

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>	Joints of the upper limb.
<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>

Kiev 2017

1. Specific objectives:

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

- 1.1 Analyze connections of the bones of the upper limb.*
- 1.2 To make the idea of discontinuous and continuous connection of bones of the upper limb (synartrozy, diartrozy).*
- 1.3 Calling main and auxiliary aids joints.*
- 1.4 Explain the formation of bone joints of the upper limb .*
- 1.5 Suggest definition features with 'associations bones of the upper limb.*
- 1.6 Classify connections of the bones of the upper limb, morphological and functional criteria biomechanics of joints.*
- 1.7 Interpret the functional anatomy of the 'bone joints of the upper limbs.*
- 1.8 Describe each connection of the bones of the upper limb.*
- 1.9 Draw each circuit connection of bones of the upper limb.*

2 Basic level of training.

Students must know and be able to:

- 2.1 Describe the development of the bones of the upper extremity, showing the physical body area of the upper limb movements are possible in them.*
- 2.2 Possess classification bones of the upper limb.*

3. Organization of educational content material.

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

Connections of the bones of the upper limb.

*Connecting the bones of the upper limb should be divided into two groups **continuous** and **discontinuous**.*

*- **Synchondrosis upper limb** refers to time and are the epiphyseal cartilage (cartilagine epiphysiales), which exist to 17-25 years. During X-ray bone extremities (upper and lower) epiphyseal cartilage give effect "extraarticular X slots" that should be taken into account during any trauma diagnosis. After 17-25 years, these synchondrosis be transformed into synostosis.*

Joints of the thoracic belt, or upper limb belt.

(art. cinguli pectorales, art. cinguli membrissuperioris)

*- **Sternal-clavicular joint** (Art. Sternoclavicularis) - the only connection of the upper limb . It is formed by the articulation of the articular surfaces of the clavicular trunk of the breast and the thoracic end of the collarbone. The articular disk is located between the articular surfaces, covered with fibrous cartilage, and divides the articular cavity into two chambers. The articular capsule is reinforced by four ligaments. On the side of the joint there is a strong **costal-clavicular ligament** (lig. costoclaviculare), which stretched between the lower end surface sternal clavicle bone*

and cartilage and the first rib. Over the jugular notch of the sternum is **interclavicular ligament** (*lig. Interclaviculare*), which connects both ends of the surface of back collarbone. **Front and rear sterno-clavicular ligament** (*ligg. Sternoclavicularia anterius et posterius*) woven front and back in the joint capsule. The shape of the articular surfaces of the joint saddle shaped, but the presence of articular disc varies biomechanics to 3 axes. Around the frontal axis movements are most restricted - inhibit ligaments. The joint is also complex.

- **Acromio - clavicle** (*Art.acromioclavicularis*). is created by the articular surface of cromial end of the clavicle and the acromion, 1/3 of which are fibrous articular disc. Joint capsule reinforced **acromio-clavicular** (*lig. acromioclaviculare*) and **coracoclavicular** (*lig. coracoclaviculare*) connections.

- **Acromio- clavicular ligament** strengthens the joint top entwined in his capsule.

Joints of the free upper limb

(*Articulationes membri superioris liberi*)

- **Shoulder joint** (*art.humeri*). It is formed by an articulation of the articular surfaces of the head of the humerus and the articular hollow of the shoulder blade. The last supplemented (enlarged, congruent) by the lobe of the articular depression (*labrum glenoidale*). In the cavity of the joint there is a tendon of long double-headed shoulder muscle (*tendo capitis longi m.bicipitis brachii*), which is wrapped around synovial membrane forming the intergranular synovial vagina (*vagina in synovialis intertubercularis*). Articulation capsule attachment line passes along the free edges of the articular lobe and articular hollow, by anatomical neck of the humerus, forming a bridge over the interhub furrow and synovial vagina. The capsule of the joint is thin and spacious, reinforced in part by the bee-shoulder ligament (*lig. coracohumerale*), which extends from a beak-like appendix of a shoulder blade to anatomic cervix near the large and small humeros of the humerus. Joint capsule also strengthened by the thickening of its fibrous layer, which is considered as articular-shoulder ligaments (*ligg. glenohumeralia*). Capsule is essential also strengthens muscle tendons (*supraspinatus, infraspinatus, teres minor subscapularis*), which are interlaced by separate beams in its fibrous layer. The cavity of the joint can be combined with the subtitle bag subcutaneous muscle (*bursa subtendinea m.subscapularis*). Indicated tendon muscles during contraction strain the articular capsule, make it impossible to pinch it. Despite fixing factors, shoulder joint anatomically inclined to dislocation, in which the head shoulder bones shifted.

