominal motion may be due to muscle fatigue
  - “Tripod” stance
  - Unable to speak in sentences
- Jugular venous distension
  - May be an indicator of increased intrathoracic or central venous pressure

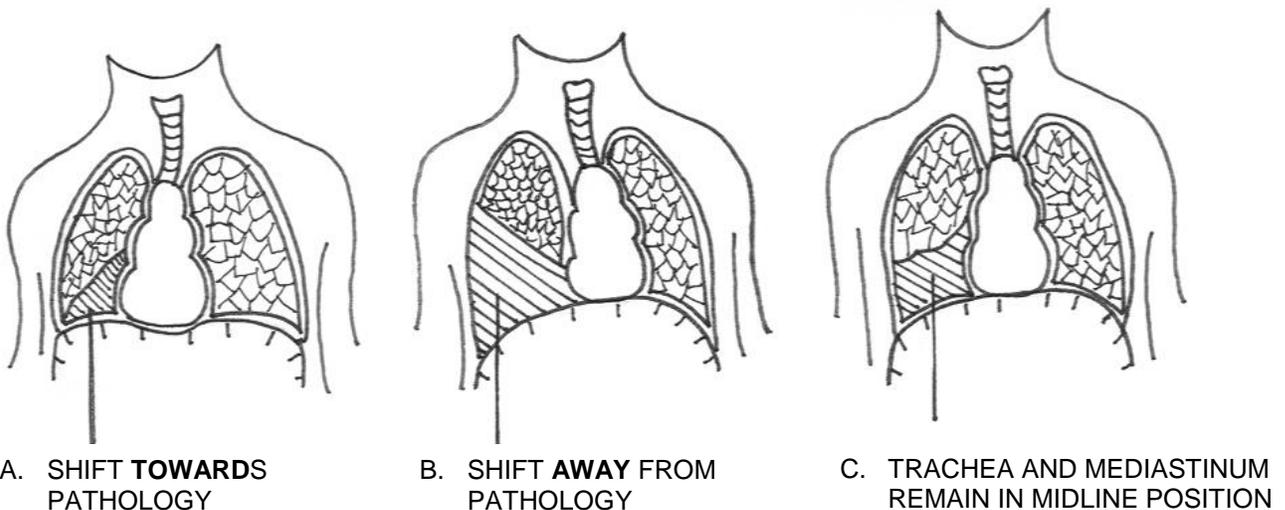
- Color
  - Grey, pale or mottling is an early sign possibly due to shunting of blood away from the skin to the vital organs (i.e. heart and brain).
  - Cyanosis is a late sign of hypoxemia indicating an increased amount of deoxygenated hemoglobin in the vessels of the skin. It is an unreliable sign that is influenced by many other factors.
    - Peripheral cyanosis is seen in extremities.
    - Central cyanosis is seen in the tongue and sublingual areas. It is an ominous sign of extreme hypoxemia.
  - Carbon monoxide poisoning causes a cherry red skin color.
  - Abnormal hemoglobin and some medications may change skin color in normal conditions.

#### 4.2.2 LISTEN

- Noisy Respiration/Abnormal Breath Sounds
  - Stridor - high pitched respiratory sound heard with partial upper airway obstruction.
  - Snoring - partial airway obstruction may be caused by the tongue pressing against the posterior pharynx or by a large or long palate. It is often heard in the sleeping or unconscious client.
  - Crowing - sound produced by laryngospasm.
  - Gurgling - sound produced by foreign matter e.g. secretions, blood or vomitus in the pharynx.
  - Wheezing - sound caused by bronchial constriction or obstruction to airflow heard on inspiration and expiration. Asthma, bronchitis, foreign body, tumors, mucosal edema, pulmonary edema, poor movement of secretions may cause wheezing
  - Grunting - low pitched, forced, end expiratory sound.
  - Crackles – Indicate fluid and exudate is present in terminal bronchioles or alveoli
    - Fine – restrictive disease or atelectasis
    - Coarse – bronchitis or pneumonia
- Pleural / Pericardial Friction Rub – a grating sound - due to friction in the movement on the inflamed pleural or pericardial surfaces. Sound may change with change in patient's position.
- Auscultation
  - Compare air entry side to side
  - Absence of abnormal breath sounds is not always indicative of absence of respiratory distress. When a patient in respiratory distress has a lack of abnormal breath sounds, this may indicate very limited air movement and is an ominous sign.

### 4.2.3 FEEL

- Palpate for the presence of:
  - The ribs and chest for tenderness, pain, air in subcutaneous tissues, fremitus
  - The chest wall for expansion and symmetry
  - The trachea for position and mobility
    - The trachea may shift to the right or left
    - Deviation to the affected side for example: atelectasis, unilateral pulmonary fibrosis, pneumonectomy, paralysis of the hemidiaphragm, inspiratory phase of a flail chest
    - Deviation to the unaffected side for example: tension pneumothorax, pleural effusion, neck tumors, thyroid enlargement, mediastinal mass, expiratory phase of a flail chest
    - Diaphragmatic rupture may cause tracheal shifting



- Percuss:
  - Resonance is normal
  - Hyperresonance – increased air
  - Tympany – air in GI tract
  - Dullness – lung consolidation, atelectasis, masses, pleural effusion, hemothorax
  - Diaphragmatic excursion – note if one side of diaphragm higher than other
    - Higher – increased intra-abdominal pressure – pregnancy, ascites
    - Lower – emphysema

#### 4.2.4 CHANGES IN VITAL SIGNS

- Decreased cardiac output and perfusion often accompanies respiratory distress. Be alert to changes in blood pressure (BP), urine output, peripheral pulses, neck vein distention, and capillary refill.
- Tachycardia is a common early indicator of hypoxemia (cardiac medications may blunt this response).
- In children, bradycardia is an ominous sign of severe decompensation.
- Pulse Oximetry
  - Ensure the values seen are accurate.
  - Inaccurate readings may be due to:
    - Anemia
    - Hypothermia
    - Nail polish
    - Reduced peripheral circulation
    - Low blood volume
    - Hypotension
    - Abnormal hemoglobin
    - Radiology contrast dyes
    - Peripheral neurologic diseases
    - Carbon monoxide poisoning / smoke inhalation
  - NOTE: carbon monoxide poisoning results in a falsely elevated SpO<sub>2</sub> reading due to the hemoglobin being saturated with CO instead of oxygen
  - NOTE: methohemoglobinemia results in a false low reading
  - Values should be above 92% unless patient's past medical history shows otherwise

#### 4.2.5 OTHER FACTORS

- Factors that increase the patient's metabolic demands can contribute to their respiratory distress. Some of these are:
  - Anxiety
  - Fever
  - Bleeding
  - Sleep deprivation
  - Hunger
  - Pain
  - Sedation / Analgesia
  - Invasive procedure
  - Blood sugar level
  - Dehydration
- Arterial blood gas values – interpretation is based on what is normal for that patient.

### 4.3 Airway Obstruction

- The tongue is the most common cause of airway obstruction. In the absence of muscle tone, the tongue, which is attached to the lower jaw, may relax and fall back to occlude the pharynx.
- Foreign material such as pulmonary secretions, vomitus, and foreign objects may also occlude the airway.
- Upper airway obstruction may present as anxiety, gagging, salivation, lack of or decreased air movement, noisy respirations, lack of phonation and/or change in color.
- Complete airway obstruction may be present even with active chest movement. In a client with a complete airway obstruction, intercostal retractions and accessory muscle use may be observed but there is no air movement at the mouth or nose or artificial airway (e.g. tracheostomy tube or endotracheal tube). Breath sounds are absent on auscultation.
- Partial airway obstruction may be present with similar active chest movements, i.e. the active retraction of the suprasternal notch, supraclavicular fossae and through the mouth or nose or artificial airway. The client with a partial airway obstruction may present with altered speech, coughing, stridor (on inspiration and expiration), snoring, crowing, gurgling or wheezing. Breath sounds are present on auscultation.

