South Tees Hospitals NHS
NHS Foundation Trust

Tracheostomy Care

An educational resource and activity pack for staff

NHS England/PA Project/J Robinson/Jan 2016

Introduction

This resource pack provides you with information about tracheostomies. It will give you the theory behind tasks you are already probably performing with your patient and a sound knowledge base to enhance your practical skills

The pack is aimed as a general overview as client specific teaching will be given as part of your training programme with your client

It is essential that you complete this workbook and can demonstrate in-depth knowledge and understanding around tracheostomy care as it will make up part of your WASP assessment.

Information sections are marked with 

Activity sections are marked with 

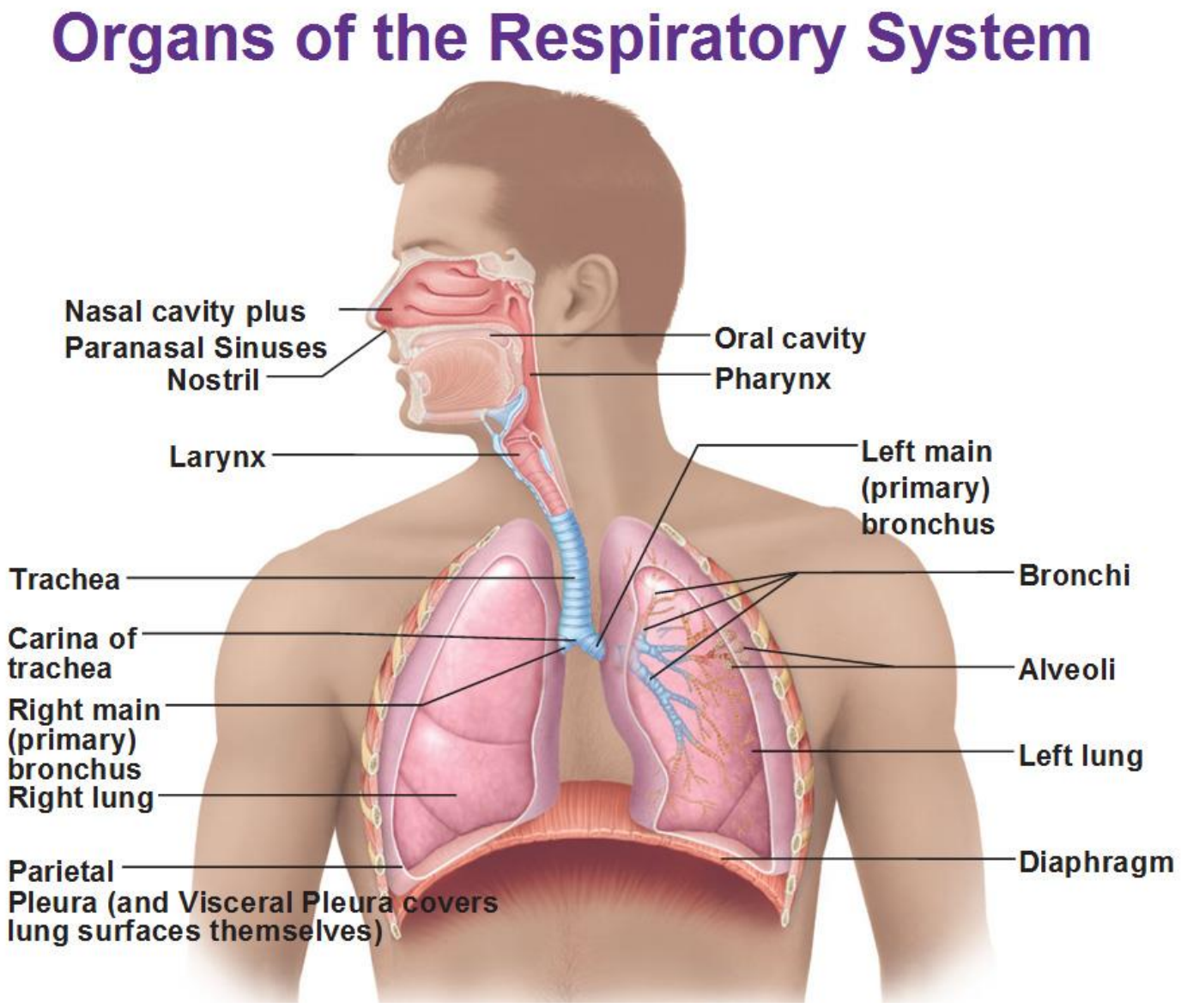
Upon completion of this pack you should be able to discuss:

- The upper and lower respiratory system
- The purpose of a tracheostomy
- The different tubes available and their purpose
- Humidification
- Care of the inner cannula
- Tracheostomy dressings and tapes
- Suction techniques
- Routine tracheostomy change
- Emergency action

Anatomy and Physiology

Prior to learning about tracheostomies and ventilation it is really important to understand the anatomy and physiology of the upper and lower respiratory system. This may be a refresher for some people or completely new to others therefore I have tried to keep it as simple as possible

The respiratory tract consists of the upper and lower respiratory tract .The respiratory system provides oxygen to the body's cells while removing carbon dioxide



The upper respiratory tract

The upper airway consists of the **nose mouth pharynx** and **larynx**. It serves as a passage way for inspired and expired air; it also filters warms and moistens the inhaled air.

The upper airway enables us to sneeze, cough and close off the larynx to ensure that solids or fluids do not go into the lungs

The nose

As well as being responsible for smelling the nose warms and humidifies inhaled air. Hairs inside the nose (cilia) prevent particles from entering the lungs and one of the reasons we sneeze is to expel foreign particles and irritants and cleanse the nasal cavity

The pharynx

The pharynx is a muscular tube lined with mucous membrane which is about 12cm long it provides a common passageway for air, fluid and food. Air can easily enter the pharynx however when food or fluid is present a reflex occurs which causes the epiglottis or Adam's apple to close off the airway and ensure that diet and fluid is directed to the oesophagus instead of the trachea and lungs

The larynx

The larynx is composed of muscle tissue and cartilage; it is lined with mucous membrane. The larynx also functions as an air passage and it houses the vocal cords, which are responsible for sound production and speech

