

Anatomy from practical perspective : →

- ① Synovial Joint - ~~Diagram~~
- ~~Classification~~
- ~~Example~~

PAGE NO.	DATE

② Classification of fibrous joint

③ Sesamoid Bone

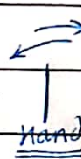
④ Cartilaginous joint - ~~Classification~~
- ~~Example~~

⑤ Pivot joint

⑥ Blood supply of long bone ⑦ Epiphysis

* Synovial joint ⇒ Diarthrosis

① Arm most evolved, most mobile type of synovial joint
Classification : →

① Plane / Gliding type → Gliding movement 

② Uniaxial

Transverse Axis • Hinge Joint

→ flexion & Extension

Vertical Axis • Pivot Joint

→ Rotation

③ Biaxial

• Condylar

→ TMJ, knee

• Ellipsoid

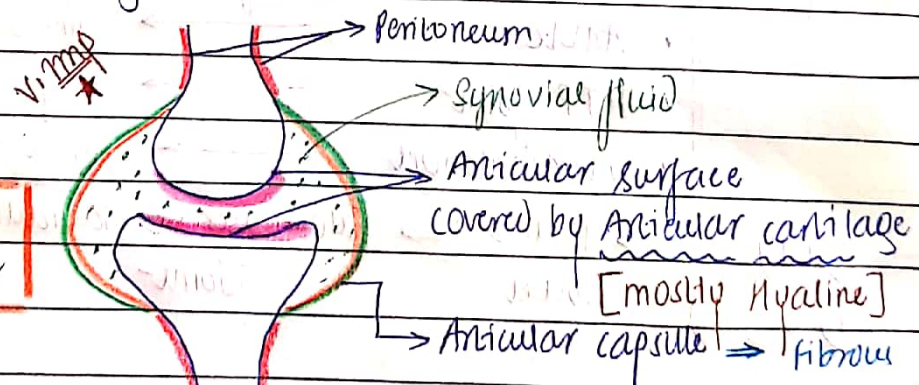
→ wrist

④ Multiaxial

• Saddle joint

• Ball & Socket joint

orange ⇒ synovial membrane



• → b/w two articulating surfaces partition called meniscus may be present or not.

• → Articular capsule is lined by synovial membrane which secretes synovial fluid.

Watch
-000
Action

Due to fibrous nature of articular capsule it is sensitive to sprain by appropriate reflexes (helpful mechanism)

PAGE NO	DATE

→ Varying degree of movements are permitted by synovial joint-

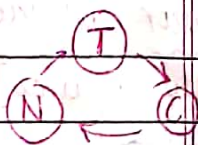
Classification

Upper limb

- Sternoclavicular → Saddle
- Acromioclavicular → Plane
- ★ • Shoulder / Glenohumeral → Ball & Socket
- ★ • Elbow → Hinge
- Radio ulnar → Sup. → Pivot
- Middle → Syndesmosis (fibrous)
- Inf. → Pivot
- ★ • Wrist / Radiocarpal → Ellipsoid
- Carpometacarpal → Saddle
- MCP joint → Ellipsoid
- Inter-phalangeal J. → Hinge

Lower limb

- Hip Joint → Ball and socket
- Knee Joint → f & t → Condylar joint
- f & Patella → Saddle joint
- Tibiofibular Joint → Sup → Plane joint
- Inf. → Syndesmosis (fibrous)
- Ankle → Hinge
- MTP joint → Ellipsoid
- Interphalangeal → Hinge
- ⇒ Ball & Socket ⇒ Talo-calcaneo-Navicular Joint



- ⑥ plane →
- ① Chondro-sternal (except 1st)
 - ② Costo-vertebral
 - ③ Acromio-clavicular joint
 - Imagine = ④ Superior-tibio-fibular

Thorax → Chondrosternal joint → Plane
 but 1st chondrosternal joint is → fibrous ***
 (unusual)

Costo-vertebral joint → Plane

Ear-osses → Mucdo-stapedial → Ball & Socket

Mucdo-malleolar → Saddle

PAA → Atlanto-Axial ⇒ Pivot joint

→ Atlanto-occipital ⇒ Ellipsoid

NOTES → ① Ball & Socket → ① Shoulder joint

② Hip joint

* ② Talo-calcaneo-Navicular joint

* ④ Mucdo-stapedial joint

② Hinge

→ ① Elbow

② Ankle

③ Metaphalangeal

③ Condylar

→ ① knee (F-T)

* ② TMJ

④ Ellipsoid

→ ① MCP

② MTP

③ wrist

④ Atlanto-occipital

⑤ Saddle

→ ① Mucdo-malleolar joint *

② Sternoclavicular joint

③ Carpo-metacarpal joint

④ knee (F & P) joint

⑤ Calcaneo-cuboid joint

- ⑦ Pivot → ① Atlantoaxial joint.
② Sup. & Inf. radioulnar joint.

DATE
PAGE NO

① Plane → If bones articular surface are flat
→ promote gliding movement in various directions
(see on next)

② Hinge → • Articular surfaces → pulley shaped
• Movement permitted in plane of around transverse axis.
Axis जो आगे में है paper में (transverse)

eg →  → Elbow (lateral view)
→ Table (view)

जोड़ में movement only permitted up & down (flexion, extension)

no other movement so it is Hinge joint

→ same is case of Ankle remember side to side movement seen at ankle is of distal fibular joint sup which is of plane variety ***

③ Pivot → • जोड़ hinge में plane of transverse here plane is vertical
 here ulna will be fixed radius will move as shown by arrow.
(superior view)

*** Conclusion ① Hinge & Pivot both have uniaxial movement

*** ② Hinge → Transverse plane → up & down mov.
Pivot → Vertical plane → fl & lt mov.

④ Condylar → Among two articulating surfaces
1 → convex
2 → concave } attached by ligament

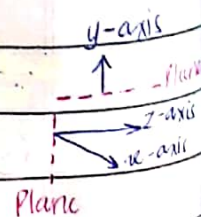
→ rather than biaxial it should be biplanar

1 plane → around transverse axis

1 plane → around vertical axis

eg → ① TMJ

② Knee joint



⑤ Ellipsoid → Among two articulating surfaces

↳ convex

↳ concave

PAGE NO.	DATE		

→ bi-axial

- around Transverse axis
- around Antero-posterior axis

* Eg → wrist joint

* Conclusion → Condylar & Ellipsoid have biaxial movements

→ Ex: for saddle for TCE

⑥ Saddle → Almost same as ellipsoid but movements around all three axis

⑦ Ball & socket →

- Globular head fitting in cup-shaped socket-
- Shoulder, hip joint-

v.m.p
*

(M)

⇕
saddle

(I)

⇕

(S)

Ball & socket

★ fibrous joint → Sutures Gomphosis Syndesmosis

→ bones articulated by fibrous tissue

either → immovable
→ or slight movement

PAGE NO.	DATE

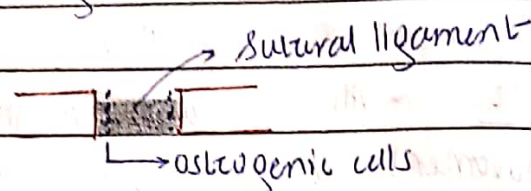
Types → ① Sutures →

* present only in skulls.

* Sutureal side of each bone covered with layer of osteogenic cells

Types →

① Plane →



Ex Intermaxillary, Interpalatine

② Squamous → overlapping bones



Ex Temporo-parietal suture

③ Serrate →



Ex Sagittal suture

④ Denticulate → (strongest) ★★



Ex Lambdoidal suture (λ)

⑤ Schindylesis →
 → fostrum of sphenoid fitting in
 → Ala of vomer bone

② Gomphosis →

→ peg & socket junction

→ connected via periodontal ligament

Ex connection b/w tooth & its socket

③ Syndesmosis →

→ Joined by interosseous membrane
 → b/w bone.

- Ex →
- (1) middle radio-ulnar joint
 - (2) Inferior tibio-fibular joint
 - (3) Sacro-iliac joint

PAGE NO.	DATE

NOTE → In neonates skull two sutures i.e. sutures are joined by fontanelles (Temporary) → 6 in all

→ These allow underlying bone to increase their size

→ Anterior fontanelle ⇒ judge hydration of baby.

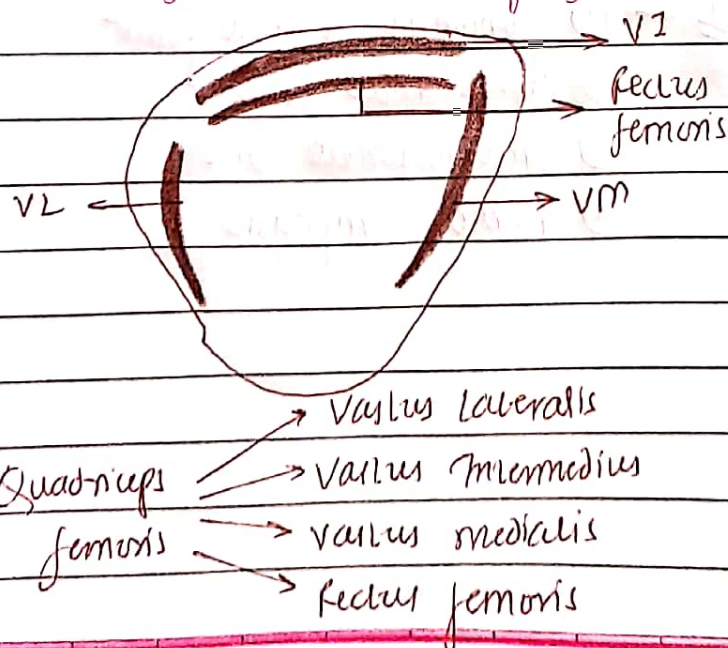
→ fontanelle judge intra-membranous ossification in progress.

