Basic Elements of Anatomy.

chapter 1 in the book, page 34.

Table 1-2. Type of joints.

- Synovial joints

* Suture joints in bones in the skull, connect bone to bone. (immobile) → Dentate + Squamous (flat).

* Hinge joints (بين المفاصل) movable joints

immobile → don't move.

* Ellipsoid joint (Ball and socket) we have them in 4 places, in the region which connect the sholder with the upper limb (left + right). and the region that connect the hips (الفخذ) with lower limb in left + right.
Ball and socket because the head of the humerous that located in arm shaped like ball go into socket (تجويف).

we have Pubic symphysis that located Peluic it is important during Birth where the peluic rises to the top.

Summary and Questions page 64...

vocal abuse

Intro to Respiration

The Trachea is cartilaginous not bone!

Lesson 2 :

Thorax : chest or Rib cage
composed of Ribs, bones very ~~small~~ thin flat ribs.

* Thoracic cage from back articulate with vertebral (T_1 - T_{12}).
from front (anterior) articulate with sternum bone.

sternum : breast bone.

lumbar toward lower back, the body become thicker and flat and widder.
because the main function of this region to support the weight of the body

- Sacrum from (S_1-S_5) all of them fused in one bone

- Coccyx from (3-5) عظمة العصعص.

Clavicle bone - الترقوة above the thorasic cage.

we have 24 ribs - 12 pairs.

Ribs 11 + 12 don't articulate with the sternum they protect the back region (kidney ...)

bone is rigid they can't move, so the presents of ~~cat~~ cartilages important to expand and rise up and to deflate and goes down.

2 ~~to~~ have 2 region in the chest :

1) 2ntercondoral, where 2 have cartilages.

2) 2nto

There are distinct land marks that distinguish one to another.

Cervical vertebra

1 Spinous process

2 Tubercle or Transverse process

body ← كل ما نقرب لتحت بصير أعرض وأخشن

blood supply to brain from vertebral artery Transverse foramin in cervical vertebra is the way that the artery goes on.

The basic landmark that distinguish betwee cervical and thorasic and lumber 2 have Transverse foramin just in cervical vartebra.
They are the way of left + right vertebral artery to bases through to brain

Spinous process in cervical vertebra bifricated

The spinal cord bases through vertebral foramen.

Spinal nerve base branches in between disks.

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C_2 Axis has ~~oton~~ odontoid
skull set on odontoid and legament around it, the rotation occurs simply.

C_1 Atlas.

software Sacral + coccygeal they are fused not separate

T_1 has intercostal ~~foramin~~ flaccid
costal → ribs.
intercostal flaccid present just in thoracic region.

* Superior Articulate facet
↑ inferior Articulate facet from the last vertebra seton.

Transverse foramen within Transverse process.

* Intercostal faccid just in Thoracic vertebra. because we have Ribs just in Thoracic.

costal facet where the Rib articulate.
يتميز الـ Thoracic عن البقية
↳ on the body.

Inf. Vertebral Notch. where spinal cord branch goes on.

Meet two vertebra

Transverse formamina within Transvers process.

Rib cage

- externall and internall muscle they cover the whole of Rib cage.

- Facets : small proove in the bone where the Rib articulate with, when the Rib passes from vertebra and it articulate with vertebra in two regions : in the body there are facet and in the Spinous process there are facet.
and in the other way there are facet.
↳ called intercostall facet.

The clavicle articulat anterior with Manubrium Inferior with Scapula.

Only Rib that attach ~~to~~ is the first Rib with Manubrium. ↩

The Second Rib on junction between Manubrium and Corpous Sterni.

→ True Ribs : each Rib makes a connection with Sternum through one cartillage.

Rib cage is strong + mobile
mobile because of cartliges.

Cartligies is the one that can be Torque.
from front articulate bone with cartlige.
from back articulate bone with bone

being attach from front with chondoral portion give the flexbility to rotate.

when Rib cage rise up, chondoral portion rise up too. bending ~~portion~~ of medial portion in the side of Rib.
Inspiration → Rise up → Torque.
↳ elevated.

• Brittle → هش
↳ It can broken

- when the volume increases the pressure decreases

2 ways the Rib cage can be expanded:
1) Horizantaly by means of Accessory muscles during Inspiration.
2) Verticaly by means of the Diaphragm.

Diaphragm dome shape muscle, inferior to the Rib cage.
* when it is contracts it's flatting out
↳ It's gonna to increase the verticle dimension of the Rib cage.

* Accessory muscles that they around intercostal or Ribs, when they contract they increases the horizental dimension of Rib cage.

Diaphragm the only primary muscle of Respiration

- medial portion of the clavical attach to Sternum.
- lateral portion of the clavical attach to Scapula

- Anatomy of hip bone on google.
All of them make the pelvic region.

