

SUCTION CATHETER

□ suction catheter is a flexible long tube attached on one end to the breathing tube (endotracheal or tracheostomy tube). The other end of the suction catheter is connected to a collection container (suction canister) and a device that generates suction

The lows of suctioning

- **F**luids and gases move from areas of higher pressure to areas of lower pressure across what's called the pressure gradient.
- Vacuum is a space in which the pressure is significantly lower than the surrounding pressure.
- If a device is used to create a zone of pressure that's lower than that of the patient, gases and fluids will be drawn out of the patient into this area of lower pressure. The clinical application of vacuum to create this pressure gradient is called suction.

USES OF SUCTION CATHETER

- ❑ Critically ill or injured patients who require a breathing (endotracheal) tube or tracheostomy tube need occasional suctioning to remove secretions from the airway.
- ❑ The respiratory therapist, nurse, or ICU technician suction a patient by inserting a small flexible tube called a suction catheter into the breathing tube.
- ❑ The purpose of suctioning is to keep the airways clear of secretions and hopefully prevent plugging of the airways

Does it hurt to use the suction catheter

- Most patients say yes. It creates an urge to cough and can cause a burning sensation in the lungs. Fortunately, the discomfort only lasts a short time**

How often is the suction catheter used

- The frequency of suctioning is determined by the amount of secretions that the patient produces.**
- The breathing tube is suctioned whenever fluid builds up in the lungs**

Catheter design

- The catheter should have at least three openings through which secretions and air may be pulled during suctioning.
- If the catheter has fewer openings, it is possible that the opening of the catheter can be against the wall of the trachea.
- When suction is applied, the pressure will actually pull cells of the wall of the trachea and pull them into the suction catheter.
- The incidence of tracheitis and accompanying infection will be reduced with catheters that have multiple openings near the tip

- You will need the following supplies to suction a patient:
 - * Suction machine
 - * Connecting tubing
 - * Collection bottle
 - * Suction catheter (Yankaur)
 - * Container of water

Before and after suction hyper oxygenation

- Since some oxygen will be removed from the lungs whenever the person is suctioned, it is essential that we assure the person has some reserve of oxygen before the catheter is inserted.
- This can be accomplished by increasing the oxygen concentration the person is receiving for at least one minute (60 seconds) before the suction catheter is inserted into the airway.
- After each pass of the catheter, the respiratory therapist must evaluate the level of oxygenation and assure the patient returns to pre-suction oxygen level before making another pass of the catheter or finishing the procedure.

Before and after suction hyper oxygenation

- The SPO2 must return back to baseline before another pass or leaving the patient. Generally increased oxygen for one minute (60 seconds) after each pass of the catheter will be sufficient. If the level of oxygen has not returned to baseline within one minute, wait before suctioning again**

Suction catheter in the trachea

- When suctioning through an artificial airway, the catheter should be in the airway no longer than 15 seconds from the time insertion is begun until the catheter is completely out of the airway.
- When suctioning nasotracheally, the catheter should be in the trachea for a maximum of 15 seconds.
- This is not the time from when it is inserted into the naris, but when it reaches the trachea

Hyper aerate before and after suction

- Since suction may create atelectasis, increased volume of breaths before and after each pass of the catheter will minimize the atelectasis created.
- The person should receive increased volume breaths for the same minute before and after suctioning that they are being hyperoxygenated

Maintain aseptic technique

- Since the procedure bypasses many of the normal protective barriers of the body, it is essential that the respiratory therapist not introduce any microorganisms into the airway during the procedure.
- Each time suctioning is to be done, a new pair of sterile gloves and a new sterile catheter must be used. Strict attention to assure the gloves and catheter are essential with suctioning of an artificial airway.
- For nasotracheal suctioning, it is not possible to maintain sterile technique since the catheter passes through non-sterile areas on the way to the trachea, it is important nothing not already in the patient be introduced during the procedure

Use of close suction system

- Each time a person is suctioned with standard technique, it is necessary open connections between the patient's airway and the equipment providing ventilation and oxygen.
- Each of these breaks is an opportunity to spread microorganisms into the airway.
- Closed systems for suctioning are available that keep the catheter in the circuitry at all times and do not require opening the circuit.
- It is much easier to maintain PEEP to keep alveoli open at the end of exhalation with the closed system, as pressure can be applied to the airway throughout the time the patient is being suctioned