★ Sesamoid bone ★

- bony masses found in tendons or joint-capsules
- have no periosteum
- can be present at articular or non-articular surface
- covered by hyaline cartilage
- lubricated by synovial membrane.

Ex → Patella in tendon of Quadriceps femoris

Pisiform in tendon of flexor carpi ulnaris



★ Cartilaginous Joint ★

→ Joined by cartilage in b/w

Type → ① Primary ⇒ (TEMPORARY)

Syn-chondrosis

↓
hyaline cartilage

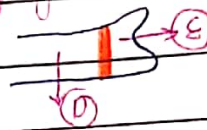
eventually with age the cartilage will ossify
converting

Syn-chondrosis

→

Syn-ostosis

⇒ ① b/w epiphysis & diaphysis of long bone



② Costo-chondral joint

③ Spheno-occipital joint

② Secondary ⇒ (PERMANENT)

Symphysis

fibrocartilage



→ hyaline cartilage

→ as fibro-cartilage don't ossify this joint is permanent

⇒ ① Manubrio-sternal joint

② Xiphisternal joint

③ Intervertebral disc

④ Pubic symphysis

★ Blood supply of long bone ★

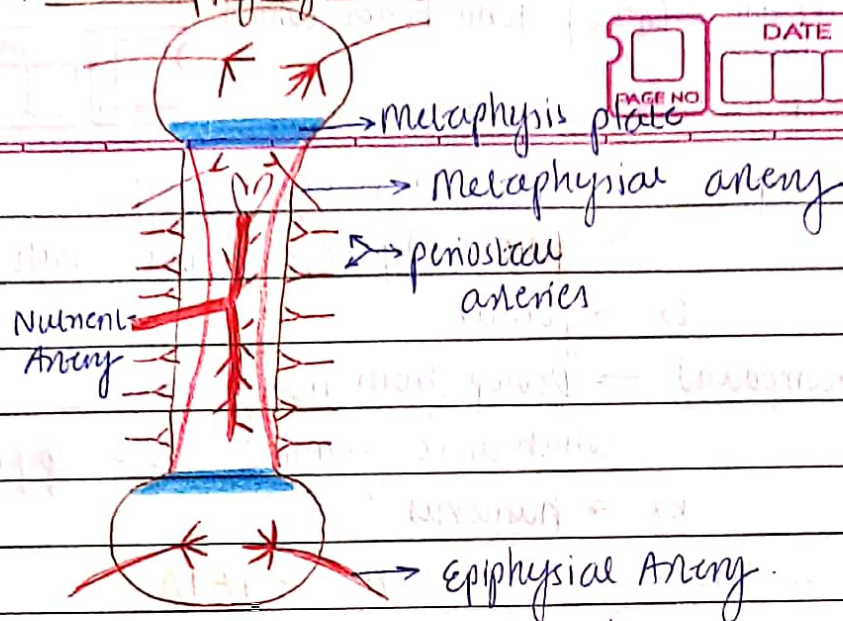


fig. blood supply of long bone

A) Arterial supply →

(a) Nutrient artery ⇒ (inner $\frac{2}{3}^{\text{rd}}$ cortex)

- ① Enters shaft through nutrient foramina
- ② Runs through cortex & divides into ascending & descending branches in medullary cavity.
- ③ Each branches, divides & redivides
- ④ Terminates by anastomosing with metaphysial & periosteal arteries.

(b) Periosteal artery ⇒

- ① Numerous, below cartilage & ligaments.
- ② Supply outer $\frac{1}{3}^{\text{rd}}$ cortex

(c) Epiphysial artery ⇒

- ① Most of foramina here are for venous exit

(d) Metaphysial artery ⇒

- ① Derived from neighbouring systemic vessels.

NOTE → Direction of nutrient foramina away from growing ends

→ Growing ends → Towards the elbow I go
from the knee I flee.

★ Epiphysis ★
→ Ends & tips of long bones which later ossify

PAGE NO.	DATE

Classification → (1) According to number →

• Simple → Develop from many epiphysis
this fuse independently with shape-

Ex → femur

• Compound → Develop from many centres
which unite forming single epiphysis

Ex → humerus

(2) According to function → **PATA**

✓ • Pressure → involved in weight transmission

Ex → Head of humerus

Lower end of radius

✓ • Atavistic → Evolutionarily extra bone that is fuse with another bone

Ex → Coracoid process of scapula

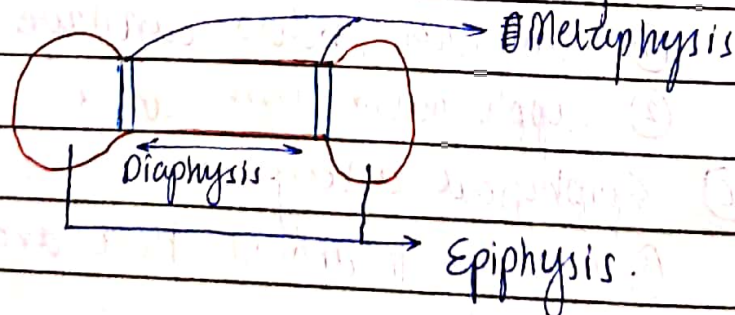
✓ • Traction → Not involved in weight transmission

Ex → Tubercle of humerus

Trochanter of femur

✓ • Aberrant → Not always present

Ex → b/w 1st & 2nd Metacarpal bone



★ Clinicals : →

① Suffix = itis
means inflammation

Page No.

Date

eg → Appendicitis

→ Tonsillitis

→ Arthritis (Inflammation of joints)

→ Neuritis

→ Dermatitis

② Suffix = edomy
mean body के किसी हिस्से का

Example → Appendectomy

→ Tonsillectomy

→ Gastrectomy

→ Nephrectomy

③ Suffix = otomy

Incision करके body के hollow organ को open

करके then उसके close कर दिया after diagnosis.

Example → Laprotomy → (Lapr = Abdominal wall)

→ hysterotomy → (Hyster = Uterus)

→ cystotomy → (Incision in urinary bladder)

→ cysto-litho-tomy → (Removal of bladder के stones)

④ Suffix = ostomy
પાત્રનાં કોઈ organ નો open તરફ સર્જાયેલ યોગ
દોડે દેતા

Example → cystostomy (for urinary bladder)
→ colostomy (for large intestine)
→ Tracheostomy (જો શ્વાસ રીતે & for
respiration & food)

⑤ Suffix = oma
means tumor

Example → Lipoma (lump under skin)
→ Osteoma (bone tumor)
→ Neurofibroma (Nerve sheath tumor in PNS)
→ haemangioma (blood vessels lump under skin)
→ Carcinoma (cancerous tumor)

⑥ Puberty → Age at which 2° sexual character
appear.

⑦ Symptoms → complaints of a patient

- ⑧ Signs → findings of a doctor
- ⑨ Diagnosis → Identification of disease, or determination of nature of disease
- ⑩ Prognosis → Traings जितने डर Disease हूँ
- ⑪ Pyrexia → fever
- ⑫ lesion → injury, pathological change in tissue
- ⑬ Inflammation → Local reaction of tissue to injury by physical, chemical, biological agent.
- * Characterised by →
- (a) Swelling
 - (b) Pain
 - (c) Redness
 - (d) Warmth or heat
 - (e) Loss of function.

- (14) Oedema → Swelling due to accumulation of fluid in Ecf
- (15) Thrombosis → Intra-vascular coagulation (solidification) of blood
- (16) Embolism → Occlusion of vessel by detached & circulating Thrombus
- (17) Haemorrhage → Bleeding which can be internal or external
- (18) Ulcers → Gap/erosions in the surface continuity of skin or mucous membrane
- ~~(19)~~ Sinus → A blind track open at one end lined by epithelium
- (20) Fistula → Abnormal passage b/w two internal organ to organ
→ or organ to surface of body
Lined by epithelium

- (21) Necrosis → local death of tissue or organ due to irreversible damage to nucleus
- (22) Degeneration → Retrogressive change causing deterioration in the structural & functional qualities
* reversible
* may end in necrosis
- (23) Gangrene → Necrosis + Putrefaction ↗ Decay, rotting.
- (24) Infarction → Necrosis of tissue due to sudden obstruction of its artery of supply
- (25) Atrophy → Diminishing size of cells, tissues, organs or a part due to loss of nutrition
- (26) Dystrophy → Diminishing size due to lack of nutrition
Ex → muscular dystrophy.

- (27) Hypertrophy → Increase in size without increase in no. of cells
- (28) Hyperplasia → Increase in size due to increased number of cells
- (29) Hypoplasia → Incomplete development
- (30) Aplasia → Failure of development
- (31) Syndrome → A group of signs & symptoms constituting together the picture of disease
- (32) Paralysis → Loss of motor power (movement) of a part of body due to denervation
- (33) Hemiplegia → Paralysis of $\frac{1}{2}$ of the body
- (34) Paraplegia → Paralysis of both lower limbs.