- **Elbow joint** (*Art. Cubiti*) joint is formed by six articular surface 3 for cysts (*brachial, ulnar, radial*) between which distinguish 3 joints:

- **Humero-ulnar joint** (*art. humero ulnaris*) (**between the shoulder block and block of the ulnar notch**);

- **Humero-radial** (*art.humeroradialis*);

- **Proximal radio-ulnar** (*art.radioulnaris proximalis*).

- **Ulnar collateral ligament** (*lig. collaterale ulnare*).

- **Radial collateral ligament** (*lig.collaterale radiale*);
- **Anular radial ligament** (*lig. anulare radii*);
- **Ligamentum Quadratum.**

• **The distal radioulnaris joint (Art. Radioulnaris *distalis*)** The joint is formed by connecting the ulnar notch radius, articular periphery and lower surface of the head of ulna, articular disc and has a triangular shape.

Six articular surfaces of three bones surrounded by a common space articular capsule, form a complex joint. Fastening line the articular capsule passes over the coronary and radius shoulders bones to the front and below the upper edge of the elbow fossa behind. On the road the humerus remain free beyond the articulate bag. On the bones the forearm of the capsule is attached to the cervix and the edges block-like cervix of the elbow.

Joints are as follows:

-Collateral ligament (*lig. Collaterale ulnare*). It starts with medial hypertrophy of the humerus, bends the joint and attached to the edge of the block-like cervix of the elbow;

-Lig.collaterale radiale, which begins with the lateral superficial of the humerus and, having captured the head with two beams radial bone, attached to the anterior and posterior edges of the elbow bones;

- Lig. anulare radii is considered an integral part of the previous link. It starts from the front and the rear edges of the cervical spine, covering the ring head of the radial bone holding it at the elbow bone;

-The quadratum (*lig. quadratum*) begins from the distal edge radial cuts of the elbow and attached to the cervical beam bones

Biomechanics of the elbow joint

It is advisable to consider biomechanics and place in the classification of each of the three joints, and then the elbow in general. Shoulder-elbow joint is a simple, blocklike (kind-guito-like), shoulder-ray is a simple, spherical (blocked). Proximal Radiation - Elbow is a simple, cylindrical (rotating type 1), combined. In general elbow joint has two axes: frontal (flexion, extension) and vertical (attraction - pronatio. reversal - supinatio).

Joints of the hand (Art. Manus)

-Radio-carpal(*Art. Radiocarpalis*) is formed distal articular surfaces of three proximal bones series (boat, crescent, triangular) and proximal articular surfaces of all bones of the distal wrist. The articular capsule is relatively spacious, but thin, especially from the back surface. Combined compound joint with two heads (one of them is formed by a boat bone, articulated with bones - trapezoid and trapezoidal, second-headed and hook-like bones connected with the triangular, crescent and boat bones). The joint is functionally linked to the radial- wrist, but with insignificant volume of movement.

- Radial collateral ligament of the wrist (*lig. collaterale carpi radiale*), which stretches from the radius bone subulates to the navicular bone;

- The ulnar collateral ligament of the wrist (*lig collaterale carpi ulnare*), tensions between styloid shoot dice and triangular and pisiform bone;

- Palmar radio-carpal ligament (*Lig. Radiocarpale palmare*), starting from the front edge of the articular surface of the radius and divides into separate bundles attached to the bone of the proximal row of carpal bones;

- Back radio-carpal ligament (*lig radiocarpale dorsale*), is extended between the back surfaces of the distal end of the radius bone and the proximal carpal row.

-Intercarpal joints (*art. intercarpales*)

-Mediocarpal joint (*Art. Medio carpalis*), is formed with distal articular bones' surfaces from the proximal row (navicular, venous, triangular) and proximal articular surfaces of bones from the distal carpal row. Joint joints have an S-shaped form.spacious, especially from the back surface. The joint is demonstrated by complex combinations, spherical with two heads . The joint is functionally associated with the radial wrist, but has a small amount of movement.

-Carpo-metacarpal joints (*Art. Carpometacarpals*). Joints are formed with frontal surfaces of the distal row of wrist bones and bases of II-V metacarpal bones. Carpo-metacarpal joints form a ligament **palmar and dorsal carpal-metacarpus** (*lig. carpometacarpalia palmaria et dorsalia*). Joints are complex .flat, combined.

-Intermetacarpal joints (*Art. Intermetacarpalis*) . These joints are formed as adjacent to the articular surface of the substrate II-V metacarpal bones.

