

BOGOMOLETS NATIONAL MEDICAL UNIVERSITY

Department of human anatomy

GUIDELINES

Student's independent work during the preparation to practical lesson

<i>Academic discipline</i>	<i>HUMAN ANATOMY</i>
<i>Module №</i>	<i>1</i>
<i>Content module №</i>	<i>3</i>
<i>The topic of the lesson</i>	<i>Joints of lower limb</i>
<i>Course</i>	<i>1</i>
<i>Faculties</i>	<i>Medical 1,2,3,4, military, dental</i>
<i>Number of hours</i>	<i>3</i>

1. Specific objectives:

After completing the course, the student must know and be able to:

- 1.1 Analyze connections of the bones of the lower extremity.
- 1.2 To make the idea of discontinuous and continuous connection of bones of the lower extremity (synarthroses, diarthroses, hemarthrosis, main and auxiliary aids joints).
- 1.3 Explain the formation of bone joints of the lower limb .
- 1.4 Suggest definition features of the bones connections of the lower limbs .
- 1.5 Classify connections of the bones of the lower extremity, morphological and functional criteria, biomechanism of joints.
- 1.6 Interpret functional anatomy connect bones of the lower extremity.
- 1.7 Describe each connection of the bones of the lower extremity and its features.
- 1.8 Draw each connection scheme of the lower extremity.

2. Basic level of training.

Students must know and be able to:

- 2.1 Describe the development of bones of the lower limbs, show the physical body area of the upper limb, movements that are possible in them.
- 2.2 Possess classification of the lower extremity.

3. Organization of the content of educational material.

Describe a logical sequence involving structural logic, tables, figures that reflect the content of the main theme for the practical classes.

Contents of the training material

Connections of the pelvic girdle (juncturae Cinguli pelvici).

The joints of the upper limb bones should be divided into two groups: continuous and interrupted. Synostosis of the thoracic belt - coracoclavicular ligament (lig. coracoacromiale), upper and lower transverse ligaments of the shoulder blade (ligg. transversum scapulae superius et inferius), intercostal membrane forearm (membrana interossea antebrachii), braid string (chorda obliqua), flexor holder (retinaculum flexorum s. lig. transversum sarpris) deep ligaments.

-Synchondroids of the upper limb are temporary and represent these are epiphysal cartilages (cartilagine epiphysiales) that exist up to 17-25 years old. During X-ray examination of limb bones (upper and lower) epiphyseal cartilage give the effect of "extra-articular X-rays" that should be taken into account in traumatological diagnosis. After 17-25 years specified synchondrosis transformed into synostoses. Discontinuous joints - joints.

Joints of the thoracic belt

The upper limb belt.

(art cinguli pectorales, s. art cinguli membri superioris)

Joints of the pelvic belt (juncturae cinguli pelvici).

Among the joints of the lower limb and, in particular, the pelvic belt, there are all three

Types of connections:

Continuous - synrterosis:

- synostoses: the formation of bone in the city of the former synchondrosis-fusion three parts of the pelvic bone - pelvic cavity (acetabulum).

Among the joints of the free lower extremities is the large-thymus syndesmosis (syndesmosis tibioflbularis). Buttocks, spine are connected by the above syndesmoses-bonds The club-lumbar ligature (lig. Iliolumbale) is tensioned between the wing iliac bone and bodies and transverse processes IV, V of the lumbar vertebrae.

The sacral sinus (lig. Sacrospinale) is directed from the lateral parts of the sacrum bones and cauda to the gluteus, forming a large butt scissor arge forehead (foramen ischiadicum majus). Cruciform-humpy ligament (lig. sacrotuberale) also starts from the sacral bone and coccyx, but more a wide bundle and attached to the nose hump.

The sacrum and lumbar ligaments and the small incisor scar lower the small lobe hole (foramen ischiadicum minus) .This membrane (membrana oburatoria)

Fills the same hole in the pelvis, bypassing its free part next to hollow furrow, where a closed canal (canalis obturatorius) is formed. The above holes and channel are studied in sections of myology, perineum, angio-neurology in the topographic anatomical aspect.Semi-continuous - pubic symphysis (symphysis pubica). Between

symphonic ones the surfaces of the pubic bones are fibrous cartilage -

Interlock disk (discus interpubicus), in the thickness of which is contained

slit-like cavity. In the upright position, pubic symphysis compressed, while sitting - stretched. Slit disk in women is wider than in men, especially during pregnancy, which is a prerequisite for movements in the pubic symphysis in childbirth. Epiphyseal and apophysic cartilage of the femur, as examples of temporary synchondrosis.The foreskin symphysis is strengthened by two ligaments: the upper pubic (lig.pubicum superius) and arcuate form, lower pubic (lig.inferiums) The lower pubic bone forms the apex of the lower angle (angulus subpubicus) For women, this angle is wider than that of men, and the lower branches of the pubic the bones form a pubic arc (arcus pubis).

