

1. The muscles of the thoracic wall

Muscle	Superior attachment	Inferior attachment	Innervation	Function
External intercostal	Inferior margin of rib above	Superior margin of rib below	Intercostal nerves; T1-T11	Most active during inspiration; supports intercostal space, moves ribs superiorly
Internal intercostal	Lateral edge of costal groove of rib above	Superior margin of rib below deep to the attachment of the related external intercostal	Intercostal nerves; T1-T11	Most active during expiration; supports intercostal space; moves ribs inferiorly
Innermost intercostal	Medial edge of costal groove of rib above	Internal aspect of superior margin of rib below	Intercostal nerves; T1-T11	Acts with internal intercostal muscles
Subcostales	Internal surface (near angle) of lower ribs	Internal surface of second or third rib below	Related intercostal nerves	May depress ribs
Transversus thoracis	Inferior margins and internal surfaces of costal cartilages of second to sixth ribs	Inferior aspect of deep surface of body of sternum, xiphoid process and costal cartilages ribs IV-VII	Related intercostal nerves	Depresses costal cartilages

2. The muscles of the gluteal region

Muscle	Origin	Insertion	Innervation	Function
Piriformis	Anterior surface of sacrum between anterior sacral foramina	Medial side of superior border of greater trochanter of femur	Branches from L5, S1, S2	Laterally rotates the extended femur at hip joint; abducts flexed femur at hip joint
Obturator internus	Anterolateral wall of true pelvis; deep surface of obturator membrane and surrounding bone	Medial side of greater trochanter of femur	Nerve to obturator internus (L5, S1)	Laterally rotates the extended femur at hip joint; abducts flexed femur at hip joint
Gemellus superior	External surface of ischial spine	Along length of superior surface of the obturator internus tendon and into the medial side of greater trochanter of femur with obturator internus tendon	Nerve to obturator internus (L5, S1)	Laterally rotates the extended femur at hip joint; abducts flexed femur at hip joint
Gemellus inferior	Upper aspect of ischial tuberosity	Along length of inferior surface of the obturator internus tendon and into the medial side of greater trochanter of femur with obturator internus tendon	Nerve to quadratus femoris (L5, S1)	Laterally rotates the extended femur at hip joint; abducts flexed femur at hip joint
Quadratus femoris	Lateral aspect of the ischium just anterior to the ischial tuberosity	Quadratus tubercle on the intertrochanteric crest of the proximal femur	Nerve to quadratus femoris (L5, S1)	Laterally rotates femur at hip joint
Gluteus minimus	External surface of ilium between inferior and anterior gluteal lines	Linear facet on the anterolateral aspect of the greater trochanter	Superior gluteal nerve (L4, L5, S1)	Abducts femur at hip joint; holds pelvis secure over stance leg and prevents pelvis drop on the opposite swing side during walking; medially rotates thigh

Gluteus medius	External surface of ilium between anterior and posterior gluteal lines	Elongate facet on the lateral surface of the greater trochanter	Superior gluteal nerve (L4, L5, S1)	Abducts femur at hip joint; holds pelvis secure over stance leg and prevents pelvis drop on the opposite swing side during walking; medially rotates thigh
Gluteus maximus	Fascia covering gluteus medius, external surface of ilium behind posterior gluteal line, fascia of erector spinae, dorsal surface of lower sacrum, lateral margin of coccyx, external surface of sacrotuberous ligament	Posterior aspect of iliotibial tract of fascia lata and gluteal tuberosity of proximal femur	Inferior gluteal nerve (L5, S1, S2)	Powerful extensor of flexed femur at hip joint; lateral stabilizer of hip joint and knee joint; laterally rotates and abducts thigh
Tensor fasciae latae	Lateral aspect of crest of ilium between anterior superior iliac spine and tubercle of the crest	Iliotibial tract of fascia lata	Superior gluteal nerve (L4, L5, S1)	Stabilizes the knee in extension

3. Superficial back muscles

Muscle	Origin	Insertion	Innervation	Function
Trapezius	Superior nuchal line, external occipital protuberance, ligamentum nuchae, spinous processes of CVII to TXII	Lateral one-third of clavicle, acromion, spine of scapula	Motor-accessory nerve [XI]; proprioception-C3 and C4	Assists in rotating the scapula during abduction of humerus above horizontal; upper fibers elevate, middle fibers adduct, and lower fibers depress scapula
Latissimus dorsi	Spinous processes of TVII to LV and sacrum, iliac crest, ribs X to XII	Floor of intertubercular sulcus of humerus	Thoracodorsal nerve (C6 to C8)	Extends, adducts, and medially rotates humerus
Levator scapulae	Transverse processes of C1 to CIV	Upper portion medial border of scapula	C3 to C4 and dorsal scapular nerve (C4, C5)	Elevates scapula
Rhomboid major	Spinous processes of TII to TV	Medial border of scapula between spine and inferior angle	Dorsal scapular nerve (C4, C5)	Retracts (adducts) and elevates scapula
Rhomboid minor	Lower portion of ligamentum nuchae, spinous processes of CVII and TI	Medial border of scapula at the spine of scapula	Dorsal scapular nerve (C4, C5)	Retracts (adducts) and elevates scapula

