Cerebellum
Get the balance right

Cerebellum Anatomy

For the Students
By the Teachers

Cerebellum

Get the balance right

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List of Topics NOT SO IMPORTANT for FMGE-Aspirants

In Head & Neck unit : Parasympathetic ganglion

Section 1

Basic Concept, Tricks and Magic of Anatomy

1 Chapter

BASIC CONCEPT, TRICKS AND MAGIC OF ANATOMY

- What is Anatomy:- cut & observe the Cadaver

Anatomy = Ana + Tomy

↓ ↓

To see Cutting

- Why Anatomy is important & how to study :-

For Proper Coordination Balance & Integration Among Different Subjects

- Conceptual Brainstorming integration: -

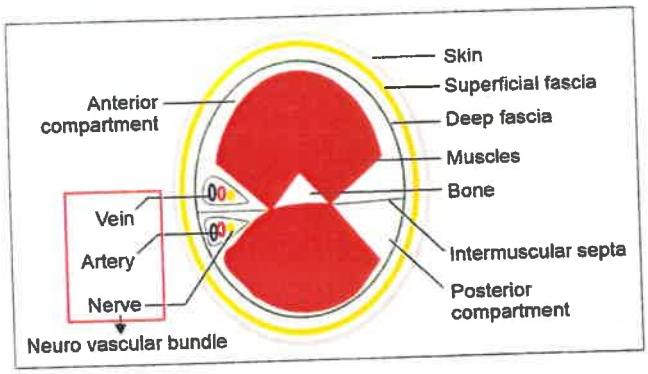
- Proper coordination, balance & integration among different subjects = cerebellum

- Dissection: autopsy /surgery

TRANSVERSE DISSECTION DIAGRAM :-

- Different types of layers of body superficially to deep: - Skin → SF → DF → muscles → Bone
- **Roof** :
  - Skin
  - Superficial fascia (fat , cutaneous nerves & vessels)
  - Deep fascia (includes collagen fibers)
- **Boundary**:
  - Muscle / tendons
- **Contents**:
  - VAN
    - Vein
    - Artery
    - Nerve

    } Neuro vascular bundle
- Floor :-
  - Muscles
  - Bone



Vein – thin walled & collapsing

Artery – thick walled & recoil

Nerve – no lumen, solid cord

- All neurovascular bundle of our body have sequence as vein-artery-nerve except -
  - 1st Intercostal space
  - Popliteal fossa
- **HILTON'S LAW**: - Hilton observed that nerves supplying the **MUSCLE** also innervate the **SKIN** overlying the muscle and the **JOINT** over which that muscle acts.

FOCUS AREA FOR EXAM: -

- Femoral triangle & hernia
- Inguinal canal & hernia
- Triangle Of neck
- Cadaveric images
- Surgery & ENT integration

Revision capsule/PYQs:-

- Roof is formed by skin, superficial fascia, deep fascia
- Floor is formed by muscles, bone
- Contents of any space: - neuromuscular bundle (VAN)

Q. Neurovascular bundle is absent in which compartment of leg? [AIIMS MAY 18]

1. Anterior
2. Lateral
3. Superficial posterior
4. Deep posterior

Q. Neurovascular bundle in abdomen runs in between? (DEC FMGE 21)

1. Between external & internal oblique
2. Between external oblique & transversus abdominis
3. Between internal oblique & transversus abdominis
4. Between transversus abdominis & fascia transversalis