Pelvic female (pelvis femininum) and its size.

-The distance between the large swabs of the femur bones (distantia trochanterica) - 30-32 cm,

-Distance of crests (distantia cristarum) - 28-30 cm.

-Distantia spinarum distance is 25-27 cm,

-The conjugate anatomical (conjugata anatomica) is 11.5 cm,

-Transverse diameter (diameter transversa) - 13 cm;

-Right diameters (diameter obliqua) - 12 cm;

-Conjugate true (gynecological) (conjugata vera s. Gynecologica) 11 cm

-Direct size of the exit from the small pelvis (diameter recta exitus pelvis minoris) - 9.5 cm,

-Axis pelvis (axis pelvis).

-Break (sacroiliac joint - art. Sacroiliaca). The joint is formed bearded surfaces of sacral and iliac bones covered fibrous cartilage. The articular capsule is tight, tightly tied and attached to the edges articular surfaces.It is reinforced in the front by the anterior

sacroiliac ligaments (*lig. sacroiliaca anteriora*), and behind-the intercostal and posterior sacro-iliac bonds (*ligg sacroiliaca interossea et posteriora*). The joint is simple, flat, combined, amphiarthrosis (slow-moving).

Pelvic in general

Connection of two pelvic bones with sacral bone (with coccyx) and between

A bone ring is formed by itself - a pelvis (a pelvis). There is a large pelvis (*pelvis major*) and small pelvis (*pelvis minor*). These pelvic divisions are delimited by the borderline a line that generally defines a hole - the upper hole of the pelvis (*apertura pelvis superior*). Below the cavity of the pelvis (*cavitas pelvis minor*) is overlower apex of the pelvis (*apertura pelvis inferior*). The dimensions of the female pelvis are of great practical importance and are studied in live women with a tazomir (three transverse sizes of a large pelvis) and small pelvis size bimanual research.

Sexual dimorphism. In women, the pelvis is wider and shorter than male.

The wings of the iliac bones are more delicate, the entrance to the cavity of the small pelvis is rounded,

The shape of the pelvic cavity is cylindrical, and the forearm angle is larger (90-100 °) against (70-75 °) in men, the appearance of the bones is less relief.

Free connection of the lower extremity.

(*Juncturae membri inferioris liberi*)

-Continuous (*syndesmozy*): *membrana interossea*, large-syndesmoze, long plantar ligament (*lig. plantaris longus*).

-Discontinuous. These are the joints of the free lower limb.

Hip joint (art. Coxae).

Made by the head of the femur and the crescent surface of the pelvic floor of the pelvic bone. The articular capsule from the outer edge of the herd lip reaches to the intervertebral line and the ridge of the femur, thus wrapping its neck. This is of practical importance in differential diagnosis and treatment of intra-articular fractures and extraarticular capsule reinforced by four poses akapsulnomy links:

.Iliac-femoral ligament (*lig. Iliofemorale*) stretched between the lower anterior iliac ostyu and mizhvertlyuzhnoyu front line of the joint. This naypotuzhni st ligament (1 cm thick) people and, together with the muscles holding the body upright and prevents it from falling while back.

.Pubic-femoral ligament (*lig. Pubofemorale*) goes from the top of the pubic branches to medial segment mizhvertlyuhovoyi line. The ligament is woven into the articular capsule, relatively weak.

.Sciatic-femoral ligament (*lig. Ischiofemorale*) tensions between the body and swivel sciatic bones femur.

.Circular zone (*zona orbicularis*) is a circular thickening bundles of fibrous joint capsule, covering the loop-shaped neck of the femur. A large belt is fixed to the iliac bone below its anterior lower spine, interwoven with bundles of fibers with all previous bonds.

In the joint there are also two intra-capsular bonds. One of them - the femoral head ligament (*lig. Capitis femoris*). The connection begins from the transverse ligament and the cervical spine and attaches to the fossa of the femoral head. The bunch, unlike the

other, plays the role of a shock absorber and a blood vessel conductor to the femoral head.

