

Good Afternoon



Fascinating Features and Mysterious Manifestations of Disease

OLLI @ University of Illinois
Fall 2022 Semester

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Session 3

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Texture or Sounds
of Disease

Plan for the Course

- Session 1: Diseases with a color
- Session 2: Diseases with an odor or a taste
- Session 3: Textures or Sounds of Disease
- Session 4: Diseases with unusual appearance
- Session 5: Flying, crawling & burrowing critters
- Session 6: Forgotten or ignored epidemics
- Session 7: }
• Session 8: } Medical detectives solve mysterious cases

Plan for the Session

- Texture:
 - Scarlatina
 - Palpable purpura
 - Keratoses.
 - Pellagra
- Sounds: Pulmonary, gastrointestinal.
- Air leak syndromes.

DISEASES with a TEXTURE



SCARLET FEVER

Scarlet Fever

(SF, Scarlatina)

- Group A streptococcus (strep throat).
- The bacteria releases a toxin that causes the rash and the strawberry tongue.
- 3 weeks after the rash, the toxin can induce an autoimmune reaction that produces rheumatic fever (RF) and rheumatic heart disease (RHD).
- A person can have SF more than once.

Scarlet Fever

(SF, Scarlatina)



- Strawberry tongue is marked by enlarged fungiform papillae and increased redness.
- The tongue can also be whitish.
- Feels like a rough bath sponge.

Scarlet Fever

(SF, Scarlatina)

- Red rash looks like a sunburn and feels like sandpaper.
- It begins on the face or neck and spreads to the trunk, arms and legs.
- Pushing on the reddened skin makes it turn pale.
- Skin around the groin, armpits, elbows, knees and neck usually a deeper red.

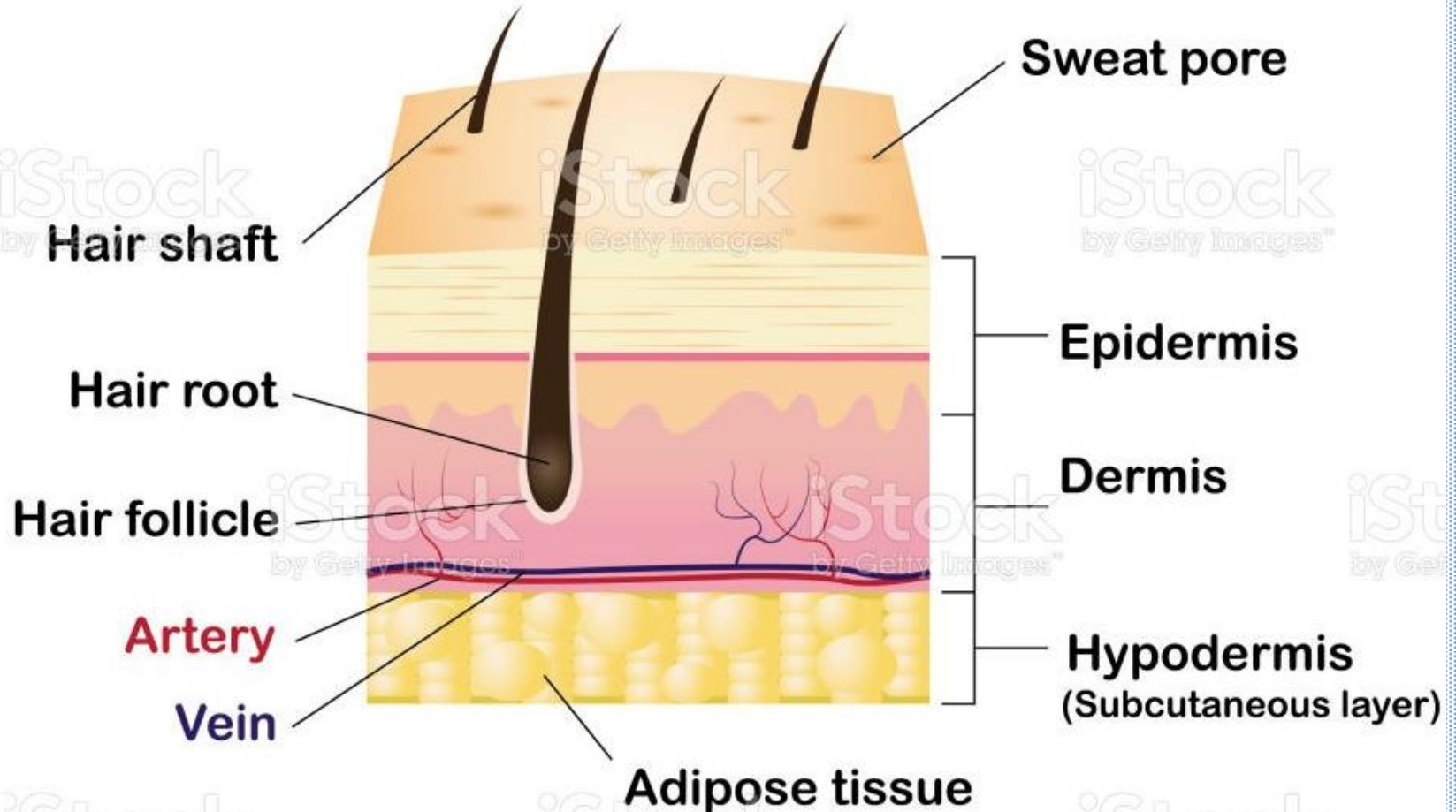


Scarlet Fever

(SF, Scarlatina)

- Possible unproven relationship between strep infection and a rare condition called Pediatric Autoimmune Neuropsychiatric Disorder Associated with group A Streptococci (PANDAS).
- Children experience worsened symptoms of neuropsychiatric conditions, such as obsessive-compulsive disorder or tic disorders.

