SUCTIONING AND TRACH CARE

Promoting Oxygenation

Shallow respirations inhibit diaphragmatic excursion and lung distensibility.

- Inadequate chest expansion—stasis, pooling of respiratory secretions (harbor microorganisms and promote infection)
- Narcotics—depress rate and depth

Nursing intervention

- Positioning to allow for maximum chest expansion
- Frequent position changes
- Ambulate
- Promote comfort (pain medication)

Position

- Semi-Fowler or high-Fowler’s best position for bedridden (maximum chest expansion)
- Side to side—alternates maximum expansion
- Tripod positions—sit upright and lean on arms or elbows
- Orthopneic positions—sit in bed and lean on overbed table
- Abdominal organs are not pressing on diaphragm
- Press lower part of chest against table to help exhale

Deep Breathing and Coughing

Indicated for COPD patients, post-op abdominal orthoracic surgery

- Abdominal (diaphragmatic) breathing
- Pursed-lip breathing
- Controlled or huff coughing

Assessment

Determine:

- Current respiratory problems
- History of respiratory disease
- Presence of cough
- Lifestyle
- Pain
- Medication history

Observe:

- Breathing pattern
- Ease or effort of breathing and position
- Breath sounds without amplification
- Chest movements
- Symptoms of hypoxia or anoxia
- Location of surgical incisions affecting breathing

Palpate:

- Respiratory excursion
Vocal (tactile) fremitus
Diaphragmatic excursion
Chest sounds

**Auscultate:**
Breath sounds

**Determine:**
- Sputum analysis
- Venous blood samples
- Arterial blood samples
- Pulmonary function test
- Pulse oximetry

**Planning**

**Delegation**—nurse must perform teaching

**Evaluation**
Client’s ability to perform and compliance
Before and after the assessment
Report abnormal findings to MD

**Incentive Spirometry**

Sustained maximal inspiration devices (SMI’s)
- Improve pulmonary ventilation
- Counteract effects anesthesia, hypoventilation
- Loosen respiratory secretions
- Facilitate respiratory gaseous exchange
- Expand collapsed alveoli
- Mimics sighing or yawning
- Long, slow deep breaths
- Offers incentive to improve inhalation
- Flow oriented—freely moveable colored balls or discs
- Longer inhalation maintained—larger is volume (quick, forceful generates high flow—low volume)
- Needed patient teaching
- Low cost, disposable, used independently by clients

Patient should be positioned for maximum expansion—upright

**Assess**
- Auscultate lungs before use
- Location of surgical incision, need for analgesic
- Client knowledge re: use of device

**Planning**
- Determine prescribed respiratory volume level
- Delegations—nurse’s responsibility for teaching, assessment, evaluation
Oxygen Therapy

Indicated for hypoxemia (low partial pressure of $O_2$ or low saturation of oxyhemoglobin in arterial blood)

- Decreased lung diffusion of $O_2$ thru respiratory membrane
- Heart failure leading to inadequate transport of $O_2$
- Lung tissue loss

Prescribed by MD—concentration, method, L/min or titrate until pulse oxygen at desired level

Nurse may initiate in emergency

$O_2$ supply

- Portable—cylinders or tanks
- Wall outlets
- Regulators—releases $O_2$ at safe level
- Content gauge—amount of $O_2$ remaining
- Flow meter
- Humidifier—for flow rates over 2L/min

Safety Precautions  Techniques Box 25-1, pg 612

Facilitates combustion

$O_2$ concentrations >50% can lead to $O_2$ toxicity (substernal pain, cough, sore throat, dyspnea, pulmonary edema)

Oxygen Delivery Equipment

Low flow—cannula, face masks, $O_2$ tents, transtracheal catheter

Clients with respiratory rate below 25/min

High flow—require all gas required during ventilation—Venturi device

Cannula—most common, inexpensive.