Knee joint (art. genus).

Anatomically it is the most complex and largest joint in a human organism.

Articular surfaces:

- Femoral bones;
- Upper articular surface of the tibia;
- Overkill;
- *Supraclavicle of the femur.* The line of fastening of the articular capsule on the femoral bone in the front is shifted 1.5 cm articular cartilage; leaving on the sides free upsurgeons, and behind passes along the edge and the articular surface of the germs. On the tibia the bone and supraclone of the articular capsule are attached to the edge of their articular surfaces. Capsula articularis of the knee joint is spacious and thickened from behind. The synovial membrane of the articular capsule covers the intraarticular ligaments, forms numerous folds, among which the largest - winged (*plicae larms*). They are located on the bottom and on the sides of the overcoat, contain fat cloth, filling part of the articular cavity. Peculiar the continuation of the middle part of the wing-like folds deep into the intervertebral there is an over-limb synovial fold (*plica synovialis infrapatellaris*). Both of these folds form the so-called subalpine fatty body (*corpus adiposum infrapatellare*). *Bursae synoviales* are also additional structures joints, which are located between the movable tendons of the muscles and the bones and eliminate mutual friction. They can be combined with the cavity knee joint or not, which is of practical importance. The supple-bag bag (*bursa suprapatellarias*) is located between the tendons quadriceps muscle and tibia. Under the tendon of the popliteal muscle there is a popliteal depression (*recessus subpopliteus*), and under the tibia of the tail muscle in its place fastening *bursa subtendinea m. sartorii* The front of the supraclone is placed sequentially subcutaneous, subfascial and subtranslatin coat bags (*bursae synoviales subcutanea, subfessional, subtendinea prepatellaris*). Consequently, the intraosseous formations include meniscus, synovial folds, connected with his cavity synovial intracapsular ties In the knee, there are intracapsular, capsular and extracapsule bon

Between the articular surface of the femoral and tibial bones are the medial and lateral menisci (*menisci Medialis That lateralis*), which are interconnected in front with transverse ligament of the knee. The ends of the meniscus are attached to the hills to improve front and back links.

Each meniscus - a fibrous, cartilaginous, triangular folded structure fused perimeter of the joint capsule and thinned free edge turned into articular cavity. Medium meniscus is narrow, semi-mild, and the lateral is wider and circular. The upper surfaces of the meniscus are concave in accordance with the configuration of the medial and lateral glands of the femur, and the lower almost flat ones lie on the upper articular surface of the tibia.

In the knee joint normally distinguish intracapsular, capsular and out of capsule ties.

Internal capsular links.

- Anterior crucial ligament (lig. Cruciatum anterius) placed between the edge of the medial femoral condyle and the anterior tibial intercondylar field.
- Rear crucial ligament (lig. Cruciatum posterius) tensions between the lateral surface of the medial femoral condyle and posterior mizhvrostkovym field.
- Front-meniscal femoral ligament (lig. Meniscofemorale anterius) runs parallel to the anterior crucial ligament medial meniscus on the inner surface of the lateral femoral condyle, is unstable.
- Rear-meniscal femoral ligament (lig. Meniscofemorale posterius) parallel to the back crossed ligament and meniscus and tensions between the inner surface of the medial femoral condyle.
- Transversal knee ligament (ligamentum Transversum genus) - Intracapsular, connects the medial and lateral meniscus with each other.

Capsule ligaments.

- Spit popliteal ligament (lig. Popliteum obliquum). It bundles of muscle tendon piperetynchastoho composed of deep crow's feet.
- Arcuate popliteal ligament (lig. Popliteum arcuatum) comes from the lateral femoral condyle, covers the popliteal muscle attached to the head of the fibula.

Non-capsule connections.

- Tibial collateral ligament (lig. Collaterale tibiale)
- Fibular collateral ligament (lig. Collaterale fibulare) bent in the form of fibrous cord between the lateral femoral nadvyrostkom and apex capitis fibulae.
- Patella ligament (lig. Patellae) - This is the final part of the quadriceps tendon thigh, which contains nadkolinok (sesamopodibna bone). The connection is directed from the top of the supraclone to the tibia.
- Medial patella holder (retinaculum patellae mediale) - is a medial quadriceps tendon bundles that are woven into nadkolinok.

Lateral patellar holder (retinaculum patellae laterale) - this is the side beams quadriceps tendon, which Mr litayutsya in nadkolinok side.