### 4.4 Maneuvers for Opening the Airway

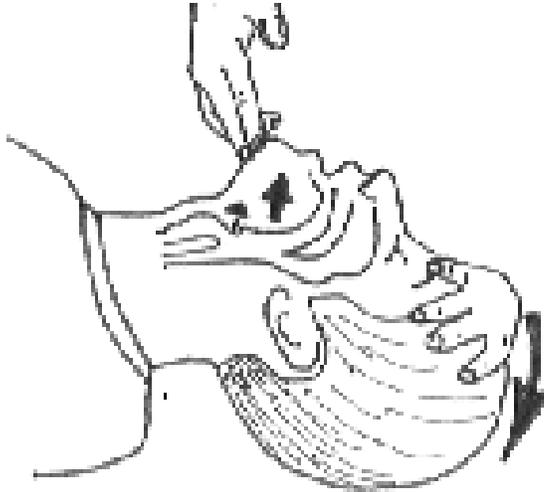
The basic maneuvers for initial management of the airway include:

#### 4.4.1 Position the Patient

- The patient must be supine and on a firm flat surface. If the patient is not supine, they should be log-rolled on to their back, keeping the head and neck aligned with the body unless contraindicated.
- Spinal stabilization must be provided throughout any patient movement and airway opening procedures when there is a risk of C-spine injury or insufficient information about the preceding events to rule out injury. Manual stabilization is performed by placing a hand on either side of the patient's head while standing at the head of the patient's bed. An assistant best performs this while the airway is manipulated.
- Infants and young children will occlude their airway if not properly positioned.
  - Infants need to be in a "sniffing" position. If the neck is over-extended the airway will occlude.
  - Young children have a large occiput, which brings their chin to their chest when supine. Place a small pad under their shoulders to improve airway alignment.

#### 4.4.2 Open the Airway

- NOTE: always wear PPE
- The initial management of an airway obstruction is a head-tilt with anterior displacement of the mandible via a chin-lift or jaw thrust.
- The Head Tilt-Chin Lift pushes the mandible forward by tipping the head back using the palm on the patient's forehead and lifting with the forefingers under the mandible near the chin (Heart and Stroke Foundation, 2010).



- If neck injury is suspected or the cervical spine is immobilized, for example halo traction, head is stabilized to prevent movement and the **Jaw Thrust** is performed. Place the fingers at the angle of the jaw on either side and pull the jaw forward while maintaining the head in a neutral position (Heart and Stroke Foundation, 2010)



#### 4.4.3 Clear the Airway

- Remove any foreign material from the mouth. Suction if necessary.

#### 4.4.4 Maintain the Airway

- This can be achieved via manual manipulation and/or artificial airways (oropharyngeal or nasopharyngeal airway)
- Insert an **Oral Airway (OPA)** only in unconscious patients or patients without a gag reflex. Oral airways in conscious or semi-conscious patients may activate the gag reflex and result in vomiting or laryngospasm (Canadian Heart and Stroke Foundation, 2010).
  - When properly positioned, the distal tip is situated between the base of the tongue and the back of the throat. (See related policy: Insertion of Oral Airway)
  - Constant monitoring of the patient is required
- The **Nasopharyngeal Airway/Trumpet (NPA)** is the preferred airway for conscious, drowsy patients or sedated patients. It can be used in semiconscious patients (with intact cough and gag reflexes) prolonged seizure activity, need for frequent nasotracheal suctioning or airway is obstructed by the tongue. Patients whose jaws are wired can also use a NPA. Do not use in patients with basal skull fracture or head injured patient with potential fractures. Cautiously use it in patients on anticoagulant therapy, have coagulopathies, recent nasal or transsphenoidal surgery
  - When properly positioned the distal tip rests in the posterior pharynx and the wide part of the trumpet rests against the external nares. (See related policy – Insertion of Nasopharyngeal Airway).
- After the airway has been opened, suctioning may be necessary. (See related Learning package and policy). (Learning Package -Suctioning Artificial Airways. Policies: Suctioning – Pediatric/Neonate Patients non-ventilated with tracheostomy, suctioning adult patients with artificial airways.)

### 4.5 The Use of Oxygen Therapy

- Hypoxia and ischemia of the heart and the brain can result in biological death within minutes. The brain begins to die after four minutes of anoxia.
- Oxygen is an essential drug in cardio-respiratory resuscitation. 100% oxygen must be delivered to the patient in acute respiratory failure or cardio-respiratory arrest.
  - High concentrations of oxygen will increase oxygen tension in the blood and may increase hemoglobin saturation.
  - The patient with spontaneous respirations may require supplemental oxygen by nasal cannula or mask depending on the clinical condition. Oxygen titrating can be done according to SpO<sub>2</sub>.

- Manual ventilation device can be used to deliver high concentrations of oxygen and provide artificial ventilation for the patient with no spontaneous respirations or to assist ventilation. It can be used with or without oxygen
- The patient with chronic obstructive lung disease who has no spontaneous respirations requires 100% oxygen and artificial ventilation. Whenever hypoxemia is suspected, oxygen should not be withheld out of fear of depressing respiratory drive.
- In adults, oxygen toxicity is not a hazard in the immediate resuscitation period. It is only a complication of long-term oxygen therapy where oxygen greater than 60-70% is administered over prolonged intervals (1 day to 3 weeks).
- Oxygen therapy in neonates should be delivered based on SpO<sub>2</sub> monitoring and blood gas results.
- See related policies -- Ventilation Assistance – Manual Ventilation Device

#### **4.6 Unplanned Extubation**

- If an unplanned extubation occurs, apply oxygen adjunct to maintain SpO<sub>2</sub> as ordered and call qualified physician or RRT stat for possible reintubation. Monitor patient's respiratory status (i.e. rate, rhythm, presence of secretions, SpO<sub>2</sub>). Position patient with head of bed in semi-Fowler's if not contraindicated.

