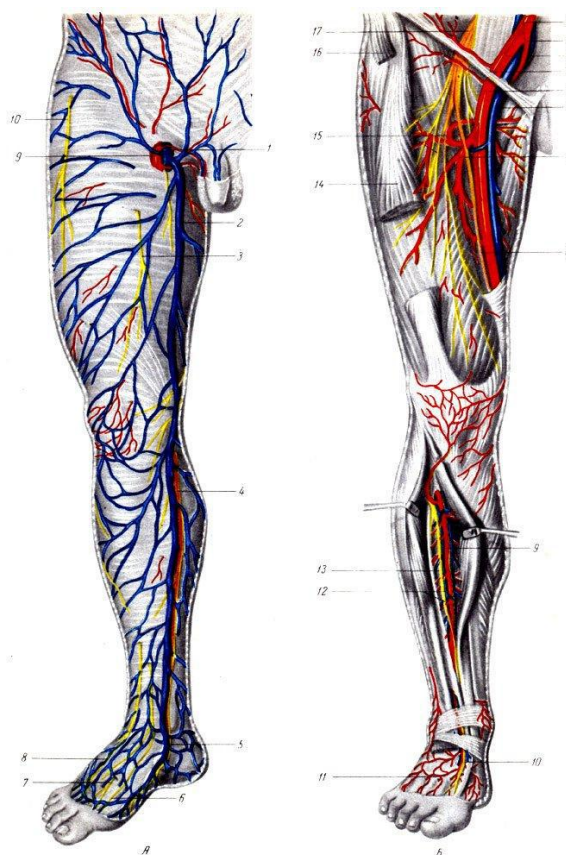


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Department of Operative Surgery and Topographic Anatomy

Clinical anatomy of the lower extremity



Teaching aid

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Clinical anatomy of lower extremity is one of the important sections in topographic anatomy. The teaching manual is intended for foreign students of medical faculty, faculty of pediatrics, faculty of dentistry of USMU.

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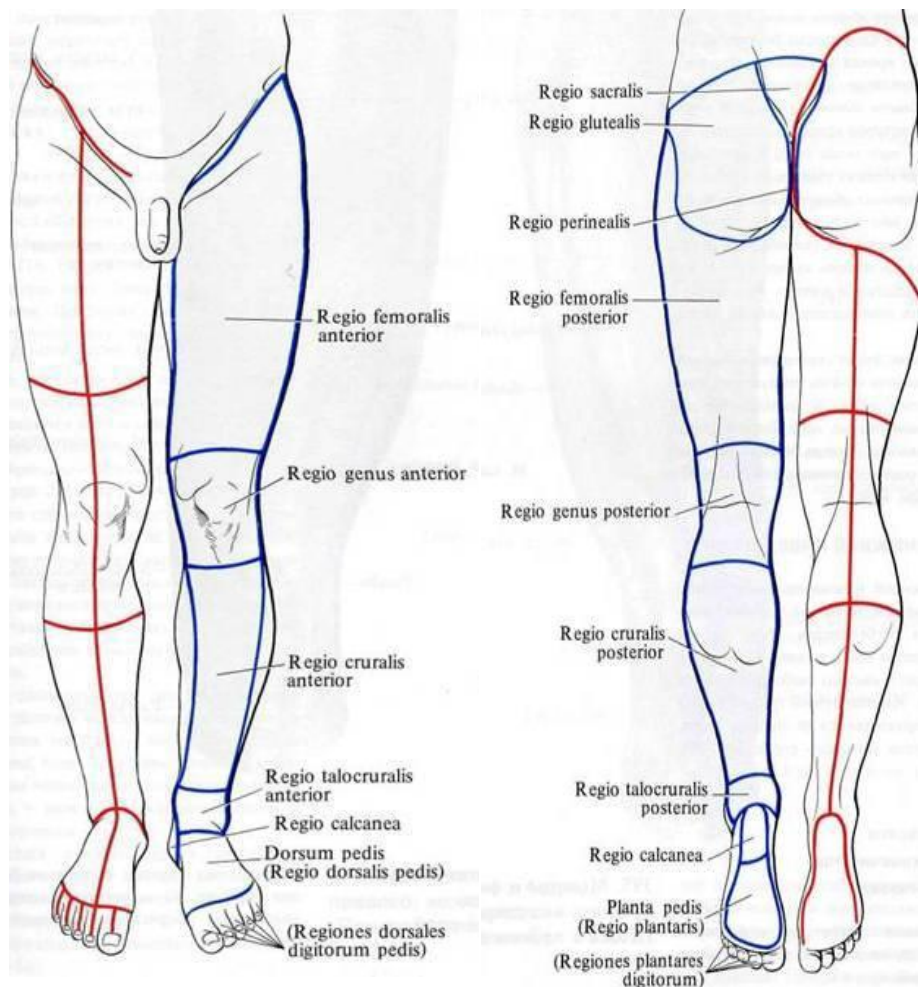
Contents

INTRODUCTION	6
GENERAL CHARACTERISTICS.....	7
CLINICAL ANATOMY OF THE GLUTEAL REGION.....	7
TOPOGRAPHY OF THE HIP JOINT	11
TOPOGRAPHY OF THE ANTERIOR AND POSTERIOR FEMORAL REGIONS	14
TOPOGRAPHY OF THE ANTERIOR REGION OF THE KNEE	21
TOPOGRAPHY OF THE POPLITEAL REGION.....	22
TOPOGRAPHY OF THE ANTERIOR REGION OF THE LEG.....	26
TOPOGRAPHY OF THE POSTERIOR REGION OF THE LEG	29
TOPOGRAPHY OF THE PLANTAR REGION OF THE FOOT	36
TOPOGRAPHY OF THE DORSAL REGION OF THE FOOT	38
TEST TASKS	39
TEST ANSWERS	45

INTRODUCTION

Clinical anatomy of the lower extremity is one of the most important sections in topographic anatomy. One of the major challenges for the students of medical university is to get the theoretical base and the competences that are professionally necessary. This manual is a useful source of knowledge of the lower extremity's regional clinical anatomy. The student, who read attentively will find for himself the necessary anatomoco-clinical connections, that in the future will help in his independent work.

The formation of holistic view of morphofunctional relations in the organism is tightly connected with anatomico-clinical characteristic of the concrete region of the human's body. The importance of this cannot be overemphasized because it is necessary for a doctor to have the knowledge and the skill to be professionally oriented in the spatial and structural organization of the biological object discredited by the disease or trauma.



GENERAL CHARACTERISTICS

Borders of the lower extremity

Anterior: pubic symphysis – pubic tubercle-inguinal ligament – anterior superior iliac spine – iliac crest. Posterior: imaginary line drawn from the posterior superior iliac spine to the middle point between the 2nd and 3rd sacral vertebrae.

The lower extremity is divided into the following regions:

- 1) gluteal region (region glutea)
- 2) anterior and posterior femoral regions (regions femoris anterior et posterior)
- 3) anterior and posterior regions of the knee (regions genu anterior et posterior)
- 4) anterior and posterior regions of the leg (regions cruris anterior et posterior)
- 5) anterior, posterior, lateral and medial regions of the ankle joint (regions articulationis talocruris anterior, posterior, lateralis et mediales)
- 6) dorsal foot region (region dorsi pedis)
- 7) region of the sole (region plantae pedis)

CLINICAL ANATOMY OF THE GLUTEAL REGION

Borders:

Superior: iliac crest. Inferior: gluteal fold. Medial: spinous process of the sacrum and coccyx. Lateral: imaginary line drawn from the anterior superior iliac spine to the greater trochanter.

Layers:

Skin: it's thick, hair follicles are found mainly on the medial side, sweat glands are distributed on the lateral side, sebaceous glands are found mainly on the middle side.

Subcutaneous tissue: the superficial fascia separates this tissue into 2 layers. The superficial layer is attached to the skin and forms cellular structure. The deep layer is a fatty space which continues to the lumbar region superiorly. It contains branches of the superior and inferior gluteal arteries.

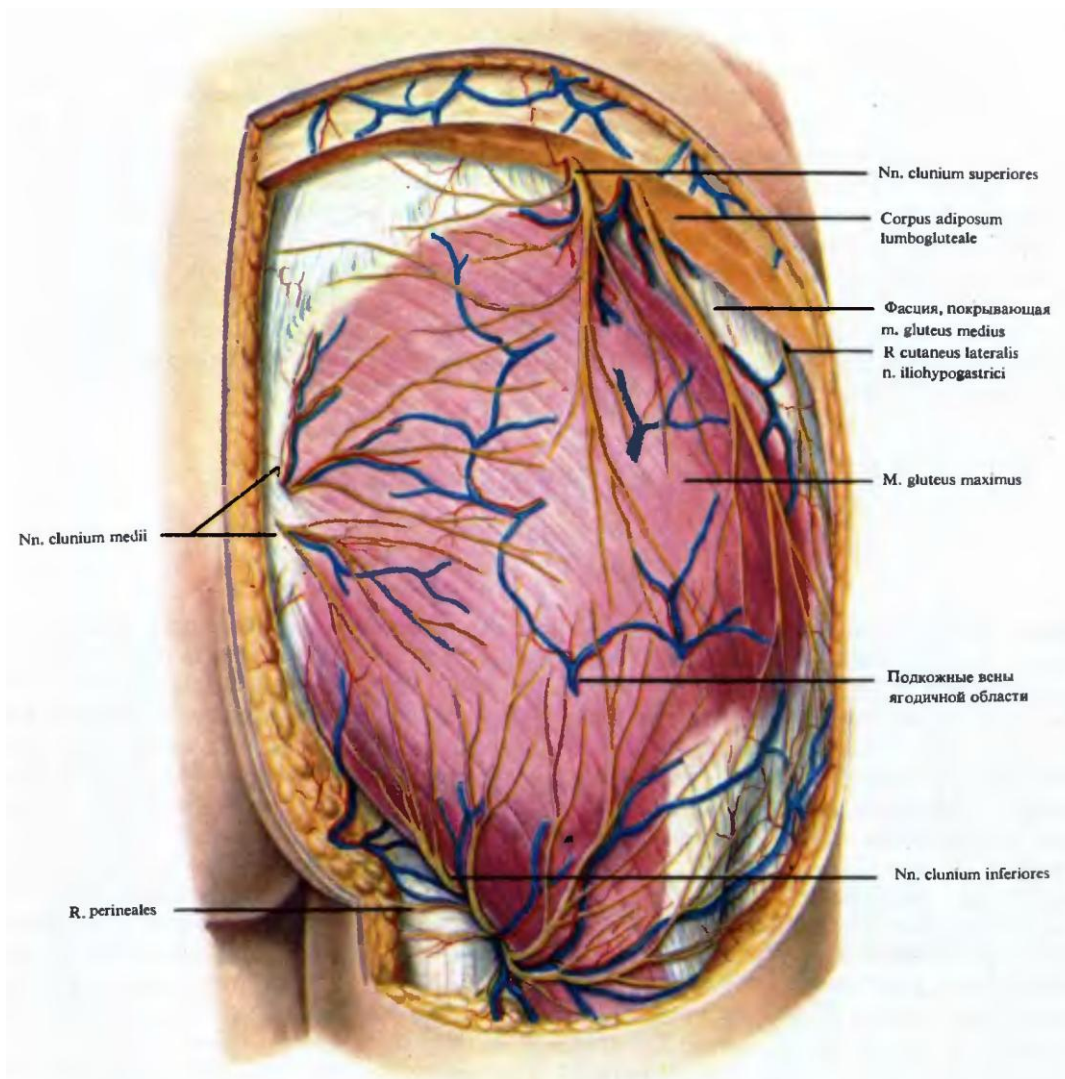
Fascia (fascia glutea): It covers the underlying muscles and inferior gluteal arteries.

First layer: 1 layer of the gluteus maximus muscle (covers the inferior part of the posterior side of the iliac crest to the greater trochanter), ½ layer of the gluteus medius muscle (covers the iliac crest post).

Second layer: ½ layer of the gluteus medius muscle, full layer of the superior and inferior gemelli muscles, periformis muscle, obturator internus muscle and quadratus femoris muscle.

Third layer:

Full layer of the gluteus minimus and obturator externus muscles.

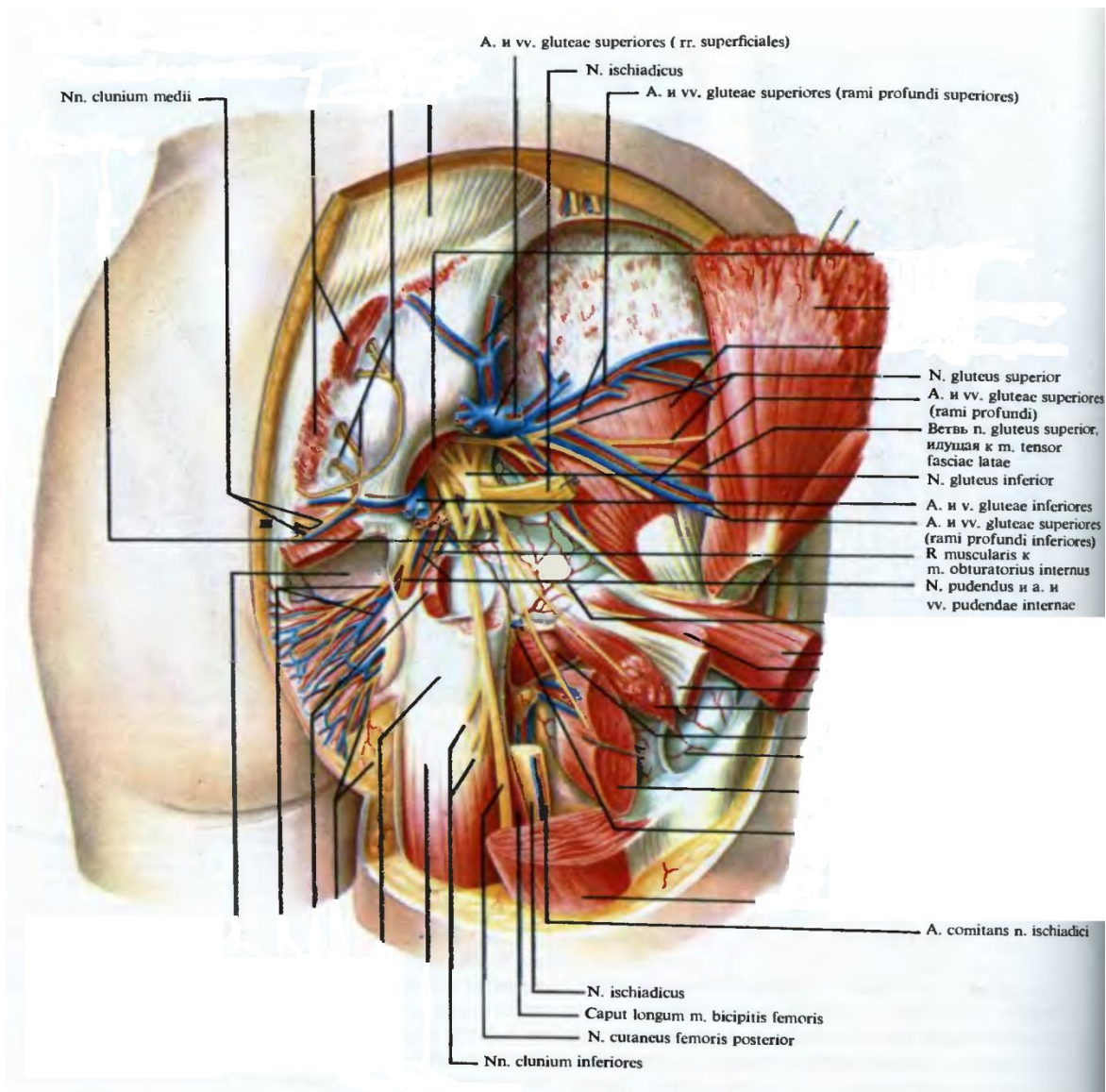


Localization of neurovascular bundles:

The sacrotuberous and sacrospinous ligaments form the greater and lesser sciatic foramina. The greater sciatic foramen is divided into the supra- and infrapiriform foramina by piriformis muscle. The main neurovascular bundles lie in these 2 spaces.