Talocrural joint (art. talocruralis) formed by the articular surfaces of the lateral ankles, lower articular surface of tibia bone, joint surfaces of talar bone.

Medial collateral ligament (lig. Deltoideum s. Collaterale mediale), which consists of four parts:

- tibial - navicular (pars tibionavicularis);
- tibial-heel (pars tibiocalcanea anterior);
- tibio-talaris anterior (pars tibiotalaris anterior);
- tibio-talaris posterior (pars tibiotalaris posterior).

Connection parts contained the names of the start and attachment.

Subtalar joint (art. Subtalaris). Formed by back subtalar articular surface and the heel bone. Joint capsule thick, bent, attached to the edges which required surfaces. It reinforced :

- lateral talocalcaneal ligament (lig . talocalcaneum laterale);
- medial talocalcaneal ligament (lig . talocalcaneum mediale)
- back talocalcaneal ligament (lig . talocalcaneum interosseum (posterior)).

Talocalcaneonavicular joint (art . talocalcaneonavicularis). It is composed by front and middle calcaneal articular surface and the heel bone, talus bone head and the navicular bone. Between these joints (5,6) there is the tarsal sinus(sinus of tarsi).

Joint is strengthen by talonavicular ligament (lig. talonaviculare), plantar calcaneus-navicular ligament (lig. calcaneonaviculare plantare).

It should be classified as combined joint, both cylindrical and spherical. Overall this is a complex joint, functional and uniaxial performing limited movements.

Calcaneo-cuboidal joint (art . calcaneocuboidea).

Formed by adjacent articular surface of the heel bone and the cube-shaped, which to some extent is a saddle. Medially joint capsule is sealed and attached to the edges of the joint surfaces. Joint is strengthen by dorsal and plantar calcaneo-cuboidal ligament (lig. calcaneocuboidea dorsale et plantare), and the long plantar ligament (lig . plantare longum). The joint is flat, and combined.

Mizhplesnevi joint and (articulationes intermetatarsales) located between the articular surface of the substrate metatarsal bones. These joints are reinforced back, and plantar metatarsal interosseous ligaments (lig. metatarsalia dorsalia, plantaria, interossea). Joints flat, combined with limited movements. The limited movement in joints cause a foot is a certain degree of flexibility .

Metatarsus - phalangeal joints (articulationes metatarsophalangeae).

Articular surface:

- heads of metatarsal bones (IV);
- bases of the proximal phalanges of the foot.

Articular capsule is thin, space, attached to the edges of the joint surfaces. Metatarsus-phalangeal joints are reinforced by deep transverse ligament shank (li g. metatarsale transversum profundum), which connects the joint capsule in the transverse direction. Fixing apparatus also includes joint side and plantar connections (li g. collateralia et plantaria). The sole connections form the basis for tendon flexor muscles of the fingers. Between the metatarsal bones, joints and ligaments there are interosseal spaces shank (interossea metatarsi spatia). This simple, spherical joints.

Interphalangeal joints (articulationes interphalangeae pedis).

- Blocks proximal and middle phalanges;
- Foundations middle and distal phalanges.

Articular capsula is thin, space, attached to the edges of the articular surfaces; strengthened by collateral and plantar ligaments (ligg. collateralia et plantaria).

It's just typical block-like joints, but with less range of motion than similar joints cysts and.

In general:

The foot is the reference machine and the spring of the human body. It has a vaulted structure with five longitudinal and one cross vaults.

The longitudinal arch ranged from one point calcaneus bone shank through their heads. Three podzdovzhni medial arch height of 3-5 cm performing spring property, and two lateral - mainly op at rnu function.

Transverse arch passes through the wedge-shaped, cuboid bone and metatarsal bones basics. This vault is open medially.

Methods of educational process at the practical lesson.

5.1. Preparatory stage.

5.1.1. Forming of motivation for advanced study of the main provisions of artrology, types of connections, classifications of joints in form and function. Learning axes and movements around them.

5.1.2. Use "Methodical recommendations for teachers' according to claim 1. - Specific goals; of claim 3. - Organize the content of educational material.

5.1.3. Conducting initial standardized level of training students:

Practical work of students

In describing the hip joint to note the features of its structure (nature of the articular surfaces, space capsule attachment available Amount articular lips, inside of capsule and off - capsular ligaments). In the analysis of movement in the hip joint should pay attention to the smaller amount of movement in it than a typical globular joints - shoulder. Pay attention to students in anthropological research methodology of human organs with pryminennyam vymyr yu Wang and descriptive characteristics to identify the individual diversions .