SKIN STRUCTURE



PALPABLE PURPURA

Palpable Purpura

Purpura is the discoloration of skin or mucous membranes due to hemorrhage from small blood vessels:

- *Petechiae* are small, purpuric lesions up to 2mm across, associated with capillaritis.
- *Ecchymoses* or bruises are larger extravasations of blood.
- Palpable purpura can be felt, due to inflammation of the blood vessels (vasculitis).

Palpable Purpura

- Visible, non-blanching hemorrhages, raised, firm and able to be touched or felt upon palpation.
- It indicates vasculitis with blood vessel destruction secondary to a serious disease:
 - Rocky mountain spotted fever (RMSF)
 - Acute meningococemia
 - Disseminated gonococcal infection
 - Henoch–Schönlein purpura (HSP)
 - Subacute bacterial endocarditis (SBE)

Palpable Purpura

- These lesions have a more dangerous prognosis than most other eruptions.
- Bleeding into the dermis implies a more grave diagnosis.



Palpable purpura

Henoch-Schönlein Purpura (HSP)

- Palpable purpura is caused by inflammatory damage to small and medium-sized vessels.
- HSP, also known as IgA vasculitis, causes the small blood vessels in skin, joints, intestines and kidneys to become inflamed and bleed.
- HSP usually follows a strep or staph infection and may cause fever, *arthralgias*, abdominal pain, and increased risk for renal vasculitis.



Palpable Purpura

- Elevated, firm, asymptomatic hemorrhagic papules or plaques on lower legs, buttocks, or back.
- Non-palpable purpura suggests hemorrhage from a platelet or coagulation disorder.
- Extravasated blood usually breaks down and changes color over a few weeks from purple, orange, brown and even blue and green.

Palpable Embolic Purpuras



Osler Nodes



Splinter Haemorrhages



Janeway Lesions

- Osler nodes: small, *tender*, nodular lesions that occur in the palms, soles, and pads of the fingers and toes.
- Splinter hemorrhages: *painless*, linear, dark streaks on the nail, caused by subungual bleeds in the capillaries of nailbeds.
- Janeway lesions: small, *painless*, hemorrhagic macules, papules, or small nodules, also located primarily on the palms and soles.

Questions 1



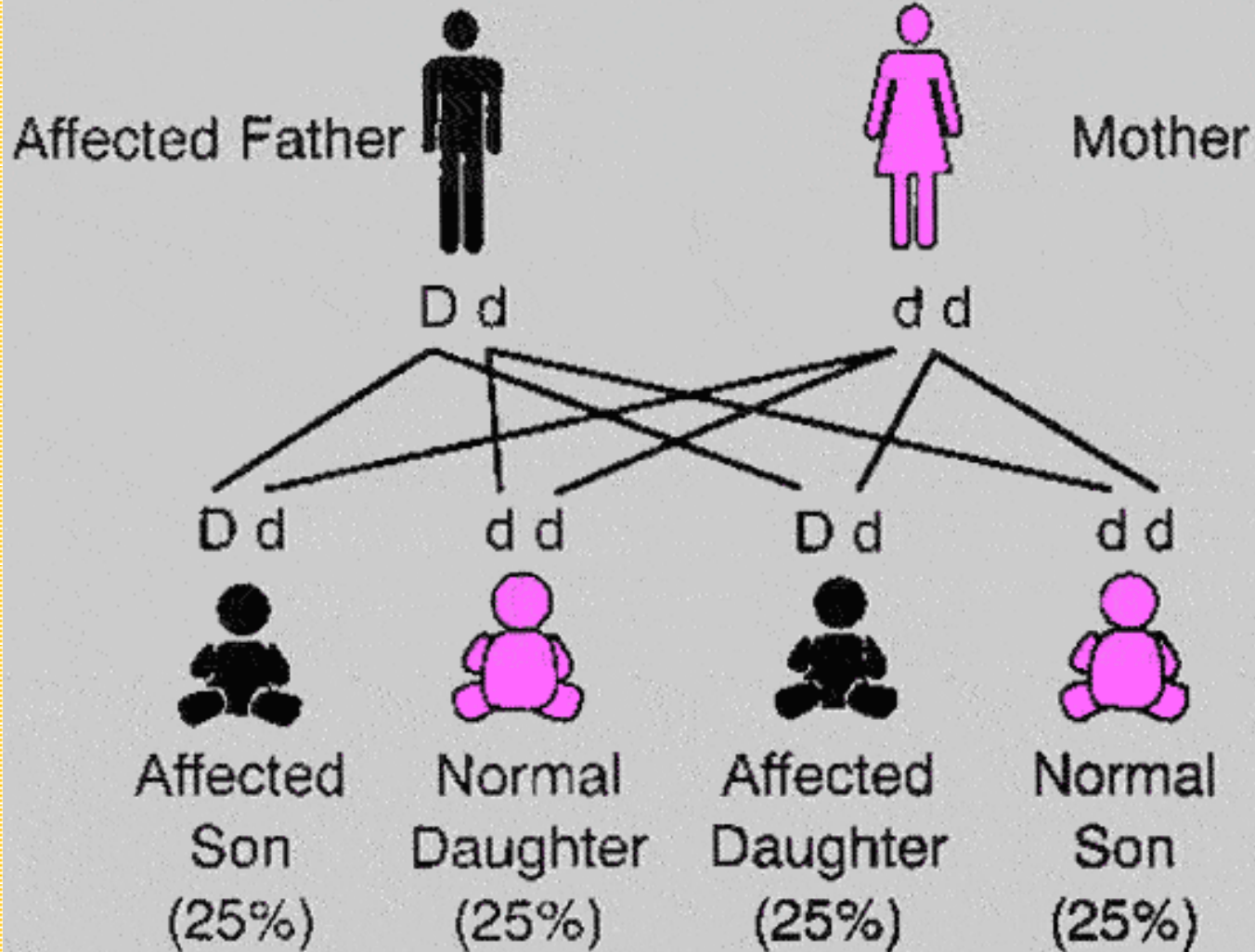
Keratosis Pilaris (KP)