Suprapiriform foramen: the superior gluteal artery, veins and nerve pass through this foramen. They supply the muscles of the deep layer (2nd and 3rd).

Infrapiriform foramen: there are 3 neurovascular bundles in this foramen, the 1st bundle consists of the sciatic nerve and arteria contains nervi ischiadici, the 2nd bundle consists of the inferior gluteal artery, inferior gluteal vein and inferior gluteal nerve, the 3rd bundle consists of the internal pudendal artery, internal pudendal vein and pudendal nerve.

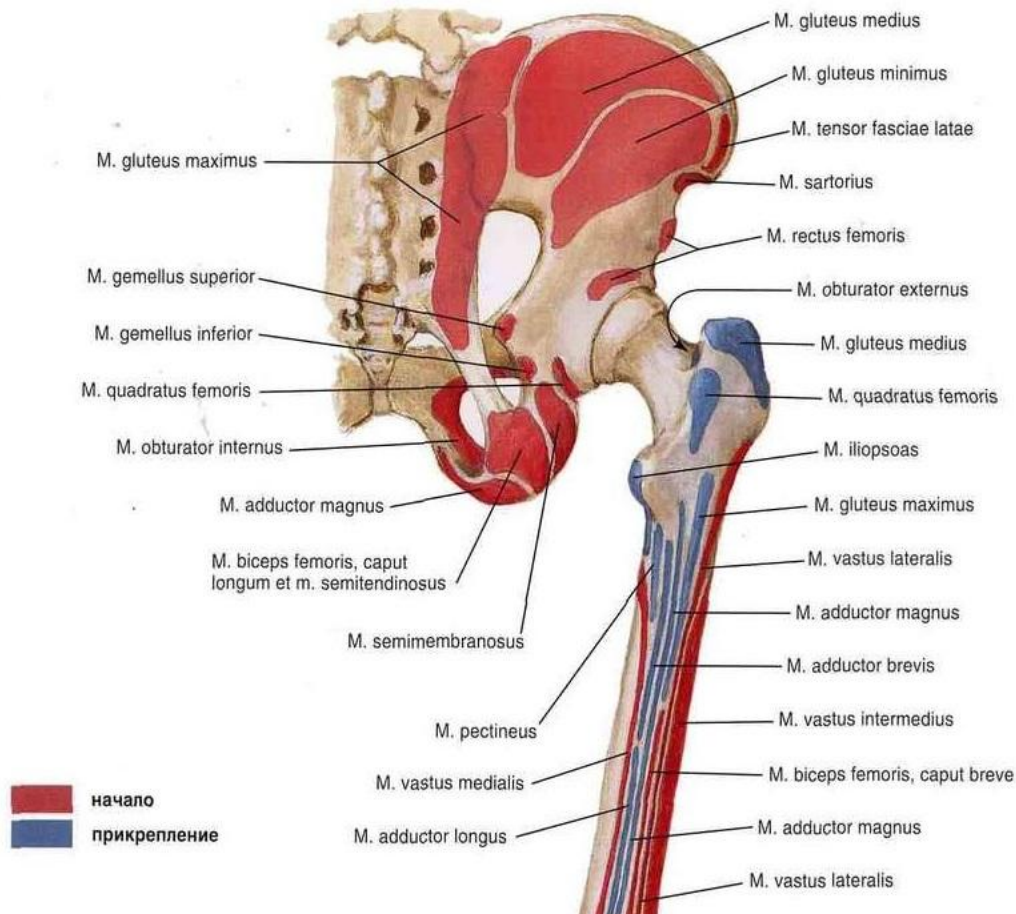


Projection of the neurovascular bundles:

The superior gluteal artery: it passes through the line between the superior and middle 1/3 from the posterior superior iliac spine to the greater trochanter. It's divided into branches, which are the superior and deep branches at the level of the greater sciatic foramen and lie on the periosteum of the wing of the ilium. The short branches run to the piriformis muscle and form an anastomosis with the inferior gluteal artery. The superficial branch is divided on the medial surface of the gluteus maximus muscle. The deep branch goes to the space between the gluteus medius and minimus muscles.

The inferior gluteal artery: it runs from the posterior superior iliac spine downwards and laterally to the medial margin of the ischial tuberosity. It is surrounded by the inferior gluteal veins and nerve. Around the infrapiriform foramen, the sciatic nerve lies lateral to these bundles (artery, veins and nerve) while the pudendal vascular

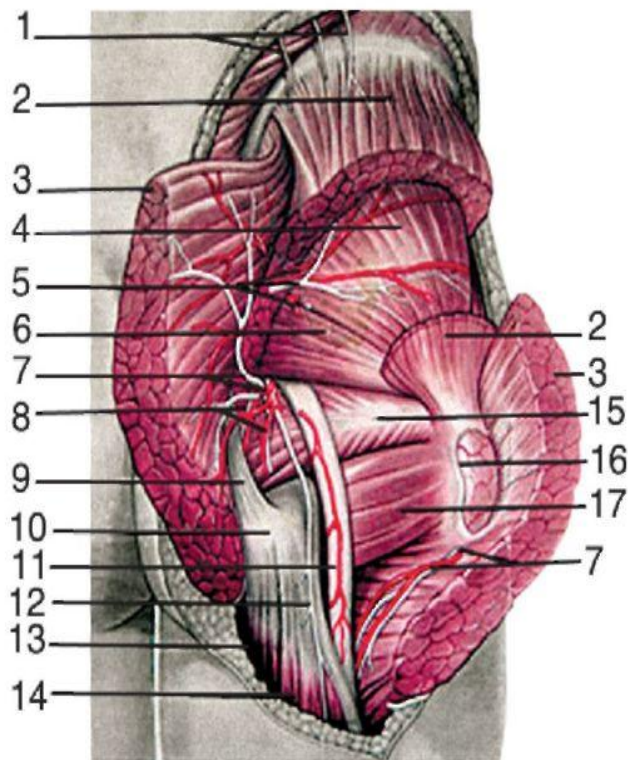
bundles lie medial to them. Lateral these neurovascular bundles penetrate to the fascia and gluteus maximus muscle.



Pudendal neurovascular bundles: they consist of the internal pudendal artery, veins and pudendal nerve. They pass through the infrapiriform foramen medially. Around the infrapiriform foramen, these the superior margin of the sacrospinous ligament and ischial bone, which form the superior margin of the lesser sciatic foramen. Then these bundles pass through the lesser sciatic foramen inferiorly to the sacrotuberous ligament on the medial surface of the ischial tuberosity. The sacrotuberous ligament covers the obturator internus muscle and fascia. This fascia forms the pudendal Alcock's canal, where the pudendal neurovascular bundles pass through. The pudendal nerve passes downwards and medially from the vessels.

The sciatic nerve: it's situated laterally in the infrapiriform foramen. The posterior cutaneous nerve of the thigh (nervus cutaneus femoris posterior), sciatic artery and arteria comitans nervi ischiadici pass medial to the sciatic nerve. In the lower margin of the gluteus maximus muscle, this nerve is located superficially and is covered by the fascia lata only. Anesthesia of the sciatic nerve is located on the middle point

between the medial margin of the ischial tuberosity and greater trochanter of the femur.



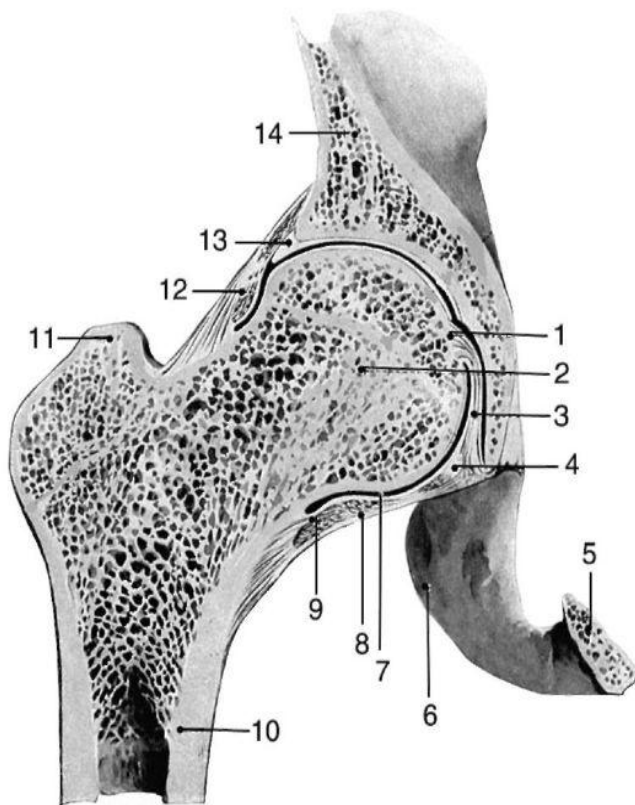
Neurovascular bundles of the gluteal region

1 - nn. clunii superiores; 2 - m. gluteus medius; 3 - m. gluteus maximus; 4 - m. gluteus minimus; 5 - a., v., n. glutei superior; 6 - m. piriformis; 7 - a., v., n. glutei inferior; 8 - a., v. pudendae internae et n. pudendus; 9 - lig. sacrotuberale; 10 - tuber ischiadicum; 11 - n. ischiadicus; 12 - n. cutaneus femoris posterior; 13 - m. semimembranosus; 14 - m. semitendinosus; 15 - m. obturatorius internus et mm. gemelli; 16 - край рассеченной bursa trochanterica; 17 - m. quadratus femoris

TOPOGRAPHY OF THE HIP JOINT

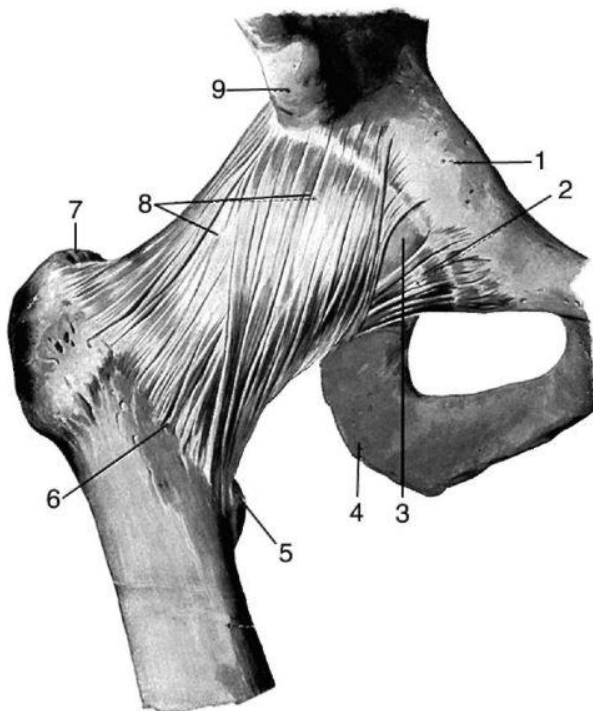
The hip joint is the articulation between the acetabulum (os coxae) and head of the femur. It is simple, ball and socket and multiaxial joint: it is reinforced by: intracapsular ligaments (ligamentum capitis femoris, ligamentum transversum acetabulae), extracapsular ligaments (iliofemoral ligament – Bigelow’s Y ligament, pubofemoral ligament, ischiofemoral, zona orbicularis).

The acetabular labrum increases the size of the articular surface. The largest lymph node in this region is the Pirogov’s node. Weak places of the joint capsule. Anterior weak place of this capsule is located between the iliofemoral ligament and pubofemoral ligament. Posterior weak place of this capsule is located under the inferior margin of the ischiofemoral ligament, from the ischial tuberosity and acetabulum to the trochanteric fossa. The obturator externus muscle is located here.



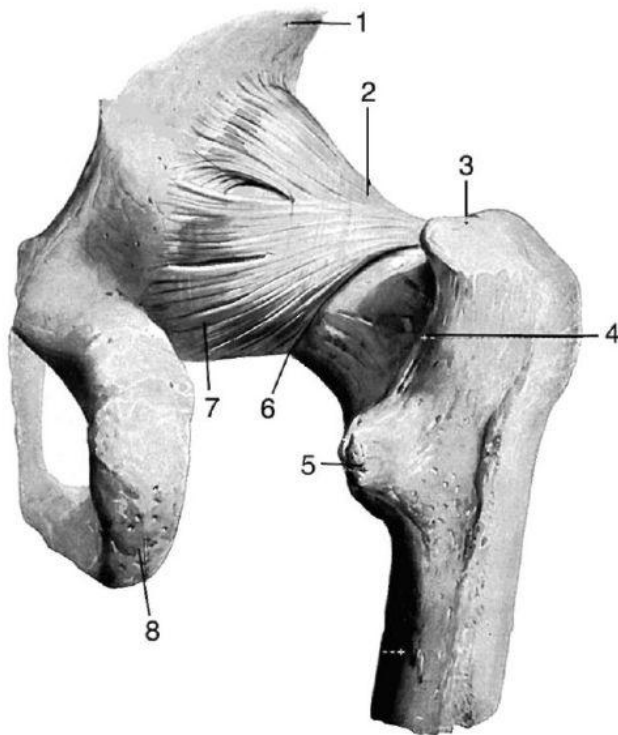
Hip Joint

1 - fovea capitis femoris; 2 - caput femoris; 3 - lig. teres femoris; 4 - lig. transversum acetabuli; 5 - ramus inferior ossis ischii; 6 - tuber ischiadicum; 7 - cavum articulare; 8 - capsula articularis; 9 - zona orbicularis; 10 - corpus femoris; 11 - trochanter major; 12 - zona orbicularis; 13 - labrum glenoidale; 14 - os ilium.



Extracapsular ligaments

1 - eminentia iliopubica; 2 - lig. pubofemorale; 3 - anterior "weak" point; 4 - tuber ischiadicum; 5 - trochanter minor; 6 - linea trochanterica; 7 - trochanter major; 8 - lig. iliofemorale; 9 - spina iliaca anterior superior



Inferioposterior “weak” point.

