

WEEK 1- RESPIRATORY DYSFUNCTION & THORACIC TRAUMA

ILO'S

- state normal arterial blood gas levels;

Type	Normal levels
Arterial blood pH	7.35-7.45
Partial pressure of carbon dioxide- PaCO ₂	35-45mmHg
Partial pressure of oxygen- PaO ₂	80-100Hg
Bicarbonate-HCO ₃	22-28mEq/L
Oxygen saturation-SaO ₂	>95%

- pH of 7.2=acidotic
- Patient with a PaO₂ of 60-at risk of hypoxia

- define blunt and penetrating trauma to the thoracic cavity;

Blunt trauma

- No communication between the damaged tissues and the outside environment
- Frequently caused by motorcycle accidents , falls, assaults and sports injuries

Penetrating trauma

- Occurs when a foreign object enters the body, causing damage to the body structures, such as the lungs, heart and vascular system
- Examples include gunshot wounds, stab wounds or impalement

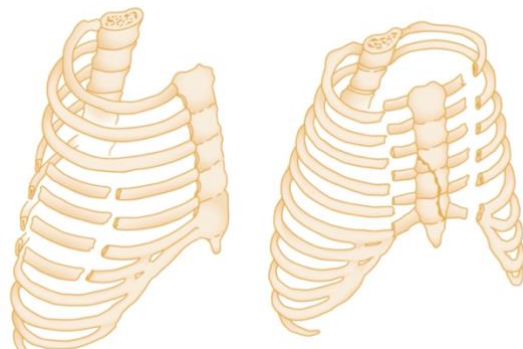
Major injuries caused by blunt or penetrating trauma

- Flail chest
- Pulmonary contusion
- Cardiac tamponade
- Pneumothorax
- Haemothorax

- describe the major effects that injuries such as flail chest, pulmonary contusion and cardiac tamponade have on the respiratory systems;

Flail chest

- Fracture of two or more adjacent ribs in two locations
- Causes a free floating or 'flail' segment of the chest wall
- Paradoxical movement of chest wall section- the flail segment is sucked inward during inhalation and moves outwards during exhalation
- Impairs ventilation directly
- Impairs chest wall stability



- Associated with pulmonary contusion-repeatedly injuring the lung by pulling this section of rib against it & primary injury

Manifestations:

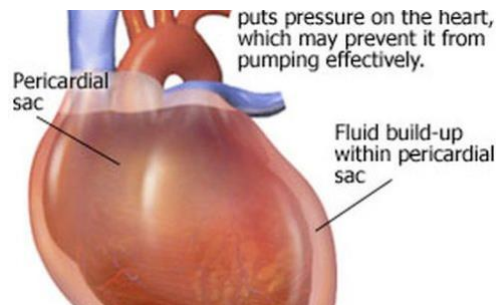
- Dyspnoea-SOB or difficult/laboured breathing
- Pain on inspiration in particular
- Chest wall expansion is unequal
- Diminished breath sounds

Treatment:

- Supplemental oxygen
- Maintain their oxygenation
- Intubate and mechanically ventilate if in significant respiratory distress

Pulmonary contusion

- Bruising of the lung (injury to the lung tissues)
- May occur either unilaterally or bilaterally
- Results when alveolar and pulmonary arterials rupture, causing alveolar haemorrhage and bronchial oedema



Cardiac tamponade

- A build-up of fluid in the pericardial sac (the membrane enclosing the heart)
- Compression of the heart due to pericardial effusion, trauma, cardiac rupture or haemorrhage
- As a result, the heart is unable to pump efficiently and blood flow is obstructed-decreased cardiac output
- Can cause life threatening myocardial compression

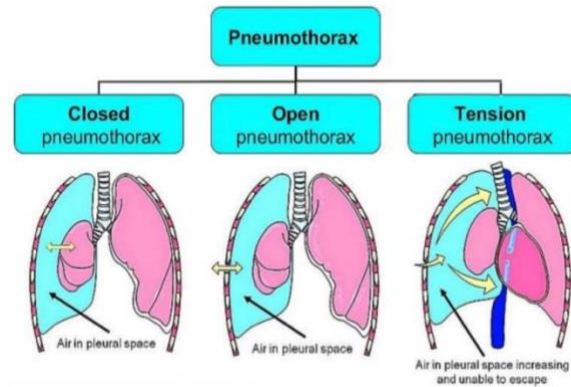
- **define traumatic, tension and spontaneous pneumothorax;**
- **describe the pathophysiology of a pneumothorax**
- **identify and explain the appropriate nursing assessment and collaborative management of the patient with a pneumothorax;**