#### **4.7 Unplanned Decannulation of Tracheostomy Tube**

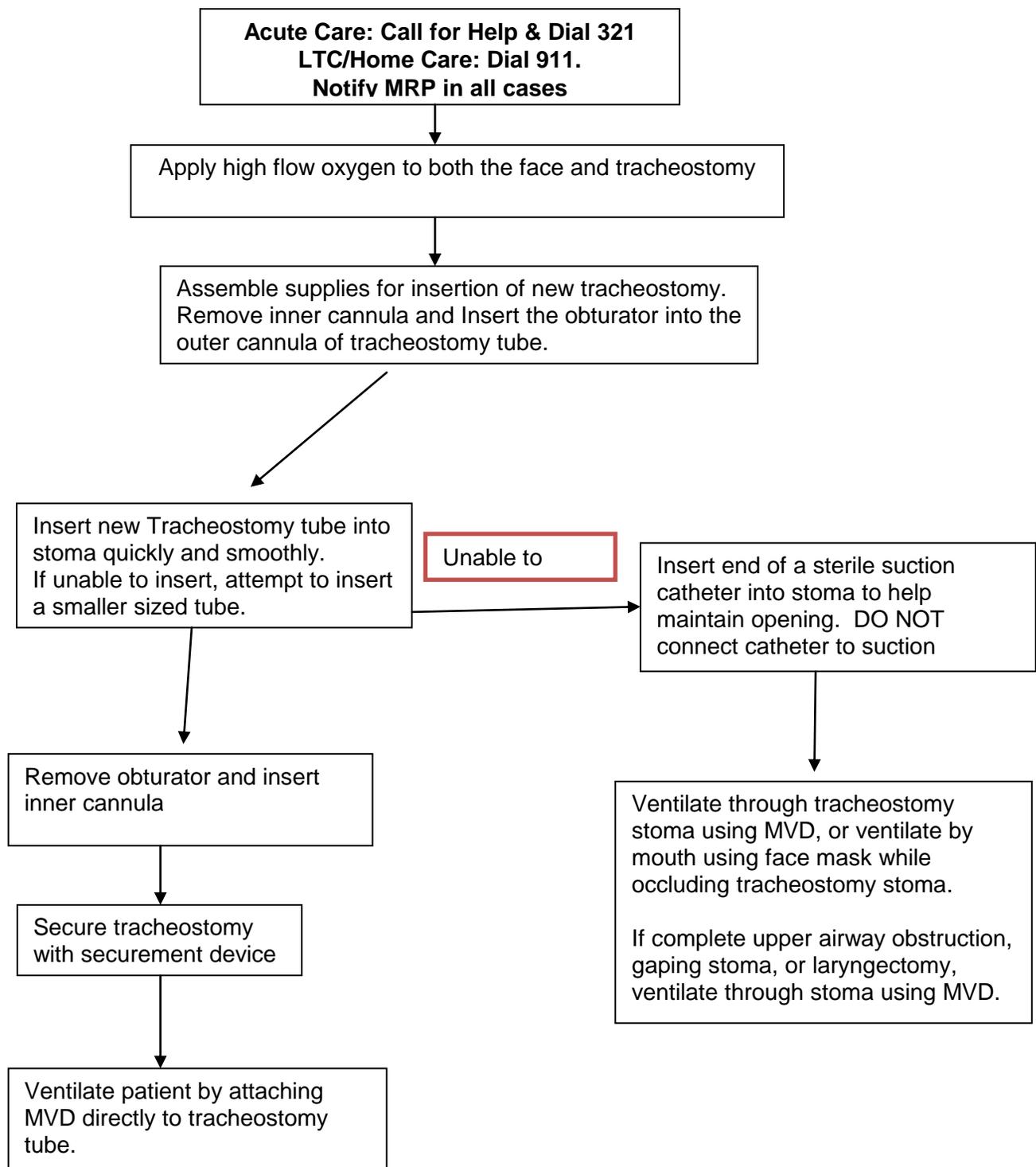
- A tracheostomy stoma that is less than 1 week old will close quickly; therefore dislodgement of the tracheostomy tube during the first post-operative week is considered a medical emergency.
- A tracheostomy stoma that is more than 1 week old will close more slowly, so the tube usually can be easily replaced if discovered. In general, a mature stoma can close up to 50% within 12 hours and up to 90% within 24 hours.
- Partial Decannulation: If the tracheostomy tube is not completely dislodged, insert the obturator and attempt to gently reinsert tracheostomy tube. Do not force.

## Unplanned Decannulation of Tracheostomy Tube

A tracheostomy stoma that is less than 1 week old will close quickly. Therefore dislodgement of the tracheostomy tube during the first post-operative week is considered a medical emergency.

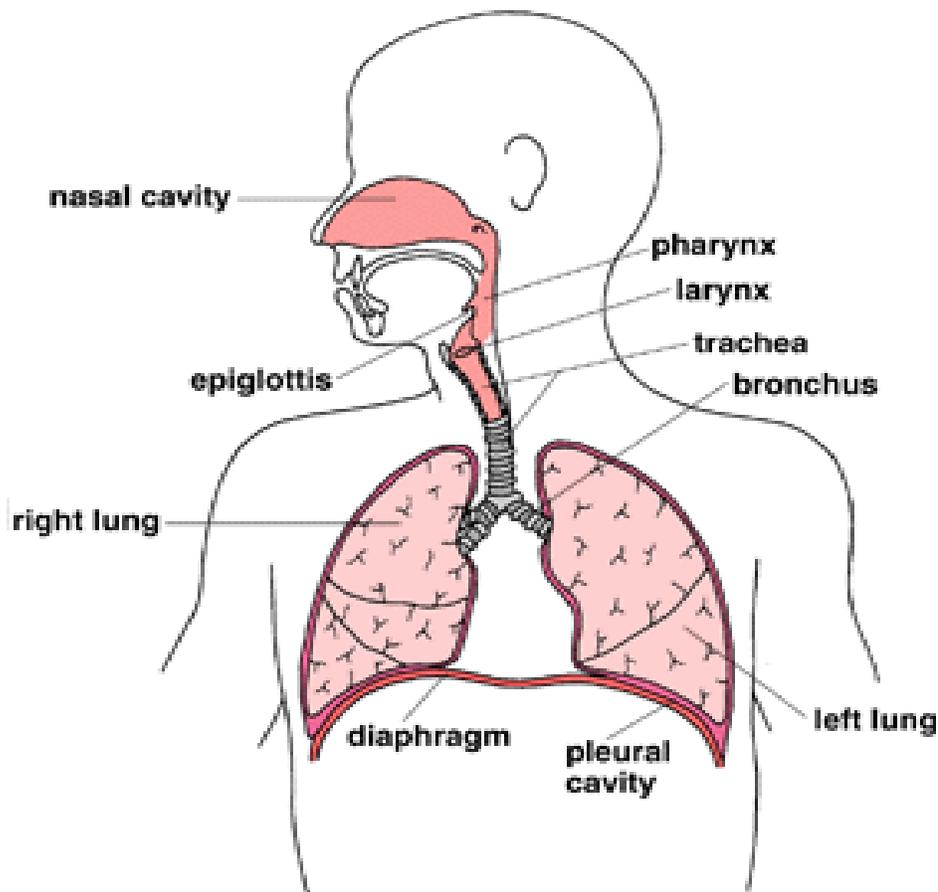
Note: A laryngectomy stoma is sewn open and will not close quickly.

A tracheostomy stoma that is more than 1 week old will close more slowly, so the tube usually can be easily replaced. In general, a mature stoma can close up to 50% within 12 hours and up to 90% within 24 hours.



## Anatomy & Physiology of the Respiratory System

The respiratory system consists of those structures that make it possible to provide oxygen to the tissues and to remove carbon dioxide from the blood. These consist of the nose, pharynx, larynx, trachea, lungs, bronchi and alveoli.



Thomas Jefferson University Hospital, Anatomy of the Respiratory System.  
Retrieved August 27, 2003 from <http://www.jeffersonhospital.org/e3font.dll?durki=5226>

The respiratory muscles create the pressure changes to allow air to flow in and out of the lungs. These muscles include the diaphragm, internal and external intercostals, scalene, sternocleidomastoid and abdominal wall muscles.

## 4.8 Airway Conduction System

### 4.8.1 Nose:

- Warms, moistens and filters air.

### 4.8.2 Pharynx:

- Common passageway for air and food.
- Consists of nasopharynx, oropharynx and laryngopharynx.