-Intercutaneous joints (art intercarpales) or, carpi joints (*art. carpi*). Medo-articular joint (*mediocarpalis*), formed distal articular surfaces of three proximal bones series (boat, crescent, triangular) and proximal articular surfaces of all bones of the distal wrist. Articulate the slit has an S-shaped configuration. The articular capsule is relatively spacious, but thin, especially from the back surface. Combined compound joint spherical with two heads (one of them is formed by a boat bone, articulated with bones - trapezoid and trapezoidal, second-headed and hook-likebones connected with the triangular, crescent and boat bones). The joint is functionally linked to the radial-wrist, but with insignificant volume of movement.

The jawbone (*ossis pisiformis*) is a connection pea and triangular bones. Thin articular capsule is reinforced peach-peach (*lig. pisohamatum*) and pea-peach (*lig. pisometacarpale*) bonds that are branching of the tendon of the elbow muscle-fingernail wrist The joint is simple, flat. The joints of the wrist strengthen the following connections:

1) Pulmonary ligament of the wrist (*lig. Carpi radiatum*) as a whole fibrous beams from the duct to the adjacent bones of the wrist, she the largest among the bond of the wrist.

2) Lateral inter-ligament bonds (*ligg intercarpalia palmaria*),

3) Intergranular ligaments (*ligg. Intercarpalia dorsalia*)

4) Interdigital interbreeding (*ligg intercarpalia interossea*) particularly noteworthy is the folding knife (*retinaculum flexorum*) which lies between the elbow and the radiant wrists above it sulcus, closing the front of the carpal tunnel (*canalis carpi*). Holder the flexors are a seal of their own fascia of the forearm. Numerous wrist ties, serving as auxiliary elements joints, are conductors of the vessels and nerves to the bones. The rest of the jaw joints do not have specific names, are between Individual bones of the wrist are combined with the middle wisdom a joint.

A hand as a whole and its anatomical features in modern humans.

During evolution under the influence of labor anatomical features in hand emerged that are characterized by increased bone size of the 1st finger saddle shap. The 1st finger is also characterized by its offset from the plane of the II-V fingers in the palmar direction. This fact significantly increased the volume of contrast of the 1st finger to the rest of the fingers.

4. Methodology of organization of educational process in practical lesson.

4.1. Preparatory stage.

4.1.1. Formation of motivation of students for in-depth study of the main provisions artrosyndesmolohiyi, types of connections bones.

4.1.2. Students' acquaintance with concrete goals and the plan of study on the material "Methodical recommendations for teachers" under item 1. - Specific goals; For item 3. - Organization of the content of educational material.

4.1.3. Conduct standardized control of the initial level of students' training:

- by tests on a control topic;

- by the checklist questions to test entry-level training of students.

Practical work of students

- The name of the joint;

- Features of articular surfaces;

- Features of articular cavities;

- Features of the articular capsule;

- Strengthening capsule bag;

- Classification of the structure of the joint, the shape of the articular surfaces;
- Think about joint movement;

When describing the sternum - clavicular joint notice that moves along with the clavicle and scapula; Define the axis (sagittal and vertical), around which these movements take place. Pay attention to the presence of the disc, but in the sternum-clavicular joint and surface coating fibrous cartilage, set shape joint movements in it and the role of communications in the correct range of motion.

Analyzing the shoulder joint it is recommended to emphasize that this type spherical joints. For example, the shoulder joint should again consider moves around 3 main axes, volume reaches 180 °, while noting that the show of hands vyschye horizontal level is only possible when returning the blade.

Describing the elbow should describe the shape and types of movements, each of the three established his connections and joints in general. Emphasize that these compounds are not combined ymi joints, as anatomically not isolated (total articular cavity and bags), but part of the elbow joint (proximal radio-ulnar beam and shoulder joint) combined with distal th radio-ulnar joint. Pay attention that the ulnar, radial and coronary holes lie in joint cavity.

Studying the arm joints, pay attention to the relationship forms the articular surfaces of possible movements and in the joint and the support joint unit, guiding and limiting movement.

4.3 A standardized final control of knowledge . We estimate the current progress of each student during classes and put in the log of visits and success, evaluation. 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.

5 . Attachments. Means of control :

- tests
- practical problems concerning illustrations teach. method. guidances nick Modul -1
- control questions:
 - entry level of students' knowledge
 - the final level of students' knowledge

D ENHANCEMENTS

Questions for control baseline knowledge. Initial level of knowledge and skills :

1. Define classification bones, called departments tubular bones ;
2. What are the parts of the upper limbs and bones that form them;
3. List the types of ' connections bones ;
4. Define sous Globa, the main elements of the joint;

5. Name the additional elements of the joint ;
6. Call and demonstrate departments in STI and bones that form them;
7. Show tubular bones of the upper limb ;

Questions for Initial knowledge .