- (35) Monoplegia → Paralysis of both upper limbs
- (36) Quadriplegia → Paralysis of all four limbs.
- (37) Anaesthesia → Loss of sensation
- (38) Analgesia → Loss of pain sensibility.
- (39) Therm-Anaesthesia → Loss of Temp. sensibility.
- (40) Hyper-aesthesia → Abnormal increased sensibility.
- (41) Par-aesthesia → Reversed, feeling of sensations.
↳ phantom limb
- (42) Coma → Deep unconsciousness
- (43) Tumor (neoplasm) → A circumscribed,
non-inflammatory, Abnormal growth
arising from body tissues
→ limited to that area

- (44) Benign → mild illness or growth which don't endanger life
- (45) Malignant → severe illness or growth which is resistant to treatment
- (46) Carcinoma → malignant growth arising from epithelium (ectoderm & endoderm)
- (47) Sarcoma → malignant growth arising from connective tissue
- (48) Cancer → Any malignant neoplasm (Tumor)
* Invasive
* Can result in death if not treated well
- (49) Metastasis → spread of local disease to distant part of body.

(50) Convalescence → Recovery period b/w end of disease & restoration to complete health.

(51) Therapy → Treatment of disease

⇒ (*) → Clinicals of Skeleton : → Disorder of bone ossification.

⇒ (1) Cleido-cranial dysostosis → Defect in membranous ossification.
 (Rare)
 → mesodermal
 → not well developed

features → (i) Varying degree of Aplasia of clavicles
 (ii) Increase in transverse diameter of cranium

(iii) Retardation in fontanelle ossification may be hereditary or environmental

no-cartilaceous ossification

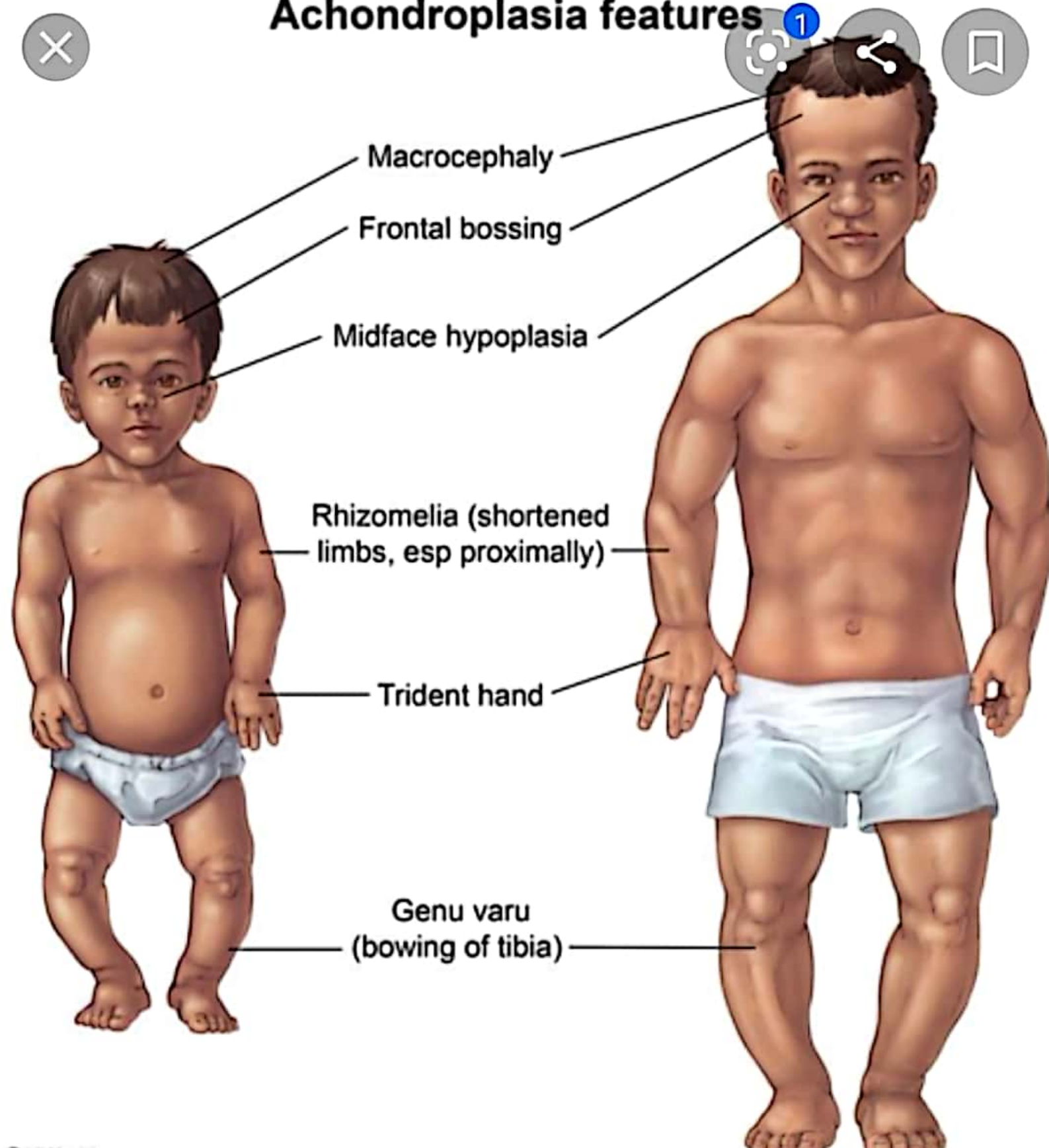
⇒ (2) Achondroplasia → formation

* common type of dwarfism due to defect in endochondral ossification / cartilaginous ossification.

* Limb → short, Trunk → normal

* Transferred in generations as Mendelian dominant character

Achondroplasia features



③ Periosteum → sensitive to tearing or tension.

→ Drilling in compact bone → Mild pain
without Anaesthesia → Hard in nature
Date

→ Drilling in spongy bone much more painful

★ → As periosteum is supplied by somatic nerves

* fractures
* Tumors
* Injections } → of bone are painful.

④ Blood supply of bone is very rich so it is difficult to interrupt it & kill the bone

★ → passing metal pin hardly interferes with its blood supply

⑤ Fracture →

2 types → simple → not connected with skin.

* can be → (a) spiral
(b) Horizontal
(c) Oblique

→ compound → connected with skin
(open)

Q Healing of bone ?

Ans Occur in ③ stages

→ Repair by granulation tissue

→ Union by callus

→ Replaced by mature bone

Conclusion → (hematoma) → (callus) → (Matured bone)

Page No.

Date

Q How hanging causes death ?

Ans In Hanging Axis (C_2) vertebrae gets fractured

→ if dens gets fracture

[C_2 vertebrae are of front part]

↓
it will hit important M.O centres

→ medulla oblongata

causing instant death.

⑥ → Rickets → caused due to vitamin-D deficiency.

* calcification of cartilage fails

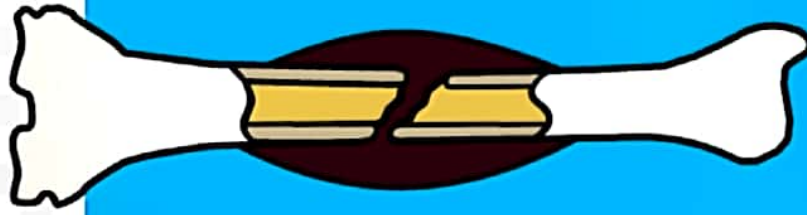
* ossification of growth zone disturbed

→ Rickets affect developing bone so it affects the period of max. growth $\frac{1}{2}$ to $\frac{3}{4}$

[3 months to 3 years]

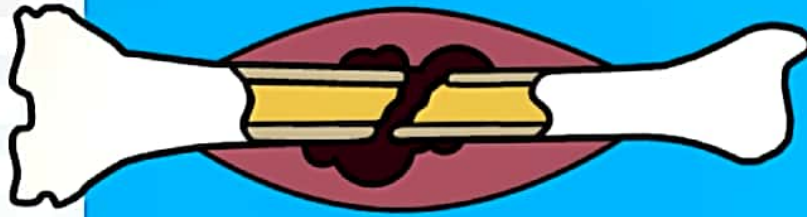
1.

Hematoma Formation



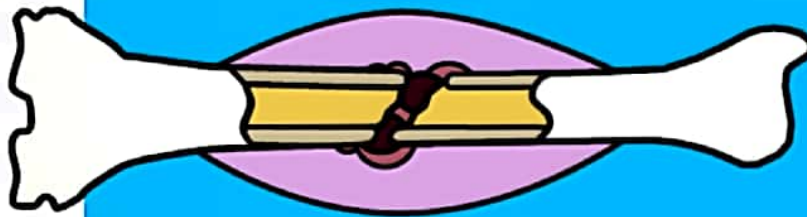
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Granulation Tissue Formation
(Inflammation)



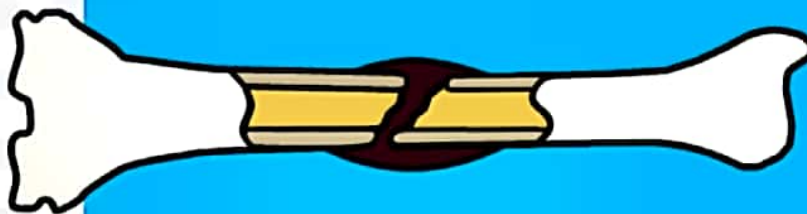
3.