### 4.8.3 Larynx:

- Is the narrowest part of the upper airway and connects the pharynx and trachea.
- Contains epiglottis, glottis and vocal cords.
- Vibration of vocal cords produces sounds. Speech is a joint function of vocal cords, lips, tongue, soft palate and respiration.
- During swallowing, valve action of the epiglottis helps prevent aspiration.
- During the cough reflex, the vocal cords close. The intrathoracic pressure increases to permit coughing or a valsalva maneuver.
- Cricoid cartilage is the only complete ring of cartilage in the larynx.

### 4.8.4 Trachea

- Passageway for air between larynx and bronchi.
- Lies anterior to the esophagus.
- Is normally midline and can be palpated immediately above the suprasternal notch.
- To keep trachea from collapsing, multiple, C-shaped cartilage rings supply structural support.
- Mucosal cells produce mucous that traps foreign material inside the trachea. Cilia then propel the mucous upward through the airway.
- The cough reflex is the strongest at the carina located at the bifurcation of the trachea.

#### 4.8.5 Lungs

- Cone shaped organs whose base lies on the diaphragm and apex rises 2-4 cm above each clavicle.
- Left lung comprised of 2 lobes; right lung comprised of 3 lobes.
- Bulk of the lungs consists of millions of alveoli that are the functional units for gas exchange.

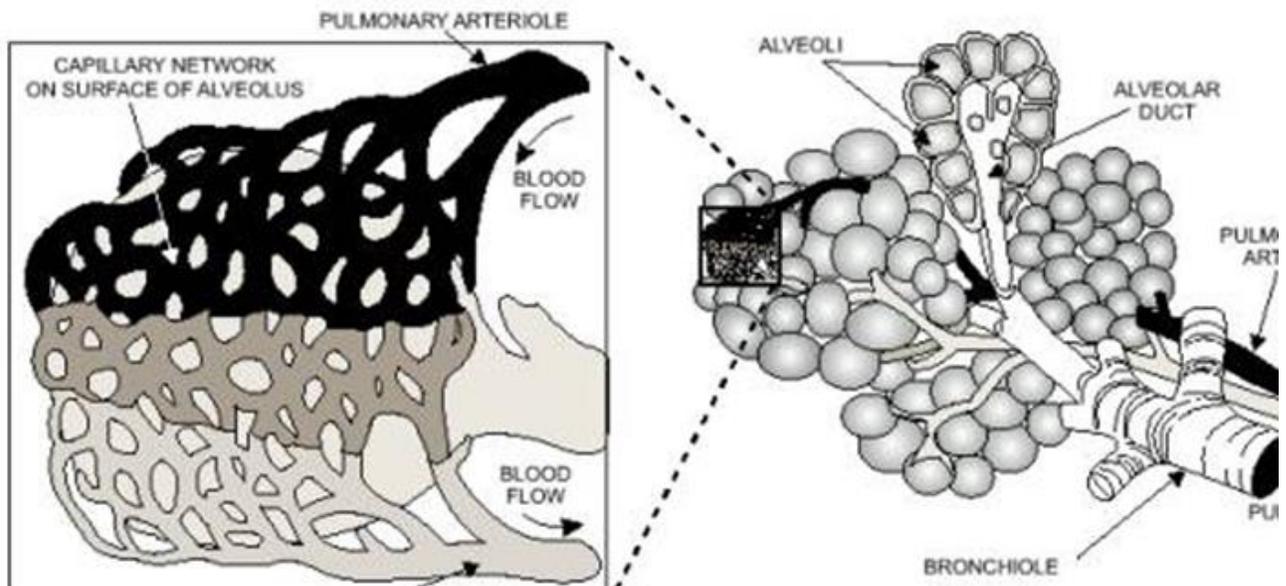
#### 4.8.6 Bronchi and Bronchioles

- Passageway from trachea to lungs.
- Trachea bifurcates at level of the junction between the manubrium and sternum into right and left mainstem bronchi which enter respective lungs and divide into smaller branches known as bronchioles.
- The smooth muscle walls dilate and constrict in response to changing levels of carbon dioxide.
- Bronchospasm narrows bronchial lumen increasing airway resistance and work of breathing.

### **4.9 Gas Exchange System**

#### 4.9.1 Alveoli

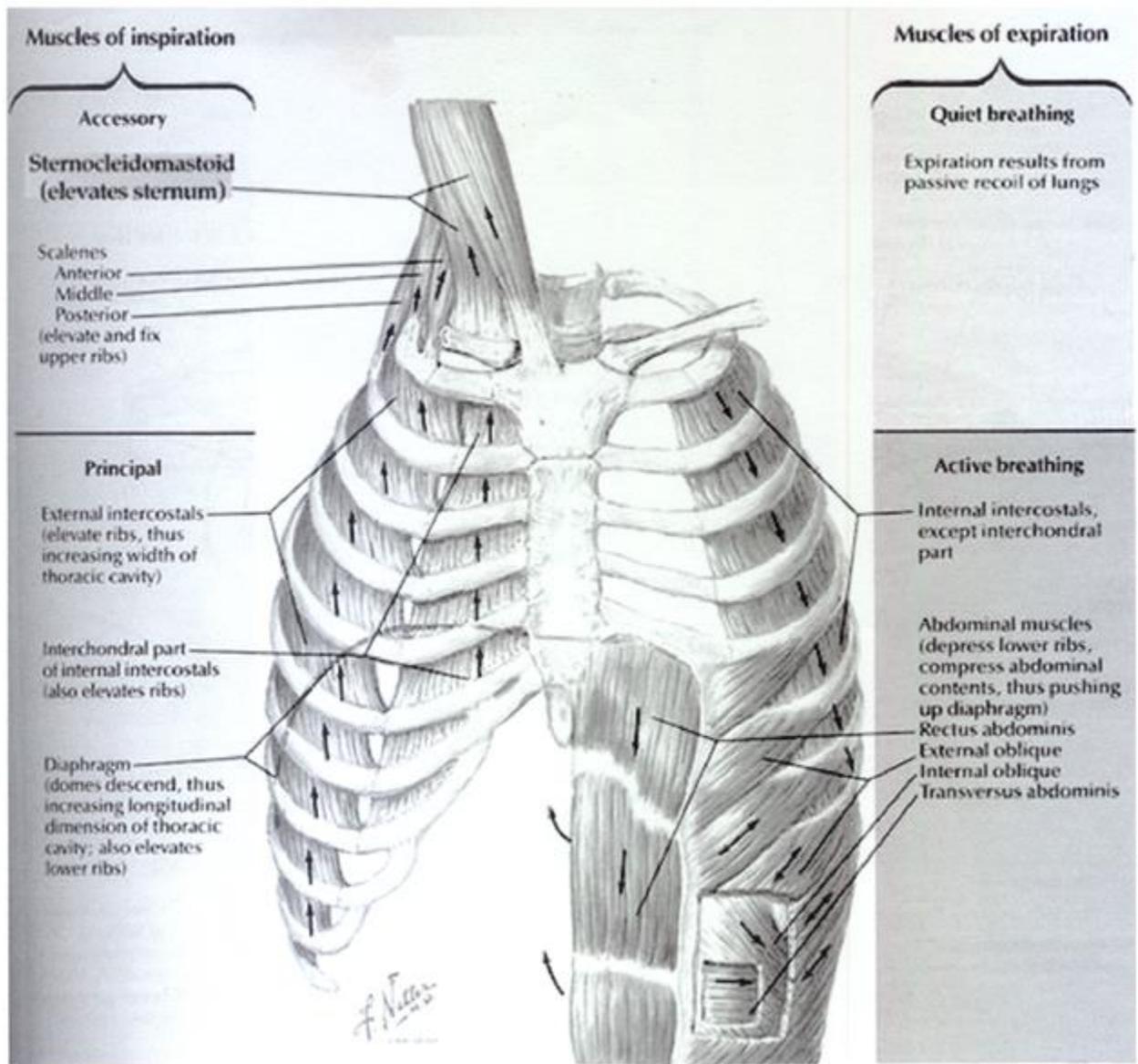
- Gas exchange occurs at the level of the alveoli-pulmonary capillary interface.
- The total alveoli surface area is about 70 square meters in a normal adult.
- The alveolar membrane is extremely thin and permeable allowing for gas exchange with the capillary bed that surrounds it.
- Pulmonary surfactant inside alveoli prevents alveolar collapse during ventilation, detoxifies inhaled gases and traps inhaled particles.