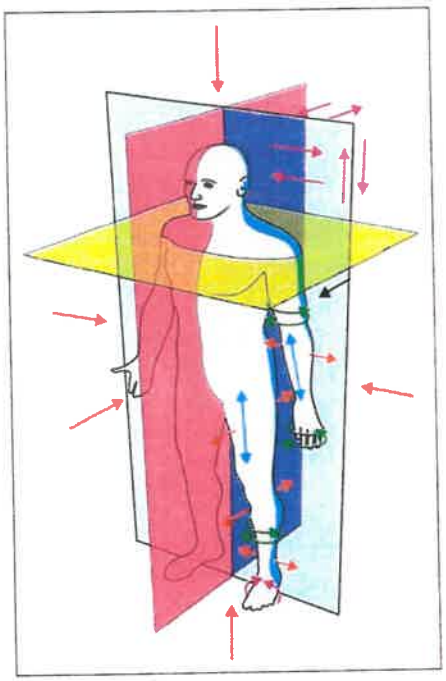
Section 2

General Anatomy

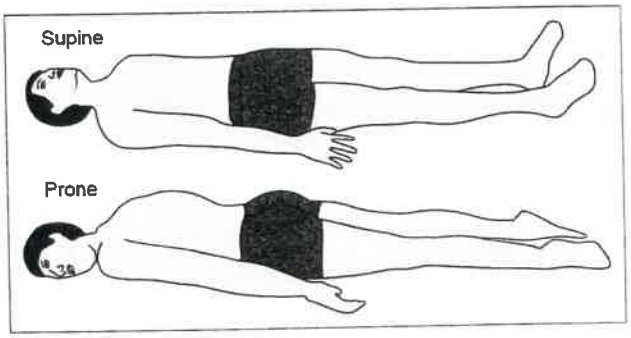
2.1 Chapter

POSITION, PLANES AND TERMINIOLOGY

ANATOMICAL POSITION



- Body is erect
- Eyes looking forward
- Hands on side with palms directed forward
- Legs together with toes in front

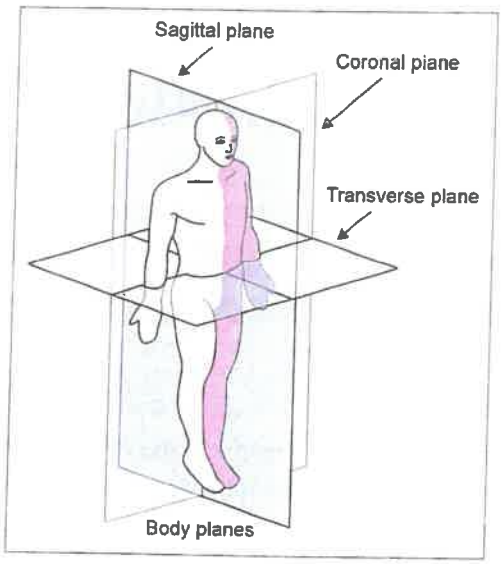


1. **Supine** - lying on back - Cardiothoracic surgeries
2. **Prone** - lying on abdomen - Spine or back surgeries
3. **Lithotomy** - a. patient lying on the back with both feet supported with footrest.
   b. Perineum area is exposed.
   c. For Obstetric-gynaecological procedures and Genito-Urinary surgeries.

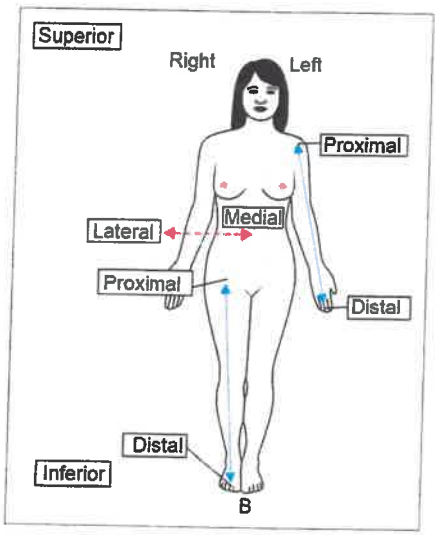
4. **Lateral decubitus** - lie on one side of the body - Best for ear surgeries.

