

DEPARTMENT OF ANATOMY

COLLEGE OF MEDICINE

MUSCULOSKELETAL BLOCK

2ND SEMESTER

PRACTICAL

PRACTICAL I

Objectives: *DEMONSTRATION & STUDY*

Topic I: Scapula, Clavicle and humerus

Topic II: Pectoral region, axilla and Shoulder joint.

By the end of this session the student will be able to know;

The position, side and general features of the scapula, clavicle, and humerus.

The pectoral region

- 1) Pectoralis major muscle: origin (clavicular & sternocostal head), insertion, nerve supply, relations.
- 2) Clavipectoral fascia.
- 3) Pectoralis minor muscle: origin, insertion, nerve supply.
- 4) Subclavius muscle: origin, insertion, nerve supply.

The axilla

- 1) Boundaries of axilla: apex, base, walls (anterior, posterior, medial & lateral)
- 2) Contents of axilla.
- 3) Axillary artery: beginning, course, subdivisions into 3 parts according to its relations to pectoralis minor muscle.
- 4) Axillary vein: beginning, relations to parts of axillary artery, terminate

The brachial plexus

Stages of brachial plexus: roots, trunks, divisions & cords.

Branches of upper trunk.

- 1) Main branches of lateral, medial & posterior cords.

The shoulder joint:

Type; articular parts, attachment of the capsule, accessory ligaments that support the capsule, movements and muscles producing these movements.

The most common type of dislocation of this joint.

Nerve supply of the joint.

PRACTICAL II

Arm, Cubital fossa and elbow joint

Topic: The arm

Objectives: DEMONSTRATION & STUDY

By the end of this session the student will be able to know;

- 1) Muscles of anterior compartment of arm: Coracobrachialis, biceps brachii, & brachialis (origin, insertion, important relations of each muscle).
- 2) Nerve of anterior compartment: *musculocutaneous nerve*
Muscles of posterior compartment of arm: triceps (origin, insertion).
- 3) Nerve of posterior compartment: *radial nerve* (formation & root value, termination).
- 4) Artery of arm: *brachial artery* (beginning, course & termination).

Topic: The cubital fossa:

Boundaries, floor, roof and contents.

Topic: Elbow joint

Type; articular parts, attachment of the capsule, accessory ligaments that support the capsule, movements and muscles producing these movements.

The most common type of dislocation of the joint.

Nerve supply of the joint.

PRACTICAL III

Topic: Muscles of the forearm.

By the end of this session the student will be able to know;

The flexor compartment of forearm

- ***Muscles:*** (origin, insertion; action & nerve supply)
 - a) Superficial group: 5 muscles (Pronator teres, flexor carpi radialis, palmaris longus, flexor digitorum superficialis & flexor carpi ulnaris).
 - b) Deep group: 3 muscles (flexor pollicis longus flexor digitorum profundus & pronator quadratus).
- ***Nerves:***
 - a) Median nerve.
 - b) Ulnar nerve.
- ***Arteries:***
 - a) Radial artery.
 - b) Ulnar artery.

The extensor compartment of forearm

Muscles: (origin, insertion, action & nerve supply)

a) Superficial group: 7 muscles

1-brachioradialis, 2- extensor carpi radialis longus, 3- extensor carpi radialis brevis, 4- extensor digitorum, 5- extensor digiti minimi, 6- extensor carpi ulnaris & 7- anconeus.

b) Deep group: 5 muscles

1-supinator, 2-abductor pollicis longus, 3-extensor pollicis brevis, 4-extensor pollicis longus & 5-extensor indicis.

Nerve: Posterior interosseous nerve: origin, course & , branches.

Flexor retinaculum: Formation, function, attachment structures passing superficial and deep to it.

Extensor retinaculum: Formation, function, attachment structures passing superficial and deep to it.

PRACTICAL IV

Topic: Back and scapular muscles

By the end of this session the student will be able to know;

- 1) First layer of muscles of back: Trapezius & Latissimus dorsi (origin, insertion, action & nerve supply).
- 2) Second layer of muscles of back: Levator scapulae, rhomboideus minor & rhomboideus major (origin, insertion, action & nerve supply).
- 3) Triangle of auscultation.