Activity 1

1. What is the function of the nose?

2. What is the function of the pharynx

3. What is the function of the larynx?

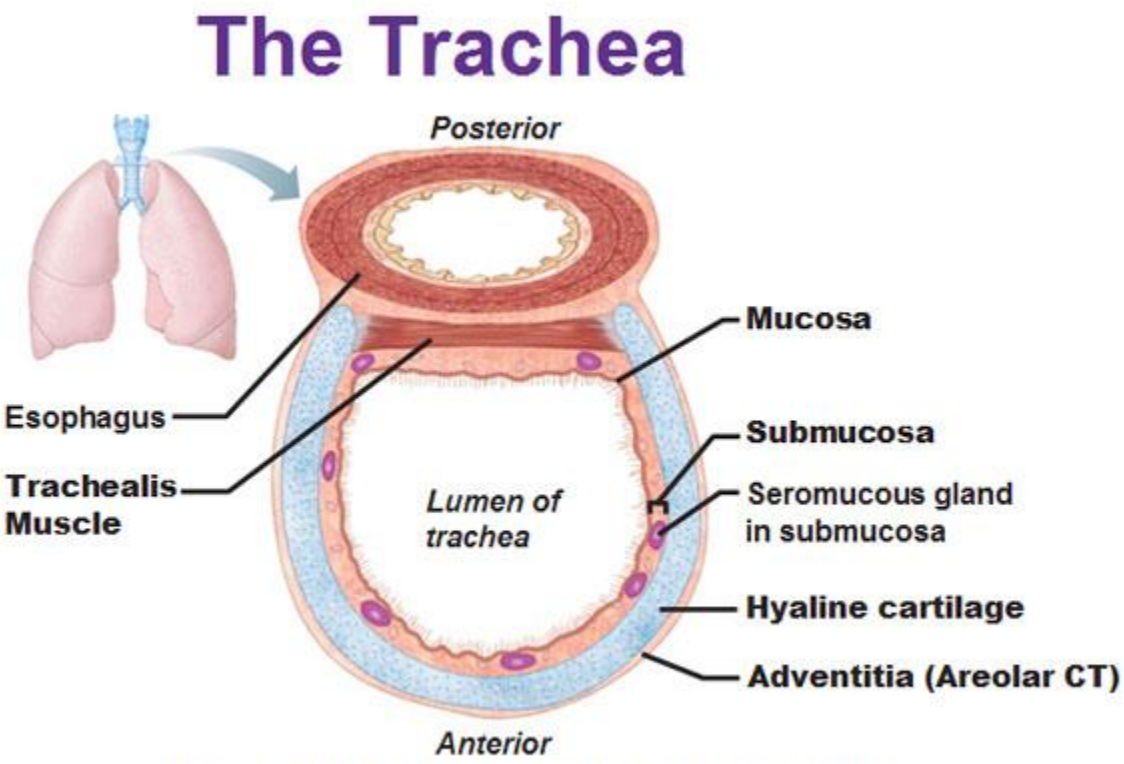
4. Why do we sneeze?

The lower respiratory tract

The lower respiratory tract consists of the trachea, bronchi and lungs

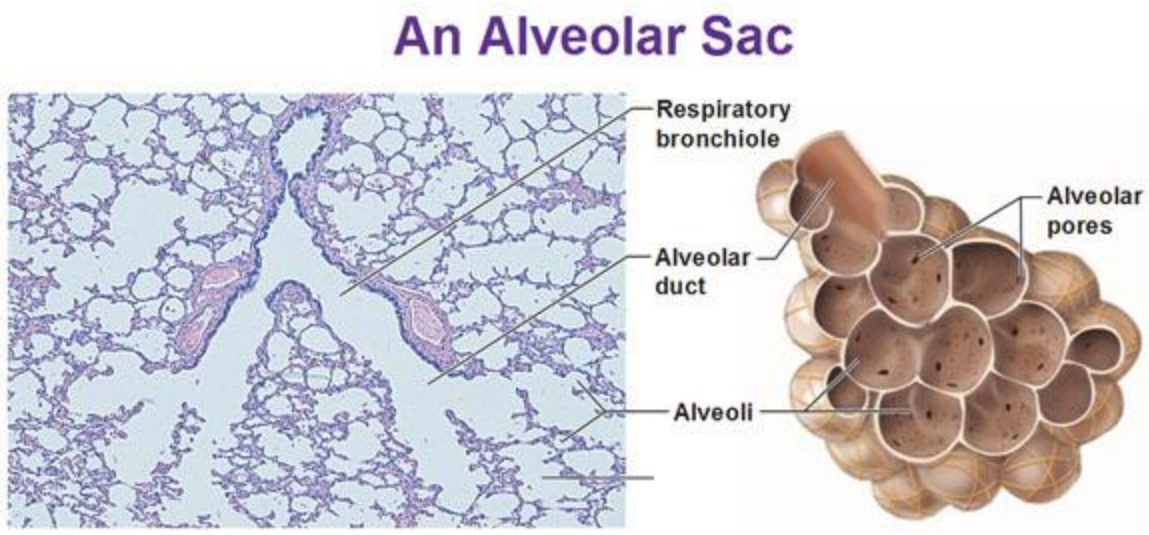
The trachea

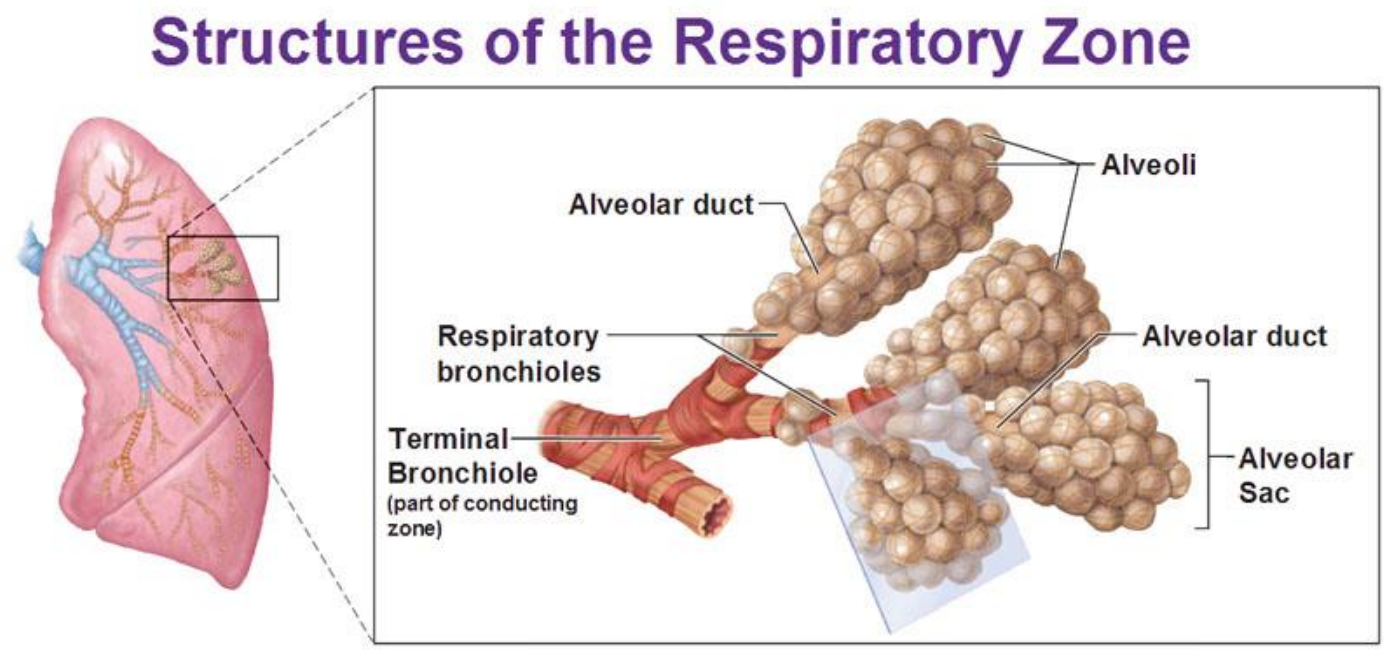
The trachea, commonly called the windpipe, is a tube that connects the pharynx and larynx to the lungs, allowing the passage of air. The trachea consists of fifteen to twenty incomplete C-shaped tracheal rings of cartilage that reinforce the front and sides of the trachea to protect and maintain the airway. The wall at the back of the trachea does not have cartilage and is more floppy, this allows the trachea to collapse slightly so that food can pass down the oesophagus which lies behind the trachea The trachea then branches into the right and left bronchus The bottom of the trachea where the right and left bronchus divide is the carina.