Callus Formation



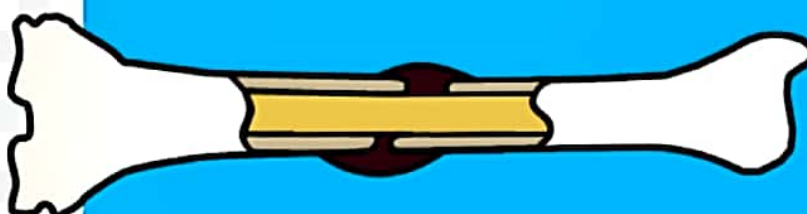
4.

Consolidation



5.

Bone remodelling



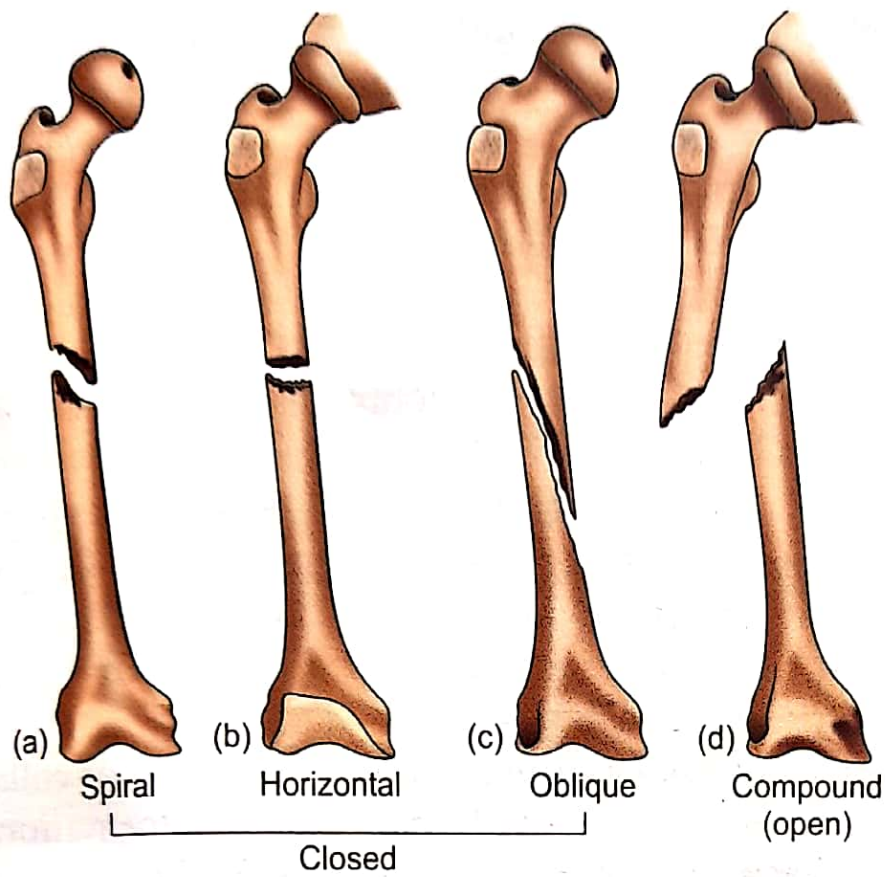


Fig. 2.26: Types of fractures

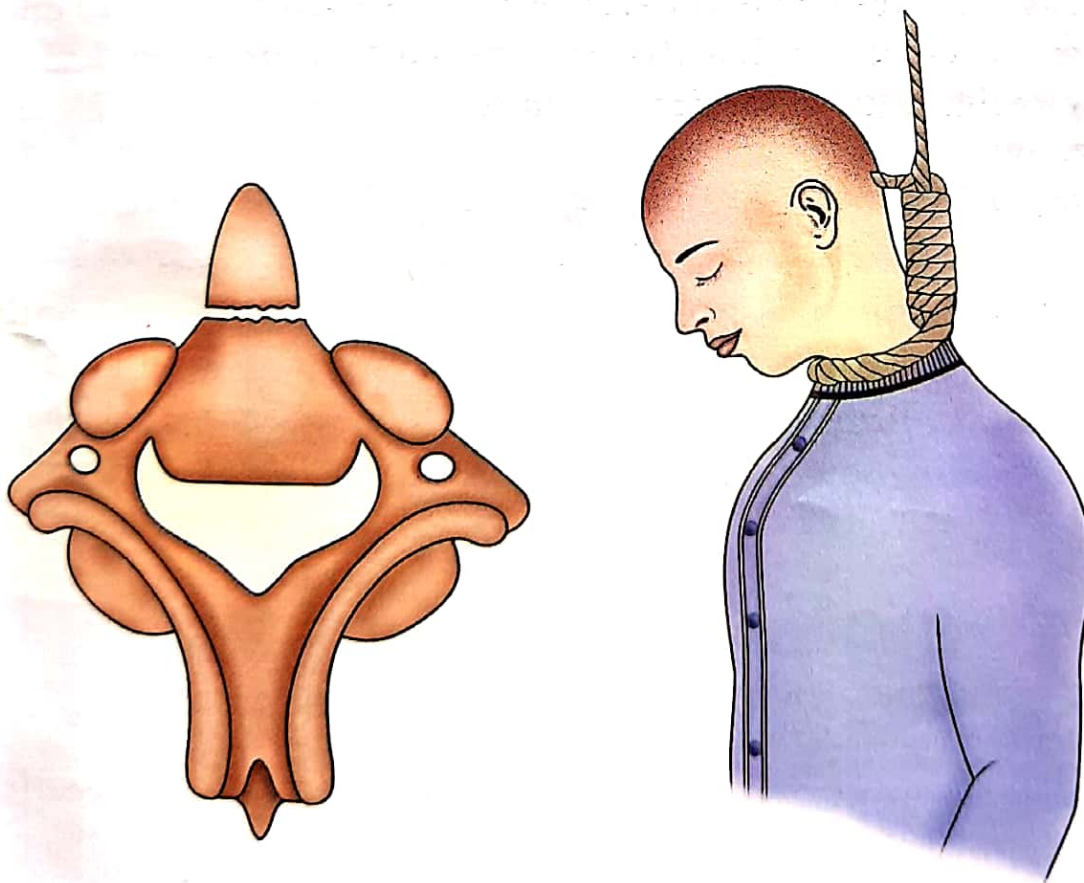


Fig. 2.27: Hanging leading to fracture of dens of axis vertebra

① → Mineralization of bone doesn't take place.

Result →

(a) Cranio tabes →

softening or thinning of skull

Page No.

Date

(b) Rachitic rosary →

at costochondral junction

(c) Harrisons sulcus →

at Diaphragmatic attachment of sternum bone

(d) Enlarged epiphysis in limb bones

(e) Pelvic & Spinal deformities.

↓
bowing legs

⑦ → Things required for development of bone

* Adequate proteins

* Calcium

* Vitamin D.

↓
Inadequate causes Rickets.

⑧ → Scurvy → caused due to vitamin-c deficiency.

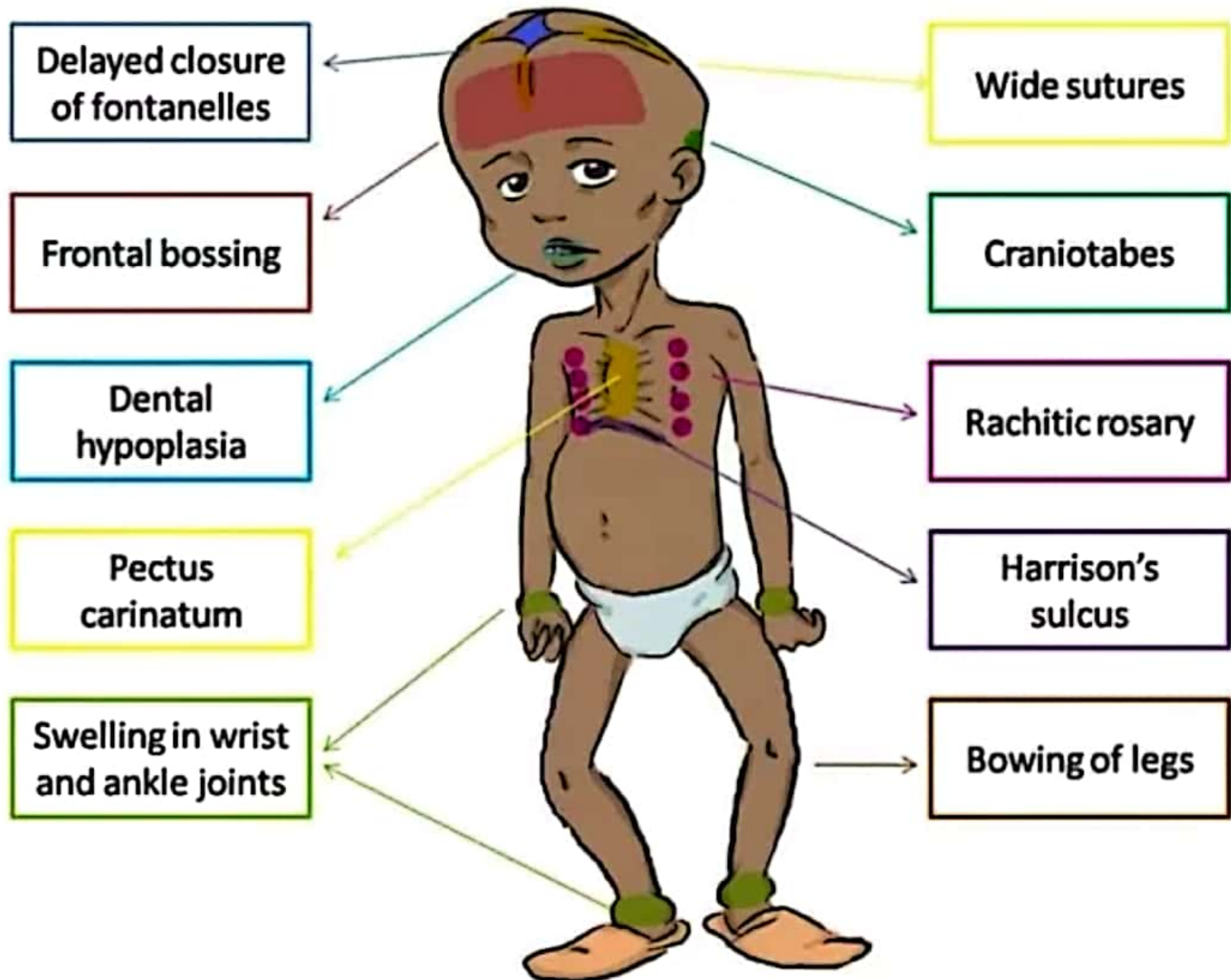
→ formation of Collagen fibres & matrix impaired