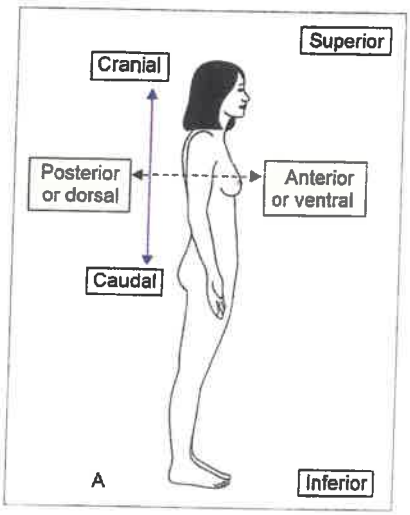
PLANES

1. **Mid-sagittal plane** - Plane divides the plane into two equal halves.
2. **Sagittal plane** - Any plane parallel to mid-sagittal plane.
3. **Coronal/Frontal Plane** - Divides the plane into front & back.
4. **Transverse/Horizontal plane** - Divides plane into upper and lower parts, parallel to the ground.
5. **Oblique plane** - Any plane making angle with the ground



TERMINOLOGY





- Superior/Cranial - Near to Head
- **Inferior/Caudal** - Near to Foot
- **Anterior/Ventral** - Any point in Front of the body.
- **Posterior/Dorsal** - Any point on the back of the body.
- Proximal - Near to trunk.
- **Distal** - Away from trunk.
- **Medial** - Close to Midline.
- **Lateral** - Away from Midline.

Focus Areas for Exams:-

Direct question may not be asked BUT ..

- In each subject & questions patient position is described in anatomical position (if not specified).
- Planes Of the body are very important for radiology especially.
- Anatomy Terminology is also commonly used in each subject.

PYQs:-

Q. **Frontal plane section is termed as?** (DEC FMGE 2021)

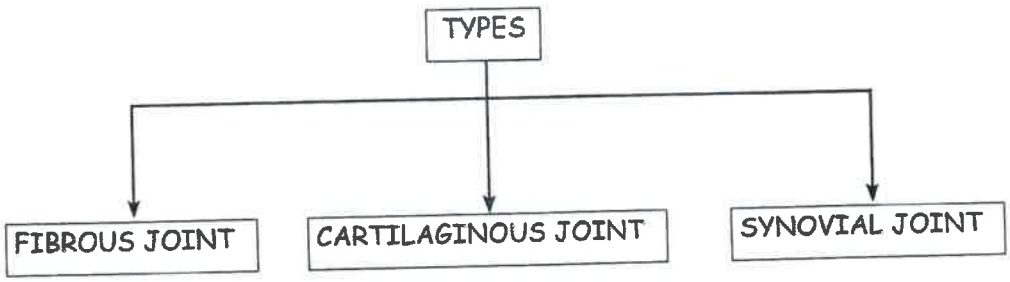
1. Sagittal Section
2. Coronal Section
3. Horizontal Section
4. Oblique Section

2.2 Chapter

JOINTS

Definition : Junction between 2 bones.

Joints are site for movement



1. FIBROUS JOINT

- Not movable (Syn- arthrosis)
- Present in skull bones - fibrous tissue in between 2 bones.

Types of Fibrous joint (Mnemonic - SaSu G)

- Sa - Sutures
- Su - Syndesmosis
- G - Gomphosis

A. Sutures

1. **Plane suture** - Articulating surfaces parallel to each other with fibrous tissue in between.

E.g. - Intranasal suture

2. **Squamous suture** - Articulating surfaces placed obliquely with each other. E.g. - Tempro-parietal suture.
3. **Serrated suture** - Articulating surfaces have serrated margins with fibrous tissue in between.

E.g. - Interparietal suture

4. **Dentate suture** - One is fitted into the other with fibrous tissue in between. E.g. - Lambdoid suture.
5. **Wedge and Groove/Schindylesis suture.**

E.g. - Sphenoid bone & Vomer.

B. Syndesmosis

2 bones are connected via Ligaments.

E.g. - Middle Radio-Ulnar joint, Middle Tibio-fibular Interosseous Membrane, Inferior Tibio-fibular joint.

C. Gomphosis

Joint found in Gums.

2. CARTILAGINOUS JOINTS

A. Primary Cartilaginous/Synostosis/Synchondrosis-

→ Ossified in later stages of life.