Pneumothorax= the collapsing of a lung due to air accumulating in the pleural space (the space between the visceral and parietal pleura)

Pathophysiology

- In the pleural space there are small amounts of serous fluid-as you breathe in and breathe out, the fluid allows your lungs to glide over one another without any pain and it creates a negative pressure
- This negative pressure acts like suction to keep lungs inflated

- When air enters into the space → can occur through an object piercing through the chest wall=**open pneumothorax**, all the air from outside is entering into the space causing pressure to push on the lung and collapse it
- Or the visceral pleura ruptures and it releases air that you're breathing in into that pleural space=**closed pneumothorax**
- As this air builds in this space, it decreases the ability of the lungs to recoil on that affected side



Traumatic pneumothorax

- Air in the pleural space caused by trauma (blunt or penetrating)
- **Closed pneumothorax**: air leaks into the pleural space without an outside wound- can be caused by blunt force trauma and fractured ribs penetrating the pleura (the rib pierces the lung and causes air to be released)
- **Open pneumothorax**: opening in the chest wall that causes a passage between outside air and the pleural space which allows air to pass back and forth with inspiration and expiration-the pleural pressure will become equal with the atmosphere pressure which will lead to collapsed lungs

Spontaneous pneumothorax

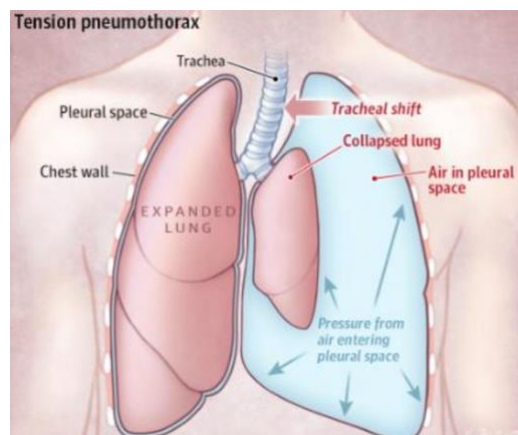
- Develops when an air filled bleb or blister on the surface of the lung ruptures
- When it ruptures it releases air into the pleural space
- **Primary spontaneous**: affects previously healthy people without lung disease
- **Secondary spontaneous**: affects people with underlying or pre-existing lung disease

S&S for traumatic and spontaneous:

- Pleuritic chest pain
- Tachycardia
- Tachypnoea
- Unequal chest expansion
- Dyspnoea
- Absent breath sounds on affected side

Tension pneumothorax

- Develops when injury to the chest wall or lungs allows air to enter the pleural space but prevents it from escaping
- Can occur as a result of an open or closed pneumothorax
- Leads to an increase in intrathoracic pressure which causes compression on the unaffected lung and the heart



- Causes a mediastinum shift-heart, trachea, oesophagus, vessels shift to the unaffected side→causes major compression on the unaffected lung and decreases venous return because the vena cava is being compressed

S&S:

- Patient tries to compensate with increased breathing (tachypnoea)
- Tachycardia-not getting enough blood to other organs and tissues
- Hypotension-reduced cardiac output
- Hypoxia
- Late sign=tracheal deviation

Nursing assessment

- Main goal=maintain adequate ventilation and promoting oxygenation
- Primary survey followed by secondary survey
- Assess vital signs
- Level of consciousness
- Respiratory assessment- auscultate for absent breath sounds or decreased breath sounds, unequal lung expansion
- Assess trachea for deviation
- Skin colour-cyanosis

Diagnosis:

- **Chest x-ray**-reveals air and/or fluid accumulation in the pleural space, may show mediastinal shift
- **CT chest**
- **Venous or arterial blood gasses**- to assess for impairment in gas exchange and acid-based disturbances

Treatment

- Surgery
- Thoracic drain tube to remove air or fluid from pleural cavity
- Effective pain management

○ **describe the pathophysiology of a haemothorax;**

- Occurs when blood accumulates in the pleural space increasing pressure on the lung which impairs ventilation and gas exchange
- Can result from blunt or penetrating chest trauma, surgery or diagnostic procedures

Signs and symptoms

- Potential for haemorrhage-need to assess for the S&S of bleeding and the potential development of hypovolaemic shock
- Symptoms similar to pneumothorax
- However on auscultation you'll hear diminished lung sounds, when percussing there will be a dull percussion tone over the blood, and the blood typically pools at the base of the lungs due to gravity