Actinic Keratosis (AK)

VARIOUS KERATOSES

Autosomal Dominant Inheritance

(One Parent Affected)



Keratosis Pilaris (KP)

- *Keratosis pilaris* (KP, chicken skin) is a common, autosomal-dominant, genetic condition of the skin's hair follicles.
- Small, gooseflesh-like bumps, with varying degrees of reddening or inflammation, on the upper arms, thighs, face, back, and buttocks.
- KP can also occur on any part of the body **except** glabrous (hairless) skin (like the palms or soles).
- Often the lesions can appear on the face and may be mistaken for acne.

Keratosis Pilaris (KP)



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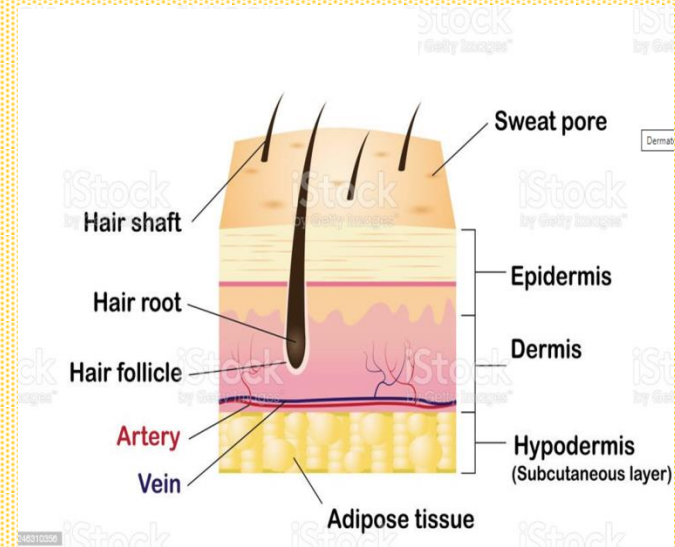
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Keratosis Pilaris (KP)

- Rough skin-colored bumps, occasionally itchy, the size of a grain of sand, many of which are surrounded by:
 - a slight pink color in light-skinned people
 - dark spots in dark-skinned people.
- More pronounced in color and texture during the colder months, during pregnancy or after childbirth.
- Increased sun exposure might mitigate the symptoms of KP.

Keratosis Pilaris

- Caused by excessive growth of cream-colored keratin on the skin which blocks hair follicles with hard plugs (if a hair is trapped inside its follicle = ingrown hair).
- Keratosis pilaris is a classic sign of vitamin A deficiency.



PELLAGRA

Pellagra

- Niacin is crucial to cell functions throughout the body, like skin, mouth, bowels and brain, and signs appear when deficient.
- If untreated, can cause lasting damage to the nervous system and even death.

Pellagra

From Italian *pelle* (skin) and *agra* (sour or rough).

Nutritional deficiency of Vitamin B₃ (niacin).