DO NOT PROP FOR RESISTANT

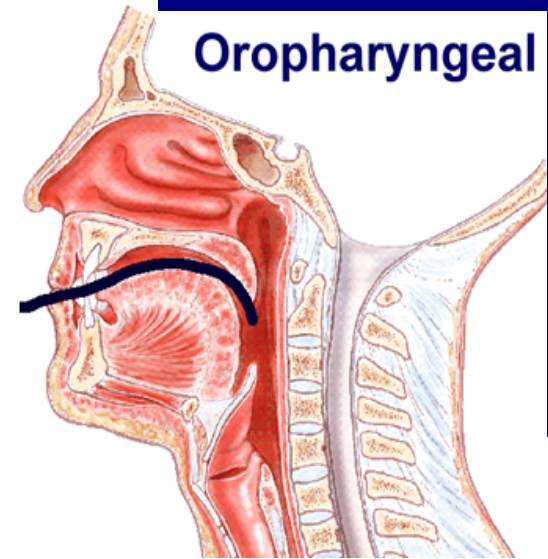
- The most common cause of arrhythmias is repeatedly contacting the carina or wall of mainstem bronchi with the catheter.
- The natural tendency when inserting the catheter is to advance until the length of catheter is sufficient to be in the trachea then advancing until resistance is felt.
- To assure the catheter is really in far enough many persons will “bounce” the catheter in and out to see if it will go further.
- This is a very bad idea and must be avoided

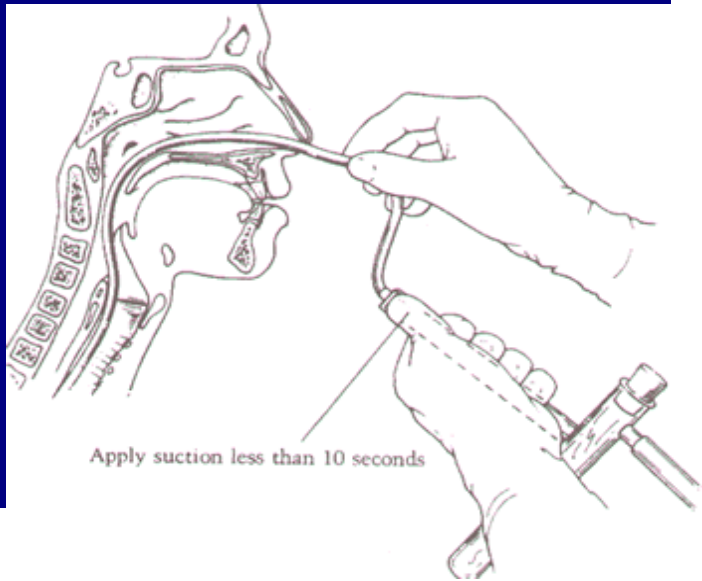
Selection of catheter size

- Catheter size should be no larger than $\frac{2}{3}$ of the inner diameter of the airway through which suctioning is performed.
- The complicating factor is that catheters are sized by outer circumference (French units) and artificial airways are sized by inner diameter.
- To compare, it is necessary to convert the inner diameter to inner circumference of the tube.

Suction catheter in trachea

- For **15 Seconds or Less** -When suctioning through an artificial airway, the catheter should be in the airway no longer than **15 seconds** from the time insertion is begun until the catheter is completely out of the airway.
- When suctioning nasotracheally, the catheter should be in the trachea for a maximum of **15 seconds**.
- This is not the time from when it is inserted into the naris, but when it reaches the trachea





Suction

If not able to get adequate cough

**Only done when there is evidence of secretions in central
airways**

Not a prophylactic procedure

Not a routine or timed procedure

Carries many hazards and should not be done if will not help

Indication for suctioning

- Without artificial airway
- Evidence of secretions in central airways withineffective cough
- With artificial airway
- See secretions in airway
- Coarse crackles in central airways
- Sudden onset of dyspnea
- Sudden increase in airway pressure

Hazards of suctioning

Hypoxemia

Arrhythmia

Tracheitis

Infection

Hypotension

Atelectasis

Depletion of FRC

Vagal stimulation

Asphyxia

Death

Proper suction pressure

-100 - 120 mmHg for adults (≥ 7.0 ID)

-80 - 100 mmHg for children (4.5 - 6.5 ID)

-60 - 80 mmHg for infants (≤ 4.0 ID)

Minimizing hazards

- **ID 8.0 mm x 2 = 16 French largest catheter**