1. List the type and connections bones of the upper limb ;
2. Which of the upper extremity joints are spherical in shape? Give examples.
3. What are the joints of the upper extremity in form ellipse, n at which at syah made in these movements? .
4. What is the feature of the articular surfaces of the joints that connect the bones of the upper limb girdle?
5. What is the feature of the capsule of the shoulder and elbow joints ?
6. Which constitute of elbow joints do you know? Define the shape of each.

Questions for final control of knowledge .

1. Describe and demonstrate hrudynno- clavicular joint: Surface features, capsules and oral. Bring classification and define joint analysis of motion in the joint.
2. Describe and demonstrate nadplecho- clavicular joint: a feature surfaces b, cavities , capsule and ligaments. Give the classification of joint analysis and bring motions.
3. Wha is the t feature of the joint capsule of the shoulder joint and its fortifications.
4. Give the classification of the shoulder joint movements and spend analysis .
5. What form are elbow joints. Describe ix joint surfaces.
6. Give the classification of each joint, forming an elbow.
7. What is the connection reinforced elbow. Spend anliz movements in this joint.
8. What types of joints connecting the bones of the forearm do you know. Demonstrate and describe interosseous membrane.
9. Describe and demonstrate the joints between the bones of the forearm.
10. Describe and demonstrate promenevo- carpal joint. What is the peculiarity of its articular surfaces.
11. What do you know about capsule strengthen radial - carpal joint. Give the classification of joint movements and spend analysis .
12. Describe and demonstrate seredynno- carpal joint, which strengthens its ties.

Test tasks

1. A man was taken to a surgical ward with a wound on a median edge forearm. The examination showed that the patient was damaged by an appendix, which beneath the block cut. What process is damaged?
 - A. Processus ulnaris .
 - B. Processus coronaris .
 - C. Processus styloideus.
 - D. Tuberositas m supinator ossis ulnaris .

E. Tuberositas ossis ulnaris .

2. Radiologically determined intra-articular fracture proximal epiphysis of the humerus. What is the structure of the shoulder bone damaged?

A. Head of the humerus.

B. Surgical cervix.

C. Crest of a large tuberculum .

D. Crest of a small tuberculum. ,

E. Tuberculum minor.

3. According to statistics, most often bone fractures occur in young men, and in the elderly in the area of the surgical cervix. Specify on which bone is the given crew?

A. Talas.

B. Radius.

C. Femor

D. Fibula.

E. Humerus.

4. In a patient the movements of the hand are limited, a slight swelling of the phytic-phalangeal joint finger What is the function of the heel-phalangeal joint and the finger?

A. Art. Tears

B. Art. spherioidea

C. Art. ginglymus

D. Art elipsoidea.

E. Art. plana

5. In the patient arthrosis art. sternoclavicularis, which led to a limitation of movements in

shoulder joint Which joint is approaching the function art. sternoclavicularis

A. Art. spherioidea

B. Art plana

C. Art. throchoidea

D. Art. sellaris

E. Art. cotylica

6. In the elderly, incisura scapulae may be perceived as a hearth bone degeneration, especially when lining the ligament, which along with the incisura scapulae forms a hole. What is the proper ligament of the shoulder blade?

A. lig. sternoclaviculare superius.

B. lig. transversum scapula inferius.

C. lig. coracoacromiale

D. lig. coracohumerale.

E. lig. transversum scapulae superius,

7. Patient arthritis of the elbow joint (art cubiti), which led to a decrease volume of movements What axes do movements in the elbow perform relative to which axes?

A. Frontal, vertical

B. Frontal

C. Vertical.

D. Flash, vertical.

E. Bullet, vertical.

8. In a woman with rheumatoid arthritis - deformation of the interphalangeal joints brushes What movements that are limited in a patient can be performed in these joints in normal?

A.Circumductio.

B.Abductio, adductio.

C.Rotatio

D. Flexio, extensio.

E.Supinatio, pronatio.

9. In teenager heavy trauma - destroyed articular surfaces of radiation- articular joint (art.radiocarpalis), torn ligaments, joint movements impossible. What movements are performed in art.radiocarpalis in normal?

A.Rotatio, flexio, extensio.

B.Flexio, extensio, abductio, adductio, circumductio.

C.Extensio, abductio, adductio.

D.Flexio, abductio, adductio; rotatio

E.Rotatio; abductio, adductio

10. The medical expert investigates the brush of an unknown child. On the X-ray The presence of oscillation nuclei in os capitatum, hamatum, triquetrum, lunatum In os scaphoideum there is no kernel of osteopenia. What is the age of a child?

A. up to 5 years.

B. to 1 year.

C. up to 3 years.

D. to 4 years

E. 3 months