E.g. - Growth plate

B. Secondary Cartilaginous joint/Symphysis joint -

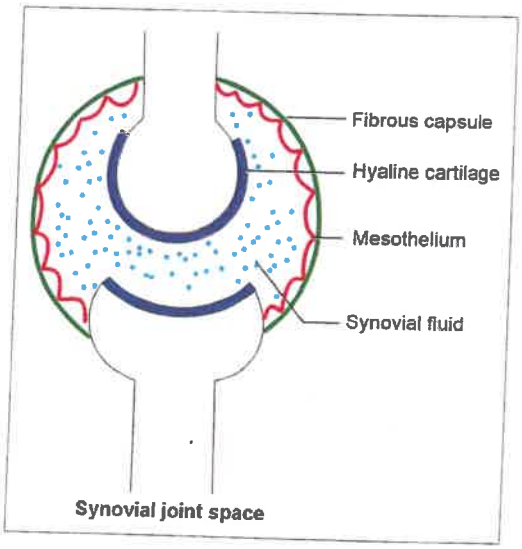
- Ends of Bone covered with Hyaline Cartilage while the in-between space has fibrous connective tissue.
- Show partial Movements.
- Present in midline of the body (except Symphysis menti - 1° Cartilaginous) (Mnemonic - SIM/MIS)

S - Symphysis pubis, Sacro-coccygeal joint

I - Intervertebral Disc

M - Manubrio-strenal joint, Xiphi-sternal joint.

3. SYNOVIAL JOINTS



A. Ball and socket joint (Mnemonic - SHIP)

S - Shoulder joint - most movable joint

H - Hip joint

I - Incudo-stapedial joint

T - Talo-calcaneo-navicular joint

B. Plane synovial joint (Mnemonic PICASo)

→ Articulating surfaces are plane and only gliding movement present.

P - Patello-femoral joint (Functionally only)

I - Intercarpal & Intertarsal joints

C - Costovertebral and costotransverse joint

A - Acromio-clavicular joint

So - Superior Tibio-fibular joint

C. Hinge joint (Mnemonic - IEA)

→ Only Uniaxial movement possible (due to bony prominences)

I - Interphalangeal movement

E - Elbow joint

A - Ankle joint

D. Ellipsoid joint

→ Convex-concave surfaces face each other.

→ Multi-axial with Restricted movements.

E - M - W

Metacarpo-phalangeal joint Wrist joint

Atlanto-occipital joint (**Yes movement** - Above atlas)

E. Saddle joint (Mnemonic - PICS)

→ Concavo-convex surfaces in each bone.

P - Patello-femoral joint (Anatomically)

I - Incudomalleolar joint

C - Carpo-metacarpal joint (1st joint)

S - Sterno-clavicular joint

F. Pivot joint

→ Rotatory movements between bones around an axis.

Atlanto-axial joint → between C1 and C2 (**No movement** - Below atlas)

Superior (via annular ligament) and Inferior Radio-ulnar joint

G. Condylar joint

→ Condyles of the 2 bones fit into each other.