Cross section of the trachea and esophagus

Bronchi bronchial tubes bronchioles and alveoli

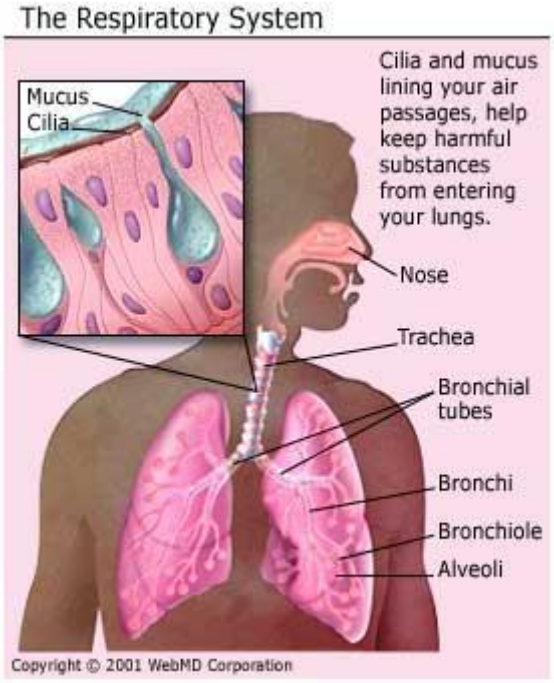




The main function of the bronchi and bronchioles is to carry air into the lungs

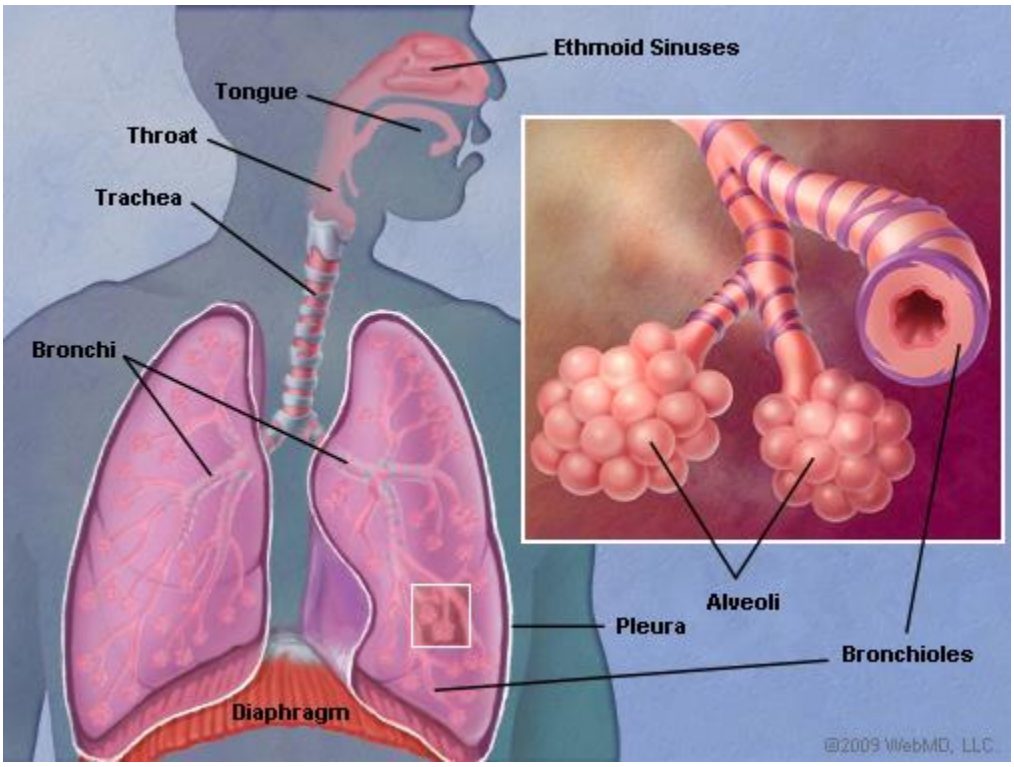
The right bronchus is shorter and more vertical than the left; this is why foreign particles enter the right bronchus more frequently. Each bronchus enter the lungs then branch off into smaller sections inside the lungs called bronchioles. Each bronchiole further splits into many smaller branches less than a millimetre in diameter called terminal bronchioles. Finally, the millions of tiny terminal bronchioles conduct air to the alveoli of the lungs which are tiny air sacs in the lungs where gas exchange takes place.

Like the trachea, a ciliated mucous membrane continuous with that of the upper air passages lines the bronchial air passages. The cilia are hair like, alternately bend in one direction, and straighten, providing a sweeping motion .Mucous traps inhaled foreign bodies such as dust particles and infection and the sweeping motion of the cilia carry them away from the lungs. Excessive secretions or foreign bodies may initiate a cough reflex, which is a defence mechanism to remove foreign bodies from the respiratory tract



Lungs

The lungs are the largest organs in the lower respiratory tract they are suspended within the pleural cavity of the thorax. The lungs are divided into different lobes. The right lung is larger in size than the left, because the heart is situated to the left of the midline. The right lung has three lobes - upper, middle, and lower, and the left lung has two - upper and lower plus a small tongue-shaped portion of the upper lobe known as the lingula.



The lungs are covered by a thin tissue layer called the pleura. The same kind of thin tissue lines the inside of the chest cavity - also called pleura. A small amount of fluid between these two layers acts as a lubricant allowing the lungs to slide smoothly as they expand and contract with each breath.