4. The rectus abdominis and its sheath

Origin	Insertion	Innervation	Function
Pubic crest, pubic tubercle, and pubic symphysis	Costal cartilages of ribs V to VII; xiphoid process	Anterior rami of lower seven thoracic spinal nerves (T7 to T12)	Compresses abdominal contents; flex vertebral column; tense abdominal wall

- Paired muscle, separated in the midline by the linea alba
- On the way to its insertion, it widens and thins and is intersected by three or four transverse fibrous bands or tendinous intersections

Rectus sheath

- Encloses rectus abdominis and pyramidalis muscles
- Completely encloses the upper three quarters of the rectus abdominis and covers the anterior surface of the lower one-quarter of the muscle

- Formation: anterior wall consist of the aponeurosis of the external oblique and half of the aponeurosis of the internal oblique, which splits at the lateral margin of the rectus abdominis

Posterior wall of the rectus sheath consists of the other half of the aponeurosis of the internal oblique and the aponeurosis of the transversus abdominis

5. The obliques and transverse abdominal muscles

Muscle	Origin	Insertion	Innervation	Function
External oblique	Muscular slips from the outer surfaces of the lower eight ribs (ribs V to XII)	Lateral lip of iliac crest; aponeurosis ending in midline raphe (linea alba)	Anterior rami of lower six thoracic spinal nerves (T7 to T12)	Compress abdominal contents; both muscles flex trunk; each muscle bends trunk to same side, turning anterior part of abdomen to opposite side
Internal oblique	Thoracolumbar fascia; iliac crest between origins of external and transversus; lateral two-thirds of inguinal ligament	Inferior border of the lower three or four ribs; aponeurosis ending in linea alba; pubic crest and pectineal line	Anterior rami of lower six thoracic spinal nerves (T7 to T12) and L1	Compress abdominal contents; both muscles flex trunk; each muscle bends trunk and turns anterior part of abdomen to the same side
Transversus abdominis	Thoracolumbar fascia; medial lip of iliac crest; lateral one-third of inguinal ligament; costal cartilages lower six ribs (ribs VII to XII)	Aponeurosis ending in linea alba; pubic crest and pectineal line	Anterior rami of lower six thoracic spinal nerves (T7 to T12) and L1	Compress abdominal contents
Pyramidalis	Front of pubis and pubic symphysis	Into linea alba	Anterior ramus of T12	Tenses the linea alba

6. The muscles of the lower limb – thigh

Anterior compartment

Muscle	Origin	Insertion	Innervation	Function
Psoas major	Posterior abdominal wall (lumbar transverse processes, intervertebral discs, and adjacent bodies from TXII to LV and tendinous arches between these points)	Lesser trochanter of femur	Anterior rami [L1, L2, L3]	Flexes the thigh at the hip joint
Iliacus	Posterior abdominal wall (iliac fossa)	Lesser trochanter of femur	Femoral nerve [L2, L3]	Flexes the thigh at the hip joint
Vastus medialis	Femur-medial part of intertrochanteric line, pectineal line, medial lip of the linea aspera, medial supracondylar line	Quadriceps femoris tendon and medial border of patella	Femoral nerve [L2, L3, L4]	Extends the leg at the knee joint
Vastus intermedius	Femur-upper two-thirds of anterior and lateral surfaces	Quadriceps femoris tendon and lateral margin of patella	Femoral nerve [L2, L3, L4]	Extends the leg at the knee joint
Vastus lateralis	Femur-lateral part of intertrochanteric line, margin of greater trochanter, lateral margin of gluteal tuberosity, lateral lip of the linea aspera	Quadriceps femoris tendon	Femoral nerve [L2, L3, L4]	Extends the leg at the knee joint

Sartorius	Anterior superior iliac spine	Medial surface of tibia just inferomedial to tibial tuberosity	Femoral nerve [L2, L3]	Flexes the thigh at the hip joint and flexes the leg at the knee joint
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Medial compartment

Muscle	Origin	Insertion	Innervation	Function
Gracilis	A line on the external surfaces of the body of the pubis, the inferior pubic ramus, and the ramus of the ischium	Medial surface of proximal shaft of tibia	Obturator nerve [L2, L3]	Adducts thigh at hip joint and flexes leg at knee joint
Pectineus	Pectineal line (pectin pubis) and adjacent bone of pelvis	Oblique line extending from base of lesser trochanter to linea aspera on posterior surface of proximal femur	Femoral nerve [L2, L3]	Adducts and flexes thigh at hip joint
Adductor longus	External surface of body of pubis (triangular depression inferior to pubic crest and lateral to pubic symphysis)	Linea aspera on middle one-third of shaft of femur	Obturator nerve (anterior division) [L2, L3, L4]	Adducts and medially rotates thigh at hip joint
Adductor brevis	External surface of body of pubis and inferior pubic ramus	Posterior surface of proximal femur and upper one-third of linea aspera	Obturator nerve [L2, L3]	Adducts thigh at hip joint
Adductor magnus	Adductor part – ischiopubic ramus	Posterior surface of proximal femur, linea aspera, medial supracondylar line	Obturator nerve [L2, L3, L4]	Adducts and medially rotates thigh at hip joint
	Hamstring part – ischial tuberosity	Adductor tubercle and supracondylar line	Sciatic nerve (tibial division) [L2, L3, L4]	
Obturator externus	External surface of obturator membrane and adjacent bone	Trochanteric fossa	Obturator nerve (posterior division) [L3, L4]	Laterally rotates thigh at hip joint