1 - os ilium; 2 - lig. iliofemorale; 3 - trochanter major; 4 - crista intertrochanterica; 5 - trochanter minor; 6 - заднее «слабое место» капсулы сустава; 7 - lig. ischiofemorale; 8 - tuber

Purulent processes of the paraarticular space may spread to fasciae of the adjacent muscles through these weak places.

Purulent process of the joint capsule may spread to:

Anterior direction:

- to the medial compartment of the thigh, through the space between the pubic bone and pectineus muscle from the medial margin of the iliopsoas muscle.
- to the suprapatellar bursa from the lateral margin of the iliopsoas muscle (pus sometimes passes between rectus femoris and vastus intermedius muscles).
- to the adductor canal (canalis adductorius) along the femoral vessels (it is more threatening)

Posterior direction:

- to the posterior direction under the gluteus maximus muscle through the fissure between the quadratus femoris and inferior gemellus muscles.
- to the gluteal region along the obturator internus muscle, medial circumflex artery and veins under the gluteus maximus muscle.
- to the gluteal region and fissure between the gluteus medius and minimus muscles along the lateral circumflex artery and veins, from the space between the Sartorius and rectus femoris muscles or from the tensor fasciae latae muscle.

Other directions:

- to the lesser pelvis from the lateral surface of the obturator externus muscle along the obturator artery, veins and nerve through the obturator canal.

- to the medial side of the thigh through the posteroinferior weak place of the hip joint along the fascia of the obturator internus muscle (where the adductor muscle is located here). From here, pus may penetrate to the lesser pelvis along the obturator canal.

- to the posterior thigh and lateral margin of the greater trochanter of the femur (it penetrates to the anterior surface of the thigh and fascia of the gluteus maximus muscle).

TOPOGRAPHY OF THE ANTERIOR AND POSTERIOR

FEMORAL REGIONS

Borders:

Anterior- pubic symphysis, inguinal ligament, anterior superior iliac spine, imaginary line between the anterior superior iliac spine and greater trochanter; posterior – gluteal fold, fold between the perineal side fold and medial side of the thigh to the pubic symphysis. Inferior – circular line drawn at the level of 2 fingers above the patella. Lateral – 2 vertical lines drawn till lateral and medial epicondyles.

Layers:

Skin: it is thick and movable. There are more hair follicles and sweat glands in males.

Subcutaneous space: it contains the superficial epigastric artery, external pudendal artery, superficial circumflex iliac artery and veins of the same name. The great saphenous vein passes to the medial side of the whole lower extremity and enters the femoral vein through the saphenous opening (fossa ovale).

Muscles: anterior compartment of the thigh contains the quadriceps femoris, Sartorius and pectineus muscles; also known as the extensor compartment of the thigh. Posterior compartment of the thigh contains the sciatic nerve, semimembranosus, semitendinosus and biceps femoris muscles; also as the hamstring compartment. Medial compartment of the thigh contains the adductor magnus, adductor longus, adductor brevis and gracilis muscles.

The muscles of the hip are grouped about the external and internal surfaces of the pelvis and run to the trochanteric region of the femur.

The *iliopsoas muscle* consists of the psoas major (arising from the sides of the twelfth dorsal and of the four upper lumbar vertebrae), of the iliacus (arising from the inner surface of the ilium), and of the iliopectineus psoas minor; it is inserted into the lesser trochanter. Opposing this muscle, we have the large muscles of the buttocks passing to the greater trochanter, and also the external rotators coming from the true pelvis. The muscles of the buttocks are the gluteus maximus, medius, and minimus.

The *gluteus maximus* arises from the posterior surface of the ilium behind the superior curved line, from the outer surface of the sacrum and of the coccyx, and from the great sacrosciatic ligament, and goes to the fascia lata and to the tuberositas glutea femoris (the rough line leading from the great trochanter to the linea aspera). Between its tendon and the great trochanter is situated the large bursa trochanterica.

The *gluteus medius* arises from the ilium between the superior and middle curved lines (linea glutea posterior and anterior) and runs to the outer surface of the great trochanter.

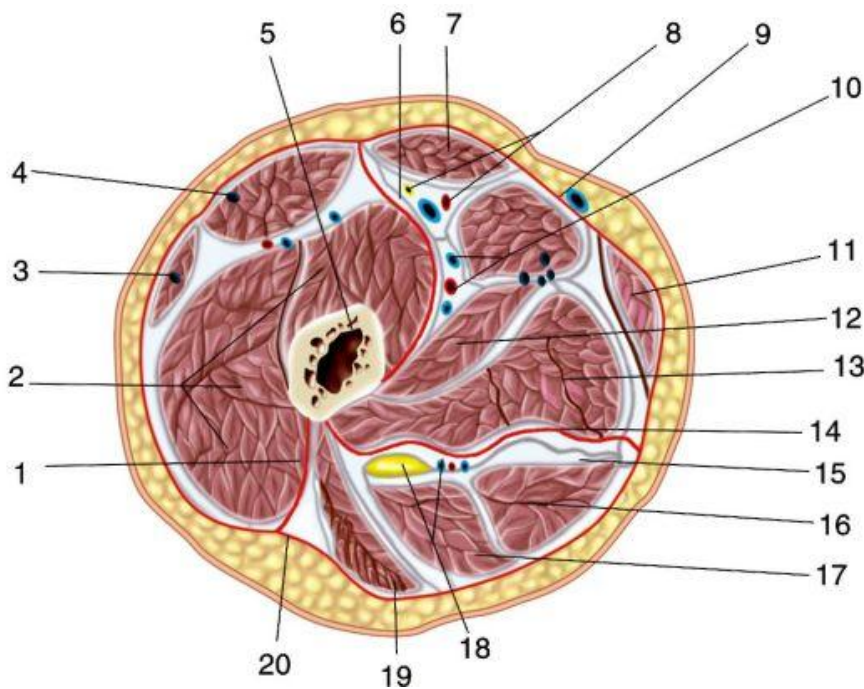
The *gluteus minimus* arises from the ilium between the middle and inferior curved lines (linea glutea anterior and linea glutea inferior) and inserts into the anterior surface of the great trochanter. The external rotators are the piriformis, the obturator internus, the gemelli, the obturator externus, and the quadratus femoris.

The *piriformis*, in relation with the inferior margin of the gluteus medius, passes from the anterior surface of the sacrum through the great sacrosciatic foramen to the trochanteric fossa (foramina suprapyriforme and infrapyriforme).

The *obturator internus* takes origin from the inner surface of the obturator membrane and from the surrounding bones; it leaves the pelvis through the lesser sacrosciatic foramen and passes to the trochanteric fossa, accompanied by the superior and inferior gemelli muscles (arising from the spine and from the tuberosity of the ischium respectively).

The *obturator externus* runs from the outer surface of the obturator membrane to the trochanteric fossa.

The *quadratus femoris* passes from the tuberosity of the ischium to the crista intertrochanterica (linea quadrati).



(upper 1/3 of the thigh)

1 - septum intermusculare laterale; 2 - mm. vastus lateralis, medialis, intermedius; 3 - m. tensor fasciae latae; 4 - m. rectus femoris; 5 - os femur; 6 - septum intermusculare mediale; 7 - m. sartorius; 8 - a. et v. femorales, n. saphenus; 9 - v. saphena magna; 10 - a. et. vv. profundae femoris; 11 - m. gracilis; 12 - m. adductor longus; 13 - m. adductor magnus; 14 - septum intermusculare posterior; 15 - m. semimembranosus; 16 - m. semitendinosus; 17 - m. biceps femoris (caput longum); 18 - n. ischiadicus et vasa comitans; 19 - m. gluteus maximus; 20 - fascia lata.

FEMORAL (SCARPA'S) TRIANGLE (TRIGONUM FEMORALE)

It is musculofascial triangle on the anterior region of the thigh.

Borders:

Superior: inguinal ligament. Medial: medial edge of the adductor longus muscle.

Lateral: Sartorius muscle.

The femoral triangle contains the femoral artery, vein and nerve. The vascular bundle projection of the femoral artery and vein is from the midpoint of the inguinal ligament to the medial epicondyle of the femur (Ken's line).

The floor of this triangle is formed by the pectineus and iliopsoas muscles. Between the pectineus and iliopsoas muscles, sulcus iliopectineus, femoral artery and veins are lodged in this sulcus.

NEUROVASCULAR BUNDLES OF THE FEMORAL TRIANGLE

Femoral artery (arteria femoralis): it passes from the midpoint of the inguinal

ligament to the femoral triangle. Compression of the midpoint of the inguinal ligament can thus stop bleeding from this artery. It is covered anteriorly by the fascia cribrosa of the saphenous opening. This artery is situated lateral to the femoral vein.

The femoral nerve (nervus femoralis): it is situated lateral to the femoral artery and separated by the iliopectineal arch and fascia of the iliopsoas muscle. Superficial branches of this nerve pectorate the fascia lata through the sheath of the Sartorius muscle and innervate the skin (rami cutanei anteriores). Deep branches of this nerve intersect with the lateral circumflex femoral artery and innervate the quadriceps femoris tendon and pectineus muscle.

The deep femoral artery (arteria profunda femoris): it has 2 branches called the medial circumflex femoral artery (arteria circumflexa femoris lateralis).

The medial circumflex femoral artery (arteria circumflexa femoris medialis): it passes posteromedial to the femoral artery and vein. It is divided into superficial and deep branches on the medial margin of the iliopsoas muscle. Superficial branch (ramus superficialis arteriae circumflexae medialis) passes to the gracilis muscle. Deep branch (ramus profunda arteriae circumflexae femoris medialis) penetrates the space between the pectineus and obturator externus muscles. It is then divided into the ascending branches which pass to the posterior surface of the thigh. The ascending branch enters the gluteal region in the space between the obturator externus and quadratus femoris muscles. It anastomoses with perforating branches of the deep artery of the thigh and obturator artery.

The lateral circumflex femoral artery (arteria circumflexa lateralis): it is divided into the ascending and descending branches. The ascending branch (ramus ascendens arteriae circumflexae femoris lateralis) passes to the space between the iliopsoas and gluteus medius muscles. Its branches anastomose with the superior gluteal artery to form an arterial network on the greater trochanter of the femur (rete trochanterica). The descending branch (ramus descendens arteriae circumflexae femoris lateralis) passes under the rectus femoris muscle. It passes between the rectus femoris and vastus intermedius muscles and to the arterial network of the knee joint, where it anastomoses with the branches of the popliteal artery (arteria poplitea).

The femoral artery (arteria femoralis): it passes from the midpoint between the pubic symphysis and anterior superior iliac spine to the tuberculum adductorium femoris (Ken's line).

The posterior tibial artery (arteria tibialis posterior): it passes from the point, 1cm posterior to the medial margin of the medial epicondyle of tibia, to the midpoint between the Achilles tendon and medial malleolus.

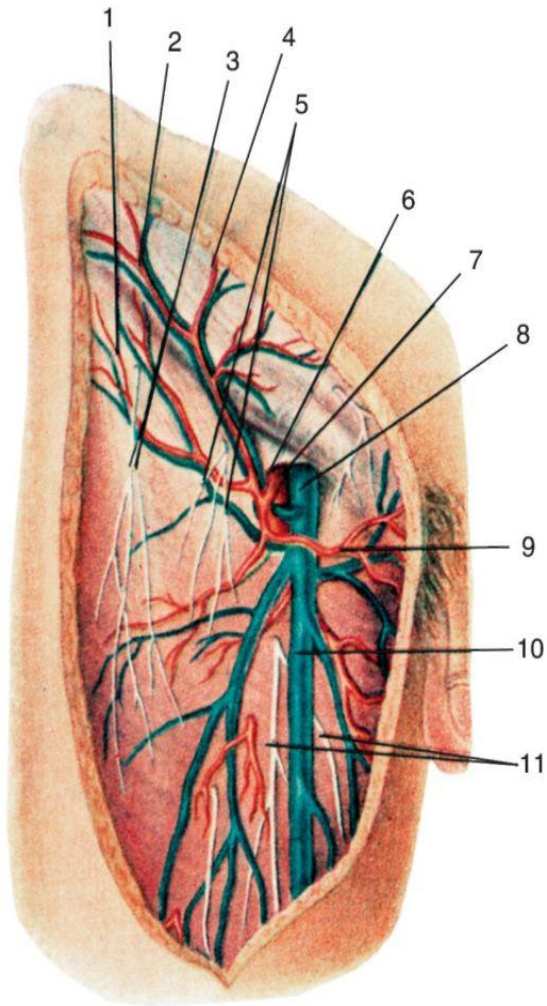
The anterior tibial artery (arteria tibialis anterior): it passes from the midpoint between the head of the fibula and tibial tuberosity to the midpoint between the

medial and lateral malleoli.

The femoral Vein is to the inner side of the artery above, but gradually passes behind it, so that at the entrance to Hunter's canal the vein is almost entirely concealed by the artery. The nearer we approach to the knee, the firmer becomes the connective tissue between the artery and the vein, for which reason the ligation of the artery in this situation is more difficult on account of the necessary isolation of the vein.

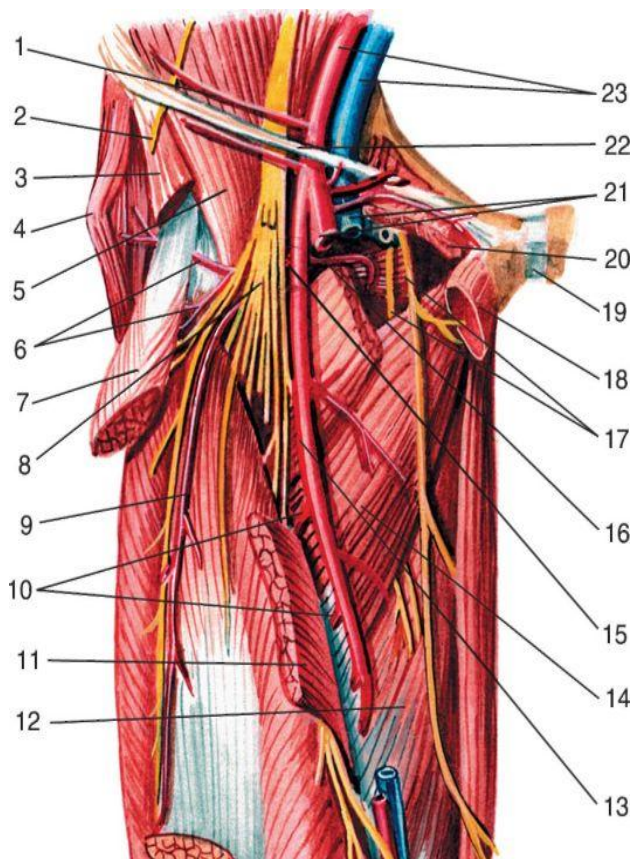
The anterior Crural Nerve, the motor nerve for the quadriceps and the sartorius muscles, passes to the thigh through the lacuna musculorum to the outer side of the femoral artery and separated from it by the iliopectineal fascia. It is scarcely endangered by the ligation of the artery, and divides just below Poupert's ligament into cutaneous and muscular branches. The longest branch is the cutaneous nerve, designated as the long saphenous, which accompanies the femoral artery to Hunter's canal; the nerve then passes through the anterior wall of the canal, runs beneath the sartorius muscle, perforates the fascia lata behind the insertion of the sartorius, and accompanies the long saphenous vein to the internal malleolus.