When the diaphragm contracts, a negative pressure is generated in the thorax and air rushes in to fill the cavity .When that happens the alveoli fill with air causing the lungs to expand .The alveoli are rich with capillaries called alveolar capillaries.

Internal respiration occurs during and after the process of external respiration .It is when the oxygen is absorbed into our blood and the carbon dioxide is removed.

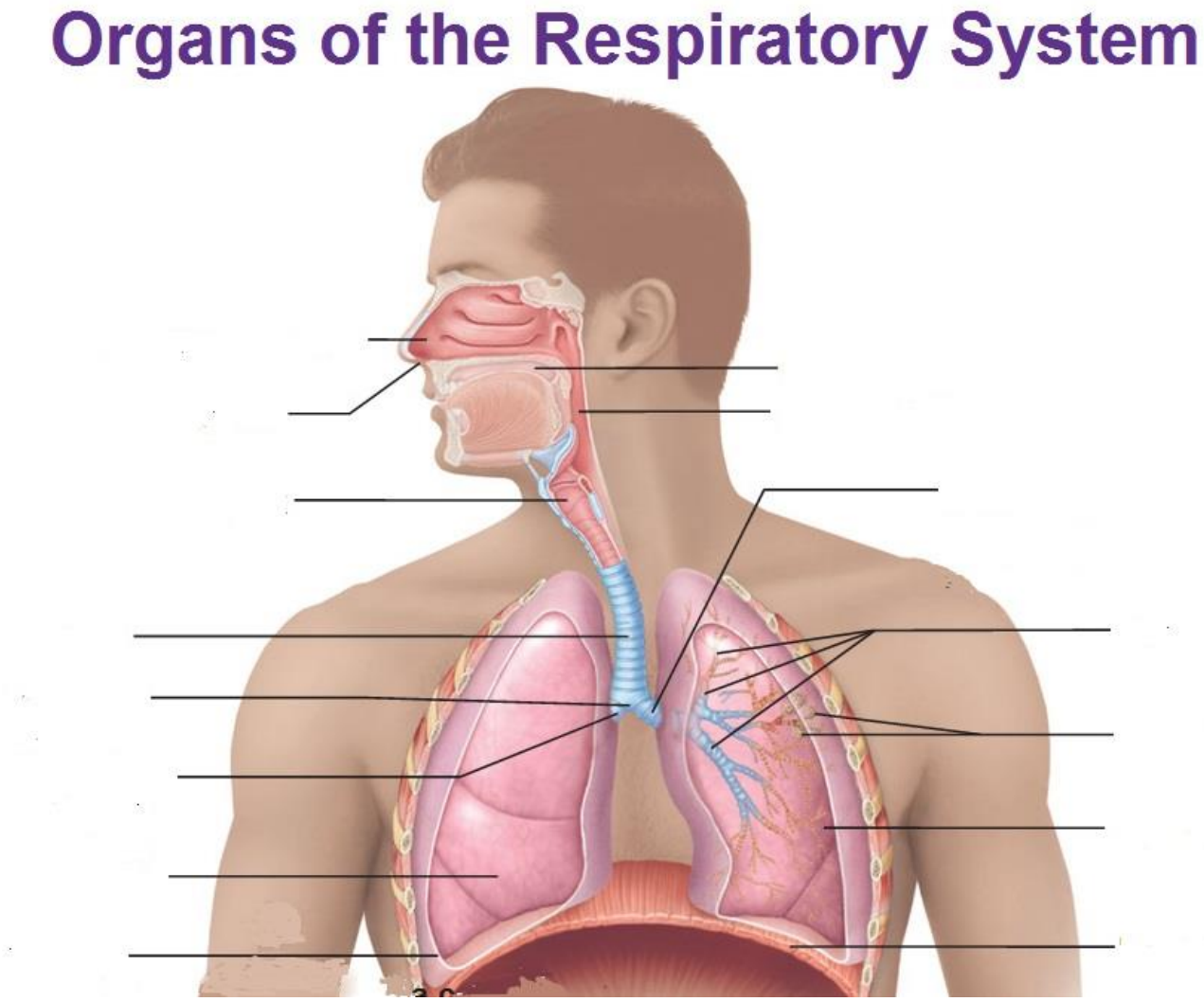
The heart pumps blood that is low in oxygen through the pulmonary arteries and into the lungs. At the ends of the pulmonary arteries are small blood vessels called capillaries which wrap like a net around the alveoli. The inhaled air has been transported by the bronchial tubes to the alveoli which are round clustered sac like tips of the respiratory tree where gas exchange occurs.

Inside the alveoli the oxygen rich air that has been inhaled is drawn into the red blood cells in the surrounding capillaries transported back to the heart by the pulmonary veins and then distributed around the body. Conversely carbon dioxide is drawn out of the blood into the alveoli and exhaled into the atmosphere. Carbon dioxide is a waste product that can be harmful and cause respiratory acidosis

Activity 2

1. Can you label the diagram below?

Diaphragm left lung alveoli bronchi nasal cavity larynx trachea carina left main bronchus pharynx oral cavity right main bronchus parietal pleura right lung



2. Describe the function of the trachea bronchi and lungs
3. Which bronchus is shorter and more vertical
4. What do cilia do?
5. Which lung is the largest?

7. Is air forced or sucked into the lungs?
8. Is the blood which is transported from the heart to the lungs high or low in oxygen?
9. Which waste product is exhaled?

The Tracheostomy

In the acute setting such as Intensive Care patients who require a ventilator will have a tube called an endotracheal tube to connect them to the ventilator. The endotracheal tube is inserted into the patient's airway through their mouth and throat and because a patient would rarely tolerate this when they are awake they need to be kept sedated

If the patient is likely to need long term /prolonged ventilation a tracheotomy will be performed

A *tracheotomy* is a surgical procedure which consists of making an incision on the anterior aspect of the neck and opening a direct airway through an incision in the trachea. The resulting stoma or hole is known as a *tracheostomy*. In some cases the tracheostomy can serve independently as an airway or as a site for a tracheostomy tube to be inserted. This allows someone to breathe without using their nose and mouth. The benefits include patient comfort, speech, the reduced need for sedation and the ability to eat and drink.

This also means that the patient may be discharged home

Not all patients with tracheostomies require ventilators and there are a number of reasons why someone may need a tracheostomy. Reasons include the inability to clear bronchial secretions by coughing or following a laryngectomy.

Tracheostomies formed following a laryngectomy require very specific care and the teaching in this work book **does not** apply to them nor does the emergency management because the patients are unable to use their upper airway.