→ as collagen imp & = rupture of capillaries & defective formation of new capillaries

→ Hæmorrhage → in muscles & bones

↓
causes pain & tenderness

10 important clinical features in Rickets



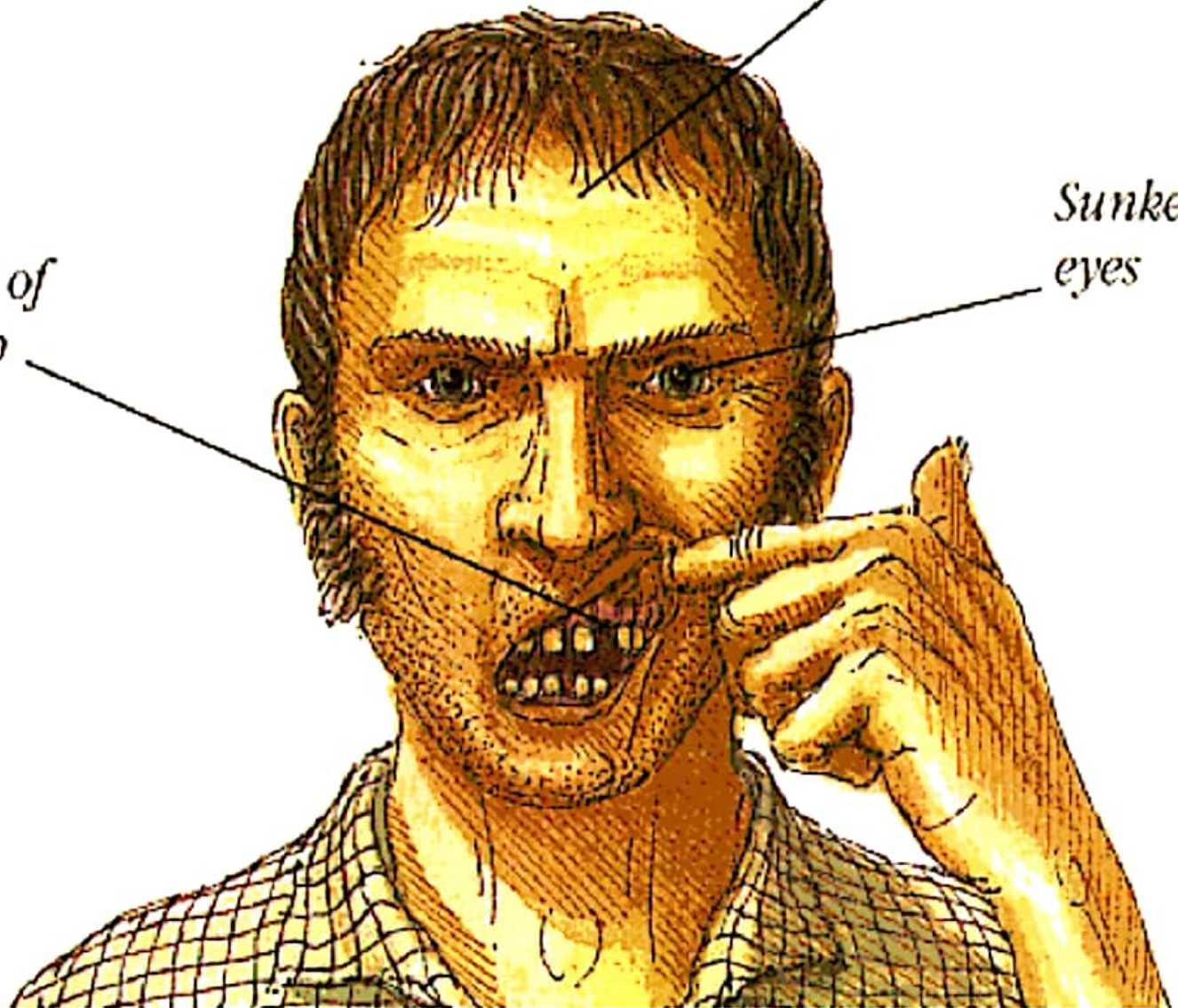
SCURVY



Pale skin

Sunken eyes

Loss of teeth



⑨ → Deficiency of Ca^{+2} & vitamin-D in adults is called Osteomalacia

→ X-ray reveals thick & uncalcified osteoid

Page No.

Date

⑩ → Osteoporosis → bone having pores.
Deficiency of Ca^{+2} in old age
↓

Result: there is forward bending of vertebral column (kyphosis)

⑪ → Septic arthritis →

Infection reaching metaphysis.



⑫ → Bone marrow biopsy →

Extraction of bone marrow

either from — manubrium sterni 

— iliac crest

⑬ → Bone tumor → can be benign or malignant

⑭ → Rupture of cartilage →

— Medial meniscus of knee mostly affected

— Treated by replacement

⑮ → Tumors of cartilage →

* benign → chondromas

* malignant → chondrosarcomas

Page No.

Date

⑯ → Cartilage transplantation →
person to person can be done

≡ ★ : Clinicals of Joints : →

① Inter-vertebral disc is secondary cartilaginous joint b/w vertebrae

— if nucleus pulposus of disc protrude backward, it can cause damage to spinal nerves



this condition is called Herniation of disc / Disc prolapse ***

NOTE → If disc prolapse occurs in Lumbar vertebrae there can be radiating pain in lower limb



called Sciatica

(2) Dislocation → end of one of the bone out of its socket.

Page No.

Date

(3) Subluxation → end of bone partially leaves socket.

(4) Rheumatic fever → Heeling pain in joints. → जोड़ों में दर्द

* Streptococcal pharyngitis

* Temporary pain

* Above bacteria for toxins can affect mitral valves of heart or the kidneys.

(5) Rheumatoid arthritis →

Inflammatory systemic disease

* Thickened synovial membrane

* Due to chronic inflammatory process there is erosion of bones



causing deformity in fingers.

(6) Osteo-arthritis →

Degenerative condition of large weight-bearing joints.