The Sciatic Nerve, the motor nerve of the flexors, and often made familiar to the laity by sciatica, leaves the pelvis through the infrapiriform foramen; it lies at first upon the obturator internus and the two gemelli muscles beneath the gluteus maximus, and then upon the quadratus femoris between the great trochanter and the tuberosity of the ischium. It becomes superficial at the lower border of the gluteus maximus muscle and for a short distance is covered only by the skin and fascia. In this situation the nerve is accessible to electric and surgical treatment. In order to expose the nerve the patient is placed upon the abdomen and a line is drawn from the great trochanter to the tuberosity of the ischium; an incision is now made parallel to the inferior margin of the gluteus maximus at the junction of the inner and middle thirds of this line.



Superficial vessels of the femoral triangle:

1 - vasa circumflexa ilium superficialia; 2, 4 - vasa epigastrica superficialia; 3 - n. cutaneus femoris lateralis; 5 - n. ilioinguinalis; 6 - hiatus saphenus et margo falciformis; 7 - a. femoralis; 8 - v. femoralis; 9 - vasa pudenda externa; 10 - v. saphena magna; 11 - nn. cutanei femoris anteriores



Vessels and nerves of the femoral triangle

1 - a. circumflexa ilium profunda; 2 - n. cutaneus femoris lateralis; 3 - m. sartorius; 4 - m. tensor fasciae latae; 5 - m. iliopsoas; 6 - rr. ascendens et transversus a. circumflexae femoris lateralis; 7 - m. rectus femoris; 8 - n. femoralis; 9 - ramus descendens a. circumflexae femoris lateralis; 10 - aa. perforantes; 11 - m. adductor longus; 12 - m. adductor magnus; 13 - a. profunda femoris; 14 - m. adductor brevis; 15 - a. circumflexa femoris lateralis; 16 - a. circumflexa femoris medialis; 17 - rr. anterior et posterior n. obturatorii; 18 - m. adductor longus; 19 - symphysis pubica; 20 - m. pectineus; 21 - a., v. femoralis; 22 - a., v. femoralis; 23 - a., v. iliaca

FEMORAL RING (ANNULUS FEMORALIS)

It is opening into the femoral canal.

Borders:

Anterior- inguinal ligament. Posterior – pectineal ligament. Medial – lacunar ligament. Lateral: femoral vein. If a femoral hernia develops, the herniated gut will form the femoral ring.

FEMORAL CANAL (CANALIS FEMORALIS)

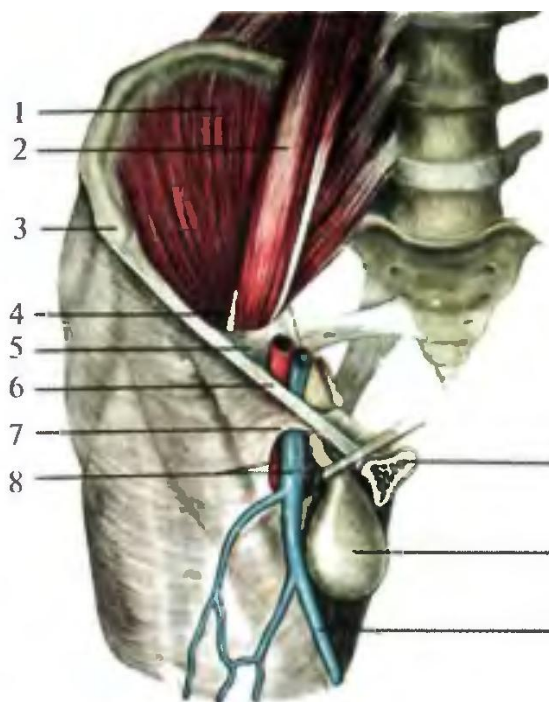
Femoral canal has a pyramidal shape.

Borders:

Anterior – superficial of the fascia lata. Posterior – deep layer of the fascia lata. Lateral – fascia on the femoral vein.

Femoral canal will only exist when the femoral hernia occurs. This is a pathological canal. This canal has 2 rings, which are the superficial and deep femoral rings: superficial ring: saphenous opening or falciform margin of the fascia lata with cornu superior and inferior; deep ring – annulus femoralis profundus.

Superficially the saphenous opening is covered by the fascia cribrosa.



Femoral canal

1 – m. iliacus; 2 – τ. psoas major;
3 – spina iliaca anterior superior;
4 – n. femoralis; 5 – arcus ilio-
pectineus; 6 – lig. inguinale; 7 –
margo falciformis et cornu superior;
8 – a., v. femoralis; 9 – os pubis;
10 – saccus herniae (грыжевой
мешок); 11 – v. saphena magna.

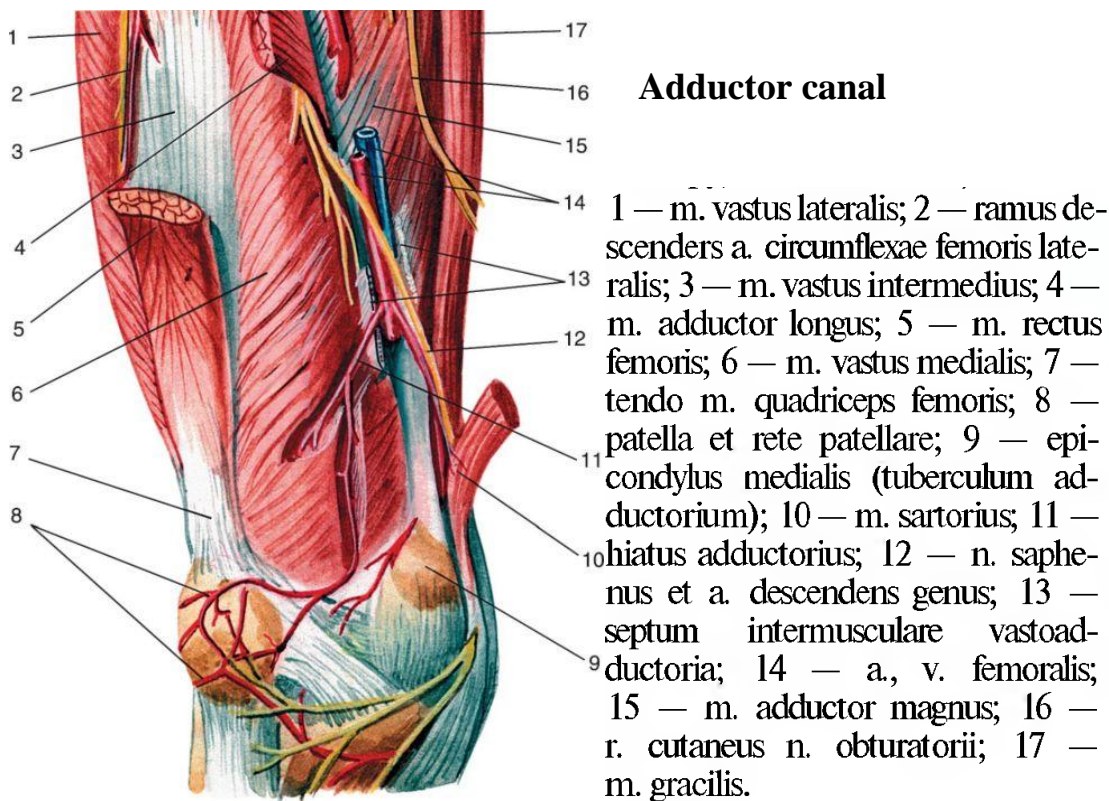
ADDUCTOR CANAL

It is a musculofascial canal that contains a large neurological bundle of the anterior thigh.

Borders:

Lateral – vastus medialis muscle. Medial - adductor magnus muscle. Anterior – lamina vastoadductoria located between the vastus medialis and adductor magnus muscles.

The Sartorius muscle, superficial and adductor longus muscles cover this canal. It begins proximally at the inferior angle of the femoral triangle and ends distally at the adductor hiatus. The adductor canal contains 3 foramina: superior foramen – femoral artery and vein pass here and are bounded by the superior margin of the lamina; inferior foramen – popliteal artery and vein pass here (hiatus adductorius); anterior foramen: saphenous nerve and arteria et vena genus descendens pass to the lamina vasoadductoria.



TOPOGRAPHY OF THE ANTERIOR REGION OF THE KNEE

Landmarks: patella, tendon of the quadriceps femoris, patellar ligament, plicae alares, head of the fibula, Gerdy's tubercle, lateral condyle of the femur.

Borders: superior – circular line drawn 6 cm above the patella; inferior – circular line drawn at the level of the tibial tuberosity; medial – line drawn through the posterior margin of the medial epicondyle of the femur.

Layers:

Skin: it is rough, movable, full of folds and contains sweat and sebaceous glands.

Subcutaneous tissue: it contains less fat. The great saphenous vein nerves and its infrapatellar branches pass here. There are several bursae in this layer, which are the bursa prepatellaris subcutanea, bursa infrapatellaris subcutanea and bursa tuberositas tibiae. There is no superficial fascia.

Fascia: on the anterior surface of the knee joint, it passes from the patella and tendon of the quadriceps femoris muscle to the retinaculum patellae mediale and retinaculum patellae laterale. There are several bursae under this fascia, which are the bursa prepatellaris subfacialis, bursaprepatellaris subtendinea, bursa infrapatellaris profunda and bursa suprapatellaris. The bursa prepatellaris subfacialis and bursa prepatellaris subtendinea are located on the anterior surface of the patella. The bursa suprapatellaris is located under the tendon of the quadriceps femoris muscle. Rete articulare genus is located on the anterior surface of the knee under this fascia. It is an arterial network which is part of the descending genicular artery. Rete patellaris is also located in the fascia of the patellar region.

TOPOGRAPHY OF THE POPLITEAL REGION

Landmarks: on the posterior surface during flexion of the leg on the knee joint, semitendinosus and semimembranosus muscles are palpated medially and superiorly; tendon of the biceps femoris muscle is also palpated superiorly and laterally.

Borders:

Superior – circular line drawn 6 cm above the patella. Inferior – circular line drawn at the level of the tibial tuberosity. Medial – line drawn through the posterior margin of the medial epicondyle of the femur. Lateral – line drawn through the posterior margin of the lateral epicondyle of the femur.

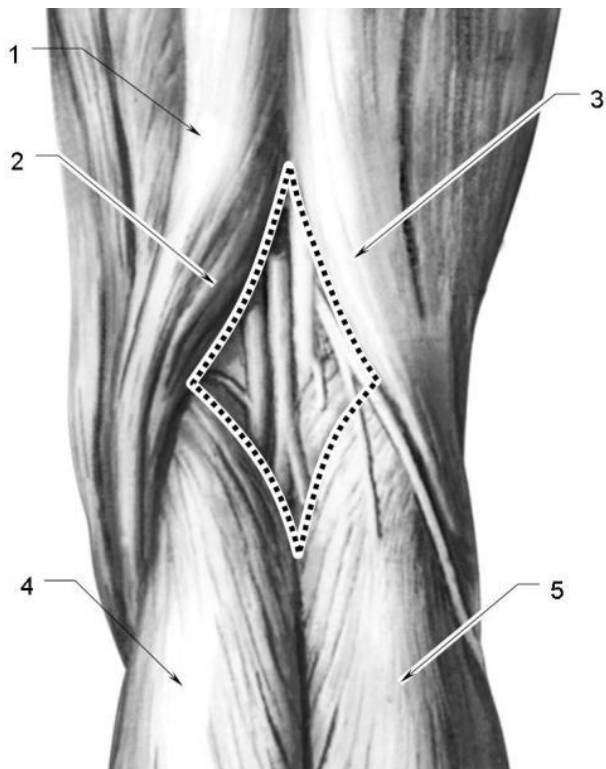
Layers:

Skin: it is thin and forms folds during flexion.

Subcutaneous tissue: it contains lymph nodes (superficial popliteal nodes). It contains the saphenous nerve, lateral sural cutaneous nerve and posterior cutaneous nerve of the thigh.

Superficial fascia;

Deep fascia – it is a continuation of the fascia lata. It serves as an aponeurosis covering the muscles. When this fascia is tensed, pulse from the popliteal artery is felt. When this fascia is removed, the popliteal fossa is revealed.



Vessels and nerves of popliteal region

A – Femoral artery; Б – Femoral vein; Б – Tibial nerve; Г – Fibular nerve. 1 – m. semitendineus; 2 – m. semimembranosus; 3 – biceps femoris; 4,5 – m. gastrocnemius

Tibial nerve (nervus tibialis) descends directly through the middle of the popliteal fossa along the popliteal vessels and enters the canalis crurupopliteus. It passes downward along with the posterior tibial artery and veins till it reaches the medial malleolus. After passing through the medial malleolus, the tibial nerve is divided into the lateral and medial plantar nerves. In the popliteal fossa, the tibial nerve gives rise to the medial sural cutaneous nerve which innervates the skin of the posteromedial surface of the leg. On the leg, the tibial nerve supplies 3 deep muscles (posterior tibial, flexor hallucis longus and flexor digitorum longus muscles). Posterior to the medial malleolus, the tibial nerve gives rise to the cutaneous branches (rami calcanei mediales).

The popliteal artery (arteria poplitea) gives off branches around the knee joint, which are the superior medial genicular, superior lateral genicular, middle genicular, inferior medial genicular and inferior lateral genicular arteries.

The superior medial genicular artery passes under the semimembranosus tendon and tendon of the adductor magnus muscle to the superior condyle of the femur.

The superior lateral genicular artery passes under the tendon of the biceps femoris muscle along the knee joint to the superior margin of the lateral condyle of the femur.

The middle genicular artery (unpaired) branches out from the popliteal artery at the level of the fissure of the knee joint and reaches the cruciate ligaments.

The inferior medial genicular artery passes to the medial condyle of the femur. Then it passes under the tibial collateral ligament, tendons of the gracilis, Sartorius and semitendinosus muscles, and medial head of the gastrocnemius muscle.

The inferior lateral genicular artery passes to the lateral meniscus. Then it goes under the fibular collateral ligament. It is covered by the gastrocnemius muscle, compartments of the popliteal artery are distinguished (around the knee joint): The 1st compartment lies in the space between the semimembranosus and vastus medius muscles. The tibial nerve is located 1-2 cm lateral to the popliteal artery.

The 2nd compartment lies in the space between the semimembranosus and gastrocnemius muscles. It gives rise to the arteries of the knee joint and muscles. The 3rd compartment lies on the oblique popliteal ligament. It gives off branches to the muscles.

The 4th compartment is bounded anteriorly by the space between the inferior margin of the popliteus muscle and posterior tibial muscle; posteriorly by the tendinous arch of the soleus muscle.