Speech

It is usually difficult to speak following a tracheostomy. Speech is generated when air passes over the vocal cords at the back of the throat but following a tracheostomy most of the air exhaled will pass through the tracheostomy. Many patients on ventilators manage to speak with the cuff down as there is still a large volume of air passing over the vocal cords however patients who don't require a ventilator may need a speaking valve. Some patients can facilitate speech by occluding the end of the tracheostomy with their finger but this may be quite tiring and there is a risk of introducing infection into the trachea

If the patient is off the ventilator or the cuff is inflated staff must ensure that a means of attracting attention such as a call bell or possum is within the patient's reach

A speaking valve

Some clients have speaking valves which work by allowing air to be inhaled but then form a seal upon exhalation so that the expired air passes over the larynx and vocal cords. It is essential that the cuff is deflated when using a speaking valve as the client will not be able to exhale which could result in death

Different types of tracheostomy tube

There are different types, sizes and makes of tracheostomy tube depending on the clients need and they are also made from different materials which will dictate how regularly the outer tubes are changed.

Most tracheostomies will have an outer cannula, inner cannula and obturator for insertion.

Figure 1 an outer cannula inner cannula and obturator

The outer cannula or tracheostomy tube stays in situ for approximately 30 days depending upon the manufacturers guidelines

Tracheostomies should only be changed by staff deemed competent however all staff managing tracheostomies should have the relevant skills to reinsert /change the tube in an emergency as this is a life threatening situation

The inner cannula or inner tube may be fenestrated or non -fenestrated and should be changed and cleaned at least every 4 hours.

The obturator or introducer is used to ease the insertion of the new tracheostomy tube and should be removed immediately as the patient cannot breathe with it in

There are cuffed tracheostomies and un-cuffed and also fenestrated (with holes) and non-fenestrated (without holes)

Figure 2 A cuffed tracheostomy tube with non-fenestrated inner tube and obturator

Figure 3 a cuffed fenestrated tracheostomy tube with non- fenestrated and fenestrated inner tube and obturator

Figure 4 uncuffed non- fenestrated tracheostomy tube with non- fenestrated inner tube and obturator

A cuffed tracheostomy is usually used in acute setting such as Intensive care .The cuff forms a partial seal in the trachea which allows more efficient ventilation as the full breath is reaching the patients lungs rather than escaping and into the upper airway and also there is less chance of vomit or secretions reaching the lungs.

There are draw backs to this as the patient is unable to speak with the cuff inflated and the pressure of the cuff can cause long term damage to the trachea

Uncuffed tracheostomy tubes are usually used for patients in the Community as there is less risk of tracheal damage from the cuff in long term use, they also aid swallowing and communication .

As discussed there are also fenestrated and non- fenestrated tracheostomy tubes and inner tubes

Fenestrated tubes have multiple holes along the shaft of the outer tube that line up with the holes of the inner cannula that provide airflow through the tube to the larynx pharynx mouth and nose. There have been concerns around tissue granulating within the fenestration of the tube and there is also doubt surrounding the position of the fenestrations in relation to the vocal cords therefore patients are currently being discouraged from using them. Tracheal suction should not be performed with a fenestrated tube

There are a variety of more specialist tracheostomy tubes and inner tubes but this will become really confusing therefore specific teaching maybe given as required with the patient

Humidification

Air is inhaled directly through the tracheostomy which results in the loss of the warming and moistening function of the nose and upper airways.
Reduced humidification may lead to thick and sticky secretions the increased risk of infection and possible tube blockage

Supplementary humidification may need to be added to the ventilator circuit or if a client doesn't need a ventilator a heat and moisture exchange filter (HME) such as a Swedish nose may be attached to the tracheostomy

A Swedish nose

There are various methods to provide supplementary humidification according to the patient's individual needs; however it is most important to ensure the patient is adequately hydrated and they must be encouraged to drink plenty of fluids.

There are various forms of humidification

A HME filter is a heat and moisture exchange filter which connects to the end of the ventilator before the catheter mount .HME filters should be changed every 24 hours or more frequently if soiled. Ventilator alarms will be tested with the filter in situ as it may affect the pressure alarm.HME's aren't suitable for some ventilators therefore guidance must be sought from the Home Ventilation Team prior to application.HME filters should never be used in conjunction with heated humidification circuits as the filters will become waterlogged and cause an obstruction in the ventilator tubing

Saline nebulisers may be used to loosen chest secretions and should be prescribed by a GP

Heated humidification circuits are most common as they provide the optimum amount of humidification you may be familiar with models such as Fischer and Paykel or Res Med

A Fischer and Paykel humidifier

In extreme cases drugs can be given through the nebuliser or swallowed to assist with breaking down secretions and these are called mucolytics

The discharging hospital or the Home Vent Team will determine which humidification best suits your patient's needs and specific teaching will be given around the equipment your patient uses.

Activity 3 

1. What is the difference between a tracheostomy and tracheotomy?
2. When will a patient with a tracheostomy be unable to speak?
3. What are the long term risks of a cuffed tracheostomy?
4. What are the risks of using a fenestrated tracheostomy?
5. Which tracheostomy tube is more ideal for Community patients?
6. When would you NEVER use a speaking valve
7. Which part of the respiratory system warms filters and humidifies the air we breathe?
8. Why does a patient with a tracheostomy need humidification
9. Name something a patient can do to help with humidification
10. Name 3 methods of humidifying inspired air

Care of the tracheostomy

Tracheostomy inner cannula cleaning

The safest tracheostomy tubes have an outer and inner cannula to allow the inner cannula to be easily removed in an emergency .The inner tube or cannula must be routinely removed checked and cleaned at least 4 hourly to prevent narrowing or blockage. The frequency of cleaning should be increased if secretions are thick or more prevalent than usual. If a patient is struggling to breathe the first thing you should check is whether the inner tube is blocked and if it is replace immediately with a clean inner tube.

It is important to remember that some inner tubes will not connect to catheter mounts or ambu bags therefore the correct tube should be selected if the patient requires these interventions

Inner tubes may be cleaned with 0.9% sodium chloride or sterile water using a trachi-swab and excess water should be shaken off and air dried to ensure water does not enter the trachea. Although this is a clean rather than sterile technique gloves should be worn the spare inner tubes should sit in a clean sealed box (such as a soap dish) and be at hand at all times.