Also lack of tryptophan

Can be secondary to some diseases/conditions:

Crohn's disease

Chronic alcoholism

Carcinoid syndrome

Also some drugs:

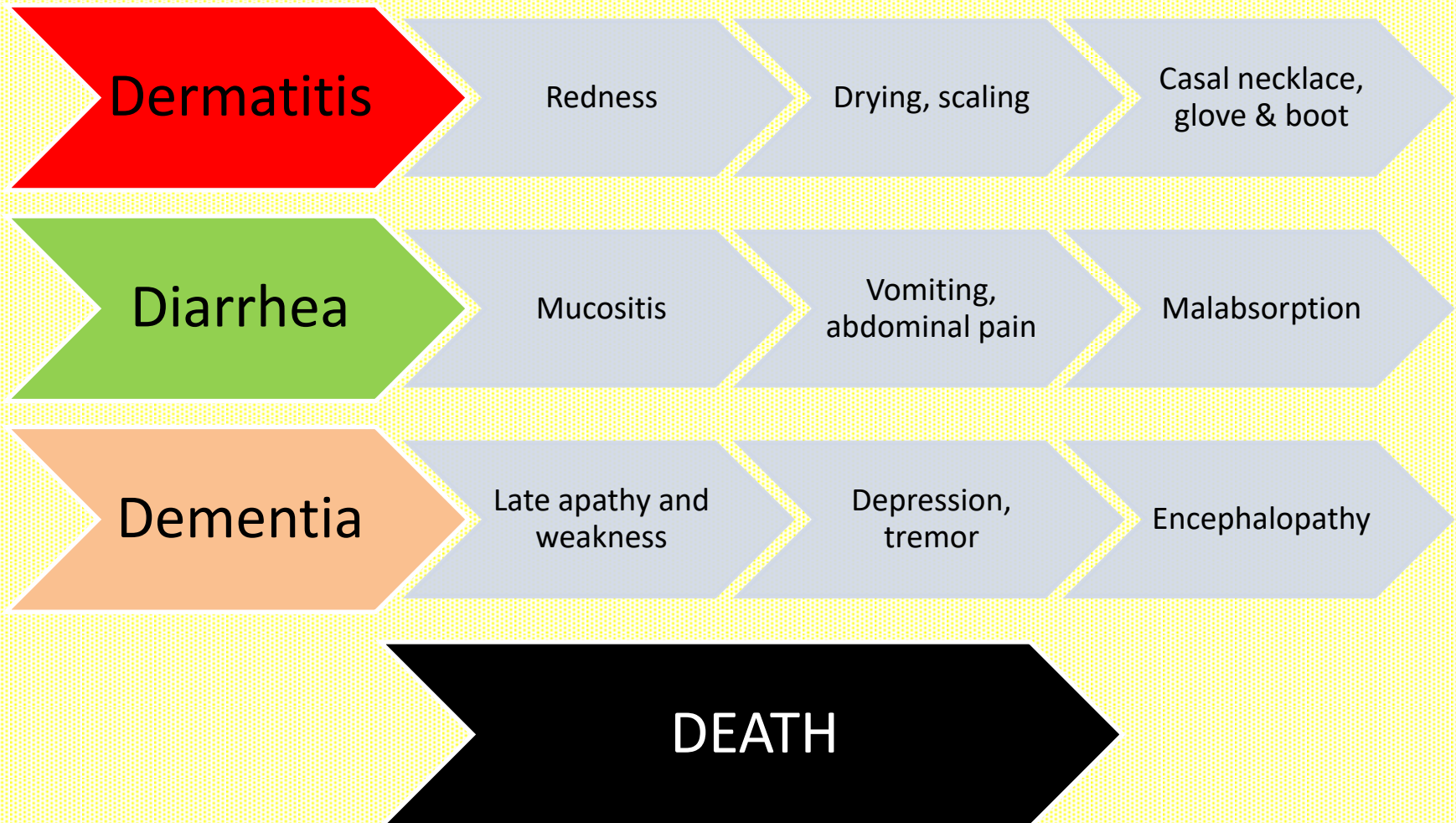
Isoniazid

Fluorouracil

Mercaptopurine

Pellagra

The 4 “D’s”





Pellagra

Initially thought to be an infection.

Also thought to be caused by a toxin in corn.

Caused by an error in the preparation of corn.

Niacin is not bioavailable in unprocessed corn.

Mesoamerican Indians used nixtamalization

Initial settlers to South US did not.

Pellagra was endemic in Southern settlers.

Rare now that diet is more varied.

Pellagra

- Between 1906 and 1940 more than 3 million Americans were affected by pellagra with more than 100,000 deaths.
- Epidemic resolved after niacin fortification.
- Now seen only in countries dependent on corn.
- Richer countries use fortified wheat and other foods.

ACTINIC KERATOSIS

Actinic Keratosis

- Actinic : relating to, resulting from, or exhibiting chemical changes produced by radiant energy especially in the visible and ultraviolet parts of the spectrum.
- Keratosis: excess in the production or accumulation of keratin.

Actinic Keratosis (AK)

- Sometimes called solar keratosis or senile keratosis; it is a pre-cancerous condition.
- The lesions appear as thick, scaly, or crusty areas that often feel dry or rough and which may be dark, light, tan, or have the same color as the surrounding skin.
- Size between 2 and 6 millimeters, but can grow to several centimeters in diameter.

Actinic Keratosis (AK)

- AKs are often felt before they are seen.
- Most commonly present as a white, scaly plaques of variable thickness with surrounding redness.
- Most notable for having a sandpaper-like texture when felt with a gloved hand.