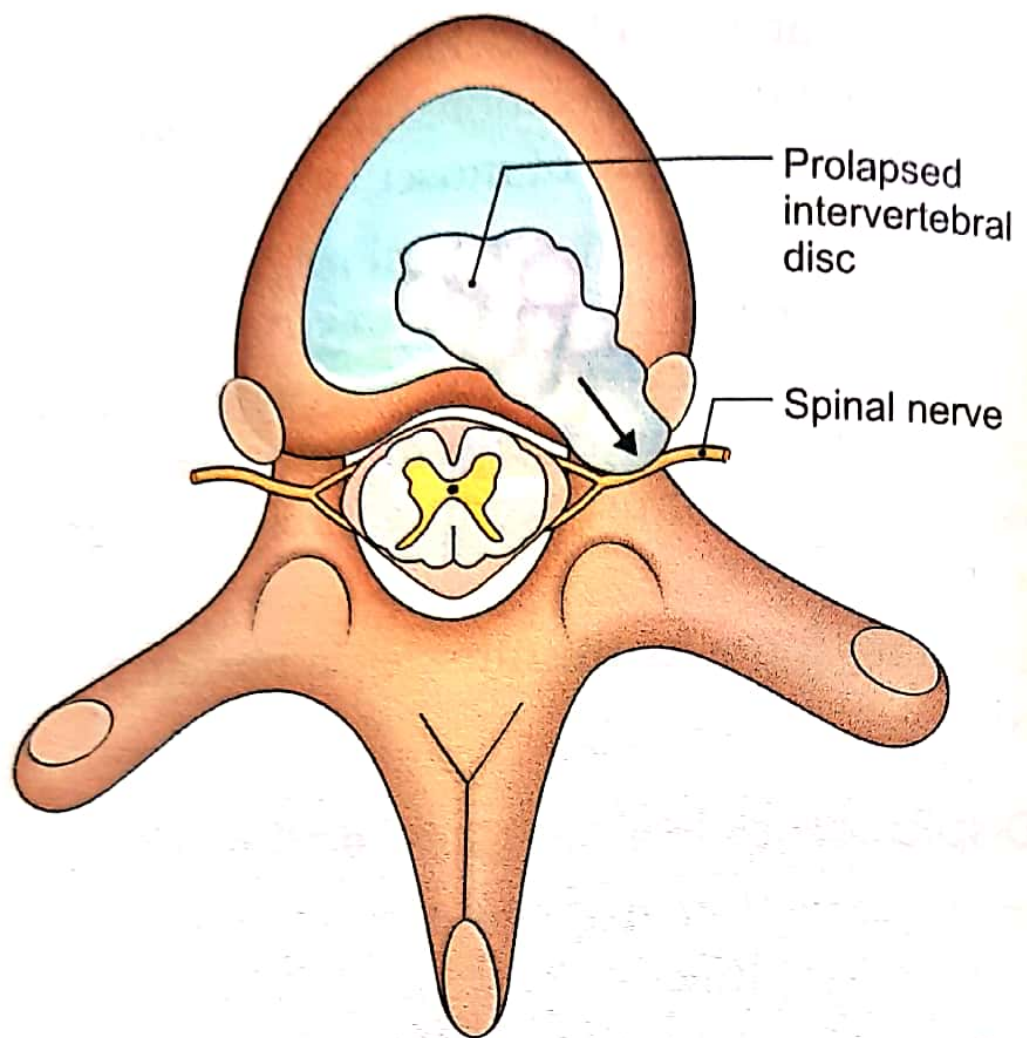


Fig. 3.31: Herniation of the disc

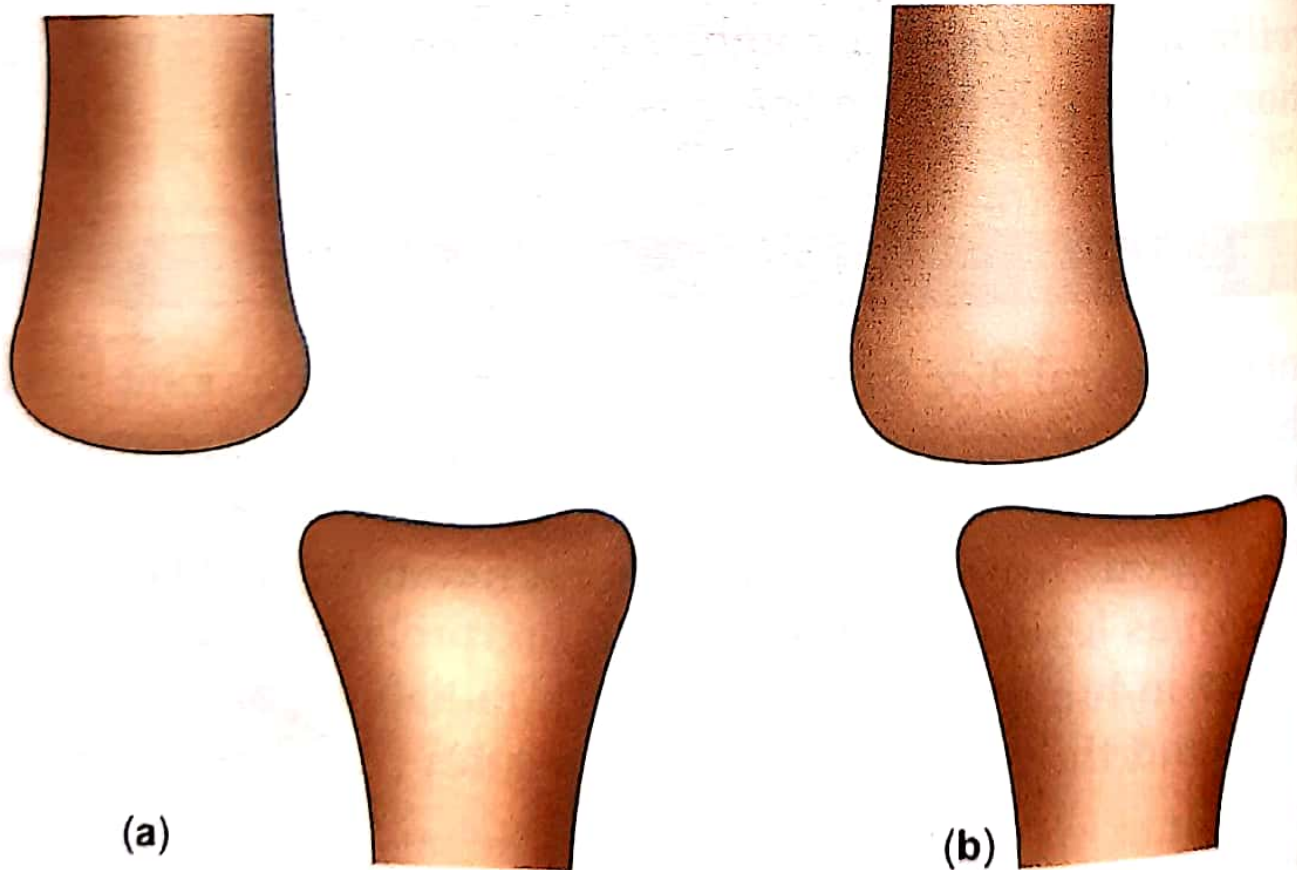


Fig. 3.32: (a) Dislocation, (b) Subluxation

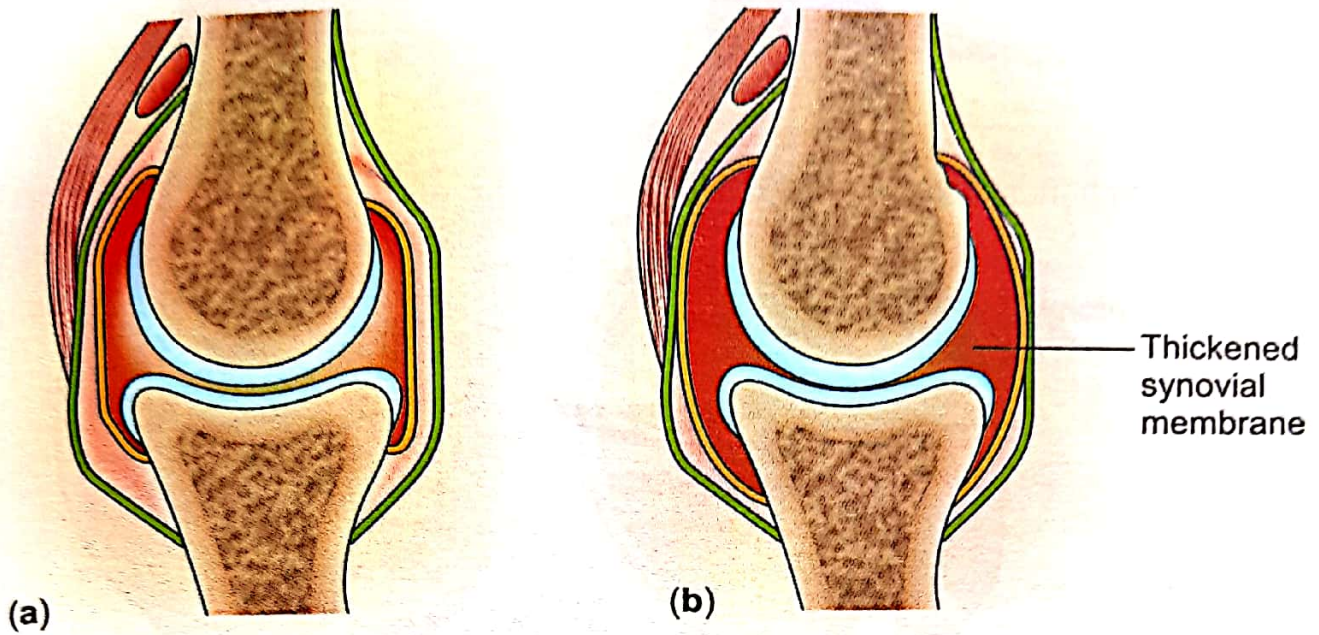


Fig. 3.33: (a) Synovial membrane in a normal joint and (b) thickened in a rheumatoid arthritis patient