Posterior compartment

Muscle	Origin	Insertion	Innervation	Function
Biceps femoris	Long head – Inferomedial part of the upper area of the ischial tuberosity; short head – Lateral lip of linea aspera	Head of fibula	Sciatic nerve [L5, S1, S2]	Flexes leg at knee joint; extends and laterally rotates thigh at hip joint and laterally rotates leg at knee joint
Semitendinosus	Inferomedial part of the upper area of the ischial tuberosity	Medial surface of proximal tibia	Sciatic nerve [L5, S1, S2]	Flexes leg at knee joint and extends thigh at hip joint; medially rotates thigh at hip joint and leg at knee joint
Semimembranosus	Superolateral impression on the ischial tuberosity	Groove and adjacent bone on medial and posterior surface of medial tibial condyle	Sciatic nerve [L5, S1, S2]	Flexes leg at knee joint and extend thigh at hip joint; medially rotates thigh at hip joint and leg at knee joint

7. The muscles of the lower limb – leg

Superficial muscles in the posterior compartment

Muscle	Origin	Insertion	Innervation	Function
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Gastrocnemius	Medial head – posterior surface of distal femur just superior to medial condyle; Lateral head – upper posterolateral surface of lateral femoral condyle	Via calcaneal tendon, to posterior surface of calcaneus	Tibial nerve [S1, S2]	Plantarflexes foot and flexes knee
Plantaris	Inferior part of lateral supracondylar line of femur and oblique popliteal ligament of knee	Via calcaneal tendon, to posterior surface of calcaneus	Tibial nerve [S1, S2]	Plantarflexes foot and flexes knee
Soleus	Soleal line and medial border of tibia; posterior aspect of fibular head and adjacent surfaces of neck and proximal shaft; tendinous arch between tibial and fibular attachments	Via calcaneal tendon, to posterior surface of calcaneus	Tibial nerve [S1, S2]	Plantarflexes the foot

Deep muscles in the posterior compartment

Muscle	Origin	Insertion	Innervation	Function
Popliteus	Lateral femoral condyle	Posterior surface of proximal tibia	Tibial nerve [L4 to S1]	Stabilizes knee joint (resists lateral rotation of tibia on femur) Unlocks knee joint (laterally rotates femur on fixed tibia)
Flexor hallucis longus	Posterior surface of fibula and adjacent interosseous membrane	Plantar surface of distal phalanx of great toe	Tibial nerve [S2, S3]	Flexes great toe
Flexor digitorum longus	Medial side of posterior surface of the tibia	Plantar surfaces of bases of distal phalanges of the lateral four toes	Tibial nerve [S2, S3]	Flexes lateral four toes
Tibialis posterior	Posterior surfaces of interosseous membrane and adjacent regions of tibia and fibula	Mainly to tuberosity of navicular and adjacent region of medial cuneiform	Tibial nerve [L4, L5]	Inversion and plantarflexion of foot; support of medial arch of foot during walking

Lateral compartment

Muscle	Origin	Insertion	Innervation	Function
Fibularis longus	Upper lateral surface of fibula, head of fibula, and occasionally the lateral tibial condyle	Undersurface of lateral sides of distal end of medial cuneiform and base of metatarsal I	Superficial fibular nerve [L5, S1, S2]	Eversion and plantarflexion of foot; supports arches of foot
Fibularis brevis	Lower two-thirds of lateral surface of shaft of fibula	Lateral tubercle at base of metatarsal V	Superficial fibular nerve [L5, S1, S2]	Eversion of foot

Anterior compartment

Muscle	Origin	Insertion	Innervation	Function
Tibialis anterior	Lateral surface of tibia and adjacent interosseous membrane	Medial and inferior surfaces of medial cuneiform and adjacent surfaces on base of metatarsal I	Deep fibular nerve [L4, L5]	Dorsiflexion of foot at ankle joint; inversion of foot; dynamic support of medial arch of foot

Extensor hallucis longus	Middle one-half of medial surface of fibula and adjacent surface of interosseous membrane	Dorsal surface of base of distal phalanx of great toe	Deep fibular nerve [L5, S1]	Extension of great toe and dorsiflexion of foot
Extensor digitorum longus	Proximal one-half of medial surface of fibula and related surface of lateral tibial condyle	Via dorsal digital expansions into bases of distal and middle phalanges of lateral four toes	Deep fibular nerve [L5, S1]	Extension of lateral four toes and dorsiflexion of foot
Fibularis tertius	Distal part of medial surface of fibula	Dorsomedial surface of base of metatarsal V	Deep fibular nerve [L5, S1]	Dorsiflexion and eversion of foot

8. The diaphragm

Attached peripherally to the:

- Xiphoid process
- Costal margin
- Ends of ribs XI and XII
- Ligaments that span across structures of the posterior abdominal wall
- Vertebrae of the lumbar region

From these attachments muscle fibers converge to join the central tendon. The pericardium is attached to the middle part of the central tendon.