A SOP (standard operating procedure) for cleaning tracheostomy inner tubes will be included with your patient's documentation

Equipment

- Sterile dressing pack
- Cleaning solution such as 0.9% sodium chloride
- Disposable apron and gloves
- Bactericidal alcohol hand rub
- Inner cannula which is compatible with the tracheostomy tube which is in situ
- Emergency tracheostomy box
- Suction unit

Procedure

- Check care plan in patient's records
- Explain and discuss the procedure with the patient
- Pre-oxygenate the patient if required and prescribed
- Wash hands using bactericidal soap and water
- Open the dressing pack and empty the inner tube from its packaging onto it
- If possible assist the patient to sit in a semi -recumbent position with the neck extended
- Clean hands with alcohol hand rub. Put on a clean disposable apron and gloves
- Disconnect the ventilator if patient is ventilated

- Remove oxygen if used
- Remove inner cannula Place the new inner tube in position and ensure it is in a locked position
- Reconnect the patient to the ventilator if appropriate
- Reattach oxygen if required
- Clean the removed tube with 0.9% sodium chloride or sterile water and a tracheostomy swab and air dry. Replace in an airtight container with a lid
- Ensure the patient is comfortable
- Document the procedure noting the appearance of the inner tube upon removal

Dressings and tapes

Tracheostomy dressings are used to manage oozing around the stoma site. The oozing is generally caused by secretions and this can lead to skin becoming sore and macerated. They can also help to prevent the flange on the tracheostomy from causing irritation. Dressing types vary in size and absorbency from patient to patient and should be ordered via the GP.Specific tracheostomy dressing should be used rather than adapting dressings in case loose fibres escape into the trachea Tracheostomy dressings should be changed at least daily and more often if dressings are soiled or wet

Changing a tracheostomy dressing and /or tapes is a 2 person technique.

A sterile non touch technique is recommended for cleaning around tracheostomies and dressing change .Sterile sodium chloride should be used to clean as it causes less tracheal mucosal irritation and sterile gauze rather than cotton wool as it is denser and has fewer loose fibres which could break off and enter the stoma.

If the stoma and surrounding skin does appear to be sore cavilon sponges or cream may be used or a similar skin barrier film however spray should not be used as it may enter the trachea.

Staff should observe for redness pus swelling and malodour when changing the tracheostomy dressing and a swab should be obtained and sent to the GP if an infection is suspected. Dressings are available which are impregnated with silver and this may be beneficial if an infection is diagnosed.

When changing the tracheostomy tapes one member of staff should secure the tracheostomy tube at all times. Staff should monitor skin integrity and check for soreness all around the patient's neck. The new Velcro tapes should not be fastened too tightly and should feel comfortable for the patient. Two fingers between the patients neck and the fastening is usually a comfortable fit

A SOP for changing dressings and tapes will be included with your patient's documentation

Equipment

- Sterile dressing pack
- Tracheostomy dressing
- 0.9% sodium chloride for Cleaning
- Emergency tracheostomy box
- Tracheostomy securing tapes
- Bactericidal alcohol hand rub
- Ensure 2 people are present 1 to hold the tube and the other to perform the task

Procedure

- Check Care plan in patient records
- Explain and discuss the procedure with the patient
- Wash hands using bactericidal soap and water
- ensure emergency equipment is at hand
- Lay out equipment on sterile field and use aseptic technique to perform the procedure
- Remove the soiled dressing from around the tube and clean around the stoma with 0.9%sodium chloride and gauze
- Observe for signs of infection
- If infection is suspected take a wound swab and inform either the nurse or GP
- Replace with a clean tracheostomy dressing
- Renew tracheostomy tapes checking that 1-2 fingers can be placed between neck and tapes
- Document the intervention in the patients care plan detailing the condition of the patient's skin and stoma

Activity 4 

1) How often should an inner cannula be checked and cleaned?
2) Which materials should be used to perform this task?

3) Why are tracheostomy dressings used?
4) What may determine the choice of dressing
5) Is changing the dressing a clean or sterile technique
6) List two signs of infection
7) What measures would you take if you thought the stoma was infected

Tracheal suction

The respiratory tract is lined with ciliated epithelial cells that secrete mucus .Each cell has about 200 hair-like structures known as cilia, whose role is to remove unwanted mucus and secretions .The role of the mucus is to trap foreign bodies such as dust particles and bacteria to prevent them from entering the lungs. When a foreign body is identified more mucus is produced to deal with it

Tracheal Suctioning

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Suction machines

Tracheal suction keeps the tracheostomy tube patent and allows ventilation to take place it clears secretions that may potentially block the tracheostomy tube and is therefore an essential component of secretion control.

Different patients will require varying degrees of intervention from a patient who is able to clear the secretions out of their tracheostomy by coughing to a spinal injury patient who may no-longer have a cough reflex.

Tracheal suction carries risks and therefore other courses of action should be considered before suction is performed.

Tracheal suction may lead to the further production of mucus as the suction catheter is recognised as a foreign body

Risks include:

- Hypoxemia/hypoxia
- Atelectasis
- Raised intracranial pressure
- Fluctuations in blood pressure
- Bronchospasm
- Bradycardia/cardiac arrhythmias especially as a result of vagal stimulation
- Tracheal mucosal damage
- Bleeding
- Introduction of infection
- Patient distress/discomfort

Wherever possible patients should be encouraged to expectorate their own secretions. There are different physio techniques available to assist with this such as:

Breathing exercises

Huffing

Coughing

Postural drainage

Percussion/shaking /vibrations /assisted cough

Cough assist

NB the instillation of saline down the tracheostomy tube is not recommended practice

If your patient has a physiotherapist they may teach you the specific techniques and assess your competence depending upon how the package of care is set up

Hand ventilation may be used using an ambu bag to loosen secretions prior to suction and this is particularly effective following a sodium chloride nebuliser (if prescribed)

If a patient is ventilated a separate profile may have been set up on the ventilator to allow for short periods of bigger breaths or they may have a device called a cough assist

When all other avenues have been explored tracheal suction may be performed

NB in an emergency situation follow the emergency protocol and disregard other methods of secretion removal

Indications for suction include:

- Noisy breathing
- Patient's inability to generate an effective cough
- Visible secretions in the airway
- Low oxygen saturations
- Low tidal volumes on ventilator
- Patient verbally requests suctioning

Equipment and technique

There is varying guidance upon how to select the correct size catheter ,recommended negative pressure for tracheal suction and the depth to insert the catheter therefore for the purpose of this work book I will use St George's Healthcare Tracheostomy Guidelines 2012

Catheter size:

There is a calculation to determine the recommended catheter size in relation to the size of the tracheostomy tube but at the beginning it may seem confusing as the tracheostomy tube is measured in mm and the suction tubes in French gauge however the equation used is:

Suction catheter size FG = (size of tracheostomy tube) –2x2

For example: 8.0mm tube ID tube (size 8 tracheostomy tube) -2x2 =12Fg

In extreme cases when secretions are particularly thick the calculation can change to (size of tracheostomy tube)-1x2 but this is the maximum and should be used with caution

Suction pressure:

Great care should be taken with setting the pressure for tracheal suction as error could result in lung collapse or trauma to the tracheal mucosa.