Integrated Publishing. Retrieved August 27, 2003 from <http://tpub.com/corpsman/30.htm>

#### 4.10 Respiratory

- Normal breathing is a rhythmic activity regulated by the brainstem that occurs without conscious effort.
- During the active process of inspiration, the chest cavity enlarges due to contraction of the diaphragm and external intercostal muscles. This creates negative pressure within the thoracic cavity causing air to enter the lungs.
- Expiration is normally passive - muscles relax and lungs recoil.



Saunders, Ross. Simon Fraser University. Retrieved August 27, 2003 from [http://www.sfu.ca/~saunders/133098/L3/Respiration\\_1.html](http://www.sfu.ca/~saunders/133098/L3/Respiration_1.html)

#### 4.10.1 Diaphragm:

- Dome shaped muscle that divides the chest and abdominal cavities
- Most important muscle of inspiration that accounts for 75% of tidal volume during inspiration.
- On contraction, descends into abdominal cavity increasing thoracic vertical diameter and facilitating inspiration.
- Innervated from C3 – C5.
- It facilitates vomiting, coughing, sneezing, defecation, and parturition (third stage of labor).

#### 4.10.2 External Intercostals

- Facilitates inspiration by pulling the ribcage up and out increasing thoracic anterior-posterior diameter.
- Innervated from T1 – T11.

#### 4.10.3 Accessory Muscles

- Not active during normal, quiet breathing.

#### 4.10.4 Inspiratory

- Scalene - helps lift the upper rib cage.
- Sternocleidomastoid - elevates the sternum.
- Alae nasi – causes nasal flaring - most frequently used by infants and children.

#### 4.10.5 Expiratory

- Abdominal wall muscles - compress abdomen and contents against diaphragm forcing it into the thoracic cavity during forced expiration. Use of these muscles indicates extreme respiratory distress.
- Internal intercostals - on contraction bring rib cage downward and inward to enhance expiration.

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## 6.0 POLICIES

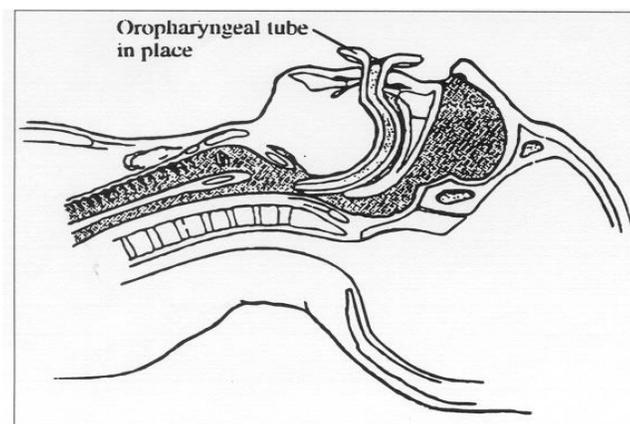
### 6.1 Airway – Oropharyngeal: Insertion; Maintenance; Suction; Removal

	<p>Policies &amp; Procedures</p> <p>Title: <b>AIRWAY – OROPHARYNGEAL: INSERTION; MAINTENANCE; SUCTION; REMOVAL</b></p> <p>I.D. Number: <b>1159</b></p>
<p>Authorization</p> <p>[X] SHR Nursing Practice Committee</p>	<p>Source: Nursing</p> <p>Date Revised: September 2014</p> <p>Date Effective: October 2002</p> <p>Scope: <b>SHR Acute</b></p>

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#### 1. PURPOSE

- 1.1 To safely and effectively use Oropharyngeal Airway (OPA).



#### 2. POLICY

- 2.1 The Registered Nurse (RN), Registered Psychiatric Nurse (RPN), Licensed Practical Nurse (LPN), Graduate Nurse (GN), Graduate Psychiatric Nurse (GPN), Graduate Licensed Practical Nurse (GLPN) will insert, maintain, suction and remove an oropharyngeal airway (OPA).
- 2.2 The OPA may be inserted to establish and assist in maintaining a patent airway.
- 2.3 An OPA should only be used in patients with decreased level of consciousness or decreased gag reflex.

2.4 Patients with OPAs that have been inserted for airway protection should not be left unattended due to risk of aspiration if gag reflex returns unexpectedly.

### 3. PROCEDURE

#### 3.1 Equipment:

- Oropharyngeal airway of appropriate size
- Tongue blade (optional)
- Clean gloves
- Optional: suction equipment, bag-valve-mask device

3.2 Estimate the appropriate size of airway by aligning the tube on the side of the patient's face parallel to the teeth and choosing an airway that extends from the ear lobe to the corner of the mouth. The curve of the airway should follow the curve of the tongue when measuring. When properly placed, the tip of the OPA will be above the epiglottis at the base of the tongue.

Recommended sizes:    Large adult – color red, size 5/10 cm;  
                                      Medium adult – color yellow, size 4/9 cm;  
                                      Small adult – color green, size 3/8 cm.

**Note:** *An airway too small will push the tongue and further the obstruction. Too large an airway may obstruct the larynx by pushing the epiglottis back.*

#### 3.3 Adult

3.3.1 Suction mouth and pharynx to clear airway of secretions so they do not enter the airway during insertion.

3.3.2 Remove dentures if loose.

3.3.3 To prevent trauma to the mouth during insertion, perform head-tilt chin-lift or jaw thrust technique to open the patient's mouth wide.

3.3.4 Insert the airway into the mouth upside down. Slowly move the airway toward the posterior pharynx, until the distal end reaches the back of the hard palate. A tongue blade may be used to hold the tongue on the floor of the mouth. **This prevents the tongue from being pushed posteriorly.**

3.3.5 Rotate the airway 180° (gently) into its proper position behind the tongue in the posterior pharynx.

**Note:** *The flange should rest between the patient's teeth. When properly positioned the distal tip is above the posterior pharynx.*

**Note:** *Do not secure in place due to increased risk of aspiration.*

3.3.6 If gagging, retching or vomiting occurs, remove the airway immediately to prevent aspiration.

3.3.7 Hyperoxygenate and suction pharynx as needed.

#### 3.4 Neonate / Infant / Child

**Note:** *An oral airway is rarely used.*

3.4.1 Use a tongue blade or gloved finger to hold the tongue on the floor of the mouth when inserting an airway. Insert the airway following the curvature of the mouth. Do not invert the airway during insertion.