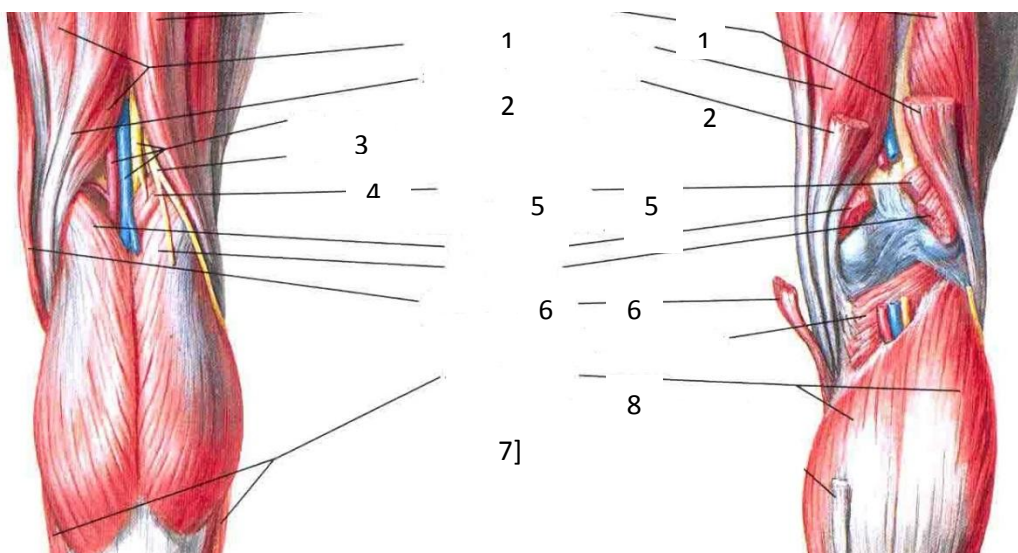
POPLITEAL FOSSA (FOSSA POPLITEA)

It is a shallow depression on the posterior surface of the knee.

Borders:

Superomedial – tendons of the semimembranosus and semitendinosus muscles. Superolateral – tendon of the biceps femoris muscle. Inferior – medial and lateral heads of the gastrocnemius muscle. Its floor consists of the popliteus muscle (constant) and plantaris muscle (inconstant). This fossa contains the fatty tissue in which the deep lymph nodes are lodged.

The neurovascular bundles from the superficial to deep are as follows: tibial nerve, popliteal vein and popliteal artery.



Fossa poplitea

1 - m. semimembranosus; 2 - m. semitendinosus; 3- a. et v. poplitea и n. tibialis; 4 - n. peroneus communis; 5 - m. plantaris; 6 - m. gastrocnemius; 7 - m. sartorius; 8 – m. popliteus.

KNEE JOINT (ARTICULATIO GENUS)

It is the articulation between the medial and lateral condyles of the femur with the medial and lateral articular facets of the tibia. It is a scondylar and biaxial joint reinforced by the intrascapsular ligaments and extrascapsular ligaments:

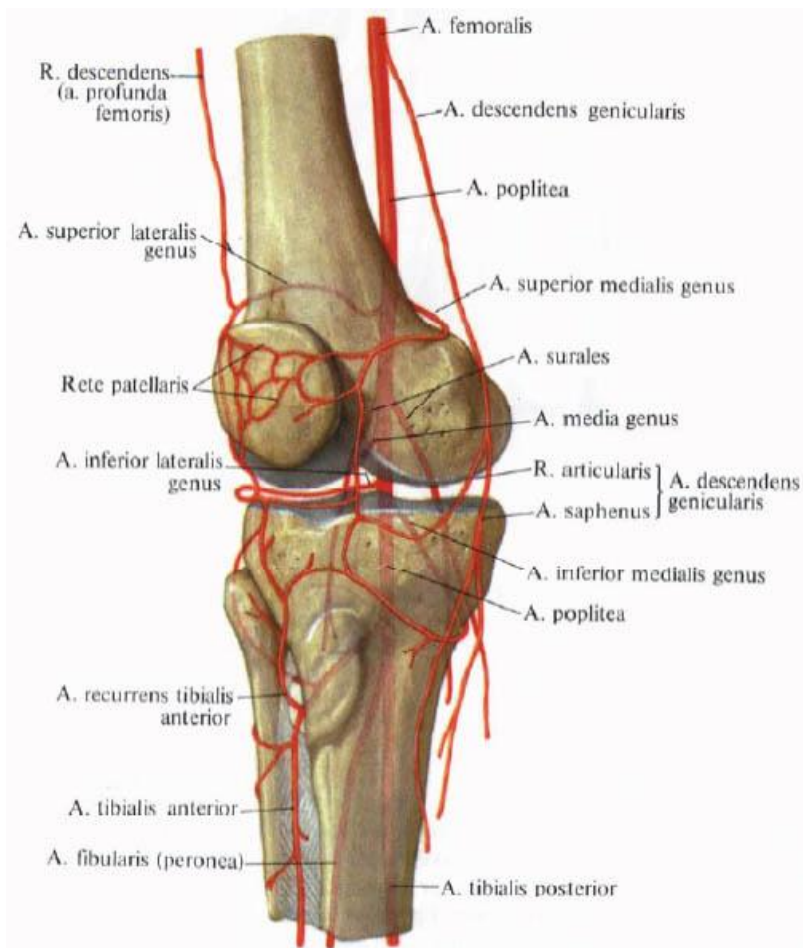
Intracapsular ligaments: anterior cruciate ligament – from the lateral condyle to the anterior intercondylar area; posterior – cruciate ligament – from the medial condyle to the posterior intercondylar area; transverse ligament of the knee – between menisci.

Extracapsular ligaments:

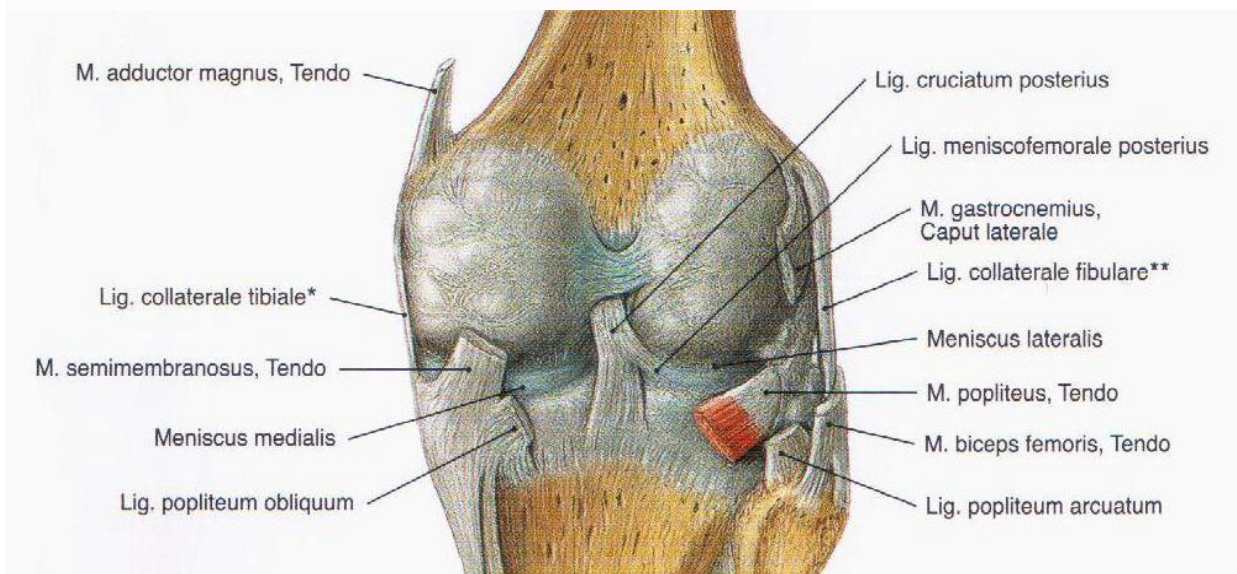
medial – tibial collateral ligament; lateral – fibular collateral ligament; anterior – patellar ligament and tendon of the quadriceps femoris muscle; posterior – oblique popliteal ligament and arcuate popliteal ligament. Medial and lateral menisci are contained within the joint capsule.

The following 3 groups of the arteries participate in the formation of the genicular anastomosis around the knee joint.

1. Descending genicular artery (branch of the femoral artery) .
2. Superior medial genicular, superior lateral genicular, inferior medial genicular, inferior lateral genicular, middle genicular arteries (branches of the popliteal artery)
3. Anterior tibial recurrent artery, posterior tibial reccurent artery, circumflex fibular branch (branches of the anterior tibial artery).



Arteries of the knee joint



TOPOGRAPHY OF THE ANTERIOR REGION OF THE LEG

Borders:

Medial – lateral margin of the leg. Lateral – sulcus between the soleus and fibular muscles.

Layers:

Skin: it is thinner on the tibia than other regions.

Subcutaneous tissue: it contains branches of the small saphenous vein, lateral sural cutaneous nerve and superficial fibular (peroneal) nerve laterally. It contains the great saphenous vein and saphenous nerve medially.

Fascia: it is similar to the aponeurosis and covers the extensor muscles of the leg and fibular muscles. It stretches from the periosteum of the anterior surface of the tibia and is attached to the anterior and posterior intermuscular septa and to the fibula. Anterior intermuscular septum is attached to the anterior margin of the fibula and divides muscles of the leg into the anterior and lateral compartments. Posterior intermuscular septum is attached to the posterior compartments.

Muscles and neurovascular bundles:

The muscles of the leg are so arranged that the only portions of the bones which may be distinctly felt are the inner surface, the crest, and the internal malleolus of the tibia, and the head and external malleolus of the fibula.

Anterior compartment: tibialis anterior muscle, extensor hallucis longus muscle, extensor digitorum longus muscle, fibularis tertius muscle, anterior tibial artery and veins, deep fibular nerve.

Lateral compartment: fibularis longus muscle, fibularis brevis muscle, superficial fibular nerve.

The tibialis anticus takes origin from the outer surface of the tibia, from the interosseous membrane, and from the deep fascia, and runs to the inner margin of the sole, where it is inserted upon the plantar surfaces of the internal cuneiform and of the first metatarsal bones.

The extensor longus digitorum arises from the external tuberosity of the tibia, from the interosseous membrane, from the fibula, and from the deep fascia, and inserts by four tendons into the four outer toes; a fifth tendon runs to the base of the fifth metatarsal bone at the outer border of the foot.

The extensor longus hallucis arises at a lower level from the interosseous membrane between the two former muscles and runs to the second phalanx of the great toe. Each of the three muscles possesses an individual synovial sheath in the anterior annular ligament at the ankle.

The peroneus longus. The anterior portion of this muscle arises from the external tuberosity of the tibia, from the head of the fibula, from the anterior intermuscular septum, and from the upper third of the anterior margin of the fibula; the posterior portion arises from the fibula between the head and the lower third of the bone. The tendon runs behind the external malleolus, through the groove of the cuboid bone, and passes obliquely across the sole of the foot to the base of the first metatarsal

bone.

The peroneus brevis, which is covered by the preceding muscle, takes origin from the lower two-thirds of the fibula as far down as the external malleolus. The tendon crosses that of the peroneus longus and inserts into the tuberosity of the fifth metatarsal bone. The tendons of both peroneal muscles pass through a common compartment behind the external malleolus, in which situation they are firmly held by two processes of the crural fascia designated as retinacula.

The gastrocnemius arises by two heads from the bone above the femoral condyles; in the middle of the leg the muscle becomes continuous with the tendo calcaneus (Achillis), which inserts into the tuberosity of the os calcis.

The soleus, beneath the preceding muscle, arises from the head and upper third of the fibula and from the oblique line of the tibia and runs downward into the tendo Achillis.

The plantaris, like its analogue in the upper extremity, the palmaris longus, is an inconstant muscle. It arises from the external condyle of the femur above the outer head of the gastrocnemius and its tendon usually runs into the tendo Achillis.

The popliteus runs from the external condyle of the femur and the capsular ligament of the knee-joint to the posterior surface of the tibia as far down as the oblique line.

The flexor longus digitorum springs from the posterior surface of the tibia. Its tendon crosses to the outer side of the tibialis posterior, enters the sole of the foot, passes beneath and is adherent to the tendon of the flexor longus hallucis, and divides into four tendons for the four lesser toes. These tendons are inserted in a similar manner to those of the flexor profundus digitorum in the hand.

The tibialis posterior arises from the interosseous membrane and the adjacent portions of the tibia and fibula in the upper portion of the leg between the flexor longus digitorum and the flexor longus hallucis. Its tendon, with that of the flexor longus digitorum, passes behind the internal malleolus to the inner aspect of the sole of the foot, where it is inserted into the internal cuneiform and scaphoid bones.

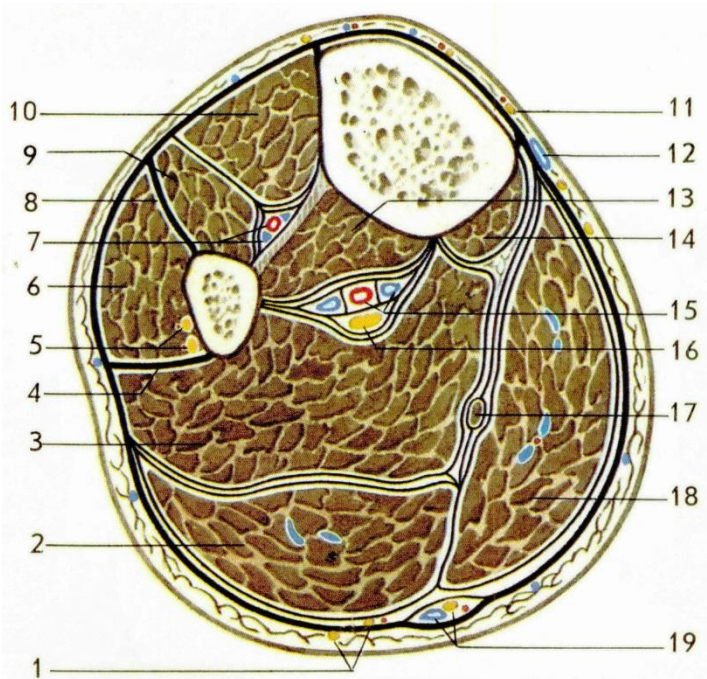
The flexor longus hallucis takes origin from the posterior surface of the lower two-thirds of the fibula and from the posterior intermuscular septum. Its tendon runs in the posterior sulcus of the astragalus and Canalis musculoperoneus superior. It is located between the portions of the fibularis longus muscle and fibula. It stretches from the lateral condyle of the femur to the head of the fibula. The common fibular nerve passes through this canal and divides it into the superficial and deep fibular nerves.

Canalis musculoperoneus inferior

Borders:

Anterior – tibialis posterior muscle. Posterior – flexor hallucis longus muscle. Medial

– fibula. Superior – peroneus longus muscle. Inferior – peroneus brevis muscle.
Contents: fibular artery and its vein.