Structures passing through the diaphragm:

- Inferior vena cava through the central tendon at vertebral level TVIII
- Esophagus through the muscular part, left to the midline, vertebral level TX
- Aorta behind the posterior attachment at vertebral level TXII
- Thoracic duct with aorta
- Azygos and hemiazygos veins through the aortic hiatus or through the crura of the diaphragm

Arterial supply:

- Pericardiophrenic and musculophrenic arteries (from internal thoracic arteries)
- Superior phrenic arteries (from lower parts of the thoracic aorta)
- Small branches from intercostal arteries
- **Inferior phrenic arteries** (abdominal aorta)

Venous drainage is parallel the arteries

Innervation:

- Phrenic nerves (C3 to C5)
- From the abdominal surface

C3, 4, 5 keeps the diaphragm alive

9 The muscles of the posterior abdominal wall

Muscle	Origin	Insertion	Innervation	Function
Psoas major	Lateral surface of bodies of TXII and LI to LV vertebrae, transverse processes of the lumbar vertebrae, and the intervertebral discs between TXII and LI to LV vertebrae	Lesser trochanter of femur	Anterior rami of L1 to L3	Flexion of thigh at hip joint

Psoas minor	Lateral surface of bodies of TXII and LI vertebrae and intervening intervertebral discs	Pectineal line of the pelvic brim and iliopubic eminence	Anterior rami of L1	Weak flexion of lumbar vertebral column
Quadratus lumborum	Transverse process of LV vertebra, iliolumbar ligament, and iliac crest	Transverse processes of LI to TV vertebrae and inferior border of rib XII	Anterior rami of T12 and L1 to L4	Depress and stabilize rib XII and some lateral bending of the trunk
Iliacus	Upper two-thirds of iliac fossa, anterior sacroiliac and iliolumbar ligaments, and upper lateral surface of sacrum	Lesser trochanter of femur	Femoral nerve (L2 to L4)	Flexion of thigh at hip joint

10. The fetal circulation

- Blood from the placenta returns to the fetus by the umbilical vein
- As it reaches the liver it flows through the ductus venosus directly into the inferior vena cava (short-circuits the liver); a small amount of it enters the liver sinusoids and mixes with blood from the portal circulation
- A sphincter in the ductus venosus prevents a sudden overloading of the heart
- The blood enters the right atrium where it is guided toward the oval foramen by the valve of the inf vena cava
- A small amount of blood remains in the right atrium, held back by the lower edge of the septum secundum, the crista dividens, and mixes with desaturated blood from head and arms by the superior vena cava (+ desaturated blood returning from the lungs)

Blood enters the left ventricle and ascending aorta

- Desaturated blood from the sup vena cava flows through the left ventricle into the pulmonary trunk, from where it passes through the ductus arteriosus into the descending aorta and the flows toward the placenta by the two umbilical arteries

11. The thoracic duct and mediastinal lymph nodes

- Saccular dilation: cisterna chili drains the abdominal viscera and walls, pelvis, perineum and lower limbs
- Extends from vertebra LII to the root of the neck
- Joined by the left jugular trunk and the left subclavian trunk
- Empties into the junction of the left subclavian and left internal jugular veins
- Receives contents from the confluence of lymph trunks in the abdomen; descending thoracic lymph trunks draining the lower six or seven intercostal spaces on both sides; upper intercostal lymph trunks draining the upper left five or six intercostal spaces; ducts from posterior mediastinal nodes; ducts from posterior diaphragmatic nodes

12. The brachiocephalic vein

- Located immediately posterior to the thymus
- Form at the junction between the internal jugular and subclavian veins
- Left and right join together and form the superior vena cava posterior to the lower edge of the right first costal cartilage close to the right sternal border

13. The external iliac artery

- Arise from the bifurcation of common iliac artery
- Makes its way from the pelvis to the lower limb
- Proceeds along the border of psoas major muscle
- 3 main branches: Inferior epigastric artery, deep circumflex iliac artery and femoral artery

14. The femoral artery

- Continuation of the external iliac artery
- Begins as the external iliac artery passes under the inguinal ligament to enter the femoral triangle on the anterior aspect of the upper thigh
- Palpable in the femoral triangle
- Passes vertically through the femoral triangle and then continues down the thigh in the adductor canal. It leaves the canal by passing through the adductor hiatus in the adductor magnus muscle and becomes the popliteal artery behind the knee
- Branches in the femoral triangle: superficial epigastric a., superficial circumflex iliac a., superficial external pudendal a., deep external pudendal a.
- Branches: deep femoral artery, lateral circumflex femoral artery, medial circumflex femoral artery, perforating arteries

15. The saphenous vein

Originates from a venous arch on the dorsal aspect of the foot and ascends along the medial side of the lower limb to the proximal thigh.

Connects with the femoral vein in the femoral triangle.