- Delivers $O_2$ as long as nasal airway patent, even in mouth breathers
- Delivers 24-44% $O_2$ concentration with 2-6 L/min
- Above 6L/min, client tends to swallow air, nasal and pharyngeal mucosa becomes irritated

Face Mask

- Holes in side allow escape of exhaled carbon dioxide
- Minimum of 5L/min required or will rebreathe carbon dioxide
- Reservoir bags provide higher $O_2$ concentration—client rebreathes expired air from trachea and bronchi

Simple face mask

- Delivers $O_2$ concentration from 40 to 60% flow rate for 6 to 10 L/min

Partial rebreather mask

- Delivers $O_2$ concentration from 40 to 60% with flow rate of 6 to 10 L/min
Reservoir bag
- Allows client to rebreathe first third of exhaled air in conjunction with O₂
- Bag must not totally deflate—if it does, increase flow rate
- Nonrebreather mask
- Highest O₂ concentration by means other than mechanical ventilation or intubation
  - 95 to 100% with 10 to 15 L/min
- Breathes only source gas from bag
- Client’s exhaled air and room air prevented from entering bag by one way valves
- Reservoir bag must not deflate during inspiration—if it does, must increase flow rate

Venturi mask
- Delivers precise O₂ concentrations
- O₂ concentration varies from 24 to 50%
- Concentration is specifies on mask, does not change with changing flow rate

Face tent
- For clients who can’t tolerate mask claustrophobia
- Often used with Venturi system for more accuracy in concentration
  - 30 to 50% concentration at 4 to 8 L/min

Transtracheal catheter
- Surgically placed directly into trachea
- Less than 1L/min doesn’t need humidification
- Can give rates over 5L/min

Assessment
- Observe:
  - Skin and mucous membranes
  - Breathing patterns
  - Chest movements
  - Chest wall configuration
  - Lung sounds
  - Presence of clinical signs hypoexemia
  - Presence of clinical signs of hypercarbia/hypercapnia—increased amount CO₂ in blood
  - Presence of clinical signs of toxicity

- Determine:
  - Vital signs
  - COPD—if client has O₂ should not be above 2L/min
  - Diagnostic studies including pulmonary function
  - Lab (blood) results
Planning:
- Consult with respiratory therapist
- UAP can not initiate O\textsubscript{2} therapy but can reapply oxygen delivery device
- Abnormal findings must be validated by nurse

**Peak Expiratory Flow**

*Measurement of maximum amount client can expire*
- Clients with COPD or asthma

**Artificial Airways**

Inserted to maintain patent air passage for clients whose airways have become or may become obstructed

Oropharyngeal airways—keep upper air passages open when may be obstructed by secretions or tongue, easy to insert, low risk of complications (same for nasopharyngeal)

Oropharyngeal stimulate gag reflex so can only be used when client has altered level of consciousness (general anesthesia, O.D., head injury)

Insertion *clean* procedure

Insert with distal end pointing up (appears upside down)
When reach soft palate at back of mouth, rotate 180 degrees and slip past uvula into oral pharynx
- During suctioning—run catheter along side airway
- Do *not* tape into place
- Oral care every 2 to 4 hours
- Suction should be available

Nasopharyngeal—tolerated better than oropharyngeal
- Doesn’t stimulate gag reflex
- Reposition to opposite nare every 8 hours

Endotracheal tubes
- Used during general anesthetics or when on mechanical ventilation
- Only inserted by MD or specially trained nurses using laryngoscope
- Tube ends above bifurcation of trachea into bronchi
- Client unable to speak as tube passes through epiglottis and glottis

Nursing Interventions Box 26-1. Techniques, pg. 625

Tracheostomy
- Inserted via surgical incision into trachea below pharynx
**Upper Airway Suctioning**

Sterile technique used for all suctioning

Upper can be considered clean, but sterile technique used to avoid introducing organisms into lower airway in case catheter slips into lower airway. Check facility policy as some may use clean technique for nasopharyngeal and oropharyngeal suctioning.