Upper 1/3 of the leg

1 - rami n. cutanei surae lateralis; 2 - m. gastrocnemius (caput laterale);
3 - m. soleus; 4 - septum intermusculare posterius; 5 - nn. peronei profundus et superficialis; 6 - m. peroneus longus; 7 - vasa tibialia anteriora;
8 - septum intermusculare anterius; 9 - m. extensor digitorum longus; 10 - m. tibialis anterior; 11 - n. saphenus; 12 - v. saphena magna; 13 - m. tibialis posterior; 14 - m. flexor digitorum longus; 15 - vasa tibialia posteriora; 16 - n. tibialis; 17 - tendo m. plantaris; 18 - m. gastrocnemius (caput mediale);
19 - v. saphena parva, n. cutaneus surae medialis.

TOPAGRAPHY OF THE POSTERIOR REGION OF THE LEG

Borders:

Medial – vertical line passing through the medial condyle of the tibia. Lateral – vertical line passing through the lateral condyle of the tibia;

Layers:

Skin: it is thin and may easily form skin folds. It is innervated by the saphenous nerve.

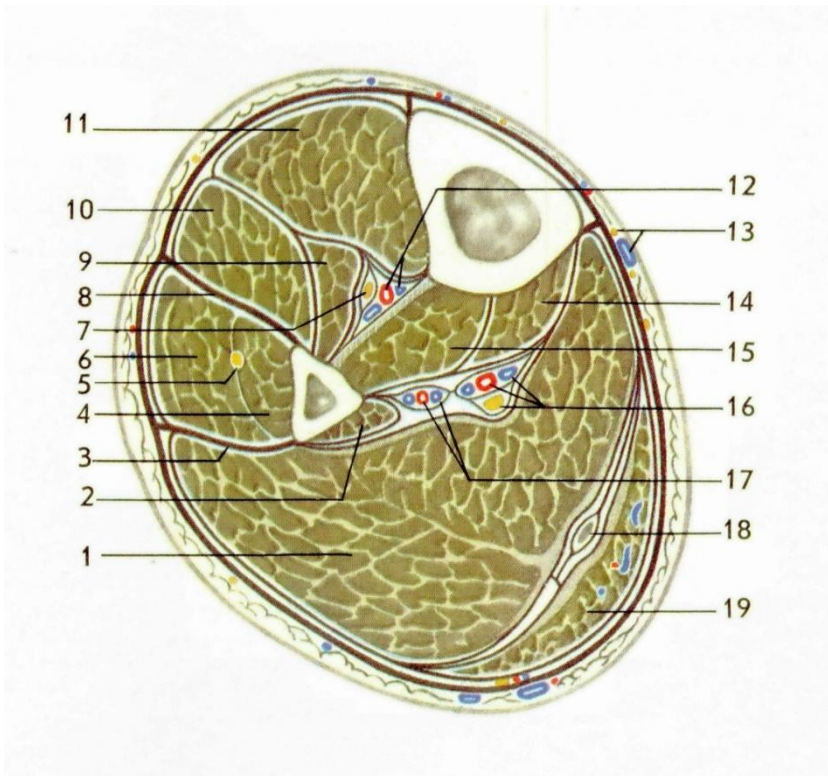
Subcutaneous tissue: the small saphenous vein, medial sural cutaneous nerve and lateral sural cutaneous nerve pass through this layer.

Fascia: it is divided into 2 layers, which are the superficial and deep layers.

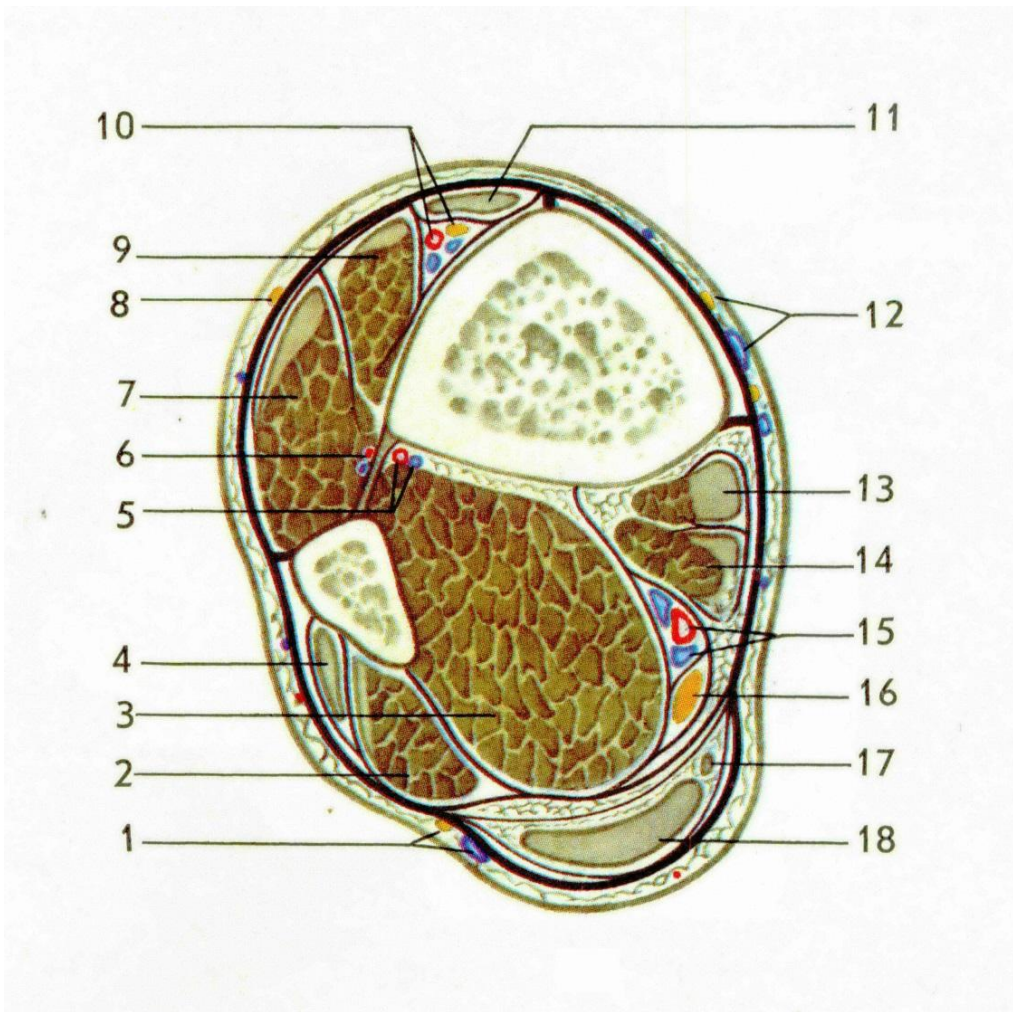
Superficial fascia covers the triceps surae muscle (soleus muscle and gastrocnemius muscle).

Deep fascia covers the deep flexor muscles extensor muscles, which are located in the deep space of the posterior fascial compartment of the knee. This space is bounded anteriorly by the tibia, fibula and interosseous membrane.

Muscles: superficial posterior compartment: triceps surae muscle, plantaris tendon. Deep posterior compartment: flexor digitorum longus muscle, tibialis posterior muscle, flexor hallucis longus muscle, popliteus muscle, posterior tibial artery and veins, tibial nerve, fibular artery and veins.



(Middle 1/3 of the leg) 1 - m. soleus; 2 - m. flexor hallucis longus; 3 - septum intermusculare posterius; 4 - m. peroneus brevis; 5 - n. peroneus superficialis; 6 - m. peroneus longus; 7 - n. peroneus profundus; 8 - septum intermusculare anterius; 9 - m. extensor hallucis longus; 10 - m. extensor digitorum longus; 11 - m. tibialis anterior; 12 - vasa tibialia anteriora; 13 - y. saphena magna, n. saphenus; 14 - m. flexor digitorum longus; 15 - m. tibialis posterior; 16 - vasa tibialia posteriora, n. tibialis; 17 - vasa peronea; 18 - tendo m. plantaris; 19 - m. gastrocnemius.



(Lower 1/3 of the leg) 1 - v. saphena parva, n. suralis; 2 - m. peroneus brevis; 3 - m. flexor hallucis longus; 4 - tendo m. peronei longi; 5 - vasa peronea; 6 - r. perforans a. peronea; 7 - m. extensor digitorum longus; 8 - n. peroneus superficialis; 9 - m. extensor hallucis longus; 10 - a. tibialis anterior, n. peroneus profundus; 11 - tendo m. tibialis anterioris; 12 - v. saphena magna, n. saphenus; 13 - m. tibialis posterior; 14 - m. flexor digitorum longus; 15 - vasa tibialia posteriora; 16 - n. tibialis; 17 - tendo m. plantaris; 18 - tendo Achillis.

NEUROVASCULAR BUNDLES

Posterior tibial artery: a line drawn from the point between the heads of the gastrocnemius muscle to the medial margin of the Achilles (calcaneal) tendon. The initial part of the posterior tibial artery is covered by the superior margin of the soleus muscle which passes above the tendinous arch of the soleus muscle.

It passes to the malleolar canal and space between the tendons of the flexor digitorum longus and flexor hallucis longus muscles. It is divided into the medial and lateral

plantar arteries in the sulcus of the medial margin of the calcaneus. The medial and lateral plantar arteries pass along with the medial and lateral plantar nerves. **The medial plantar artery**, vein and nerve pass to the junction of the fasciae of the median and medial parts. These neurovascular bundles give off branches to the muscles of both parts (median and medial parts) and also give rise to the superficial and deep branches.

The lateral plantar artery passes between the tendons of the flexor digitorum brevis and quadratus plantae muscles.

The medial plantar artery nerve innervates the muscle of the little toe, adductor hallucis muscle, quadratus plantae muscle, 2 lateral lumbrical muscles and all interosseous muscles. This nerve gives rise to nervi digitales plantares propriae, which pass to the little toe and lateral margin of the 4th finger.

The anterior tibial artery: a line drawn from the point between the head of the fibula and tibial tuberosity to the point between the malleoli.

This artery passes to the anterior compartment through the opening of the interosseous membrane and is situated at the medial margin of the fibula 4-5 cm under the head of the fibula. It gives off *arteria recurrens tibialis anterior* and forms an anastomosis with *arteria genua descendens* and *arteria genua inferior medialis*. Then it gives off the *anterior medial malleolar artery* and *anterior lateral malleolar artery*.

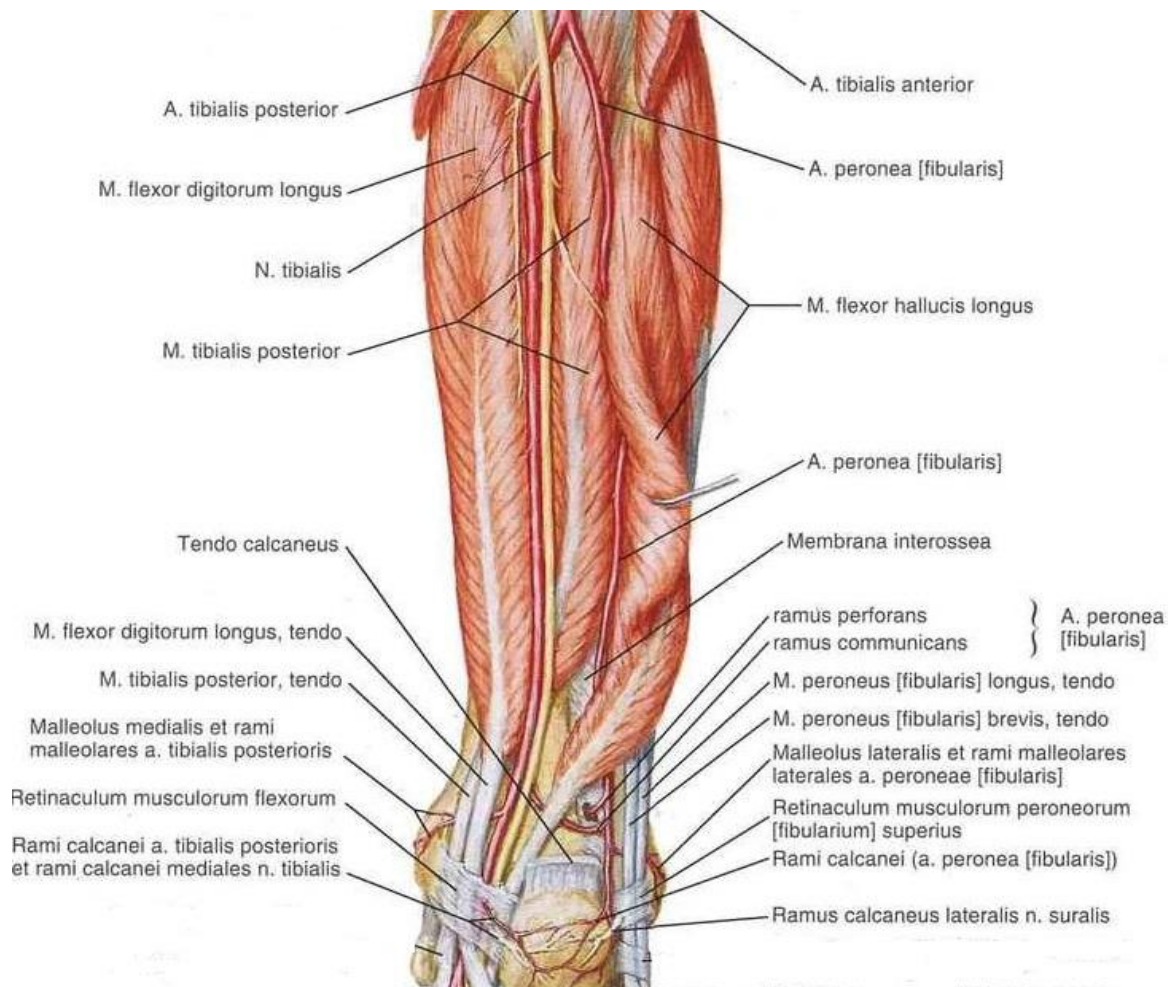
The fibular artery: the initial part of this vessel is situated on the posterior surface of the tibialis posterior muscle along the lateral margin of the tibial nerve.

The deep peroneal nerve is located lateral to the vessels on the knee, then penetrates the anterior intramuscular septum and lies lateral to the vessels at first, then crosses anterior to the vessels at the level of the middle point of the malleoli and passes medial to the vessels of the 1st interdigital space.

At the level of the intermalleolar line, this nerve gives off a motor branch to the extensor digitorum brevis muscle. It passes with the lateral tarsal artery.

The dorsalis pedis artery is projected from the middle point of the malleolus to the 2nd interdigital space. Then it lies between the fascial coverings of the tendons of the extensor digitorum muscles and fascia interossea.

Before entering the 1st intermetatarsal space, this artery gives rise to the arcuate artery. The arcuate artery gives rise to *arteria metatarsae dorsales*, from which *arteria digitales dorsales* branch off.