**Note:** *The flange should rest between the patient's teeth/gums.*

3.5 Assess airway patency and breathing effectiveness by noting:

- Spontaneous breathing
- Chest rise and fall
- Skin color
- General rate and depth of respirations
- Use of accessory muscles
- SpO<sub>2</sub>
- Bilateral chest auscultation

### 3.6 Maintenance

3.6.1 Continue to maintain proper head tilt/chin lift or jaw thrust position following insertion of the airway.

3.6.2 Perform mouth care frequently and following suctioning.

3.6.3 Assess area of mouth touching the flange for tissue breakdown.

3.6.4 Suction the mouth around the airway and the pharynx through the airway as needed.

3.6.5 If patient spits out oral airway due to presence of gag reflex, do not reinsert.

### 3.7 Suctioning

3.7.1 Equipment:

- Clean gloves
- Face shield
- Suction catheter
- Suction set-up (regulator, canister, liner, tubing)
- Sterile normal saline

3.7.2 Set the suction gauge at 80-120 mmHg.

3.7.3 Put on clean gloves and face shield.

3.7.4 Choose a suction catheter about one half the diameter of the airway and lubricate the tip with normal saline.

3.7.5 Advance the catheter without applying suction about 2 cm beyond the tip of the airway or less if the patient begins to cough.

**Note:** *Suctioning further than this is considered a sterile procedure to decrease the incidence of hospital-acquired pneumonia.*

**Note:** *An assistant may be necessary to stabilize the airway during suctioning.*

3.7.6 Withdraw the catheter while applying suction for no more than 10 seconds.

3.7.7 Rinse the suction catheter with sterile normal saline to clear secretions from the catheter. Assess respiratory status and repeat as necessary.

3.7.8 Discard the suction catheter and used normal saline after use.

### 3.8 Removal

3.8.1 While the patient is exhaling, holds the flange and pulls out the oral airway in one smooth downward motion.

**Note:** *Withdrawal during expiration prevents aspiration.*

3.8.2 Do mouth care after removal. Examine mouth and lips for signs of swelling, injury or erosion.

### 3.9 Documentation

- Date and time of initial insertion
- Respiratory assessment before and following insertion as per 3.5
- Date and time of removal of airway
- Adverse reactions to procedure and associated nursing interventions
- Size of airway inserted
- Condition of patient's mouth / mucous membranes
- Patient tolerance of procedure.

## 4. REFERENCES

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## 6.2 Airway – Nasopharyngeal: Insertion; Maintenance; Suction; Removal

	Policies & Procedures Title: <b>AIRWAY – NASOPHARYNGEAL: INSERTION OF: MAINTENANCE, SUCTION, REMOVAL</b> I.D. Number: <b>1064</b>
Authorization <input checked="" type="checkbox"/> SHR Nursing Practice Committee	Source: Nursing Date Revised: September 2014 Date Effective: October 2002 Scope: <b>SHR Acute</b>

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### 1. PURPOSE

1.1 To safely and effectively use a Nasopharyngeal Airway (NPA).

### 2. POLICY

2.1 The Registered Nurse (RN), Registered Psychiatric Nurse (RPN), Graduate Nurse (GN), Graduate Psychiatric Nurse (GPN) will insert, maintain, remove and suction a nasopharyngeal airway (NPA).

2.2 The Licensed Practical Nurse (LPN) and Graduate Licensed Practical Nurse (GLPN) may only perform suctioning and maintenance of a NPA.

2.3 The NPA may be inserted to establish and assist in maintaining a patent airway. A NPA may be better tolerated than an oral airway in a patient with fluctuating levels of consciousness.

2.4 The NPA will not be inserted in patients with suspected or confirmed head or facial trauma/ fracture.

2.5 Following head or facial surgery, the appropriate surgeon should be consulted before inserting a NPA.

**Note:** Following orthognathic (jaw surgery), NPAs may be inserted without first consulting the surgeon.

### 3. PROCEDURE

#### 3.1 Equipment

- Nasopharyngeal airway of appropriate size
- Water soluble lubricant
- Clean gloves

- Optional: suction equipment, bag-valve-mask device

3.2 Estimate the appropriate size of airway by laying the tube on the side of the patient's face parallel to the teeth. The curve of the airway should follow the curve of the tongue when measuring. Choose an airway that extends from the nares to the angle of the jaw. The airway diameter changes with the length of the tube.

Recommended sizes: Large adult – 8-9 mm,  
Medium adult – 7-8,  
Small adult – 6-7mm.

**Note:** *Too short an airway will be ineffective. Too long an airway may obstruct the larynx, and may cause laryngospasm, retching, and vomiting.*

### 3.3 Adult

3.3.1 To determine nostril patency, feel for air movement through one nostril while occluding the other with external finger pressure.

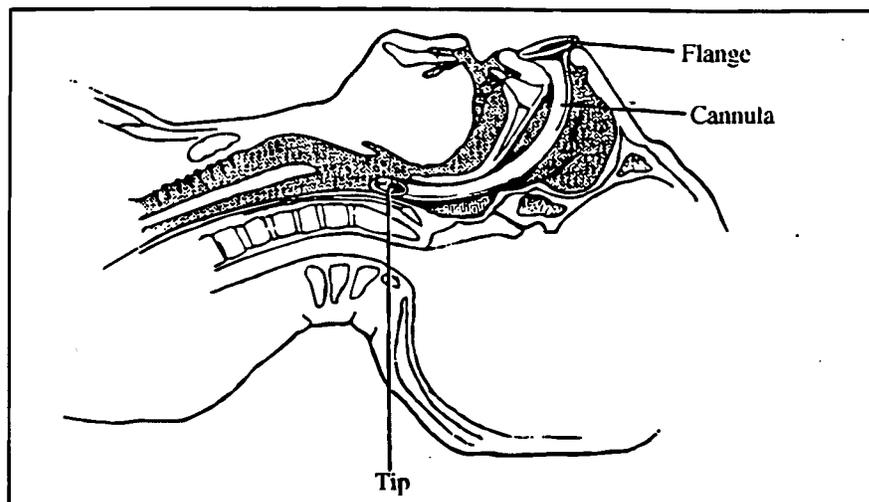
3.3.2 Ensure head of bed is at least 30 degrees to assist in breathing.

3.3.3 Lubricate the tip of the airway with the water-soluble lubricant to ease insertion.

3.3.4 Slightly extend the patient's neck (chin lift or jaw thrust maneuver) and raise the end of the patient's nose.

3.3.5 Gently insert the airway into the patient's nostril. Position it in such a way that the beveled opening of the airway is facing the nasal septum. Guide it medially and downward. **DO NOT FORCE THE TUBE.** Allow the tube to follow the natural curve of the patient's airway. If resistance is met, pull the tube back slightly, reposition and guide it forward again. The right nostril may be easier to insert than the left.

**Note:** *When properly inserted, the flange should fit snugly against the opening of the nare. The distal tip rests in the posterior pharynx. If the patient gags or coughs, the NPA may be too long. Remove (see 3.8) and insert a shorter one.*



3.3.6 To verify tube's placement, look for chest movement, listen for breath sounds, and feel for air movement over the tube's flange.

3.3.7 Provide humidification as required.

3.3.8 If patient removes NPA, do not reinsert until it is needed again due to the trauma to the nares.

**Note:** *Following orthognathic (jaw surgery), nursing staff may consult Respiratory Therapy if there are any airway concerns prior to / following removal.*

3.4 **Infant or Child:** This type of airway is not commonly used as its small size occludes easily with secretions. It may traumatize enlarged adenoids causing severe epistaxis and/or compression of nasopharyngeal airway.