Actinic Keratosis (AK)



THE SOUNDS of DISEASE

PULMONARY SOUNDS

Pectoriloquy

- From Latin pectus (chest) and loqui (to speak), literally, “the chest speaks”.
- Distinct articulation of a patient's voice, heard on applying the stethoscope to the chest.
- It usually indicates some morbid change in the lungs or pleural cavity.

Pectoriloquy

- Normal lungs are filled with air, which does not transmit sound well, so voice sounds are difficult to hear.
- When substances such as fluid or solid masses replace air in the lungs, sounds are transmitted more clearly.
- The sounds that can be assessed are:
 - Whispered pectoriloquy
 - Bronchophony
 - Egophony:

Pectoriloquy

- **Whispered pectoriloquy:** Whisper a 1-2 syllable word. Heard clearly = consolidation is present,
- **Egophony:** Patient says "**E**". If lung consolidation is present, it may sound like a nasal "**A**" instead.
- **Bronchophony:** Patient says "**99**" in a normal voice. If consolidation present, may be heard clearly or with more intensity.

FREMITUS

Fremitus

- Vibration of the chest wall that results from sound vibrations created by speech or other vocal sounds.
- Sound from the vocal cords is transmitted to the chest wall and felt as a palpable vibration.
- In persons with healthy lung tissue, tactile fremitus is felt symmetrically along both sides of the chest.
- Abrupt or asymmetrical changes in tactile fremitus are abnormal and reflect an underlying lung condition.

Fremitus

- Men have lower-pitched voices, which conduct more easily through lung tissue than do women's higher-pitched voices.
- It may be absent in some healthy persons, like those with high-pitched or soft voices or those with thick chest walls.
- Asymmetric decreased fremitus is an abnormal finding which occurs when air, fluid, or tumor pushes the lung away from the chest wall.
- When there is consolidation of the underlying lung (unilateral pneumonia), it is asymmetrically increased

Crepitus

- Can also be used when describing the sounds produced by lung conditions such as interstitial lung disease; these are also referred to as "rales".
- Crepitus is often loud enough to be heard by the human ear, although a stethoscope may be needed to detect instances caused by respiratory diseases.

Stridor

- May also be called “musical breathing” or extra-thoracic airway obstruction.
- Stridor affects children more often than adults (congenital, infection traumatic).
- Inhaled *Heliox* (70% helium, 30% oxygen); has an almost instantaneous curing effect.

Stridor

- Latin for "creaking or grating noise", it is a high-pitched extra-thoracic breath sound resulting from turbulent air flow in the larynx or lower in the bronchial tree.
- It is different from a *stertor* which is a noise originating in the pharynx.

Type	Audible	Problem
Inspiratory	Only in inspiration	Above vocal cords
Expiratory	Only in expiration	Tracheal issues
Biphasic	Inspiration and expiration	Cord narrowing

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Wheezing

- Musical, high-pitched, adventitious sound generated in the small distal bronchioles during expiration.
- Shrill-whistle sound generated on or around the cords are heard on inspiration.
- People with any lesion that causes narrowing of the airways may wheeze, but wheezing does NOT equal asthma.
- Computerized analysis shows it has a sinusoidal waveform.

Crackles

(Rales)

- Loud opening of small airways, they are discontinuous, non-musical, brief and are more common during inspiration than expiration.
- Inflammation and/or infection of the small bronchi, bronchioles, and alveoli.
- If they do not clear after a cough:
 - Pulmonary edema
 - Fluid in the alveoli due to heart failure
 - Pulmonary fibrosis
 - Acute respiratory distress syndrome (ARDS)
- If partially clear or change after coughing, may indicate bronchiectasis.

Ronchi

- Continuous low-pitched, rattling lung sounds that may resemble snoring.
- Caused by obstruction or secretions in larger airways and usually clear briefly after coughing.
- Can be heard in patients with:
 - Bronchiectasis
 - Pneumonia
 - Chronic bronchitis,
 - Cystic fibrosis
 - Chronic obstructive pulmonary disease (COPD).

Crepitus

- Crepitus (crepitation) is any grinding, creaking, cracking, grating, crunching, or popping that occurs when moving a joint.
- People can experience crepitus at any age, but it becomes more common as people get older.

Crepitus

- Can be created when two rough surfaces in the body come into contact during motion.
- It is a common sign of bone fracture when the surfaces of the broken bones rub together.
- Can easily be created and observed by 'cracking a joint' so that bubbles of nitrogen formed in the synovial fluid burst.

WARNING

Even though all these pulmonary sounds may be indicative of serious disease, BEWARE of the patient who looks very ill and is not making a sound: they are probably moving little or No air!!!