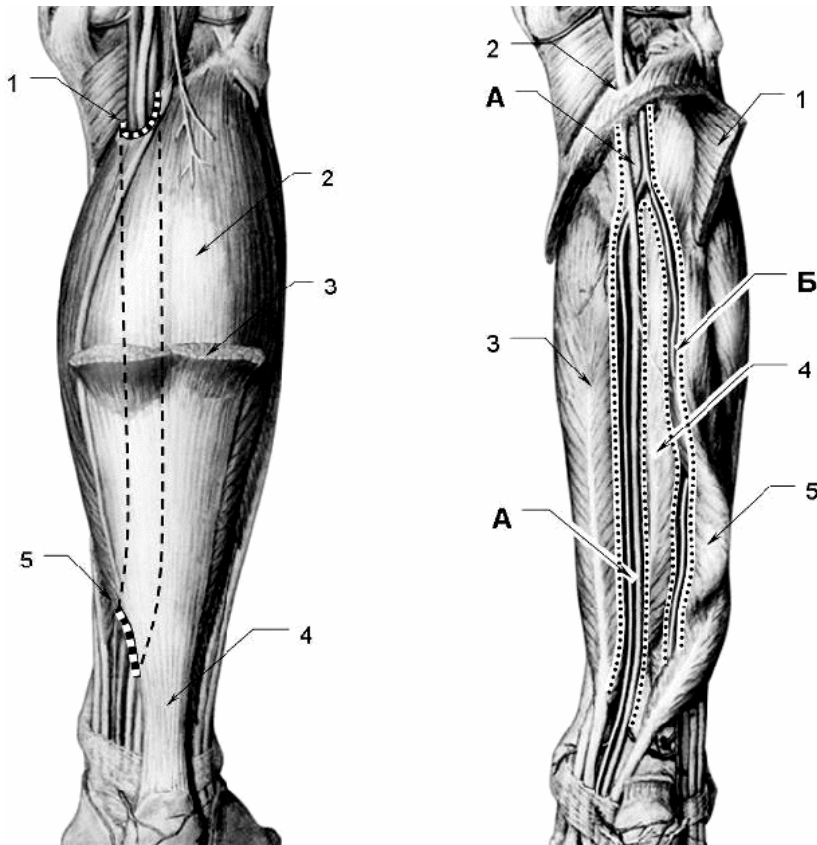
CANALIS CRUROPOPLITEUS

It is bounded anteriorly by the tibialis posterior muscle posteriorly by deep layer of the fascia of the leg and soleus muscle, laterally by the flexor hallucis longus and medially by the flexor digitorum longus muscle.

The entrance of this canal is bounded anteriorly by the popliteus muscle and posteriorly by the tendinous arch of the soleus muscle.

There are 2 exits of this canal which are the superior, anterior and inferior openings. The anterior tibial artery penetrates the anterior compartment of the leg through the anterior opening in the interosseus membrane.

The inferior opening is formed by the tibialis posterior muscle anteriorly and Achilles tendon. The posterior tibial artery, posterior tibial vein and tibial nerve pass to the medial malleolar canal through the inferior opening.



Canalis cruropopliteus

Left: 1 – foramen superior; 2 – m. soleus; 3 – m. gastrocnemius; 4 – Achilles tendon.

Right: 1 – m. gastrocnemius; 2 – upper ring; 3 – m. flexor digitorum longus; 4 – m. tibialis posterior; 5 – m. flexor hallucis longus.

A –tibial artery and tibial nerve. B – fibular artery.

ANKLE JOINT (ARTICULATIO TALOCRURALIS)

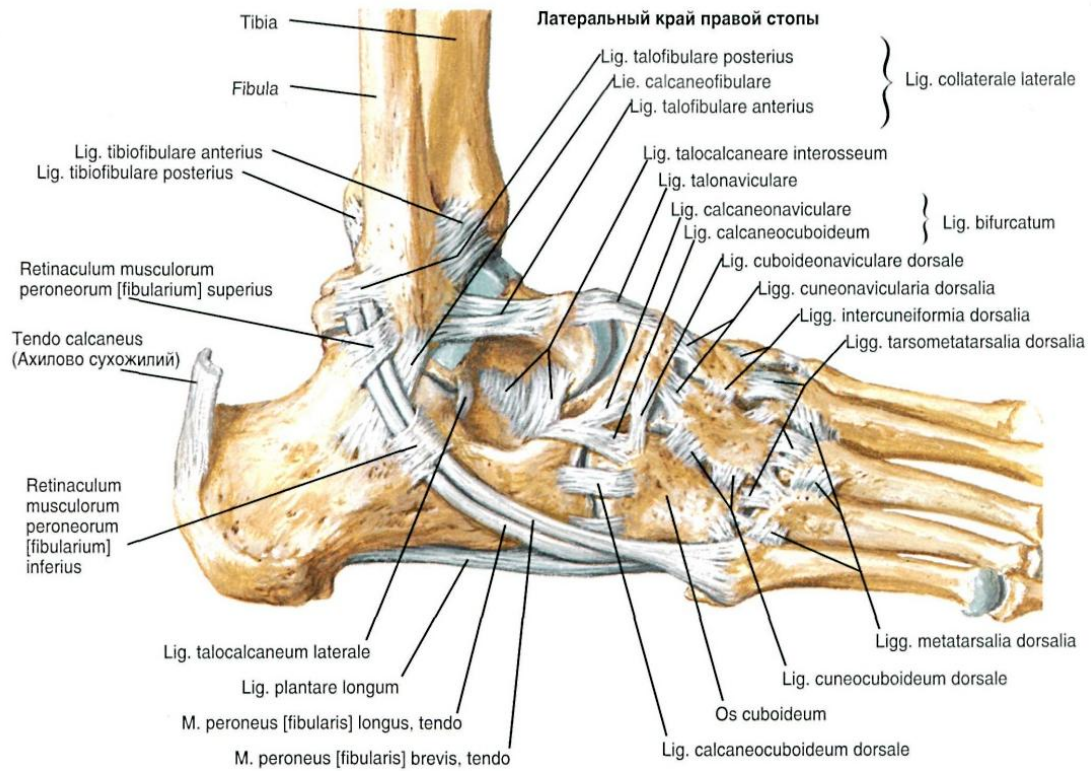
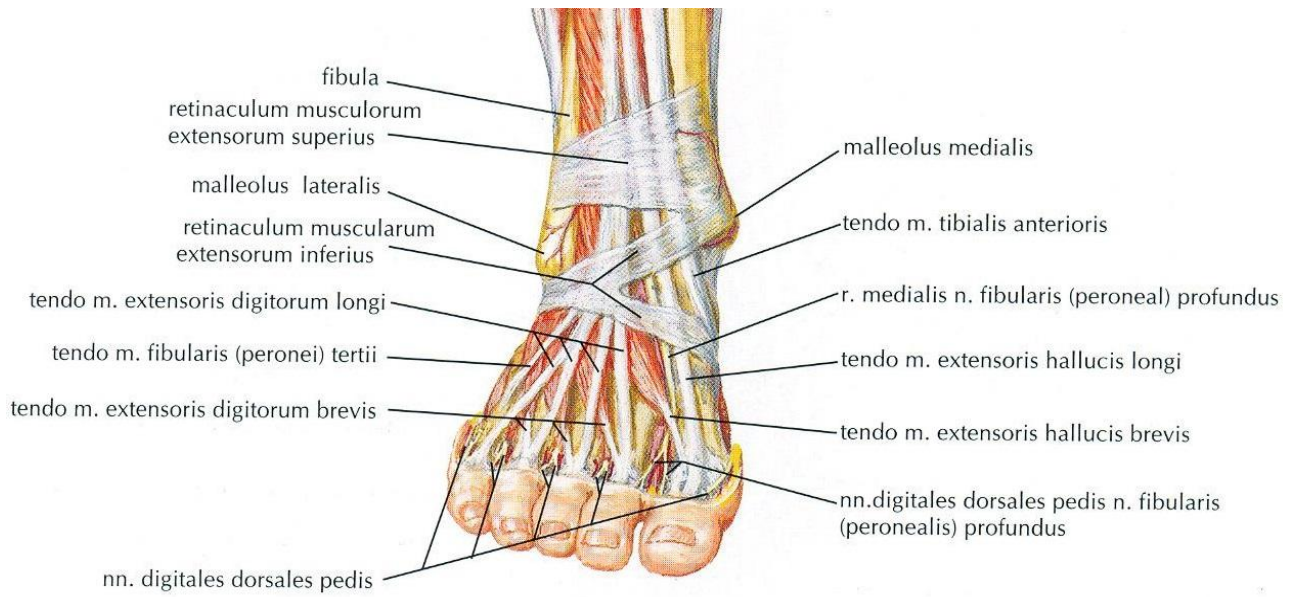
It is the articulation between the distal tibia, medial malleolus of the tibia, lateral malleolus of the fibula and talus.

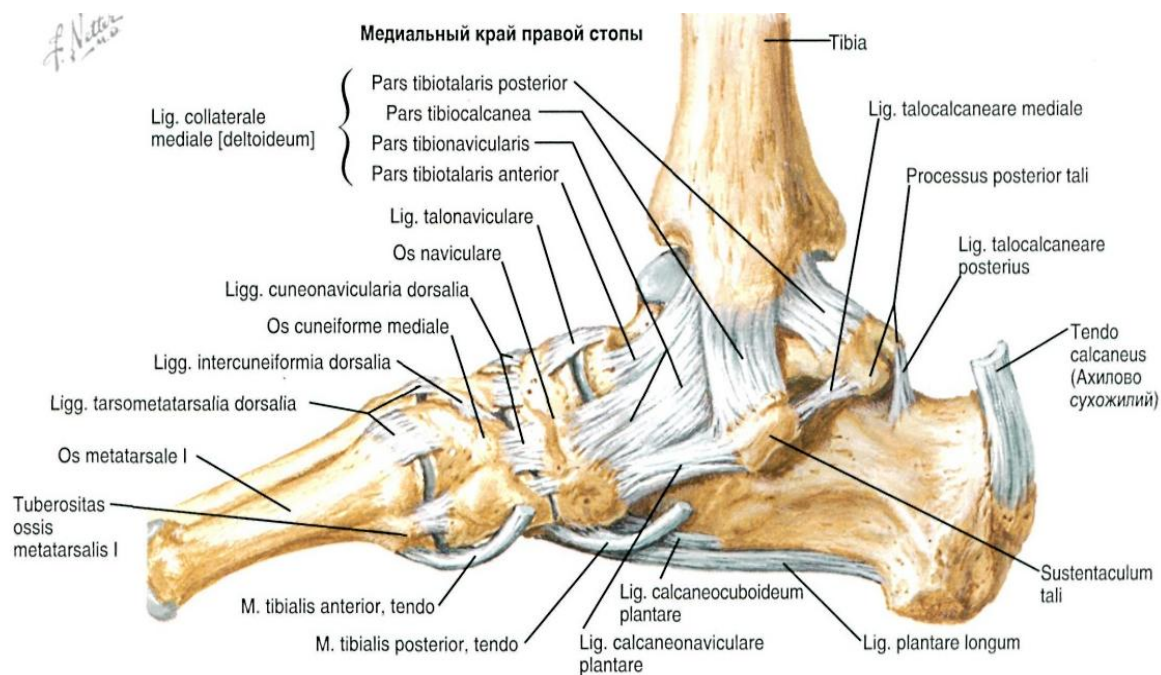
It is a synovial hinge joint; the ankle is reinforced by: deltoid ligament (consists of anterior tibiotalar, tibionavicular, tibiocalcaneal and posterior tibiotalar parts), collateral ligament (consists of anterior talofibular ligament, calcaneofibular ligament and posterior talofibular ligament)

Due to the shape of the talus, the ankle is most stable when the foot is dorsiflexed; the ankle is often injured when the foot is plantar flexed. This lateral surface of the joint is innervated by the sural nerve; medial surface by the saphenous nerve; anterior surface by the deep fibular nerve.

This joint is supplied by 3 arteries, which are the anterior tibial, posterior tibial and fibular arteries.

Articulatio talocruralis





TOPOGRAPHY OF THE PLANTAR REGION OF THE FOOT

Borders:

Medial – middle point of the calcaneus to the head of the 1st metatarsal bone. Lateral – middle point of the calcaneus to the head of the 5th metatarsal bone. The toes are divided into the plantar and dorsal surfaces by the U-shaped (arch-like) lines.

Layers:

Skin: it is thick, especially on the tuberosity of the calcaneus and heads of the metatarsal bones.

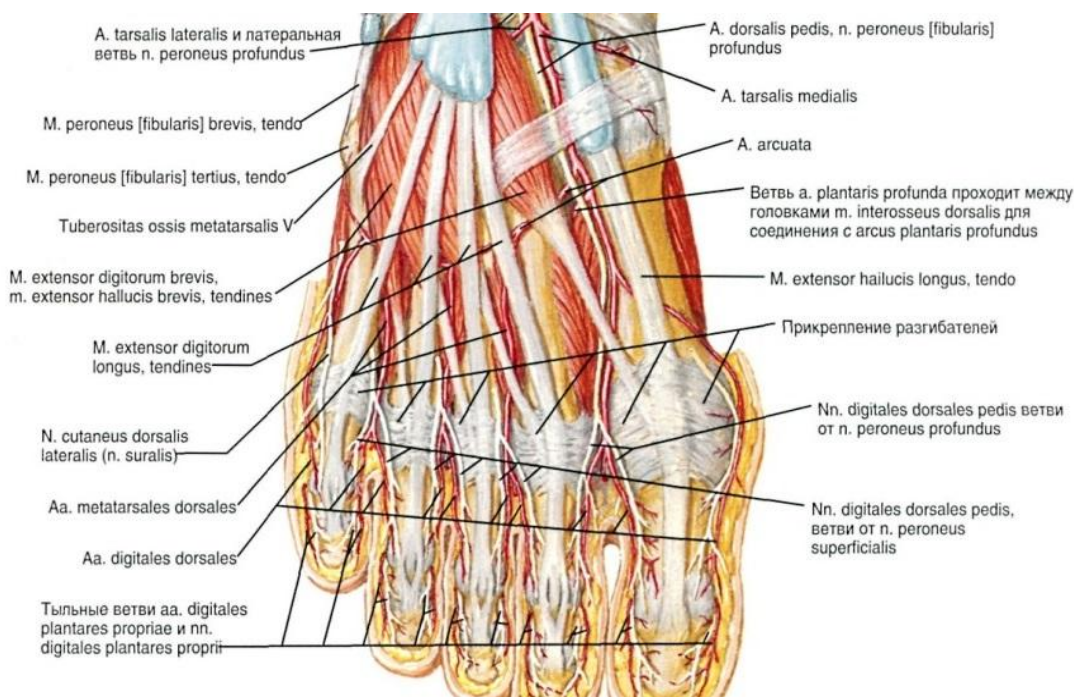
Subcutaneous tissue: it contains the common plantar digital arteries and nerves, cutaneous branches of the medial plantar arteries and nerves, cutaneous branches of the lateral plantar arteries and nerves.

Proper fascia: In the middle part of the sole, this fascia represents the plantar aponeurosis. The plantar aponeurosis is especially dense in the sole, where the fibres of the flexor digitorum brevis muscle begin. In the median part of the sole, these superficial and deep fatty spaces are situated between the tendons of the flexor digitorum longus and flexor digitorum brevis muscles. The deep fatty space is situated between the flexor digitorum longus tendon and flexor digitorum brevis muscle.