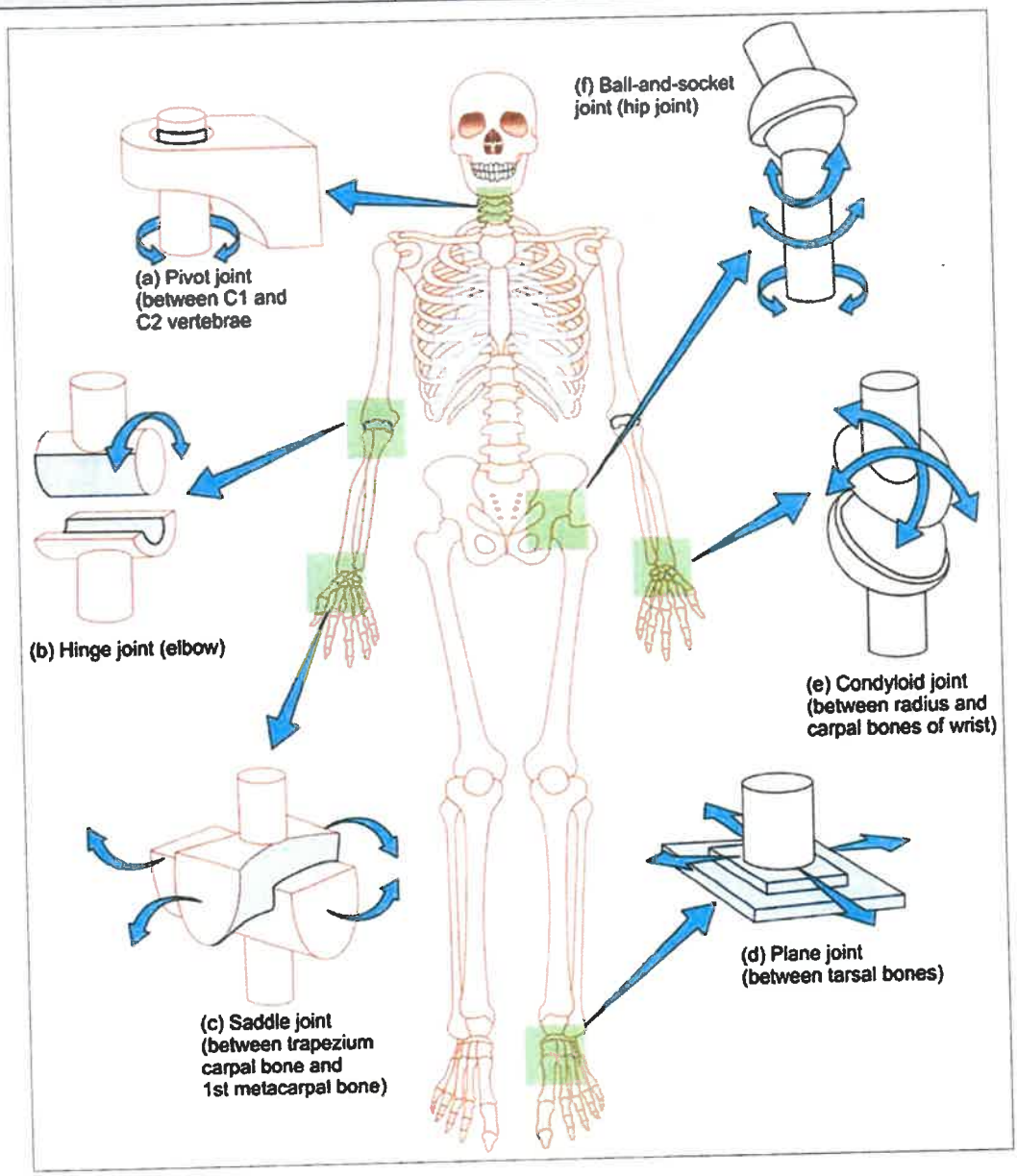
Knee - Bicondylar > Condylar joint

Temporomandibular joint (TMJ) - Bicondylar joint

- (Amphiarthrosis)
- Partical movable

CARTILAGINOUS JOINT

Synchondroses	Symphysis
The articular cartilage is hyaline in nature	Hyaline cartilage but in between them there is a layer of fibro cartilage
Immovable	It allows little movement
Temporary	Mostly permanent
The cartilage is ossified after a period of growth	Not so
Present in growing end of bone	All are present in the midline of the body
E.g.- joint between epiphyses & Diaphysis	E.g. - Public symphysis, joint between the bodies of the vertebrate



Focus Areas for Exams

- Identification of joint & its type based on:
  a. Osteology
  b. Radiology
- Sure shot questions from Joint directly and also related to Orthopaedics.

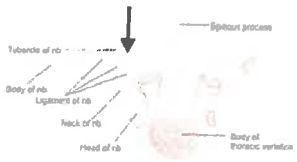
Revision Capsule / PYQs

- Joint permits a person to look to the right and left (NEET PG 2019) : .....
- The joint between the attachment of the 8th & 9th rib to the 7th rib is (NEET PG 2018): .....
- Middle radioulnar joint is (FMGE 2022) .....
- Inferior tibiofibular joint is (AIIMS 2017): .....