1) Posterio, Inferior → Ischium

2) Posterior, Anterior → Pubic

3) Superior, Anterior → Ilium

※ Structure of the lungs give them the ability to comblines (inflate and deflate)

The external force of the Rib cage force the lung to stay expanded

Trachea expanded when we do an exercise because we need more air.

Termenal Respiratory bronchiole
the last one

Mainstem Bronchi → primary

Tertiary → segmental.

floating Ribs → They are short ribs just provide protection from the back.

• heart notch in the lungs where the heart is located.

** Right lung is a littele bit higher than the left lung, because the Liver is located inferior to it.
↳ the largest organ in the body.

* separates the lung from the liver → Diaphragm

- Apex of the lung is the top portion.
- Base of the lung is the lower portion where it sets on the Diaphragm.

* Alveoli the smallest dimaeter but the largest surface tension, because of their number.

large surface area → efficient gas exchange

* Conduncting passegway → to transmit air into the respiratory zone.

conducting zone all except the respiratory bronchiole that they attach to alveoli and alveoli duct

Capillary bed have the larger surface area because of the great number of them

Why the tissue of the lungs is spongy?
- cartligenous network supporting the alveoli
- Blood supply from capillarys.
- Elastic of the cartillage.

Surfactant in pleural cavity and in alveoli reduces the surface tension.

* Visceral pleura surround the spongy tissue of the lung. (close to organ)

* Pleural cavity is a fluid filled cavity to decrease the force of friction + make the sliding between the different pleura easier.

- When the Rib cage expand, Diaphragm contract, the volume inside lungs increases. pressure insid it decreases.
we have (-) pressure → allows the air to move from outside into inside.

* Infants don't have Residual volume
Because the lungs follows the thorax + Infant lungs exactly fit the Thorax but when it dereolpes the thorax growes much facter than the lungs, so that the lungs are stretched to fill the space, So it's start accumilating some air which the resedual volume to fit the thorax.

Lesson 2-6 : Diaphragm

Diaphragm + Thorax both have the ability to increase Rib cage into 2D : Vertical Dimension.
Horizental Dimension.

Increase Thorax volume → the pressure within the lung will decreases.

when Diaphragm relax → has Dome shape structure
Dome shape → Decrease the volume of Thorax
when it contracts during inspiration → it flat out
Verticle Dimension will increase → pressur of thorax
↓

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So I will have (-) pressure, The flow of air will go from outside → inside

(-) means below atmospheric pressure.

* Accessory muscle of Inspiration
muscles that are between the Ribs _ costal- external intercostal muscle + internal intercostal

muscles that help on the Rise up of Rib cage always above thorax, and these that help it to drop on always below therax.

* All the muscle in the Diaphragm take lateral side in the middle I have Central tendon.

• When the Diaphragm contract, the muscle shorten so they pull the Diaphragm → flat out.

Inferior vena cavea branches out from Right Atrium.

I don't have ~~Foramen~~ foramen of Trachea, Because the Diaphram below the lungs, and it does not pass through.

Abdominal Aorta, Decending Aorta which pass in Diaphragm. to bring the blood with O_2 to the area of abdominal + Pelvic Area.

* Phrenic nerve which innervate the Diaphragm which is responsible of the contraction and relexation of Diaphragm.

Costal attachment → the region where the muscles of Diaphragm are attach to the Ribs

Esophegus located posterior to Trachea and it passes through Diaphragm to reach the stomach.
↳ have Esophegeal hiatus because of that.

Inferior vena cavea that return to the Right Atrium, it need to pass through the Diaphragm to reach the Right Atrium, because the heart is above the Diaphragm.

~~Abdominal Aorta, it branches out of decending to go~~

* Decending Aorta it branches out to go to Abdominal Aorta, so it need to go through the Diaphragm to deleiver all the oxygenated blood to the rest of the body.

Radiate Medially → moves (muscle's striation moves)
Translucent شفاف

Aoartic hiatus = Abdominal Aorta.

* Posterior muscle fiber longer than Anterior muscle fiber.

When Diaphragm contracts it's gonna push down, central tendon will goes down.
Contraction of Diaphragm compress the abdominal viscera and expands the thorasic cavity
Abdominal cavity

- When Diaphragm contract it moves down and forwoard.

* Cervical plexues : network of neuron that arrises from the cervical region from neck

Diaphragm is innervated by 2 different nerves :

1) Right + left Phrenic nerve / Upper + lower of Diaphragm
2) Lower intercostal nerve / Inferior portion of Diaphragm

* The source of Phrenic nerve : It arrises from Cervical plexus. It innervate heart + Upper and lower portion of Diaphragm.

- Thoracic cavity composed of 2 plural cavity + cardiac + Mediastinum.
All of them are Region.