3.5 Assess airway patency and breathing effectiveness by noting:

- Bilateral air entry
- Chest rise and fall
- Rate and depth of respirations
- Use of accessory muscles
- Skin color
- SpO<sub>2</sub>

### 3.6 Maintenance

3.6.1 Always keep an extra airway at the bedside to ensure immediate reinsertion if the airway becomes occluded.

3.6.2 Change the airway daily alternating nostrils if possible to prevent infection (especially sinusitis), pressure necrosis, and occlusion.

3.6.3 Perform mouth care and assess external nares for skin breakdown q4h and prn.

3.6.4 Maintain a head tilt/chin lift or jaw thrust as needed.

### 3.7 Suctioning

#### 3.7.1 Equipment

- Clean gloves
- Suction catheter
- Suction set-up (regulator, canister, liner, tubing)
- Sterile normal saline

3.7.2 Set the suction gauge at 80 – 120 mmHg.

3.7.3 Don PPE.

3.7.4 Choose a suction catheter about one half the diameter of the airway and lubricate the tip with normal saline.

3.7.5 Advance the catheter without applying suction about one inch beyond the tip of the airway or less if the patient begins to cough.

**Note:** *Suctioning further than this is considered a sterile procedure to decrease the incidence of hospital-acquired pneumonia.*

**Note:** *An assistant may be necessary to stabilize the airway during suctioning.*

3.7.6 Withdraw the catheter while applying suction for no more than 10 seconds.

3.7.7 Rinse the suction catheter with sterile normal saline to clear secretions from the catheter. Assess respiratory status and repeat as necessary.

3.7.8 Discard the suction catheter and used normal saline after use.

### 3.8 Removal

3.8.1 While the patient is exhaling, hold the flange and pull out the nasopharyngeal airway in one smooth downward motion.

**Note:** *Withdrawal during expiration prevents aspiration.*

3.8.2 If resistance is felt, do not force. Apply lubricant around the tube and nostril, gently rotate the tube until it is free and then remove.

3.8.3 Gently clean the nostril with sterile normal saline after removal and examine for signs of swelling, injury or erosion.

### 3.9 Documentation

- Date and time of initial insertion
- Respiratory assessment before and following insertion as per 3.5
- Date and time of removal of airway
- Adverse reactions to procedure and associated nursing interventions
- Size of airway inserted
- Condition of patient's nares / mucous membranes
- Patient tolerance of procedure

#### 4. REFERENCES

American Heart Association, 2010, Advanced Cardiac Life Support Provider Manual.

Barash, P. G., Cullen, B. F., Stoelting, R. K., Cahalan, M. K., Stock, M. C. (Eds). (2009). Post Anesthesia Recovery in [Clinical Anesthesia](#). 6th Edition. Philadelphia: Lippincott Williams & Wilkins.

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## 6.3 Ventilation Assistance - Manual Ventilation Device

	<p>Policies &amp; Procedures</p> <p>Title: <b>VENTILATION ASSISTANCE - MANUAL VENTILATION DEVICE</b></p> <p>I.D. Number: <b>1027</b></p>
<p>Authorization</p> <p>[X] SHR Nursing Practice Committee</p>	<p>Source: Nursing</p> <p>Date Revised: September 2014</p> <p>Date Effective: February 2001</p> <p>Scope: <b>SHR Acute, Home Care &amp; LTC</b></p>

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**Definition:** The manual ventilation device (MVD) consists of a self-inflating bag with a non-rebreathing valve and an attached oxygen reservoir.

- Infants – less than 10 kg – 250 ml – 500 ml bag
- Pediatric – infants and children up to about 6 years of age – 500 ml bag
- Adult – for ages 6 years and older – 1600 ml bag

Ventilation is as per current Heart and Stroke Foundation – Canada Guidelines – BCLS, ACLS, PALS, NRP

### 1. PURPOSE

- 1.1 To effectively and safely use a manual ventilation device.

### 2. POLICY

- 2.1 The Registered Nurse (RN)/Registered Psychiatric Nurse (RPN) / Graduate Psychiatric Nurse (GPN) /Graduate Nurse (GN)/ Licensed Practical Nurses (LPN) / Graduate Licensed Practical Nurses (GLPN) will have the knowledge of the set-up and use of a manual ventilation device.
- 2.2 Manual ventilation can be initiated by an RN/RPN/GPN/GN/LPN/ GLPN upon a prescriber's order or when judged to be necessary.

**Note:** An RN/RPN/GPN/GN/LPN/ GLPN may administer high concentrations of oxygen during an adult cardiorespiratory arrest.

**Note:** Resuscitation of neonates begins with room air and oxygen is delivered according to oxygen saturation to prevent neonatal morbidities.

- 2.3 MVDs will be kept assembled in Code Blue Carts on all patient care areas, and elsewhere as required.

**Note:** Oxygen tubing and flow meter must be readily available.

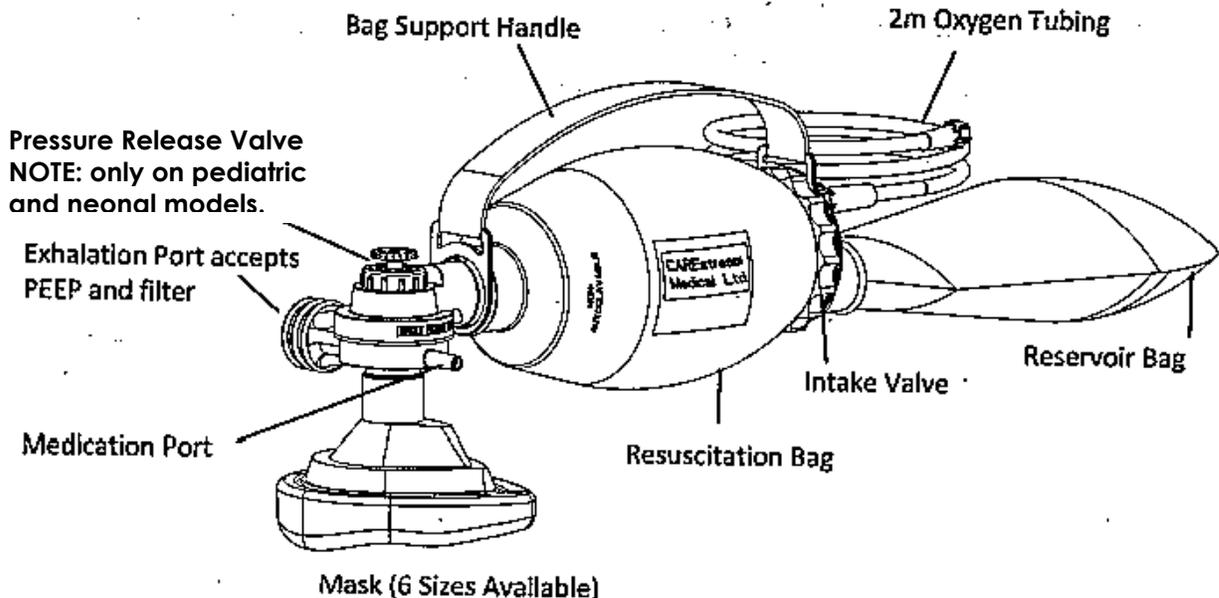
### 3. PROCEDURE

#### 3.1 Equipment:

- MVD with the appropriate size mask ( it does not cover the patient's eyes and does not extend beyond the chin)
- Oxygen flow meter and tubing
- Suction supplies
- Oral or nasopharyngeal airway of appropriate size (optional)
- Appropriate size adapter when the patient has a metal tracheostomy tube
- PPE – clean gloves, mask with face shield.