The recommended negative pressure for tracheal suction in adults is 10.6-16 kPa or up to 20kPa for thicker secretions .This measurement is kilopascals but can also be measured in mmols of mercury (mm Hg) which would be 80-150mmHg. Suction pressures can be checked by occluding the suction tubing with a gloved thumb prior to connecting the suction catheter. Once the suction catheter is connected suction (negative pressure) will only be applied when the port is occluded.

It is recommended that the suction catheter is inserted without suction to the carina (when resistance is felt) and withdrawn by 1cm before applying suction .The suction tube should be withdrawn with pressure applied for no-longer than 10-15 seconds. If the patient can cough the catheter may only need to be inserted to the length of the tracheostomy tube or until a cough is stimulated

Suction may be performed using a clean technique and a step by step guide is below.

A SOP for tracheal suction and care plan will be included with your patient's documentation

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Assessment

Suctioning into the tracheostomy tube should not be a routine procedure

As discussed previously the patient must be assessed for signs of sputum in the airways. Where the patient can cough secretions independently into the top of the tracheostomy tube these secretions can be can be removed with a clean yankauer sucker or tissue.

Equipment

- Functional suction unit (wall or portable)
- Gloves, apron
- Bactericidal alcohol hand rub
- Appropriately sized suction catheters (size of tube)-2x2
- Water to clean suction tubing

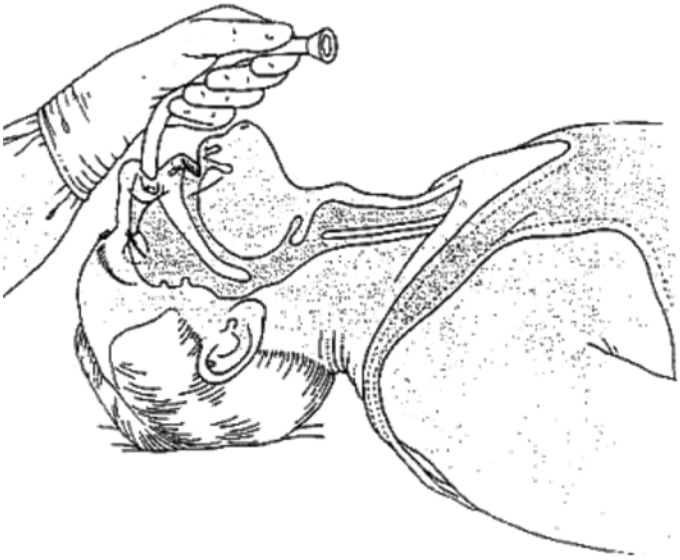
Procedure

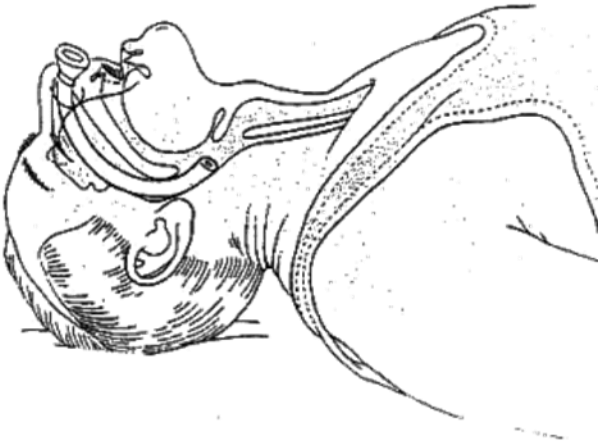
- Assess patient for signs of airways secretions that they are unable to remove by coughing
- Discuss the need for suctioning with the patient gaining consent for the procedure where possible
- Pre-oxygenate patients who are receiving supplemental oxygen
- Replace fenestrated inner tube with non-fenestrated if required
- Wash hands put on gloves and an apron
- Set suction pressures to 10.6-20Kpa (80-150mmHG). Ensure that applied suction pressure is no greater than 20kpa by occluding the suction tubing with a gloved thumb
- Select an appropriately sized catheter. Connect suction catheter to bubble tubing
- If patient is on a ventilator open the port on the catheter mount or disconnect the ventilator
- Put on *clean* glove. Remove outer packaging ensuring only the clean glove touches the sterile catheter
- Insert the suction catheter without suction, to the carina and then withdraw 1cm.If the patient can cough this may not be necessary and the catheter need only be inserted to the length of the tracheostomy tube
- Apply continuous suction on withdrawal only, this should take no longer than10-15 seconds
- Wrap used suction catheter in outer glove and discard
- Rinse the bubble tubing with water
- Reapply oxygen if required by the patient, within 10 seconds of completing suctioning
- Reassess patient, reapply suction if required. Ideally suction no more than three times and use a separate catheter each time
- Reassure patient post suctioning
- Wash and gel hands
- If infection if suspected (discoloured green thick secretions)obtain a sputum sample using a sputum trap and inform the nurse or GP in case medical intervention is required
- Document suctioning and patient response
- The instillation of normal saline, to facilitate sputum clearance, is not recommended practice, and it may actually be harmful (Blackwood 1999, Kinloch and Rock 1999)

Nasopharyngeal / Oropharyngeal Suction

Nasopharyngeal and oropharyngeal suction are techniques use to stimulate a cough and /or to remove secretions from the airway when a patient does not have a tracheostomy and is unable to cough sufficiently to remove the secretions themselves. The insertion of a nasopharyngeal or oropharyngeal tube may be required

Insertion of a nasopharyngeal airway





The procedure carries significant risks including accidental entry into the oesophagus which may result in gastric contents being deposited in the trachea which could cause a patient to aspirate

Other risks include:

- Hypoxemia :Low oxygen in blood
- Hypoxia :Low oxygen in tissues
- Trauma
- Arrhythmias (irregular pulse)
- Respiratory arrest
- Lung collapse
- Pneumothorax
- Considerable discomfort to the patient

There are patients who *will* require oro/nasopharyngeal suctioning in the community and a full teaching package will be given prior to the patient being discharged from hospital or if you are required to perform this task with an existing patient

Sputum specimens

You may be requested to obtain a sputum sample from a patient with a tracheostomy; this is usually if infection is suspected;

Signs of infection include:

- Purulent sputum
- Change in colour ,quantity or odour of sputum
- Raised temperature
- Reduced oxygen saturations

A sputum trap is designed to be connected to the suction equipment and once the sputum is obtained the lid can be sealed and the sample can be sent to the lab for culture and sensitivity. Always ensure that the sample is labelled correctly as errors may result in delayed treatment for your patient

A sputum trap

Oral suction

Oral suction may be required if a patient has difficulty swallowing oral secretions.

A yankauer sucker

This procedure is performed using a suction catheter known as a yankauer sucker which is made from rigid plastic which is inserted into the patient's mouth The yankauer sucker is attached to the bubble tubing on the suction unit and suction pressures should be 37.5-75mmHg or 5-10 kPa.