Describing the knee to emphasize that it is the largest and most complex, which incorporate themselves longer lever body on a large scale movement. The functional importance of communication knee meniscus, vnutrishnokapsulnyh ligaments, sesamoid bone, synovial folds and bags that have clinical significance. And also need to consider the rotational motion of the knee, possible only with a bent knee.

To help students conduct comparative characterization of compounds shin, knee replacement with the compounds of the department of the upper limb. Pay attention to real estate joints tibia performing supporting function. Considering connect the bones of the foot, it must be said to their limited movements, except NADP 'yatkovo-ankle joint.

The most important in the foot connection :

- The joint of the foot - a complex, composite compound, which consists of the upper ankle joint nadp'yatkovoho and lower sections between which is in the form minyska talus.*

A standardized final control of knowledge.

We estimate the current progress of each student during classes and put in the log of visits and evaluation of progress. Estimates are announced and age group

simultaneously puts them in the roll of the success of attendance of students and their teacher demonstrates his signature.

Students are informed about the topic of the next classes and instructional techniques to prepare for it.

Means of control knowledge :

- Tests
- Practical problems concerning illustrations teach. method. manual Mod 1
- Control questions
- The final level of students' knowledge.

Attachments

Baseline training (baseline knowledge and skills)

1. Identify and demonstrate to the skeleton of the pelvic bone, pubic and buttock, details of their structure ;
2. Types of connections between the bones of the pelvis, the main dimensions of large and small basin, the main dimensions of large and small pelvis, sex differences and their importance in obstetrics;
3. To demonstrate and call basic parts and details describing the structure of the femur ;
4. Define and demonstrate to the hip joint preparation, its structure, form joint ligaments in and moves it;
5. discontinuous types of connections, diarthrosy, their fundamental characteristics ;
6. Classification of joints in structure, shape and axes of movement ;

Questions for initial level of knowledge of students:

1. Identify and demonstrate on the skeleton the pelvic bone, pubic and buttocks, details of their structure;
2. Types of connections between the pelvic bones, the main sizes of large and small pelvis, major size of pelvis, gender differences and their meanings in obstetric practice;
3. Demonstrate and name the main parts and details that characterize structure of the femur;
4. Define and demonstrate on a preparation a hip joint, its structure, shape, ligamentous apparatus of the joint and movements in it;
5. Perform types of compounds, diarthrosis, and cardinal signs;
6. Classification of joints in structure, form and axes of movements;

Questions to control the initial level of student knowledge:

1. What are the syndesmoses of the pelvic bone joints?
2. Demonstrate the cavity. Which parts of the pelvic bones connect in it and what kind of connections in children under 14 years old;
3. What is amfiartrosis, give an example of it with connected pelvic bones.

4. *What should be the exact size of the pelvis to know the obstetrician doctor. Give them a name.*
5. *Name the ligaments of the hip joint.*
6. *Name the features of the capsule of the knee joint.*
7. *What is the fundamental difference between the joints of the tibia with the homologous bones of the forearm.*
8. *What are the two joints isolated by surgeons-doctors when the bones of the foot are united?
Make a definition, specify their keys.*
9. *What bones form a solid base of the foot?*
10. *Name the structures that strengthen the vault of the foot;*

Question to control the final level of training.

1. *What types of connections are the bones of the pelvis?*
2. *Describe the varieties of syndesmoses that connect the pelvic bones;*
3. *What are the topographical constraints they limit?*
4. *Name synrterosis when joining the pelvic bones. Determine synchondrosis and synostoses*
5. *What kind of compounds are the connection between the pubic bones?
How are these connections strengthened?*
6. *Name and hold the line on the bones of the pelvis. which separates the large pelvis from small*
7. *What is the big pelvis and its dimensions?*
8. *Interstitial distance, interstitial, intervertebral, external conjugate;*
9. *What is a limited small pelvis, called entrance dimensions, anatomical conjugate, gynecological, transverse, and oblique diameters;*
10. *What is the limited output from the pelvis, to name its size: straight conjugate and transverse diameter.*
11. *What are the features of the articular surfaces of the hip joint?*
12. *How to classify the ligaments that strengthen the hip joint?*
13. *Name intra-articular and extra-articular ligaments of the hip joint*
14. *Classify the hip joint and compare with the upper limb.*
15. *What are the features of the articular surfaces and the cavity of the knee joint What bones form the knee joint?*
16. *Name and demonstrate the capsule of the knee joint, its features attachment;*
17. *Demonstrate intra-and extra-articular ligaments of the knee joint*
18. *Give classification of the knee joint in structure, form and feature. Describe movement in the joint.*
19. *What kinds of connections connect the shin bones. Describe the joint between the bones of the shin.*