Both have got perforating veins, moving blood from superficial to deep (musculo-venous pump)

Great saphenous vein

- Formed by the dorsal vein of the great toe and dorsal venous arch
- Contains important valves (musculo-venous pump)
- Ascends on the medial side of the leg and thigh

Small saphenous vein

- Formed by the union of dorsal vein of little toe and dorsal venous arch
- Ascends on the posterior surface of the leg
- Empties in the popliteal vein

16. The anterior and posterior tibial arteries

Anterior tibial artery

- Supplies structures in the anterior compartment
- It's the smaller terminal branch of popliteal artery
- Passes through the interosseous membrane
- Terminates as dorsalis pedis artery

Posterior tibial artery

- Larger and more direct branch of popliteal artery
- Supplies posterior and lateral compartment and the leg
- Gives rise to the fibular artery (supplies lateral compartment)
- Terminates as the medial and lateral plantar arteries

17. The thoracic aorta

- Continuation of the arch of aorta
- slightly on the lateral side of the vertebral bodies
- Terminates at the aortic hiatus in the diaphragm
- Thoracic aortic plexus surrounds it

18. The azygos venous system

Azygos vein

- Drain posterior thorax and abdomen
- Situated on the right side of 7 lower thoracic vertebral bodies

- Arches over right lung to the SVC

Hemiazygos vein

- Arises on the left side of the bodies of the thoracic vertebra below the accessory azygos vein
- It crosses the midline and empties into the azygos vein

Accessory azygos vein

- Arises on the left side of the bodies of the thoracic vertebra above the hemiazygos vein
- It crosses the midline and empties into the azygos vein

19. Blood supply of the heart

- Coronary arteries
- Affected by both para/sympathetic stimulation
- Course around the heart muscle deep to the epicardium
- Dominance depends on which artery that gives rise to post. Interventricular (Usually it's the right coronary artery)

Right coronary artery

- Arises from the right aortic sinus
- Runs in the coronary sulcus
- Branches: SA nodal, right marginal, post. interventricular (67%), AV nodal

Left coronary artery

- Arises from the left aortic sinus
- Runs in the coronary sulcus
- Branches: SA nodal (40%), ant. interventricular, circumflex, left marginal and post. interventricular

20. The superior and inferior caval veins

Superior vena cava

- Located in the superior mediastinum (part terminal end is in the middle)
- Returns blood from all structures superior to the diaphragm, except the lungs and heart
- Ends at the level of 3rd costal cartilage

Inferior vena cava

- Located in the abdominal cavity
- Begins at the L5 in the union of common iliac veins
- Collects venous blood from the lower limb, non-portal blood from the abdomen and pelvis
- Tributaries are arranged in paired visceral (right suprarenal, right/left renal, right gonadal veins) and parietal branches (inferior phrenic, lumbar and common iliac veins)

21. The abdominal aorta and its branches

- Supplies a lot of blood to the abdominal cavity
- Begins in the aortic hiatus in the diaphragm and runs parallel to the IVC
- Ends by bifurcating into common iliac arteries

Vascular planes

- Unpaired visceral (celiac, sup/inf mesenteric)
- Paired visceral (suprarenal, renal, gonadal)
- Paired parietal (subcostal, inferior phrenic, lumbar)
- Unpaired parietal (median sacral artery)

22. The portal vein

- Not a true vein, contains oxygenated blood
- Part of portal hepatic system
- The liver has got a dual blood supply (dominant venous and lesser arterial)
- The hepatic portal vein brings most of the blood to the liver (75-80%)
- The blood contains most of the nutrients absorbed by the alimentary tract

23. The internal iliac artery

- Principal artery of the pelvis
- Begins at the bifurcation of common iliac artery and then descends down the lesser pelvis
- Ends by dividing into ant/post division
- Many many branches (e.g. obturator, umbilical, uterine, internal pudendal, vaginal)

24. The position of the heart

- Middle mediastinum
- Situated slightly to the left
- Apex pointing to the left, 5th intercostal space, hands breadth from the median plane
- Sup. border – 2nd intercostal space
- Inf. border – 5th intercostal space
- Aortic area – 2nd right intercostal space, near sternum
- Pulmonary area – 2nd left intercostal space, near sternum
- Tricuspid area – 5th right intercostal area, near sternum
- Mitral area – 5th right intercostal area

25. The heart (external and internal anatomy)

- Pumps all the blood in the body
- Right side receives poorly oxygenated blood and pumps it to the lungs (pulmonary circulation)
- Left side receives well oxygenated blood from the lungs and pumps it to all the structures in the body
- Walls consists of 3 layers: endocardium, myocardium, epicardium
- Left side is thicker (higher pressure) than the right side
- Fibrous skeleton
- External grooves: atrioventricular groove and ant/post interventricular sulci
- 4 surfaces, and 4 borders
- 4 chambers
- Interventricular septum contains the conducting system of the heart (moderator band)
- 4 valves that prevent "back-flow" of the blood

Right atrium

- Receives venous blood through the sup/inf vena cava (also coronary sinus)
- Connected with the right ventricle through right AV orifice (tricuspid valve)

Right ventricle

- Receives venous blood from the right atrium and pumps it to the lungs via the pulmonary trunk
- Contains papillary muscles that attach to the cusps of the right AV valve
- Contains the pulmonary valve

Left atrium

- Receives arterial blood from the pulmonary veins
- Connects with the right ventricle through the left AV orifice (mitral valve)

Left ventricle

- Receives arterial blood from the left atrium through the mitral valve (left AV orifice)
- Pumps blood out to the body through the aortic valve that leads to the aorta
- Very high pressure, muscle is very strong
- Walls covered by trabecular carneae and has ant/post papillary muscles