The median part of the sole communicates with: subfascial space of the dorsal part of the foot by means of dorsalis pedis artery and lateral plantar artery; interdigital fatty spaces and dorsal surface of the toes along the lubrical muscles; subcutaneous fatty tissue of the sole along the plantar metatarsal arteries and proper plantar digital arteries; medial part of the sole along the tendon of the flexor hallucis longus muscle;

lateral part of the sole along the tendon of the flexor digiti minimi muscle and lateral plantar vessels.; deep space of the posterior part of the knee along the tendon of flexor hallucis longus muscle and neurovascular bundle. The neurovascular bundle passes through the malleolar canal.

The external plantar artery passes into the sole beneath the abductor hallucis and then runs outward between *the flexor brevis digitorum* and *the flexor accessorius*; the vessel then curves to the inner side of the foot and forms the plantar arch by anastomosing with the communicating branch of the dorsalis pedis. *The plantar arch* lies directly upon the bases of the second, third, and fourth metatarsal bones and upon the interosseous muscles. Anteriorly it gives off four digital branches for the interosseous spaces and the corresponding sides of the toes, while the outer and inner margins of the sole are supplied by separate branches from the arch. The smaller internal plantar artery runs anteriorly to the inner side of the abductor hallucis to the great toe, where it usually anastomoses with the first digital branch. Before entering the sole *the posterior tibial nerve* divides into the external and the internal plantar nerves. The external plantar nerve accompanies the external plantar artery and divides into a superficial and a deep branch. The superficial branch supplies the muscles of the ball of the little toe and gives off three digital nerves to the sides of the little toe and to the outer side of the fourth toe. The deep branch follows the plantar arch into the depth of the sole and supplies *the interosseous muscles* and *the adductor hallucis*. The internal plantar nerve runs to the inner side of *the flexor brevis digitorum*, supplies the muscles of the ball of the great toe and *the flexor brevis digitorum*, and ends in seven digital nerves which supply both sides of the three inner toes and the inner side of the fourth toe.



TOPOGRAPHY OF THE DORSAL REGION OF THE FOOT

Layers:

Skin: it is thin and movable.

Subcutaneous tissue: the fat is less developed here. Edematous fluid tends to accumulate here. It contains a vascular network known as rete venosum dorsale pedis which anastomoses with the dorsal venous arch. They collect the blood from veins in the intermetatarsal spaces. The dorsal venous arch is drained into the great saphenous vein which passes along the anterior surface of the medial malleolus.

Superficial fascia: it is less developed. It contains the branches of the saphenous nerve. It contains the branches of the sural nerve which innervate the skin of the lateral margin of the foot and little toe. Between these nerves, there are several branches of the superficial fibular nerve. They are medial dorsal cutaneous, intermediate dorsal cutaneous and lateral dorsal cutaneous nerves.

Deep fascia: it is a continuation of the fascia cruris. The extensor hallucis brevis and extensor digitorum brevis muscles are situated under this fascia. It lies on the metatarsal bones and dorsal interosseous muscles. If the fibularis tertius muscle exists, its tendon is attached to the base of the 5th metatarsal bone.

The dorsalis pedis artery, the continuation of the anterior tibial, passes from the anterior annular ligament along the dorsal surface of the foot in the first interosseous space. It runs anteriorly from a point midway between the two malleoli and divides at the bases of the first and second metatarsal bones into a larger branch, *the plantar digital* (ramus plantaris profundus), passing between the first and second metatarsal bones to the plantar arch, and a smaller branch, *the dorsalis hallucis*, running forward to the web between the great and the second toes. To the outer side, the dorsalis pedis gives off *the tarsal artery tarsea lateralis*, passing beneath the *extensor brevis digitorum* and anastomosing with the next branch, the metatarsal artery, which runs outward upon the bases of the metatarsal bones and gives off the dorsal metatarsal arteries for the second, third, and fourth metatarsal spaces and the corresponding sides of the toes. To the inner side, the dorsalis pedis gives off two or three insignificant vessels, the A. a. tarsee mediales.

The nerves of the dorsum of the foot are:

The musculocutaneous, which divides at a higher level into an external and an internal branch. They supply digital branches for all of the toes except the outer side of the little toe and the adjacent surfaces of the great and second toes. The latter is supplied by *the anterior tibial*; the outer margin of the dorsum of the foot and of the little toe is supplied by the short saphenous, which is known in this situation as the *N. cutaneus dorsi pedis lateralis*. All three nerves inosculate with each other.

For the movements of the foot there are 2 joints which are worthy of particular attention:

1. *The ankle-joint, or talocrural articulation*, between the leg and the astragalus; the trochlea and the lateral surfaces of the astragalus are surrounded by the articular surfaces of the lower end of the tibia and by the two malleoli. The articular cavity communicates with that of the inferior tibiofibular articulation. The movements of the joint are those of dorsal and plantar flexion.

2. *The talotarsal articulation* consists of two separate portions: the posterior calcaneo-astragaloid articulation, between the posterior articular surfaces of the astragalus and of the os calcis, the anterior calcaneo-astragaloid articulation, between the middle and anterior articular surfaces of the astragalus and of os calcis, and also between the head of the astragalus and the scaphoid bone. The movement is chiefly that of pronation and supination.

The remaining joints are:

3. *The calcaneocuboid*, between the corresponding articular surfaces of the os calcis and of the cuboid bone. This joint, together with the astragaloscaphoid, although separate anatomically, forms the so-called Chopart's joint.

4. *The intertarsal joint*, between the remaining tarsal bones.

5. *The tarsometatarsal articulations*, Lisfranc's joint, consists of three separate cavities, of which the middle one communicates with the intertarsal articulations and with the joint between the scaphoid and the cuneiform bones.

6. The metatarsophalangeal and *the interphalangeal articulations*.

TEST TASKS

1. BORDERS OF THE GLUTEAL REGION

- a) Superior: iliac crest, inferior: gluteal fold, medial: spinous process of the sacrum and coccyx
- b) Superior – circular line drawn 6 cm above the patella; inferior – circular line drawn at the level of the tibial tuberosity
- c) Lateral: imaginary line drawn from the anterior superior iliac spine to the greater trochanter

2. BONES THAT ARE THE LANDMARKS FOR MAKING PROJECTION LINES OF PLACES OF THE MOST IMPORTANT VESSELS AND NERVES OF THE GLUTEAL REGION

- a) Spina iliaca posterior superior

- b) Spina iliaca anterior superior
- c) Tuber ischiadicum
- d) Trochanter minor
- e) Trochanter major

3. LINEA SPINATROCHANTERICA GOES FROM AND TO

- a) Spina iliaca posterior superior
- b) Spina iliaca anterior superior
- c) Tuber ischiadicum
- d) Trochanter minor
- e) Trochanter major

4. LINEA TUBERTROCHANTERICA GOES FROM AND TO

- a) Spina iliaca posterior superior
- b) Spina iliaca anterior superior
- c) Tuber ischiadicum
- d) Trochanter minor
- e) Trochanter major

5. IN THE GLUTEAL REGION THERE ARE FASCIAE LAYERS IN A NUMBER OF

- a) 2
- b) 3
- c) 4
- d) 5

6. THE FORMATIONS THAT GO THROUGH THE FORAMEN SUPRAPIRIFORMIS

- a) Superior gluteal neurovascular bundle
- b) Inferior gluteal neurovascular bundle
- c) Pudendal neurovascular bundle
- d) Obturatorius neurovascular bundle

7. THE FORMATIONS THAT GO THROUGH THE FORAMEN INFRAPIRIFORMIS

- a) Nervus ischiadicum
- b) Inferior gluteal neurovascular bundle
- c) Pudendum neurovascular bundle
- d) Nerve cutaneous femoral posterior

8. MUSCLES THAT ARE THE BORDERS OF CANALIS OBTURATORIUS

- a) Obturator externus muscle
- b) Obturator internus muscle

- c) Pectineus muscle
- d) Gluteus minimus muscle

9. THE FORMATIONS IN CANALIS OBTURATORIUS

- a) Superior gluteal neurovascular bundle
- b) Inferior gluteal neurovascular bundle
- c) Pudendal neurovascular bundle
- d) Obturatorius neurovascular bundle

10. ALKOK'S CANAL IS MADE BY SPLITTING OF FASCIA

- a) Obturator externus muscle
- b) Pectineus muscle
- c) Obturator internus muscle
- d) Gluteus minimus muscle

11. INTERARTICULATIONIS LIGAMENTS OF ARTICULATIO COXAE

- a) Lig. transversum acetabuli
- b) Lig. capitis femoris
- c) Lig. iliofemorale
- d) Lig. pubofemorale
- e) Lig. Ischiofemorale

12. EXTRAARTICULATIONIS LIGAMENTS OF ARTICULATIO COXAE

- a) Lig. transversum acetabuli
- b) Lig. capitis femoris
- c) Lig. iliofemorale
- d) Lig. pubofemorale
- e) Lig. Ischiofemorale

13. TWO WEAK PLACES OF ARTICULATION COXAE

- a) Anterior
- b) Lateral
- c) Posteroinferior
- d) Medial

14. SUPERFICIAL VEINS OF THE LOWER EXTREMITY ARE

- a) Subcutaneous major vein
- b) Subcutaneous minor vein
- c) Femoral vein
- d) Obturatorial vein

15. THE FORMATIONS THAT GO THROUGH THE LAMINA CRIBROSA

- a) Subcutaneous major vein
- b) Arteria epigastrica superficialis

- c) Arteria circumflexa ilium superficialis
- d) Arteries and veins pudendal externi

16. BORDERS OF THE FEMORAL TRIANGLE ARE

- a) Superior – inguinal ligament
- b) Externus – Sartorius muscle
- c) Internus – adductor longus muscle
- d) Internus and externus – iliopsoas muscle

17. THE BOTTOM OF THE FEMORAL TRIANGLE IS

- a) Femoral canal
- b) Fossa iliopectineus
- c) Obturator canal
- d) Adductor canal

18. THREE GROUPS OF HIP'S MUSCLES

- a) Anterior
- b) Posterior
- c) Medial
- d) Lateral

19. INTERMUSCULAR SEPTAS OF THE HIP

- a) Anterior
- b) Posterior
- c) Medial
- d) Lateral

20. ADDUCTOR CANAL HAS THREE FORAMENS

- a) Superior
- b) Medius
- c) Anterior
- d) Inferior

21. BORDERS OF THE ADDUCTOR CANAL

- a) Externus - caput medialis of quadriceps muscle
- b) Internus - adductor longus muscle
- c) Anterior – lamina aponeurotica

22. THE FORMATIONS THAT GO THROUGH THE ADDUCTOR CANAL

- a) Arteria femoralis
- b) Nervus obturatorius
- c) Nervus femoralis
- d) Vena femoralis

23. BORDERS OF REGION GENUS

- a) Superior – circular line drawn 6 cm above the patella
- b) Externus - caput medialis of quadriceps muscle
- c) Internus - adductor longus muscle
- d) Inferior – circular line drawn at the level of the tibial tuberosity

24. BORDERS OF POPLITEAL FOSSA

- a) Superomedial – tendons of the semimembranosus and semitendinosus muscles
- b) Superolateral – tendon of the biceps femoris muscle
- c) Inferior – medial and lateral heads of the gastrocnemius muscle

25. THE FORMATIONS THAT GO IN THE POPLITEAL FOSSA

- a) Tibial nerve
- b) Common fibular nerve
- c) Popliteal vein and popliteal artery
- d) Lig. pubofemorale
- e) Subcutaneous minor muscle

26. BRANCHES OF POPLITEAL ARTERY

- a) Superior medial genicular, superior lateral genicular arteries
- b) Tibial artery
- c) Middle genicular artery
- d) Inferior medial genicular and inferior lateral genicular arteries

27. SUPERFICIAL NEUROVASCULAR BUNDLES OF THE GENUS REGION

- a) Arteria femoralis
- b) Nervus obturatorius
- c) Nervus femoralis
- d) Vena femoralis

28. THERE ARE ROTATION IN ARTICULATION GENUS

- a) 5
- b) 7
- c) 10
- d) 13

29. BORDERS OF THE REGION OF THE LEG

- a) Medial – lateral margin of the leg;
- b) Medial – vertical line passing through the medial condyle of the tibia; lateral – vertical line passing through the lateral condyle of the tibia;
- c) Medial – middle point of the calcaneus to the head of the 1st metatarsal bone

30. LAYERS OF THE POSTERIOR REGION OF THE LEG

- a) Skin: it is thin and may easily form skin folds. It is innervated by the saphenous nerve.
- b) Skin: it's thick
- c) Subcutaneous tissue: the small saphenous vein, medial sural cutaneous nerve and lateral sural cutaneous nerve pass through this layer.
- d) Fascia: it is divided into 2 layers, which are the superficial and deep layers.

31. MUSCLES OF THE POSTERIOR REGION OF THE LEG SUPERFICIAL POSTERIOR Compartment

- a) triceps surae muscle
- b) plantaris tendon

32. ARTICULATION TALOCRURALIS IS FORMED BY

- a) Anterior - tibialis posterior muscle
- b) Posterior - sural muscle

33. FIBULAR ARTERY ARISES FROM

- a) Fibularis muscle
- b) Tibialis anterior muscle
- c) Tibialis posterior muscle

34. ARTICULATIO TALOCRURALIS Is Formed By

- a) Fibula
- b) Talus
- c) Palmar
- d) Tibia

35. ARCHS OF THE FOOT

- a) 2 perpendicular
- b) 3 lateral
- c) 3 perpendicular
- d) 2 lateral

36. SKIN OF THE FOOT

- a) It is thin
- b) It is thick
- c) It is very thick
- d) It is movable

37. SUBCUTANEUS TISSUE OF THE FOOT

- a) The fat is less developed here

- b) The fat is more developed here
- c) Edematous fluid tends to accumulate here.

38. THE REMAINING JOINTS IN THE FOOT REGION

- a) Hip's joint
- b) Calcaneocuboid, intertarsal articulations
- c) Tarsometatarsal articulations, metatarsophalangeal and the interphalangeal articulations

39. CHOPART'S JOINT CONTAINS

- a) Metatarsophalangeal joint
- b) Calcaneocuboid joint
- c) Astragaloscaphoid joint

40. LISFRANC'S JOINT IS

- a) Metatarsophalangeal joint
- b) Calcaneocuboid joint
- c) Astragaloscaphoid joint
- d) Tarsometatarsal joint

TEST ANSWERS

1 – a,c	11 – a,b	21 – a,b,c	31 – a,b
2 – a,c,d	12 – c,d,e	22 – a,d	32 – a,b
3 – a,c	13 – a,c	23 – a,b	33 - c
4 – c,d	14 – a,b	24 – a,b,c	34 – b,d
5 – a	15 – a,b,c,d	25 – a,b,c,e	35 – a,d
6 – a	16 – a,b,c	26 – a,c,d	36 – b,c
7 – a,b,c,d	17 – b	27 – a,c,d	37 – a,c
8 – a,b,c	18 – a,b,c	28 – d	38 – b,c
9 – d	19 – b,c,d	29 – a,b	39 – b,c
10 – c	20 – a,b,c	30 – a,c,d	40 - d

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Учебное пособие

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