20. Describe syndesmosis. which connect the shin bones.

Tests

1. When removing the bladder and pelvic part of the ureter was accidental injured n.obturatorius, which goes out on the thigh through closed closed by a fibrous mooring hole. What type of connection is applicable? Membrane obturatoria?

A. Synchondrosis

B. Sinostosis.

C.Sindesmosis

D.Dyartroz

E. Articulatio

2. In the patient's trauma of a grass plot with fracture of the iliac bone in the lower region

front at the same time, the astringent fibers capsule ligament of the hip joint, which fixed in the place of the fracture. The fibers of which are ligaments damaged?

A.Lig. capitis femoris.

B.Zone orbicularis (Weber's belt).

C.Lig.transversum acetabulus.

D.Lig.iliofemorale (call Bertin's tongue).

E.Lig. ischiofemorale

3.Gynecologist studies the size of a woman is large pelvis. What is the major pelvic?

A. Cleavage of the iliac bones and body LV.

B. Cleft bones and body L IV.

C. Cleavage of the iliac bones and body S I.

D. Cleavage of the iliac bones, body LV, upper the edge of the pubic symphysis.

E. Cleavage of the iliac bones, body LV, lower the edge of the pubic symphysis.

4. When choosing an obstetrician tactics of conduct birth is very important measurement of the transverse diameter (diametr transversa) of the entrance to the small pelvis, which should be somewhat larger than the size fetal head What is the outer size of the pelvis? Measure to subtract from it 14-15 cm, or divide in half to get the diametr size transversal

A. Distantia interspinosa

B.Distantia intercrystalis..

C.Distantia intertrochanterica.

D.Conjugata externa.

E. Conjugata.mediana.

5. When the ultrasound of a pregnant woman doctor suggests excessively large weight of the fetus and solves the question of possibility of birth independently. For the final diagnosis obstetrician carefully meets

outer dimensions of the pelvis. Using the payload the obstetrician has determined the distance between the upper edge pubic symphysis and sphincter V lumbar vertebra What is the size determined by the doctor and why is it normal?

- A. *Conjugata externa* (20-21 cm).
- B. *Distantia interspinosa* (25-27 cm).
- C. *Distantia intercrystalis* (28-30 cm).
- D. *Distantia intertrochanterica* (30-32 cm)
- E. *Conjugata median.*

6. Studying X-ray of a child, 9 months, the doctor realized the underdevelopment of the cavity with the formation of congenital dislocation of the femoral head in art. coxae In the bodies the buccal and pubic bones have been found to be squeezing centers. In the body

the iliac bone is absent. At what month ?

- A. 7. V. 5. S. 6. D. 8. E. 9.

7. A football player is injured at the bottom of the game limb in the knee area. Inspecting an athlete doctor suspected a rupture intracapsular ligament that connects between the front ends of both meniscus. What kind of bunch art.genus can be damaged?

- A. *Lig. meniscofemoralis anterior.*
- B. *Lig. meniscofemoralis posterior.*
- C. *Ligamentum cruciatum anterior*
- D. *Lig. transversus. genus.*
- E. *Lig. cruciatum. posterior.*

8. In the patient during the fall injured median bypass, which strengthens the ankle-tibia joint. As a result of injury, limited movements. To what joints is art. talocruralis in shape and number of rotation?

- A. Monovalent.
- B. Blocklike, uniaxial.
- C. Swirling.
- D. Seedlings, two-legged.
- E. Double-headed, two-legged.

9. In a patient with diabetes, the surgeon excises distal part of the foot at the joint level. This joint is easily dismembered only when dissection of the ligament, which is still called joint key What connection does the surgeon cross?

- A. *Lig. tarsometatarsalia dorsalia.*
- B. *Lig. tarsometatarsalia plantaria.*
- C. *Lig. calcaneocuboideum plantaria.*
- D. *Lig. cuneometatarsalia interossea.*
- E. *Lig. cuneocuboideum plantare.*