Questions 2



Subcutaneous emphysema

Pneumothorax

Pneumomediastinum

Traveling Air

AIR LEAK SYNDROME

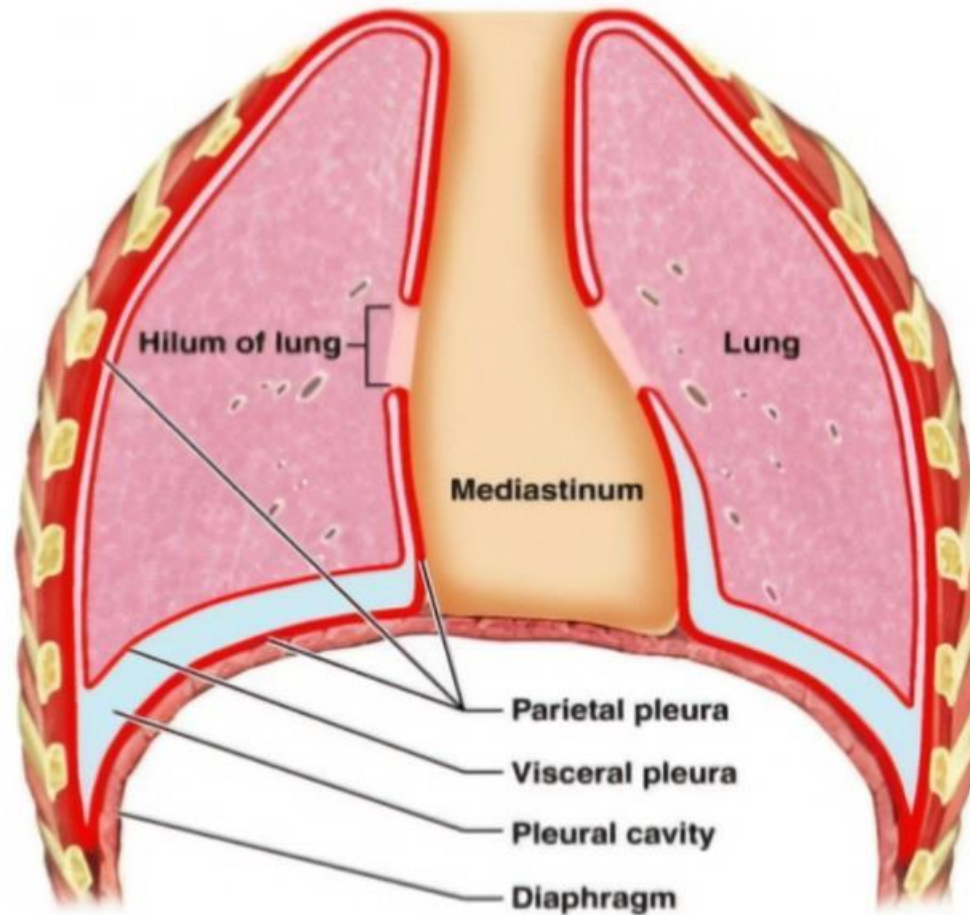
This is Not Rocket Science



Physics of Air

- In the body, air will intrude between layers of tissue and go towards area of less pressure.
- Air will find virtual cavities and fill them (a gas expands to fill the space available).
- Air will exert pressure, displace and compress organs and structures.
- In certain areas, trapped air can be fatal.

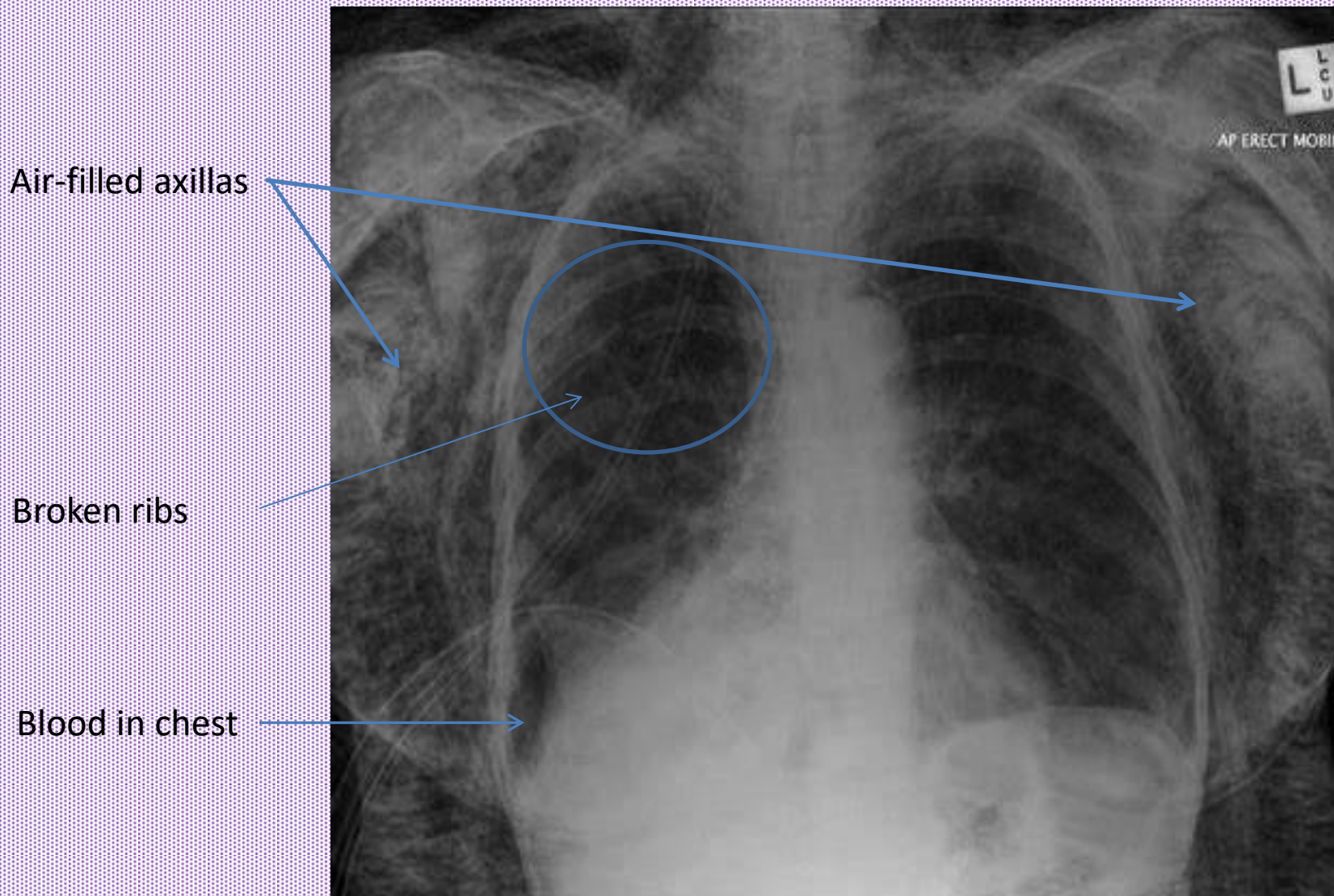
Diagram of the Pleurae and Pleural cavities