26. The innervation and conducting system of the heart

Conducting system

- Essential for the proper work of the heart
- Generates and transmits impulses that create and coordinate the contractions
- Consists of nodal tissue and conducting fibres
- Sinuatrial node (initiates and regulates impulses for the contractions)
- Atrioventricular node (receives impulses from the SA node)
- Right/left AV bundle (receives impulses from AV node and distributes them)
- Subendocardial branches

Innervation

- Autonomic fibres from the cardiac plexus

Sympathetic

- Presynaptic fibres thoracic segments of the spinal cord
- Postsynaptic from cervical and thoracic prevertebral ganglia and sympathetic trunks
- Causes increased heart rate, increased blood flow

Parasympathetic

- Presynaptic fibres from vagus nerve
- Postsynaptic are located in the walls of the heart
- Slows heart rate, reduces the force and constricts the coronary arteries

27. The coronary vessels

- Affected by both para/sympathetic stimulation
- Course around the hearth muscle deep to the epicardium
- Dominance depends on which artery that gives rise to post. interventricular Usually it's the right coronary artery

Right coronary artery

- Arise from the right aortic sinus
- Runs in the coronary sulcus
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Left coronary artery

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28. The cardiac veins

- All veins empty into the coronary sinus (some smaller veins drain directly into right atrium)

Great cardiac vein

- Main tributary of the coronary sinus Largest part is the ant. IV vein

Middle cardiac vein (post IV branch)

- Accompanies the posterior IV artery

Small cardiac vein

- Accompanies the right marginal branch of RCA

Smallest cardiac veins

- Open directly into the chambers of the heart

29. The pericardial sac

- Part of middle mediastinum
- Fibroserous membrane that covers the heart
- External fibrous pericardium
- Internal serous pericardium (parietal and visceral layer)
- Pericardial cavity is a potential space between parietal and visceral layer of serous pericardium, minimises friction
- Forms transverse and oblique pericardial sinus (recess within the pericardial cavity)
- Innervated mainly by the phrenic nerves (also by vagus nerve and sympathetic trunks)

30. The inguinal canal

- Oblique canal in the lower abdomen/upper part of lower limb
- Mainly occupied by the spermatic cord or round ligament of the uterus (embryonic migration)
- 2 openings: deep (internal) and superficial (external) ring
- Common place of hernia
- Usually collapsed
- Walls formed by fascia, and aponeurosis of surrounding muscles and tracts

31. The urogenital diaphragm

- Also known as deep perineal pouch
- Bounded inf. by perineal membrane and sup. by pelvic diaphragm

Contents

- Deep transverse perineal muscle
- External sphincter muscle of urethra
- Compressor Urethrae Muscle
- Urethrovaginal Sphincter (female)
- Urethra
- Vagina (females)

32. The perineal muscles and fascias

- Perineum is a shallow diamond compartment bounded by the pelvic outlet
- Divided into two triangles: anal and urogenital triangle

Fascia

- Invests structures such as muscles and organs
- Superficial fascia layers (perineal fascia (Colles fascia) and superficial fatty layer)
- Deep fascia layers

Muscles

Superficial perineal pouch

- Ischiocavernosus
- Bulbospongiosus

- Superficial transverse perineal muscle
- Anal sphincter

Deep perineal pouch

- External urethral sphincter
- Compressor urethrae
- Deep transverse perineal muscle
- Urethrovaginal sphincter

33. The kidneys

- Produce urine conveyed by the ureters to the urinary bladder
- Contacts with the suprarenal gland superiorly
- Part of endocrine system
- Retroperitoneal on the posterior abdominal wall at the level of T12-L3 (deep to rib 11 and 12)
- Surrounded by fat and fascia
- Renal cortex, medulla, pyramids, hilum, pelvis

34. The ureters and urinary bladder

Ureter

- Muscular ducts that carry urine from the kidneys to the bladder
- Retroperitoneal
- Begin at the pelvis/hilum of the kidneys
- 3 constrictions

Urinary bladder

- Temporary reservoir for urine
- Capable of great expansion
- When empty located in the lesser pelvis
- Held in place by numerous ligaments
- Apex, body, neck, trigone, internal urethral sphincter

35. The female and male urethra.

Male

- Long muscular tube that conveys urine from the bladder to the external urethral orifice (also exit for semen)
- 4 parts
- Preprostatic part
- Prostatic urethra
- Membranous part
- Spongy urethra
- Mucose-secreting glands

Female

- Passes from the internal to the external urethral orifice
- Shorter than in males
- Glands are present

36. The male internal genitalia

Considered internal due to the developmental position

Testis

- Male gonads (paired)

- Produce sperms and hormones

Epididymis

- Elongated structure on the post part of the testis
- Receive newly developed sperms

Ductus deferens

- Primary component of the spermatic cord
- Begins in testis and ends by joining the duct of seminal gland

Seminal glands

- Lie between bladder and rectum, secrete fluid that gives energy to the sperms

Ejaculatory ducts

- Forms in the union of duct of seminal gland and ductus deferens
- Terminates in the prostatic utricle

Prostate

- Largest accessory gland of the male reproductive system
- Situated just in relation to the neck of the bladder
- Traditionally described as having an isthmus and right/left lobes