* Sternoclaidmastuid has 2 legs
one of them on clavical bone.
the other on Steraum.
and exit from mastuid process in the skull.

- Internal intercostal begin from chondoral portion and stop before the vertebra

- Externalintercostal begin from vertebra and stop before chondoral portion.
↳ Intersous region
↳ I have both Internal + External
Because Internal is deeper to External
External more superfessial

The striation of External intercostal Diagonally but the Internalintercostal straight.

* Accessory muscle of Respiration in chondoral portion just ↓ have Internalintercostal.

* ↓n Vertebra ↓ have just Externalintercostal.

* Intercous portion ↓ have both.

Accessory muscle of Respiration

- Ribs from posterior articulate with vertebral column.
- Anterioley articulate with chondoral portion with the sternum.

Torque → tilting of the Rib from chondoral portion.

- Elevating from the Ribs the Accessory muscle of ↓nspiration is responsbile to it.
- changin on the horezintal dimension, the Accessory muscle of ↓nspiration is responsible for it
- changing on the verticle dimension, the primary muscle of ↓nspiration (Diaphragm)

During muscle contraction of the Diaphragm central tendon pulles down, decreasing the volume in ~~thoracic cage~~ abdominal pelvic cage and increase volume in thoracic cage.

* in forced Expiration the abdominal muscle contract.

Primary Accessory muscle of Inspiration:
External intercostal muscles.

Intersous region of external intercostal it acts with external intercostal in Inspiration

* External intercostal muscle all of them → Inspilation
2 have Interchondoral portion + Intersous portion
Intersseous portion which is lateral around the Ribs.

Internal intercostal muscle have 2 regions:
1) Interchonderal portion.
2) Intersous portion.

→ for Inspiration 2 have 2 regions:
1) External intercostal muscle.
2) Interchondoral portion of Internal intercostal muscle.

→ For Expiration:
* Intersous portion of Internal intercostal muscle.

* Intercostal muscle innervated by Intercostal nerve.

levator costarum muscle are deep to the serratus muscle (superficial) P. 125

Levator costarum longus muscle
↳ to elevate. ↳ it skip a Rib (it is long)
↳ found in lower thorax. (9-12) Rib

levator costarum brevis muscle.
↳ doesn't skip a Rib
↳ 12 pairs.

Serattus are superficial to the levator costarum brevis (because they are located in the upper thorax)
it elevate Rib 2 through 5

Sternocleidomastoid. it elevate the sternum it is not insert on Rib cage, it is r indirectly elevate the Rib cage through the elevation of sternum

Scalenus inserts on the Ribs. They come from cervical vertebra, they elevate the Rib cage.

- Anterior Scalenus muscle ~~inne~~ elevate the first Rib only.
- Middle Scalenus elevate first Rib.
- Posterior Scalenus elevate second Rib

- List the muscles that innervate or aid for inspiration in anterior view.

1) sternocleidomastoid

2) Pectorals major + minor

3) Intercostal muscle : External intercostal
Interchondoral portion of
Internal intercostal muscle

Posterior view :
Upper portion of it without levator costarum longis

I should say that Scalanus just elevate the first + second Rib.

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* The deepest one is the levator muscle then Seratus posterior superior then the Rhmboideus minor + major. then superficial of all of them is Trapizius muscle.

** Trapezius + Sternocledmastoid
Innervated by the XI (11) Accessory nerve.

** Scalenus innervated by cervical plexues.

All the muscles on the back help in Protect + Stablizied. other than the deeper one
G to Rib cage. indirect help in elevate the Rib.

Torque : one side of the Rib is held constant it doesn't move (iminobile) while the other side tilled a littele bit when rising up of Rib cage or going down of thoracic cage.

* The compliance of the long, allow it when it force to stretch and after that the Rib cage returns to it's size, the lung also return back to normall size. Because of the tissue of the lung has compliance.

- front-to-back dimension, Accessory muscle for Inspiration responsible for them.

When the Rib cag dipressed (when it is down) horizental dimension between vertebra + sternum it diminach (decreases in size).

Out force movement of Rib cage force the lungs to expand or to relax (unstretshed)

- Inhale → the thorax rises up + expand.
- Exhale → goes down and decrease in size.
  ↳ horizental dimension (anterior-posterior) it decreases, decreasing volume of thoracic cage, decreasing volume of the lung. pressure inside increas (+) move from inside → outside.

Abdominal muscle contract to force you expire max.

- Internal intercostal the contraction of them causes the Rib cage depressed (go down).

Internal intercostal deep.

* The first major muscle of expiration: Internal intercostal Intersouse portion of

Active expiration

* The second muscle: Transverse Thoracic. innervate by intercostal nerve

Almost muscle in the region of the costal they innervat by intercostal nerve.