Deltoid and Scapular muscles

- 1) Muscles of shoulder region: deltoid, supraspinatus, infraspinatus, subscapularis, teres minor & teres major (origin, insertion, action & nerve supply).
 - 2) Superficial & deep relations to deltoid.
 - 3) Intermuscular spaces: quadrangular, upper triangular & lower triangular spaces (boundaries, structures passing through each space).
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PRACTICAL V

Topic: Hand muscles and wrist joint

Objectives: DEMONSTRATION & STUDY

By the end of this session the student will be able to know;

- 1) Deep fascia: palmar aponeurosis & fibrous flexor sheaths).
- 2) Muscles: palmaris brevis, thenar, hypothenar, lumbricals & interossei (palmar & dorsal).
- 1) Nerves: median & ulnar nerves (course in the palm).
- 2) Arteries: radial & ulnar arteries (course, in the palm)

Topic: Wrist joint

Type; articular parts, attachment of the capsule, accessory ligaments that support the capsule, movements and muscles producing these movements.

Nerve supply of the joint.

PRACTICAL VI

Topic: Gluteal region, back of the thigh and Hip joint

By the end of this session the student will be able to know;

1- GLUTEAL REGION

- **Muscles:** Study and demonstrate, the origin, insertion, nerve supply & action of each muscle.
 - 1) **Glutei:** gluteus maximus, gluteus medius & gluteus minimus.
 - 2) **Others:** piriformis, quadratus femoris, obturator internus, superior & inferior gemelli, tensor fasciae latae.
- **Nerves:** superior & inferior gluteal nerves, nerve to quadratus femoris, nerve to obturator internus, pudendal nerve (study the course and branches of each nerve).
- **Vessels:** superior & inferior gluteal vessels, internal pudendal vessels (study **Ligaments:** Sacrotuberous & sacrospinous (study the attachments of each ligament)).
- **Sciatic foramina:** greater & lesser sciatic foramina (study the boundaries & contents of each foramen).

2- BACK OF THIGH

* **Muscles:** Study origin, insertion & action and nerve supply of each of the following muscles.

- 1) Biceps femoris.
- 2) Semitendinosus.
- 3) Semimembranosus.

* **Nerve supply:** SCIATIC NERVE

Study the origin, course & branches & termination of the sciatic nerve.

3- HIP JOINT

Study:

- 1) Articular surfaces.
 - 2) Attachments of capsule.
 - 3) Attachments of ligaments (extracapsular & intracapsular ligaments).
 - 4) Relations of joint.
 - 5) Movements of joint.
 - 6) Stability of joint. Compare between hip & shoulder joint, regarding factors maintaining stability for each of them.
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PRACTICAL VII

Topic: Front and medial side of the thigh

By the end of this session the student will be able to know;

ANTERIOR COMPARTMENT OF THIGH

- **Muscles:** Sartorius, pectineus, quadriceps femoris. *Study the origin, insertion & action of each muscle.*
- **Nerve supply:** femoral nerve. *Study the course & distribution of femoral nerve.*
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FEMORAL TRIANGLE

- 1) **Roof:** skin, superficial fascia containing nerves (lateral, intermediate & medial cutaneous nerve of thigh, femoral branch of genitofemoral nerve), vessels (superficial inguinal vessels) & lymph nodes (superficial inguinal) & deep fascia.
- 2) **Boundaries:** medial border of sartorius (laterally), medial border of adductor longus (medially) & inguinal ligament (base).
- 3) **Floor** :(from medial to lateral) adductor longus, pectineus, psoas major & iliacus.
- 4) **Contents:** femoral sheath (*study the compartments of the sheath*), femoral vein (*study the course & tributaries*), femoral artery (*study the beginning, course, relations & branches*), femoral nerve & deep inguinal lymph nodes.