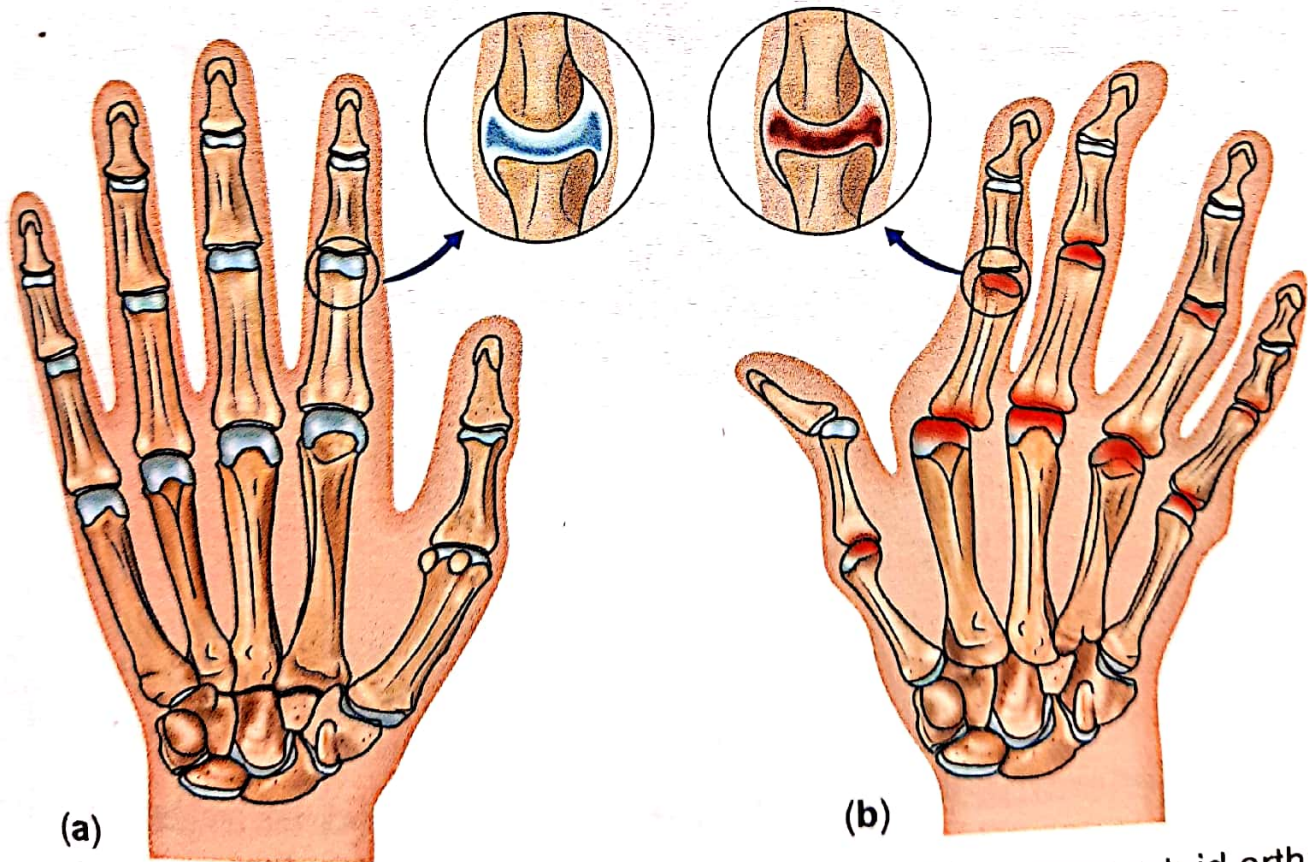


Fig. 3.34: (a) Joints of hand in normal subject and (b) in rheumatoid arthritic hand

→ Articular cartilage wears out, degenerates
 + there is formation of peripheral osteophytes.

Page No.

Date

→ जो जोड़ों में bone rub होते हैं वहाँ
 there will be pain

	<u>Osteo-arthritis</u>	<u>Rheumatoid arthritis</u>
① Age & joints	Middle age generally in single large weight-bearing joints	Any age = multiple small joints of hand & feet
② Disorder	Degenerative	Inflammation
③ Initial damage	Articular cartilage damaged	synovial membrane on inflammation
④ Systemic disease	None	⊕ NB
⑤ ESR	Normal	Raised, Anemia

⑦ spondylitis → degenerative changes

→ can occur in cervical spine

↓
leading to narrowed inter-vertebral

foramen

↓
causing pressure of spinal Nerves.

Page No.

Date

⑧ Septic arthritis →

* Metaphysis is actively growing end of bone

* In some joint capsule encloses metaphysis as well

* If there is infection in metaphysis it can reach joint capsule

Septic Arthritis

→ note -

⑨ Stiffness of joint is related to weather.

V. Temp Viscosity of synovial fluid $\propto$ the Temp.

→ Joint become stiff in cold weather

NOTE → mobility promotes lubrication & decreases stiffness. Joint with passing day movements are resumed to normal

⑩ Neuro-pathic joint → result of complete denervation

→ so, all reflexes are eliminated
& joint is open to mechanical damage

Page No.

Date

→ shows →

- (a) swelling
- (b) excessive mobility
- (c) bony destruction

→ happens in →

- (a) leprosy
- (b) tabes dorsalis

cyst = syrinx ← (c) Syringo - myelia
formed in spinal cord
overtime destroys spinal
cord.



Symptoms of **LEPROSY**



Tabes Dorsalis



LOSS OF POSITION AND VIBRATION SENSE BELOW LEVEL OF LESION

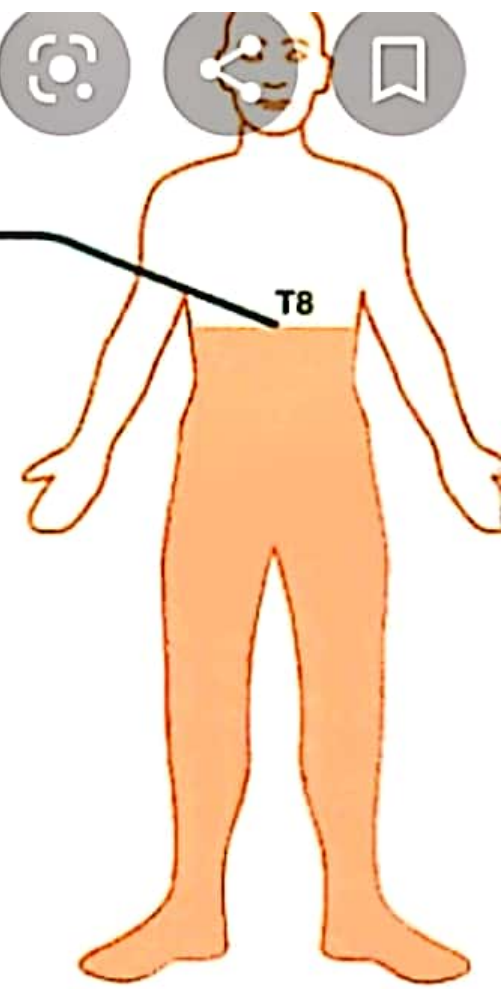
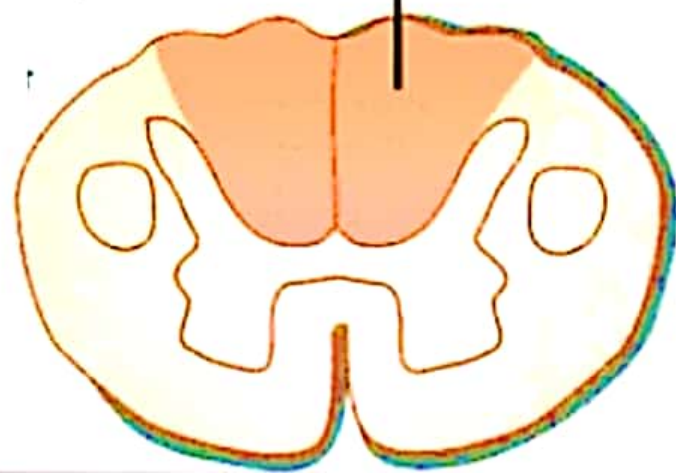
T8

With eyes closed patient tend to fall

Feet together

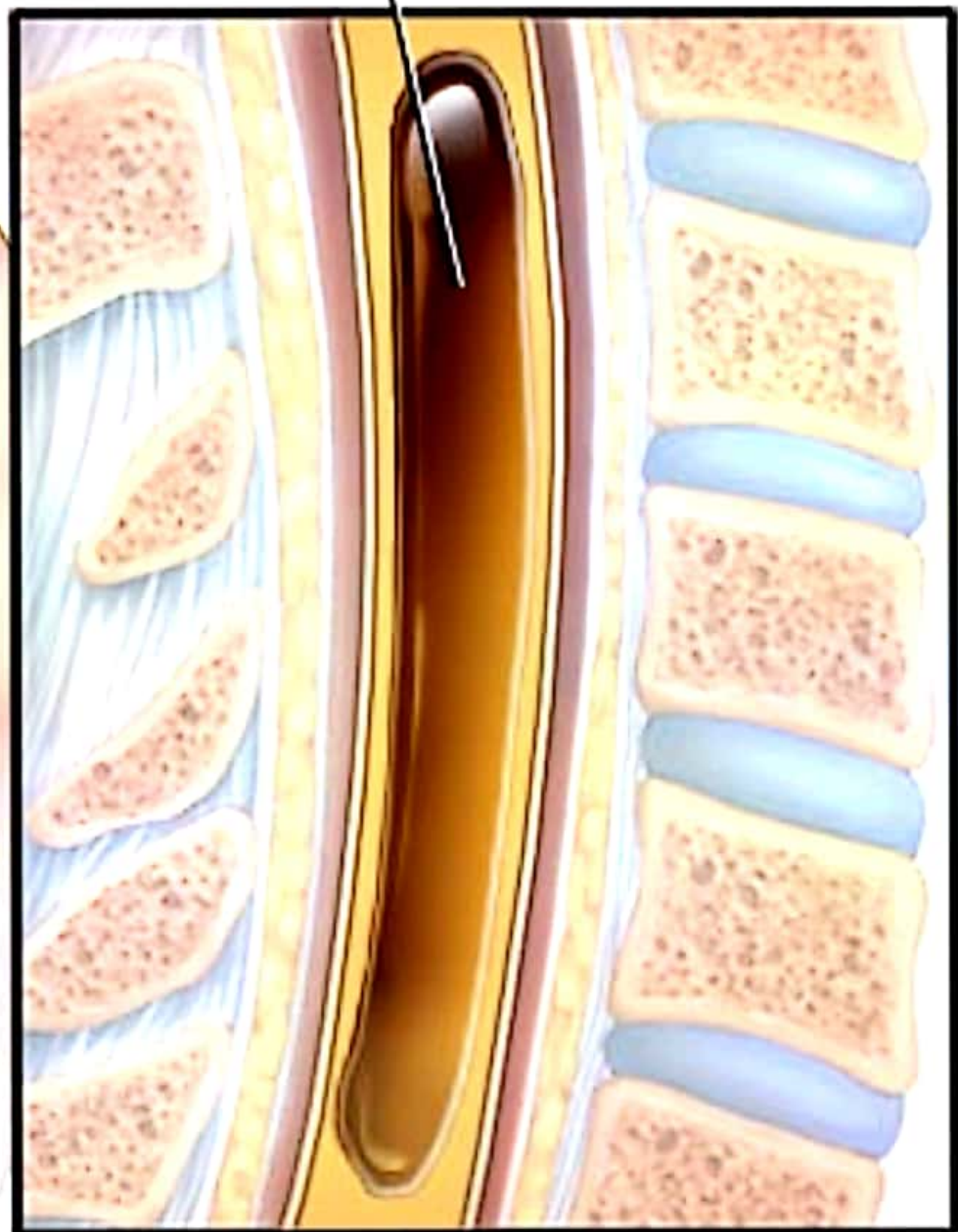
T8 spinal segment

DORSAL COLUMNS





Fluid-filled cyst (syrinx)