Bulbourethral glands

- Secretes mucosa-like fluid during arousal
- Embedded within external urethral sphincter

37. The male external genitalia

Distal urethra

- 4 parts in total, 2 parts in the distal (membranous and spongy urethra)
- Bulbourethral glands open into the spongy urethra

Scrotum

- Cutaneous fibromuscular sac for testes and associated structures
- Two compartments, one for each testis

Penis

- Male copulatory organ and provides the outlet for semen and urine
- Consists of root, body and glans
- Three cylindrical bodies of erectile tissue: paired corpora cavernosa and single corpus spongiosum
- Covered by tunica albuginea and held together by deep fascia of the penis
- Drained by external pudendal vein and prostatic venous plexus

38. The female internal genital organs

Ovary

- Almond-shaped female gonads where the oocytes develop
- Also endocrine glands to produce hormones
- Suspended by the mesovarium (part of broad ligament)

Uterine tubes

- Conduct the oocytes and is the usual site of fertilization
- Lie in the mesosalpinx
- Infundibulum, ampulla, isthmus and uterine part

Uterus

- Hollow dynamic muscular organ
- Embryo and fetus develops inside
- Body, fundus, isthmus, cervix
- Perimetrium, myometrium and endometrium
- Suspended by many ligaments (ligament of the ovary, broad ligament of the uterus, mesometrium)

Vagina

- Musculomembranous tube
- Extending from the middle cervix of the uterus to the vaginal orifice
- Serves as a canal for menstrual fluid, birth canal and is used during sexual intercourse
- Inferior 1/5 is somatic (pudendal nerve)
- Most of the vagina is visceral (uterovaginal nerve plexus)

39. The female external genital organs

- Also named vulva
- Sensory and erectile tissue
- Direct flow of urine
- Prevent entry of foreign material

Mons pubis

- Fatty eminence

Labia majora

- Prominent folds of skin around the pudendal cleft

Labia minora

- Folds of fat-free hairless skin
- Surround the vestibule of the vagina

Clitoris

- Erectile organ where the labia minora of both sides meet
- Highly sensitive and its only function is sexual arousal

Vestibule of vagina

- Space surrounded by the labia minora
- Many glands and other structures open in this area

Bulbs of vestibule Vestibular glands

- Secrete mucous into the vestibule

40. The mediastinum - its subdivision and contents

- Mass of tissue between the two pulmonary cavities in the central thoracic area
- Extends from the superior thoracic aperture to the diaphragm

Superior mediastinum

- Thymus
- Great vessels
- Thoracic duct
- Trachea and esophagus

Inferior mediastinum

Anterior

- Lies between sternum and transversus thoracic muscles
- Loose connective tissue

- Fat
- Lymphatic vessels
- Branches of internal thoracic vessels
- Thymus in infants and children

Middle

- Heart
- Roots of great vessels

Posterior

- Posterior to the pericardium and diaphragm
- Thoracic aorta
- Thoracic duct
- Lymphatic trunks
- Azygos and hemiazygos veins
- Esophagus

41. The lungs (external and internal anatomy)

- Supplies the venous blood with oxygen
- Exchange in the bronchioles

External

- Apex and base
- Two (left) or three (right) lobes
- Three borders
- Three surfaces (costal, mediastinal, diaphragmatic)
- Hilum of the lung

Internal

- Divided into bronchopulmonary segments
- Surgically resectable (individual blood supply)

42. The pleural cavity and its recesses

- Surrounded and enclosed by pleural sac (visceral and parietal pleura)
- Pleural cavity containing fluid (potential space)
- Recesses (costodiaphragmatic, costomediastinal)

43. The trachea and principal and lobar bronchi.

Trachea

- Airway leading to the lungs
- Descends together with the esophagus
- Terminates by dividing into right and left bronchi

Bronchi

- Tracheobronchial tree
- Bronchus - lobar bronchi - segmental bronchi - bronchopulmonary segments - terminal bronchioles

44. The esophagus

- Part of the alimentary tract
- Transports food and liquid for digestion
- Fibromuscular tube that extends from the pharynx to the stomach
- 3 constrictions (important in clinical practice when passing instruments)

- Internal circular and external longitudinal layers of muscle
- Superior third is voluntary striated muscles
- Inferior third is smooth muscle
- Middle is mixed

45. The peritoneum and the peritoneal cavity.

Peritoneum

- Serous membrane covering abdominopelvic cavity
- Consists of visceral and peritoneal layer
- Viscera is classified according to its relation with the peritoneum
- Intraperitoneal organs
- Extraperitoneal organs

Peritoneal cavity

- Potential cavity between the visceral and parietal layers
- Contains peritoneal fluid

46. The lesser sac (omental bursa)

- Sac-like cavity posterior to the stomach and lesser omentum
- Sup/inf recess
- Permits free movement of the stomach and adjacent structures
- Communicates with the greater sac through the omental foramen

47. The stomach and duodenum

Part of the alimentary tract

Stomach

- Expanded part of the digestive system
- Between esophagus and duodenum
- Mechanically and chemically digests food (with the help of gastric juice)
- Cardia, fundus, body, pyloric part
- Greater and lesser curvature
- Inner surface is lined with gastric folds