MEDIAL SIDE OF THIGH

- **Muscles:** adductor longus, adductor brevis, adductor magnus & gracilis. *Study the origin, insertion & action.*
- **Nerve supply:** obturator nerve. *Study the course, relations & distribution of obturator nerve.*
- **Adductor (subsartorial canal):**
- **1) Boundaries:** vastus medialis (anterolateral wall), adductor longus & magnus (posterior wall or floor), fibrous tissue extending from anterolateral to posterior wall (anteromedial wall or roof).
- **2) Contents:** *femoral artery & vein (study the branches of femoral artery in the canal & compare the relations between artery & vein in the canal to that between them in the femoral triangle), saphenous nerve & nerve to vastus medialis.*

PRACTICAL VIII

Topic: Front and lateral compartments of the leg and dorsum of the foot

By the end of this session the student will be able to know;

Front of the leg and dorsum of the foot

- * **Bones:** Study *tibia, fibula & skeleton of foot.*
- * **Fasciae:** Superior & inferior extensor retinaculae: Study *attachments of each retinaculum & structures passing deep to it.*
- * **Muscles:** Study *origin, insertion & actions* of each muscle.
 - 1) In the leg: Tibialis anterior, extensor hallucis longus, extensor digitorum longus and peroneus tertius (may be absent).
 - 2) In the dorsum of foot: Extensor digitorum brevis.
- * **Nerve:** Deep peroneal (anterior tibial) nerve: Study *origin, course, relations & branches in the leg & dorsum of foot.*
- * **Vessels:**

- 1) In the leg: anterior tibial artery: Study *origin, course, relations & branches*.
- 2) In the dorsum of foot: Dorsalis pedis artery (is the continuation of anterior tibial artery in front of ankle joint): Study *origin, course, relations & branches*.

Lateral compartment of the leg

- * **Fasciae**: Superior & inferior peroneal retinaculae:
Study the *attachments of each retinaculum & structures passing deep to it*.
 - * **Muscles**: Study *origin, insertion & actions* of each muscle.
Peroneus longus & peroneus brevis.
 - * **Nerve**: Superficial peroneal (musculocutaneous) nerve:
Study *origin, course, relations & branches*.
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PRACTICAL IX

Topic: Popliteal fossa and posterior compartment of the leg and Sole of the foot

By the end of this session the student will be able to know;

POPLITEAL FOSSA

Study site, boundaries, roof, floor & contents of the popliteal fossa.

POSTERIOR COMPARTMENT OF LEG

Superficial muscles:

Gastrocnemius, plantaris & soleus.

Study *origin, insertion & actions* of each muscle.

Deep muscles:

Popliteus, flexor hallucis longus, flexor digitorum longus & tibialis posterior.

Study *origin, insertion & action* of each.

Arterial supply: Posterior tibial artery.

Nerve supply: Tibial nerve.

Study course, & branches of both artery & nerve.

Flexor retinaculum:

Study attachments & structures passing deep to the flexor retinaculum.

SOLE OF FOOT

- **Deep fascia:** plantar aponeurosis, fibrous flexor sheaths.

- **Layers of sole:**

First layer: abductor hallucis, flexor digitorum brevis & abductor digiti minimi.

Second layer: tendon of flexor hallucis longus, tendon of flexor digitorum longus, lumbricals & flexor digitorum accessorius.

Third layer: flexor hallucis brevis, adductor hallucis & Flexor digiti minimi.

Fourth layer: tendon of tibialis posterior, tendon of peroneus longus, plantar & dorsal interossei.

- **Blood & nerve supply:** medial & lateral plantar vessels & nerves.

Study course, & branches of each.

PRACTICAL X

Topic: Knee and Ankle joints

By the end of this session the student will be able to know;

KNEE JOINT: Study:

- Type of knee joint.
- Articular surfaces.
- Attachment of capsules.
- Accessory ligaments.

- Structures inside knee joint.
- Bursae related to knee joint.
- Movements of knee joint.
- Muscles producing these movements.

Ankle Joint

: Study:

- Type of the joint.
- Articular surfaces.
- Attachment of capsules.
- Accessory ligaments.
- Movements of the joint.
- Muscles producing these movements.