PYQs

Q. The type of joint marked in the image below is (NEET PG 2020)

A. Syndesmosis
B. Synarthrosis
C. Synchondrosis
D. Synovial



Q. Which type of joints is involved in shown movement in image (June FMGE 2022)

A. Pivot joint
B. Saddle joint
C. Ball & socket joint
D. Hinge joint

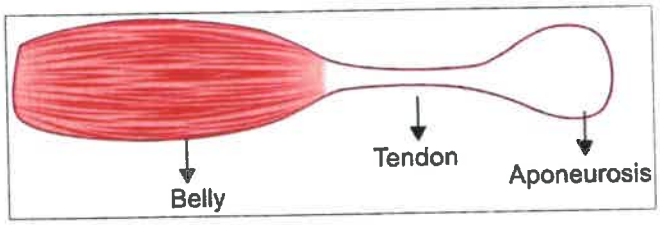
Q. At a marked arrow which type of joint is shown? (DEC FMGE 2021)

A. Saddle synovial
B. Secondary cartilaginous
C. Primary cartilaginous
D. Ellipsoid synovial

2.3 Chapter

MUSCLE & MOVEMENT

- Total **639** muscles in our body
- Muscle is modified cell with contractile protein:- actin & myosin.
- **2 parts of Muscle:-** Belly (soft & contractile) and Tendon (non contractile).
  - Sometime tendon is becoming flat known as **aponeurosis**
- **Raphe:-** It is Inter-digitation of muscle fibers



- **Movements at a joint:-**
  - Muscle only help to movement when it crosses the joints
  - If any Muscle crossing joint from front can make forward movement & if crossing from back can perform backwards movement.
- **Gliding:-**
  - Flat surfaces of two bones glide across each other.
  - Gliding occurs between
    - Carpals
    - Articular processes of vertebrae
    - Tarsals

(Carpal bones mnemonic :- She Looks Too Pretty Try To Catch Her)

- **Angular movement:-** movement in which there is a change in angle
  - Decrease in angle called **flexion** movement
  - Increase in angle called **extension** movement
  - Movements towards midline called **adduction**
  - Movements away from midline called **abduction**
  - Movements as rotating towards midline called **internal rotation**
  - Movement as rotating away from midline called **external rotation**

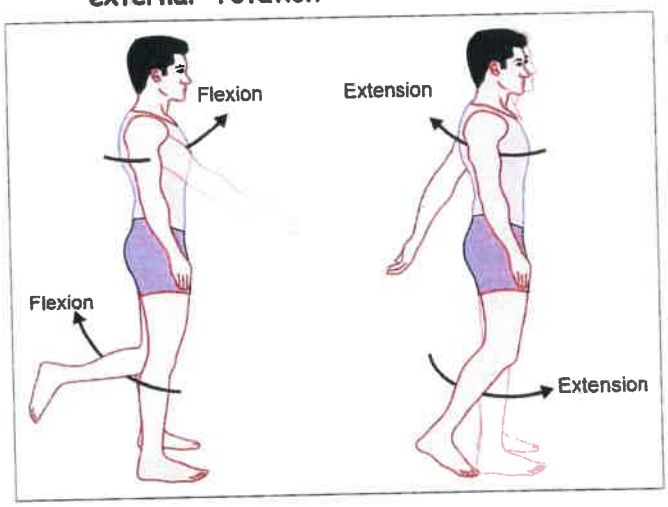


Image (x)

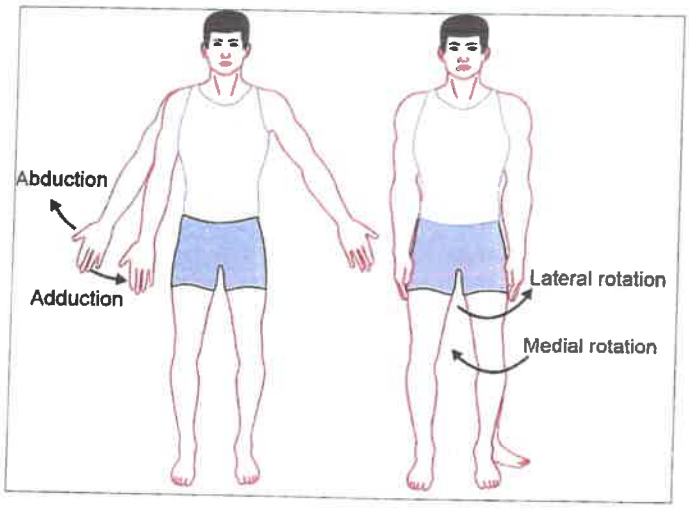


Image (y)