Duodenum

- First and shortest part of the small intestine
- Located between the stomach and jejunum
- C-shaped around the pancreas
- Superior, descending, inferior and ascending part

48. The small and large intestine.

Part of the alimentary tract

Small intestine

- Jejunum (deep red, thick and heavy, great vascularity, large folds)
- Ileum (pink, thin and light, lesser vasculature, less folds)
- Very long (6-7m)
- Anchored to the posterior abdominal wall through the mesentery
- Superior mesenteric arteries

Large intestine

- Absorbs water and converts the liquid to feces

- Omental appendices, haustra, teniae coli
- Cecum and appendix
- Ascending, transverse and descending colon
- Sigmoid colon, rectum and anal canal

49. The pancreas

- Accessory digestive gland
- Retroperitoneal
- Exocrine (pancreatic juice) and endocrine (glucagon and insulin) secretion
- Head, neck, body and tail

50. The spleen

- Size of a fist
- Largest lymphoid organ in the body, part of the defence system
- Left upper quadrant
- Splenic hilum
- Fibrous capsule
- Internal trabeculae and pulp

51. The liver

- Largest gland in the body
- All nutrients (except fat) are absorbed from the digestive tract and conveyed through the portal venous system
- Secretes bile
- Mainly in the upper right quadrant
- Protected by thoracic cage and diaphragm
- Covered by the peritoneal cavity, except on the bare area
- Right/left lobe, quadrate and caudate lobe
- Hepatic portal vein brings most of the blood (contains nutrients)
- Hepatic artery (conveys arterial blood)

52. The gallbladder and biliary ducts

Gallbladder

- Lies in the fossa of the gallbladder on the visceral surface of the liver
- Holds bile
- Fundus, body and neck

Biliary ducts

- Conveys bile from the liver to the duodenum
- Bile emulsifies the fat in the stomach
- Right/left hepatic ducts drain the liver and join to form the common hepatic duct which is joined by the cystic duct to form the bile duct
- The bile duct runs to the duodenum (in contact with main pancreatic duct, to form hepatopancreatic ampulla)

53. Vagus nerve (X)

- Sensory and motor nerve
- Motor fibers to the voluntary muscles of the larynx and superior esophagus
- Visceral motor to involuntary muscles and glands
- Sensory fibers to pharynx and larynx
- Descend into the thorax, supply branches to many organs
- Ends as ant/post vagal trunks to innervate structures in the abdomen

54. The sciatic nerve

- Very large nerve
- Continuation of sacral plexus Sensory and motor
- Divides into common fibular and tibial nerve in the distal thigh
- Innervates muscles of posterior thigh, entire leg and foot
- Innervates skin on posterior thigh and gluteal region
- Supplies much of the skin of the leg and all of the foot

55. The cutaneous nerves of the lower limb

Genital area

- Genitofemoral nerve, ilioinguinal nerve

Gluteal area

- Sup/inf/medial clunial nerves

Thigh

- Laterally by lat. cut. nerve of the thigh
- Posteriorly by post. cut. nerve of the thigh (sciatic nerve)
- Anteriorly by ant. cut. nerve of the thigh (femoral nerve)
- Medially by obturator nerve

Leg

- Medially by the saphenous nerve (femoral nerve)
- Laterally by the fibular nerve
- Posteriorly by sural nerve

Foot

- Sole by tibial nerve
- Dorsum by fibular nerve

56. The lumbar plexus

- Situated in the posterior abdominal wall
- Anterior rami of L1-L4
- Femoral nerve
- Obturator nerve
- Lumbosacral trunk (joins sacral plexus)
- Ilioinguinal, iliohypogastric, genitofemoral nerve, lat. cut. n. of the thigh

57. The sacral plexus

- Located at the posteriolateral wall of lesser pelvis
- Formed by lumbosacral trunk and S1-S3
- Sciatic nerve
- Pudendal nerve
- Sup/inf gluteal nerve

58. The tibial nerve

- Sensory a motor
- Branch of the sciatic nerve
- Formed in the distal thigh
- Passes through the popliteal fossa
- Innervates the muscles of the posterior compartment of the leg

- Together with the common fibular nerve, forms sural nerve
- In the foot it divides into medial and lateral plantar nerves

59. The fibular nerves

- Sensory a motor
- Branch of the sciatic nerve
- Formed in the distal thigh

Superficial branch

- Supplies lateral compartment of the leg
- Continues as a cutaneous nerve of the leg and foot

Deep branch

- Innervates anterior compartment of the leg
- Innervates intrinsic muscles of the foot and a small area of skin

60. The femoral nerve

- Sensory a motor
- Largest branch of the lumbar plexus
- Originates in the abdomen
- Passes deep to the inguinal ligament and enters femoral triangle
- Innervates the muscles of the anterior compartment of the thigh
- Innervates the skin of ant. compartment of the thigh
- Terminates as a cutaneous nerve, the saphenous nerve and innervates the skin of the anteromedial aspect of the thigh, leg and foot

61. The pudendal nerve

- Originates from the sacral plexus in the pelvis
- Main nerve of the perineum
- Chief sensory nerve of the external genitalia
- Leaves through greater sciatic foramen and loops back through the lesser sciatic foramen