PRACTICAL XI

Topic: Muscles of the Face

By the end of the session the students should be able to:

- Identify the following muscles of facial expression: orbicularis oculi, orbicularis oris, mentalis, buccinator, dilator nares, zygomaticus.
 - State their nerve supply and actions.
 - Identify the facial artery and its main branches and the facial vein.
 - Indicate the features that differentiates the artery from the vein in the face.
 - Show the point at which pressure can be applied to the facial artery to control bleeding in the face.
 - Discuss the facial nerve and its distribution on the face.
 - Explain the effects of injury to the facial nerve on one side and demonstrate a method of testing for such an injury.
 - Demonstrate the position of supraorbital, infraorbital, and mental nerves in the face. Demonstrate the territories of the ophthalmic, maxillary and mandibular divisions of the trigeminal nerve.
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PRACTICAL XII

Topic: Temporomandibular joint and muscles of mastication

At the end of this session, students should be able to:

1. Demonstrate the movements which occur at the temporomandibular joint. Explain the mechanism of dislocation of mandible.
 2. List the relations of the temporomandibular joint.
 3. List the muscles involved in depression, elevation, protraction and retraction of the mandible.
 4. State the actions of the following muscles: medial pterygoid, lateral pterygoid, temporalis, and masseter, digastric.
 5. Explain the origin, insertion, action and nerve supply of the 4 muscles of mastication.
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PRACTICAL XIII

Topic: Triangles of the neck

At the end of this session, students should be able to:

Posterior triangle of the neck

1. Demonstrate the boundaries and contents of the triangle.
2. State the attachment, action and nerve supply of the sternocleidomastoid and trapezius muscles.
3. Describe the test for function of accessory nerve.
4. Describe the usual arrangement of the superficial veins (external jugular, anterior jugular) of the neck.
5. Demonstrate the roots of the brachial plexus.
6. Demonstrate the deep fascia of the neck: pretracheal, prevertebral, investing layer and the carotid sheath.
7. Identify the 3rd part of the subclavian artery.
8. Identify the inferior belly of omohyoid muscle.

Anterior triangle of neck

At the end of this session, students should be able to:

1. Define and demonstrate the boundaries of the anterior triangle.
2. Show the subdivisions of the anterior triangle into muscular, submandibular, submental and carotid triangles, by the 2 bellies of the digastric and the superior belly of omohyoid muscles.

3. Identify their contents, and the boundaries of each triangle.
4. Identify the hyoid bone.
5. List the muscles attached to the hyoid bone.
6. Name the structures that can be palpated in the midline of the neck, from the chin to the suprasternal notch.
7. Demonstrate the structures deep to the sternocleidomastoid muscle

PRACTICAL XIV

Topic: Anterior abdominal wall

ANTERIOR ABDOMINAL WALL

Objectives:

At the end of this session, students should be able to:

Demonstrate and describe:

* Layers of anterior abdominal wall: Skin, superficial fascia, external oblique, internal oblique, transversus abdominis, fascia transversalis & extraperitoneal fatty tissue.

Rectus sheath: anterior & posterior walls, contents.

INGUINAL CANAL

Objectives: DEMONSTRATION & STUDY

- Roof, floor, anterior & posterior wall of inguinal canal.
- Contents of the inguinal canal.

PRACTICAL XV

Topic: Posterior abdominal wall

*** POSTERIOR ABDOMINAL WALL AND PELVIC WALL**

Objectives:

By the end of this session the student will be able to know;

1) Bones:

- Lumbar vertebrae: typical (1st – 4th) & atypical (5th)

Study the general features, articulations & ligamentous attachments.

2) Muscles of posterior abdominal wall:

- Psoas major
- Quadratus lumborum
- Iliacus
- Psoas minor (may be absent)

Study the attachments, relations & actions of each muscle.

3) Fasciae of posterior abdominal wall:

- Thoracolumbar fascia.
- Fascia of psoas & iliacus.

Study their attachments to lumbar vertebrae.

Topic: * PELVIC WALLS

Objectives:

By the end of this session the student will be able to know;

1) Revision of bones, joints & ligaments of pelvis.

2) Study the attachments of muscles in the posterior wall (piriformis) & lateral wall (obturator internus) of pelvis.

1) Study the attachments & relations of pelvic floor muscles (pelvic diaphragm): levator ani & coccygeus.