- **Circumduction** is the combination of Movements (ex. During bowling)

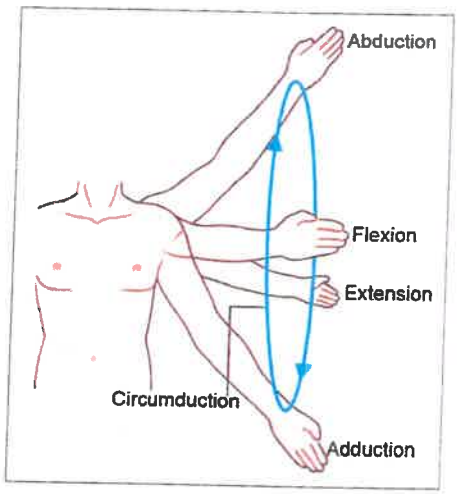
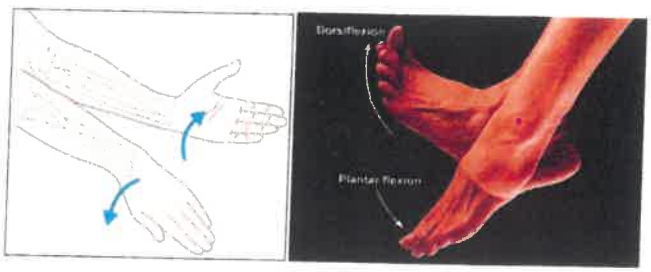


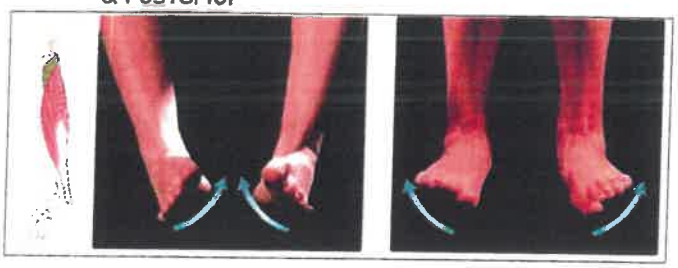
Image (z)

- Surfacing the palm upward called **supination**
- Surfacing the palm downward called **pronation** (supination & pronation occur between sup. & inf. radio ulnar joint)



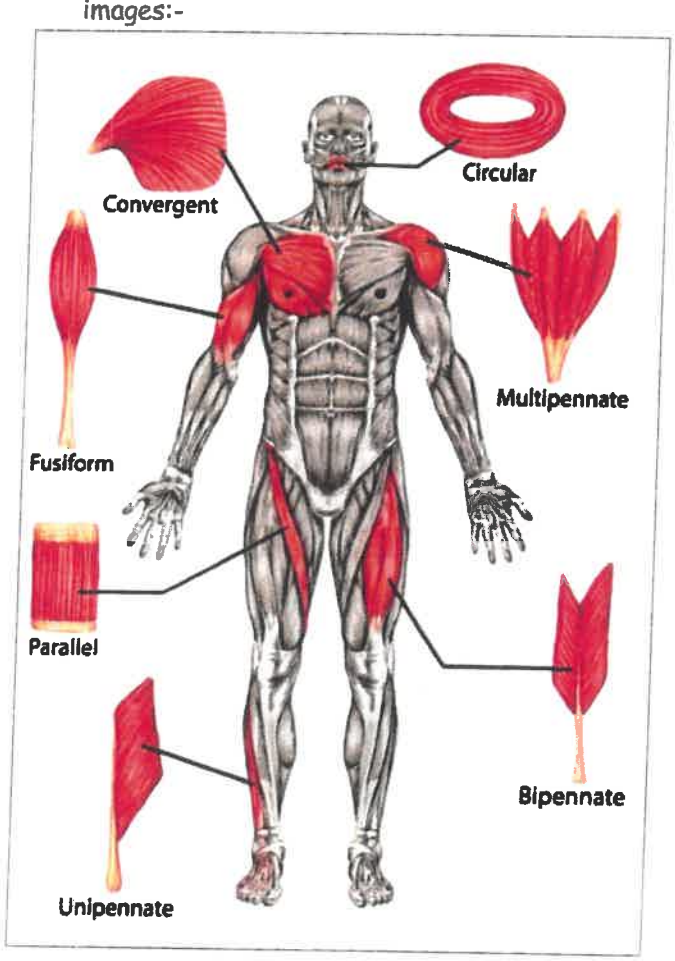
- **Foot drop**:- due to paralysis of some muscles no upward movement in foot which mainly involves common peroneal muscle