3.2 Assemble MVD as per diagram. Secure the connectors with a “twist” so the unit does not come apart during use.

**Note:** If there is a PEEP valve on or included with the device, ensure it is set to zero before beginning to ventilate patient.



3.3 Connect oxygen tubing from the oxygen nipple on the MVD directly to the oxygen flow meter.

3.3.1 Verify oxygen source in wall outlet by label and color: green and white for oxygen vs. black and white for medical air.

3.4 Set the flow meter to flush (15 liters/min or more - for neonates 5 - 10 liters/min) and allow the reservoir bag to fill.

**Note:** The reservoir bag must remain inflated to deliver 100% oxygen. Adjust flow rate to ensure the reservoir remains at least 2/3 inflated at all times.

**Note:** For neonates: the reservoir and oxygen tubing may be removed as appropriate for lower oxygen concentrations.

3.5 Position the patient supine and flat unless contraindicated and ensure airway is patent.

3.6 To manually ventilate or assist ventilations in a patient with an unprotected airway:

3.6.1 Open the airway with a head tilt / chin lift as per BCLS or NRP standards

**Note:** An appropriate size oral or nasopharyngeal airway can be inserted to hold the tongue forward to maintain an open airway. If the airway stimulates a gag reflex, remove it. See Related Policies: Airway – Oropharyngeal: Insertion; Maintenance; Suction; Removal #1159; Airway – Nasopharyngeal: Insertion Of; Maintenance; Suction; Removal #1064; and Tracheostomy Care #1184.

**Note:** When opening an infant's airway, exercise caution not to hyperextend the neck. The 'sniffing' position is desired for optimal ventilation.

**Note:** In patients with suspected or known spinal injuries, immobilize the head and neck and open the airway with the jaw thrust maneuver.

3.6.2 Suction to clear airway if needed during use of device.

3.6.3 Apply the mask firmly over the patient's nose and mouth to create an adequate seal while maintaining an open airway.

3.6.3.1 One Person Technique ('E-C' method): with dominant hand, place three fingers on the mandible, keeping the head slightly hyperextended. Place thumb and one finger in C position around the mask, pressing hard enough to form a seal on the patient's face.

3.6.3.2 Two Person Technique: First person holds the mask and maintains the airway. Second person compresses ventilation bag.

3.7 To manually ventilate or assist ventilation in a patient with an endotracheal tube or a cuffed tracheostomy tube:

3.7.1 Ensure the cuff is inflated adequately to seal the airway.

3.7.2 Remove the mask from the MVD and connect the device directly to the tube.

**Note:** Metal tracheostomy tubes require an adaptor to attach the MVD device.

3.8 To manually ventilate or assist ventilation in a patient with an uncuffed tracheostomy or endotracheal tube, remove the mask from the device and attach the MVD directly to the tube. There will always be some air leak around the tube. If unable to ventilate adequately:

3.8.1 For personnel certified to change tracheostomy tubes, remove occluded tracheostomy tube and replace with appropriate tracheostomy tube unless contraindicated.

3.8.2 If patient's upper airway is patent, occlude the tracheostomy tube with a trach plug or gloved finger and place the mask over the nose and mouth. Ventilate.

3.8.3 If patient's upper airway is not patent, (i.e. Laryngectomy) continue to ventilate directly to the tracheostomy tube until a cuffed tracheostomy tube can be inserted.

**Note:** See Related Policies: Airway – Oropharyngeal: Insertion; Maintenance; Suction; Removal #1159; Airway – Nasopharyngeal: Insertion Of; Maintenance; Suction; Removal #1064; and Tracheostomy Care #1184. to determine which items should be stored at the patient's bedside to facilitate proper airway management of patients with tracheostomy tubes.

3.9 Using non-dominant hand, ventilate at the rate set by the current Heart & Stroke standards or as warranted by the patient's clinical condition. Deliver each breath over 1 second to decrease the risk of gastric distention. There should be visible chest rise with each ventilation.

3.10 Assess the patient by:

- Observing for chest expansion
- Auscultating the chest for bilateral air entry
- Monitoring for gastric distention
- Observing for signs of clinical improvement
  - Improved color
  - Increased level of consciousness
  - Improved respiratory effort
  - Improved SpO<sub>2</sub> and ABG values
  - Stable vital signs

3.11 If unable to ventilate, reassess by:

- Readjusting mask
- Repositioning airway (head tilt / chin lift or jaw thrust)
- Suctioning airway

**Note: Neonatal and Pediatrics:** Circumstances may warrant over-riding the preset pressure – limiting device (30 – 35 cm H<sub>2</sub>O) to achieve effective ventilation. Give controlled volumes to prevent barotrauma.

3.12 Documentation:

- Time of initiation of manual ventilation
- Rate of ventilation
- Oxygen flow rate
- Vital signs (BP, P, RR, SpO<sub>2</sub>)
- Chest auscultation
- Patient's color and level of consciousness
- Presence of gastric distention and interventions
- Suctioning of patient

3.13 Send non-disposable devices to SPD for cleaning.

**4. REFERENCES**

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Name \_\_\_\_\_

## 7.0 REVIEW QUESTIONS

### Assessment of Signs of Respiratory Distress

1. List 3 signs of each of the following when assessing respiratory distress.

LOOK	FEEL
•	•
•	•
•	•
LISTEN	CHANGE IN VITAL SIGNS
•	•
•	•
•	•

### Opening the Airway

2. What is the most common cause of airway obstruction?
3. How do the airway opening maneuvers, Head Tilt-Chin Lift and Jaw Thrust, work to open the airway?
4. When would you use the Jaw Thrust instead of the Head Tilt-Chin Lift?
5. What are two purposes for using an Oropharyngeal (oral) airway?
  - i. Pull tongue forward
  - ii. Cause the patient to gag
  - iii. Not allowing patient to talk
  - iv. Help when suctioning pharynx
6. What landmarks do you use to estimate the appropriate size of oral airway?
  - i. Chin
  - ii. Ear
  - iii. Nose
  - iv. Mouth
7. What type of patient does not tolerate an oral airway?
8. What problem could arise from using an oral airway which is too small?

9. Circle TRUE or FALSE for each statement:

Insert the oral airway into the mouth upside down	TRUE	FALSE
	TRUE	FALSE
Insert an oral airway only in conscious patients	TRUE	FALSE
If patient spits out oral airway, replace it immediately	TRUE	FALSE
Remove oral airway to suction mouth or throat	TRUE	FALSE
Certified LPNs may insert nasopharyngeal airways	TRUE	FALSE

**Manual Ventilation Device – (Bag-Valve-Mask)**

10. What percentage of oxygen is used in a cardiac-respiratory arrest?

11. Circle TRUE or FALSE for each statement:

All oxygen must be humidified, including a manual ventilation device	TRUE	FALSE
	TRUE	FALSE
Set the oxygen flow meter to flush when using BVM	TRUE	FALSE
To deliver 100% oxygen, wait until the reservoir is empty	TRUE	FALSE
Remove oral airway before bagging a patient	TRUE	FALSE

12. Why are children put in the sniffing position to help with airway problems?