- Whistle tipped—less irritating to tissue
- Open tipped—more effective to remove mucous plugs
- **Yankauer**—hard plastic, used in oral cavity. Clients can be taught to use without assistance
- Tracheal suction used to remove secretions from trachea and bronchi (lower respiratory tract)

Symptoms indication need for suctioning:

- Dyspnea, bubbling or rattling breath sounds, poor skin color (cyanosis), decreased $O_2$ sats
- Suction when needed but not too often, as suctioning irritates mucous membranes which leads to increased in secretions

Planning:

Oral or oropharyngeal suction using **Yankauer** can delegated to UAP, client, or family if appropriate

Determine facility policy for sterile versus clean when performing oropharyngeal and nasopharyngeal suctioning.

Implementation:

- Conscious patient place in Semi-Fowler’s position with head turned to side
- Unconscious patient placed in lateral position
- To determine length of catheter insertion for nasopharyngeal suction, measure, approximately 5 inches
- For oropharyngeal suctioning—catheter advanced 4 to 6 inches along side of mouth to avoid gagging.
- Suction should be applied during catheter removal only for 5 to 10 seconds
- Entire procedure should last 10 to 15 seconds for insertion, suctioning, and removal.
- Rotate catheter during suctioning
- Allowing 20 to 30 seconds between each suction to avoid hypoxemia

Evaluation

Repeat assessment after suctioning is performed to evaluate effectiveness of procedure

**Tracheostomy or Endotracheal Tube Suctioning**

Following endotracheal intubation or tracheostomy—increased secretions due to irritation so increased need for suctioning
Open method—traditional method
- Client must be disconnected from ventilator (if being used), suction, reconnect, discard catheter
- This method risks increased hypoxemia
- More chance of caregivers exposure to sputum
- More expensive if frequent suction due to one-time use of catheter

Closed method—(in line)
- Suction catheter attached to ventilator tubing
- So do not need to detach patient
- No exposure to secretions

Complications of Suctioning
Hypoxemia, trauma to airway, nosocomial infection, cardiac dysrhythmia secondary to hypoxemia
Minimize complications:
- Suction only as needed—irritating and can cause need for further suctioning
- Use sterile technique—avoid infection of lower respiratory tract
- Hyperinflation—deeper breaths by ventilator or manual resuscitation (ambu) bag prior to suctioning
- Hyperoxegenation—used for both upper and lower airway suctioning, increase O2 flow rate before and between suctioning.
- Safe suction catheter size, one half diameter of trach or endotrachial tube.
- No saline instillation—recent research shows not helpful, O2 saturation decreased and took longer to recover, can dislodge bacteria from artificial airway and more into lower airway.

Tracheostomy
Advantage—improved client comfort less laryngeal, pharyngeal, oral, and nasal damage than from long-term endotracheal placement.
May not need NG feeding tube as can swallow with trach tube
Better management of oral secretions.
Can speak with adaptive devices.
Types of tracheostomy tubes:
Uncuffed—clients with permanent trachs.
- Allows air to flow around tube.

Cuffed—inflatable cuff provides airtight seal between tube and trachea.
- Prevents aspiration.
- Often used immediately with trach procedure.
- Used in clients on ventilators.

Low pressure cuffed—distributes even low pressure against trachea, decreasing risk of tracheal necrosis
- Does not need routine deflation—just for removal.
Fenestrated:
- Holes in outer cannula.
- Inner cannula in place when client on ventilator.
- Weaning from ventilator—in inner cannula removed, cuff deflated, external opening of trach tube plugged
- Client can breathe around tube through fenestration
- Can talk because tube is plugged.
- Easily placed back on ventilator by inserting inner cannula, inflating cuff, unplugging trach tube, attach to ventilator.

Trach care and suctioning every 1 to 2 hours when new due to large amount of secretions
  Then 1 to 2 times daily
  Well healed trach—clean technique for changing dressing and ties

**Tracheostomy Dressing and Tie Tapes**

Changed when soiled and usually after cannula cleaned.
Do not cut gauze squares for trach dressing—small fibers can be aspirated.
When changing ties—best to have assistant present wearing clean gloves and stabilizing trach.
If assistant not available, **do not** remove old ties until new ties secured

**Humidification**

Using a mist collar as upper airway bypassed.

**Plugging Tracheostomy Tube**

Done during weaning process to discontinue mechanical ventilation.
- Establishes natural airway
- Removing from ventilator does not mean automatic removal of artificial airway