- Popliteus Muscle having action of unlocking(beginning of flexion is known as unlocking)
- Quadriceps femoris known as footballer's muscle Which responsible for kick action & it's doing extension of knee **(unlocking- popliteal muscle, locking - Quadriceps femoris) (Mnemonic: UPLQ)**
- **Inversion Muscle of foot:-** tibialis Anterior & Posterior



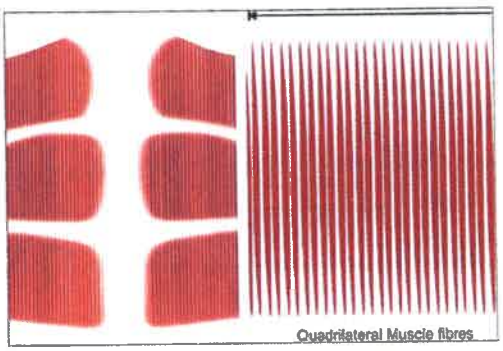
- **Evertor of foot:-** Peroneus longus & brevis

- Basic rules of muscle identification in cadaveric images:-



1. Parallel muscles:-

- **Strap muscle fiber**
  - Sternohyoid
  - Sternothyroid
  - Omohyoid
  - Longest muscle of body :- Sertorius a.k.a. honeymoon muscle / tailor's muscle
- **Quadrilateral muscle fiber**
  - Thyrohyoid
  - Rectus abdominis:- have Tendinous intersection



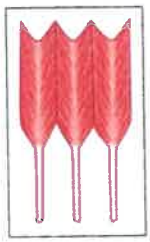
- **Fusiform muscle** :- biceps

2. Oblique muscle :-

- **Pennate**
  - **Unipennate** :- 1st & 2nd lumbrical , Palmar interosseous

  - **Bipennate**:- 3rd & 4th lumbrical , all dorsal interosseous

  - **Multipennate**:- middle fiber of deltoid, subscapularis muscle

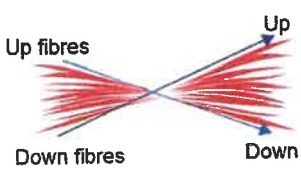


  - **Circumpennate**

3. Cruciate:-

Which crossing each other, ex:- Sternocleidomastoid, masseter (strongest muscle of body)

4. Twisted / spiral :- pectoralis major (NEET 18)



Focus Areas for Exams:

1. Identification of muscles in cadaveric images
2. Action of muscle
3. Nerve supply of muscle
4. Muscle & nerves related different clinical tests & signs.

PYQs:

Q. What is the function of the lumbricals at the metacarpophalangeal joint? (NEET PG 2018)

A. Flexion
B. Extension
C. Adduction
D. Abduction

Q. What is the nerve supply of the first lumbrical? (INI-CET 2022 Pattern)

A. Radial nerve
B. Median nerve
C. Ulnar nerve
D. Musculocutaneous nerve

Q. Action performed by marked muscle? (June FMGE 2022)

A. Abduction of shoulder joint
B. Adduction of shoulder joint
C. Protraction of scapula
D. Retraction of scapula

Q. Mention the type of joint present at the marked region. (ANAT FMGE JAN 2024)

A. Ellipsoid
B. Condylar
C. Plane
D. **Saddle**

Section 3

Upper Limb