Subcutaneous Emphysema

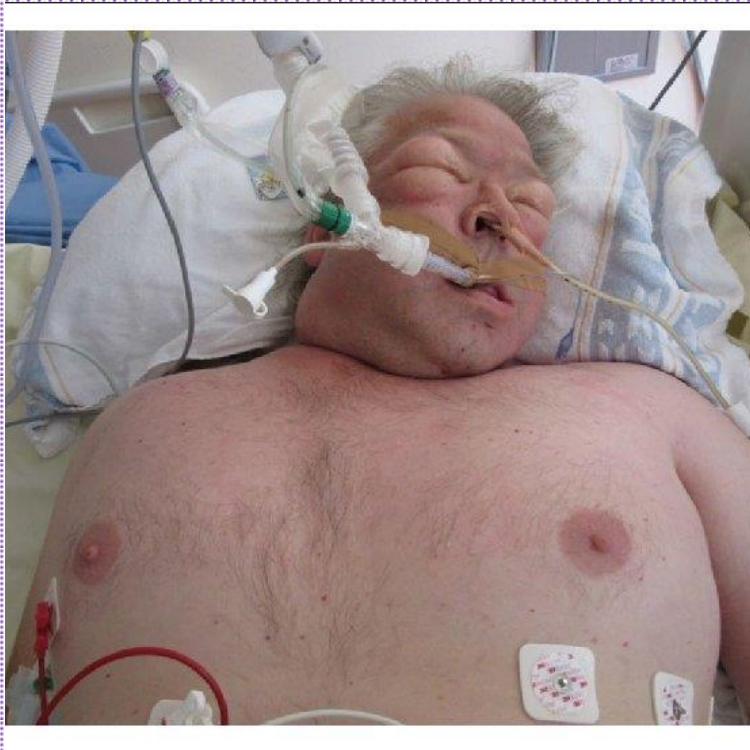
- In soft tissues, crepitus can be produced when gas is introduced into an area where it is normally not present.
- Crepitus (or surgical emphysema) is a crackling sound produced by air trapped in the subcutaneous tissues.
- Can happen as surgical complication with anaerobic infection by strains of *Clostridium perfringens* which can cause gas gangrene in tissues.

Subcutaneous Emphysema (SCE)



Subcutaneous Emphysema (SCE)

(Pre- and Post- treatment)