Pasive expiration due of the: Torque, elacticity, gravity.

- forced expiration include abdominal muscle

. Transverse abdominis is very ~~superficial~~ deep.

. I should remove ~~Transverse abdominis~~ External oblique to see Internal oblique abdominis.

. Rectus abdominis → six pack.

. External oblique is very superficial.

↑ muscles of forced expiration of abdomen

Aponeurosis which articulate between the muscle in the back with vertebral column.

\# All the muscles of abdominal connected with Rectus abdominis through Aponurosis which is Anterior sheep of Rectus abdominis

2 Rectus abdominus connect with each other by linea alba. P. 146

linea semilunaris at the side of Rectus. and external oblique.

when the muscles of abdomin contract it pushes the Diaphragm up toward the thorasic that will causes the air to leave the lung.

* ~~Aponeurosis~~ Aponeurosis, sheet like, membrane between muscles and bones.

- External oblique abdominis is innervated by spinal and subcostal nerve

Inguinal ligment region
the region between pubic symphysis + Illium and close to external abdominal.

Pubic symphysis
The area where cartillage where 2 hip bones fused together.

* Rectus abdominis not continuous it's segmented bifricate by Tendinous intersection.

* ~~Linea alba~~ → membrane that covers Rectus abdominis. the horizental line that cut the Apenuourose. → linea alba.

- Linea semilunaris lateral to Rectus abdominis.

- Thoracolumbar fascia
membrane that cover the region of Thoracic and lumbar from back.

Physiology of Respiration Lesson (3)

- Ambient air pressure (reference) which is : Atmospheric pressure.

2 ways to measure the pressure and volume
1) wet spirometer.
2) U-tube manometer.

Respiratory Rate → 12 - 18
normal tidal volume = 525 ml.
6L per minute.

4 volume in Respiration process
1) Tidal
2) Inspiratory reserve
3) Expiratory reserve
4) Resdual volum

The volum we are able measure by spirometer :

1) Tidal
2) Expiratory reserve.
3) Inspiratory reserve.

- Tidal volume → amount of air that we
- breath in and out in one breath.
  In
- ~~Re~~spicatory reserve : amount of we air we can inhal byond inspiration of tidal volume.

- Residual volume only measure thoraticly.

- Page 6 dead air space → in conducting pharynx + larynx + Trachea → zone.

* Conducting air space : amount of air that occubize pharynx, larynx + Trachea.
  it is aproximatly → 150 ml.
  ↳ never reach the alveoli

- Vital capacity with aging decrease because of the compliance of the lungs decrease, so it can't stretched like it is small.
  so we can't be able to breath the same amount of air

lesson 3, Page 15 in software.

- Supine position (الاستلقاء)
  ↳ Distribution of the gravity is the same to whole body

- Erect position (الوقوف)
  ↳ Distribution of gravity more toward botton meaning, all the organs due the force of gravity pull downward.

* vital capacity → ability (sum of volume of air that help you to speak)

recline ينحني

The low expand of the thoracic cage, the low vital capacity.

* Standing position, just 40 % from the air that goes inter from outside go under gas exchange.

. when vital capacity become low, we need to breath sooner to meet the needs for life.

We have different pressure:

1) subglottal pressure
2) Intra oral pressure
3) Intra pleural pressure
4) Alveolar pressure

- Alveolar pressure equall to subglottal pressure

. In Inhale, the Ribs go up more, thoracic cage volume increases, so pressure decreases

* lungs always in a stretched position. inside the thorasic cage.

* Intrapleural presure always (-)
Because the lungs always stretched. 2
Because of the external force from Rib cage volume of lung high, but pressure inside it low.

* 2 have surface tension, between the pleural cavity which is between the parietal and visceral, so 2 have also release of surfactant in this region. not just in alveoli release.

- when 2 decrease intrapleural pressure subglottal become more positive.

Respiratory cycle → cycle include expirator + inspiratory (inhale + exhale.)
time for 1 cycle → 10 sec.

• Inorder for speech to be produce, we nece more air to move out.

Effect of speech on the Respiratory cycle

- the speech has very good effect on resperatory cycle. It decreases the insperation drop it from 40.٪ to 10.٪, increase the experation from 60.٪ to 90.٪.
Because we need more air to produce speech & the amount of inspiration is less than at rest, so we feel tired during speech.

* when the lung volume is at rest, vital capacity is 38 %.

- when we inhale ~~too much~~ more, pressure generated in the tissue of the lung become high.

- Elasticity of lung make the ~~pressure generated~~. cause the generation of (-) pressure.

we have negative alveolar pressure because thorax always tend to recoil, when it expand it return back to it's normall so it recoil back this recoiling due the alveolar pressure inside it.

Recoiling of the thorax causes generation of (-) pressure.