Depending upon the make of yankauer a hole in the stem of the tube may need to be occluded to apply suction and for others the suction is active as soon as the tube is connected Gloves and aprons should be used to perform this task.

Care should be taken not to insert the yankauer further than the patient's back teeth as there is the risk of stimulating the gag reflex which may cause vomiting and aspiration and the procedure should be performed gently to reduce the risk of tissue or dental damage

The yankauer and tubing should be rinsed through with water following the procedure and the yankauer should be changed daily

Activity 4 

1) Why is mucus produced?
2) Why may tracheal suction cause more mucus production?
3) List 3 risks associated with tracheal suction
4) List 3 signs that a patient may require tracheal suction
5) How do you calculate which size suction catheter to use for the removal of normal secretions?
6) Which inner cannula should be used when performing tracheal suction?
7) How far should the catheter be inserted?
8) When should you apply the suction?
9) Is tracheal suction a clean or sterile procedure in the Community
10) What are the recommended suction pressures in adults?
11) When might a patient require nasopharyngeal suction?
12) What is the biggest risk associated with this technique?
13) When might a patient require nasopharyngeal suction?
14) What is the biggest risk associated with this technique?
15) When might a patient require nasopharyngeal suction?
16) What is the biggest risk associated with this technique?
17) List 2 signs of infected sputum
18) What steps would you take if you thought infection was present
19) When may a patient need oral suction
20) List 2 risks associated with oral suction

Changing a tracheostomy tube

Tracheostomies should be changed according to manufacturer's guidelines and are generally every 30 days (depending upon the materials they are made from)

In the acute setting the initial tube change carries a high risk however in the Community setting with a patient with a well-established stoma the risks are lower however staff need to be aware of emergency protocols and what to do in the event of being unable to reinsert the tube as this is a life threatening situation.

Whilst a qualified nurse will generally carry out routine tracheostomy changes; all staff caring for someone with a tracheostomy must have the relevant skills to change it in an emergency. Staff must be deemed competent by a nurse prior to performing this task.

A tracheostomy change is a two person technique, with one person supporting the tube and the patient and the other performing the change.

There are two methods of tracheostomy change however patients in the community have a blind exchange using an obturator as they have formed stomas and a low risk of airway loss

A SOP for a tracheostomy change will be included with your patient's documentation

Equipment

- Sterile dressing pack (including gloves and apron)
- Appropriately sized tracheostomy tube and one size smaller
- Tracheostomy tube holder
- 10ml syringe for cuffed tubes
- Water soluble lubricant
- Sterile normal saline
- Pre-cut key hole dressing
- Functioning suction unit and appropriate sized catheters
- Ambu bag
- Occlusive dressing
- Emergency tracheostomy box

Procedure

- Check tracheostomy tube size and expiry date
- Check emergency equipment
- Explain procedure to patient and gain consent
- Position patient in semi-recumbent position where possible
- Pre-oxygenate where required
- Ensure assistant is clear as to what their role will be
- Open dressing pack
- Empty all contents onto sterile field
- Apply sterile gloves
- Insert obturator
- Check cuff if applicable and lubricate tube
- Ask assistant to perform suction if required ,remove old dressing ,inner cannula and tapes and support tube
- (Deflate cuff with suction applied if appropriate)
- Disconnect ventilator where applicable
- Remove tube on expiration
- Clean and dry stoma with sterile saline and gauze
- Observe for signs of redness/infection around the stoma
- Insert tube on expiration ,remove obturator insert inner cannula and inflate cuff if applicable
- Reconnect the ventilator if applicable
- Ask assistant to support the new tube
- Apply dressing and tapes
- Ensure patient is comfortable
- Document procedure in notes including batch number size and make of tube and the expiry date
- Throw away old inner cannula and replace with new

EMERGENCY MANAGEMENT

If unable to re-insert tube

- CALL 999
- Reassure you patient
- Try to insert one size smaller tracheostomy tube
- If patient can breathe through the stoma give reassurance until help arrives unless their condition deteriorates
- If patient's condition deteriorates and they stop breathing occlude the stoma with a granuflex dressing and give breaths using a facemask and ambu bag until help arrives.

EMERGENCY MANAGEMENT

Blocked tube

If the patient appears unable to breathe/ventilate

- Feel for air movement from tracheostomy tube
- If tube blockage is suspected remove and replace inner cannula
- If inner tube isn't blocked and blockage is still suspected ring 999 and deflate cuff to allow patient to breathe around the tube
- Hand ventilate using the ambu bag
- Perform suction to clear secretions

If the patient is still struggling to breathe

- Remove tracheostomy tube by removing tube holder and gently pulling tube in an outward and downward direction (ensuring the cuff has been deflated)
- This may resolve the problem if the blockage was the tube
- If able to, reinsert a new tracheostomy tube or one size smaller
- If unable to reinsert a new tracheostomy tube and patient is able to breathe provide reassurance until help arrives

- If patient is unable to breathe occlude the stoma with granuflex and give breaths using facemask and ambu bag until the paramedics arrive

- NB a face mask may be attached to the ventilator and applied over the patient’s nose and mouth if you are working alone as it is difficult to form a good seal around the nose and mouth and hand ventilate at the same time

Activity 5 

1. How often should a tracheostomy be changed?

2. Who should perform this task?

3. Can this task be carried out alone?

4. Which equipment will you need for this procedure?

5. Is this a clean or sterile technique?

6. If you are unable to re-insert the tracheostomy tube what is the first thing you should try?

7. What emergency steps would you take in the event of a blocked tracheostomy tube?

Now you have completed this work book you should be able to discuss:

- The upper and lower respiratory system
- The purpose of a tracheostomy
- The different tubes available and their purpose
- Humidification
- Care of the inner cannula
- Tracheostomy dressings and tapes
- Suction techniques
- Routine tracheostomy change
- Emergency action

Congratulations upon the completion of this work book it will help to demonstrate the in-depth knowledge required for the WASP assessments

Glossary

Hypoxaemia: low oxygen levels in the blood

Hypoxia: low oxygen levels in tissues

Sputum: purulent sputum contains pus and is discoloured and this could indicate an infection

Arrhythmias: Irregular heart beat

Pneumothorax: Air that is trapped between a lung and the chest wall

Bronchospasm: A temporary narrowing of the airways into the lungs

Bradycardia: Slow pulse rate

Vagal Stimulation: Stimulation of the vagus nerve which can cause bradycardia (low Pulse) fainting

Raised intracranial pressure: Raised pressure inside the skull

Atelectasis: Collapse of part or the entire lung

Sources

St George's Healthcare tracheostomy Guidelines

Intensive Care Society Standards (Tracheostomy Standards and Guidelines 2014)

The Royal Marsden Manual of Clinical Nursing Procedures (Ninth edition)