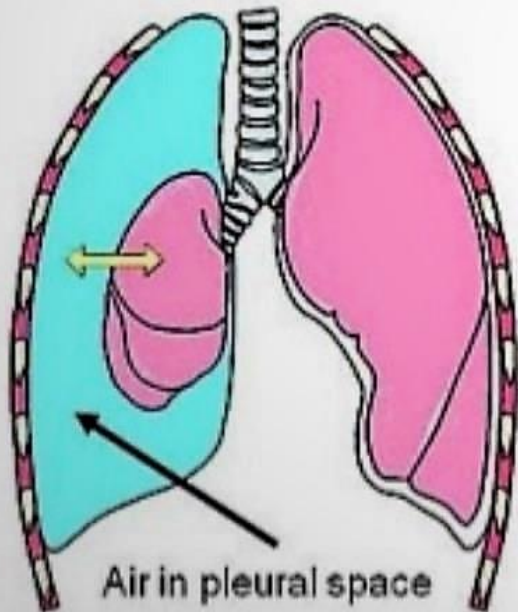
Day 1



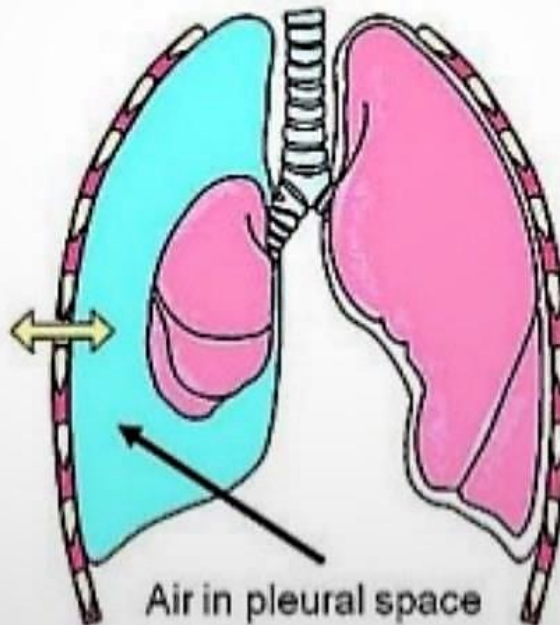
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Pneumothorax

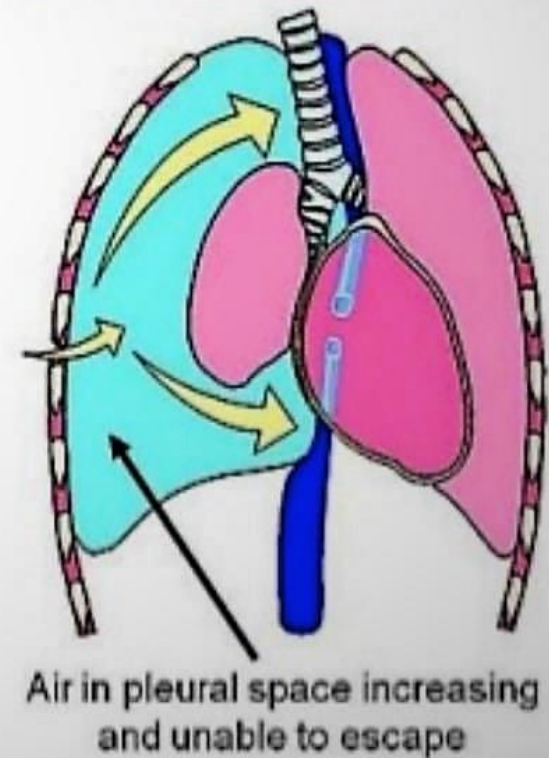
Closed pneumothorax



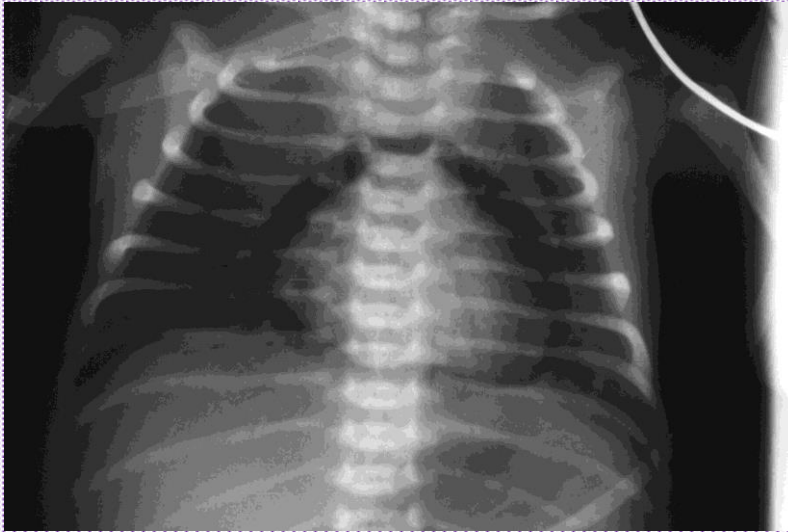
Open pneumothorax



Tension pneumothorax



Pneumo-Anything



GASTROINTESTINAL

Ascites

- Palpating wave of fluid moving within the peritoneal cavity in response to percussion helps in diagnosing ascites.
- Liquid accumulation can have many causes:
 - Cirrhosis of the liver
 - Kidney failure
 - Infection
 - Congestive heart failure
 - Pancreatitis
 - Portal vein thrombosis
- Ascites produces malfunction of other organs/systems.

Ascites



Hand in the midline prevents the ascites thrill from being transmitted through abdominal fat.

Borborygmus

- Characteristic growling or rumbling sound made by the stomach and intestines as food and gas pass through.
- When food or fluids are ingested, they travel through the esophagus to the stomach, and then the intestines.
- It is the result of peristalsis, (contraction and relaxation of muscles in the stomach and intestines) that pushes contents down the digestive tract.

Final Questions



Thank You