★ Muscles : →

→ (mus = mouse) as most of muscles resemble like mouse
Tendon as its tail

Page No.

Date

Origin → Generally at part which remains fixed

However can be 3rd

Insertion → Generally at which moves

NOTE → In limb muscles origin is usually proximal to insertion

* → muscle has two parts

(A) Fleshy part = called belly

(B) Fibrous part = noncontractile & inelastic

→ Rope like → Tendon

→ Flattened → Aponeurosis

* muscle is supplied via capillaries

Arrangement → muscle → fasciculi → fibres → Myofibril

↓
Myofilaments.

*

A-band → H-zone

I-band → Z-line

★ Muscles : →

→ (mus = mouse) as most of muscles resemble like mouse
Tendon as its tail

Page No.

Date

Main → Generally at part which remains fixed

Insertion → Generally at which moves

However can be
3rd

NOTE → In limb muscles origin is usually proximal to insertion

* → muscle has two parts

(A) Fleshy part = called belly

(B) Fibrous part = noncontractile & inelastic

★ → rope like → Tendon

★ → flattened → Aponeurosis

* muscle is supplied via capillaries

Arrangement → muscle → fasciculi → fibres → Myofibril

↓
myofilaments.

* A-band → H-zone
I-band → Z-line ★

Table 4.1: Types of muscles

<i>Striated/skeletal</i>	<i>Non-striated/smooth</i>	<i>Cardiac</i>
1. Striated muscles are present in the limbs, body wall, tongue, pharynx and beginning of oesophagus (Fig. 4.1)	Oesophagus (distal part), urogenital tract, urinary bladder, blood vessels, iris of eye, arrector pili muscle of hair (Fig. 4.2)	Wall of heart (Fig. 4.3)
2. Long and cylindrical	Spindle shaped	Short and cylindrical
3. <u>Fibres unbranched</u>	<u>Fibres unbranched</u>	<u>Fibres branched</u>
4. <u>Multinucleated</u>	<u>Uninucleated</u>	<u>Uninucleated</u>
5. Bounded by sarcolemma	Bounded by plasma-lemma	Bounded by plasma-lemma
6. Light and dark bands present	Light and dark bands absent	Faint light and dark bands present
7. No intercalated disc	No intercalated discs	Intercalated disc present and a characteristic feature
8. Nerve supply from cranial nervous system	Nerve supply from autonomic nervous system	Nerve supply from autonomic nervous system
9. Blood supply is abundant	Blood supply is scanty	Blood supply is abundant
10. Very rapid contraction	Slow contraction	Rapid contractions
11. They soon get fatigued	They do not get fatigued	They never get fatigued
12. Voluntary	Involuntary	Involuntary

Slow fibres

- ① Red in colour
- ② Large amount of Myoglobin
- ③ Rich in mitochondria
- ④ Aerobic
- ⑤ Late fatigue

Fast fibres

- ① White in colour
- ② Small amount of Myoglobin
- ③ Less no. of mitochondria
- ④ Anaerobic
- ⑤ Easily fatigued

Page No.

Date

* Naming the muscles : →

→ on the basis of

① Shape : →

(1) Deltoid → Triangular

(2) Quadratus = Quadrangular

Ex → Quadratus femoris

(3) Rhomboid = Diamond shaped

Ex → Rhomboid major, minor

(4) Teres = Round

Ex → Teres major, minor

(5) Gracilis = Thin

Ex → Gracilis

(6) Lumbricals = Worm like

Ex → Lumbricals of palm

(1) Pectus = straight-
Ex → Pectus abdominis

Page No.

Date

② Size →

(1) Major - big

Ex → Pectoralis major

(2) Minor - small

Ex → Pectoralis minor

(3) Longus - long

Ex - Adductor longus

(4) Brevis - small

Ex - Adductor pollicis brevis

(5) Latissimus - broadest

Ex - Latissimus dorsi

(6) Longissimus - longest

Ex - Longissimus thoracis

③ Number of heads →

(1) Biceps - two heads

(2) Triceps - three heads

(3) Quadriceps - four heads

Ex → Quadriceps femoris

(4) Diaphragm - two bellies

Ex → Ant. & Post. bellies

④

Attachment →

(1) Sterno-clavedo-mastoid →
from sternum & clavicle → to mastoid process (Arm)

Page No.

Date

(2) Brachialis → 2- brachium & 1/2
(Humerus to Ulna)

(3) Coraco-brachialis → from coracoid process to Arm

⑤

Depth →

(1) Superficialis (superficial) → F.D.S

(2) Profundus (deep) → F.D.P

(3) Externus (external) → E. oblique

(4) Internus (internal) → 2. oblique

⑥

Position

(1) Dorsi → of the back.
Ex → latissimus dorsi

(2) Brachii → of the Arm
Ex → biceps brachii

(3) Femoris → of the thigh
Ex → rectus femoris.

(4) Oris → of the mouth
Ex → orbicularis oris

(5) Oculi → of the eye
Ex → orbicularis oculi

⑦

Action →

① Extensor → ↑ the $\angle$ b/w two

② flexor → ↓ the $\angle$ b/w two

Page No.

Date

③ Abductor → take away

④ Adductor → towards midline

⑤ levator → to elevate

⑥ Depressor → to pull down

⑦ Supinator → turning palm Anteriorly

⑧ Pronator → turning palm Posteriorly

⑨ Constrictor → to narrow

⑩ Dilator → to dilate

→ H
→ Z

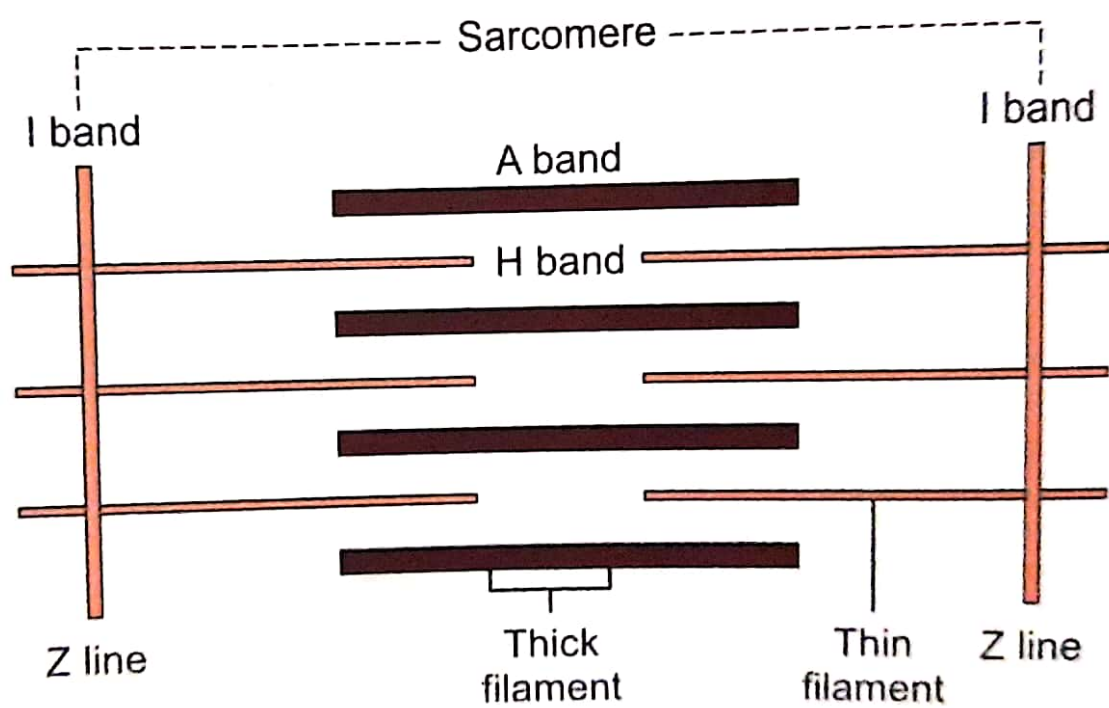


Fig. 4.5: Myofibrils in skeletal muscle

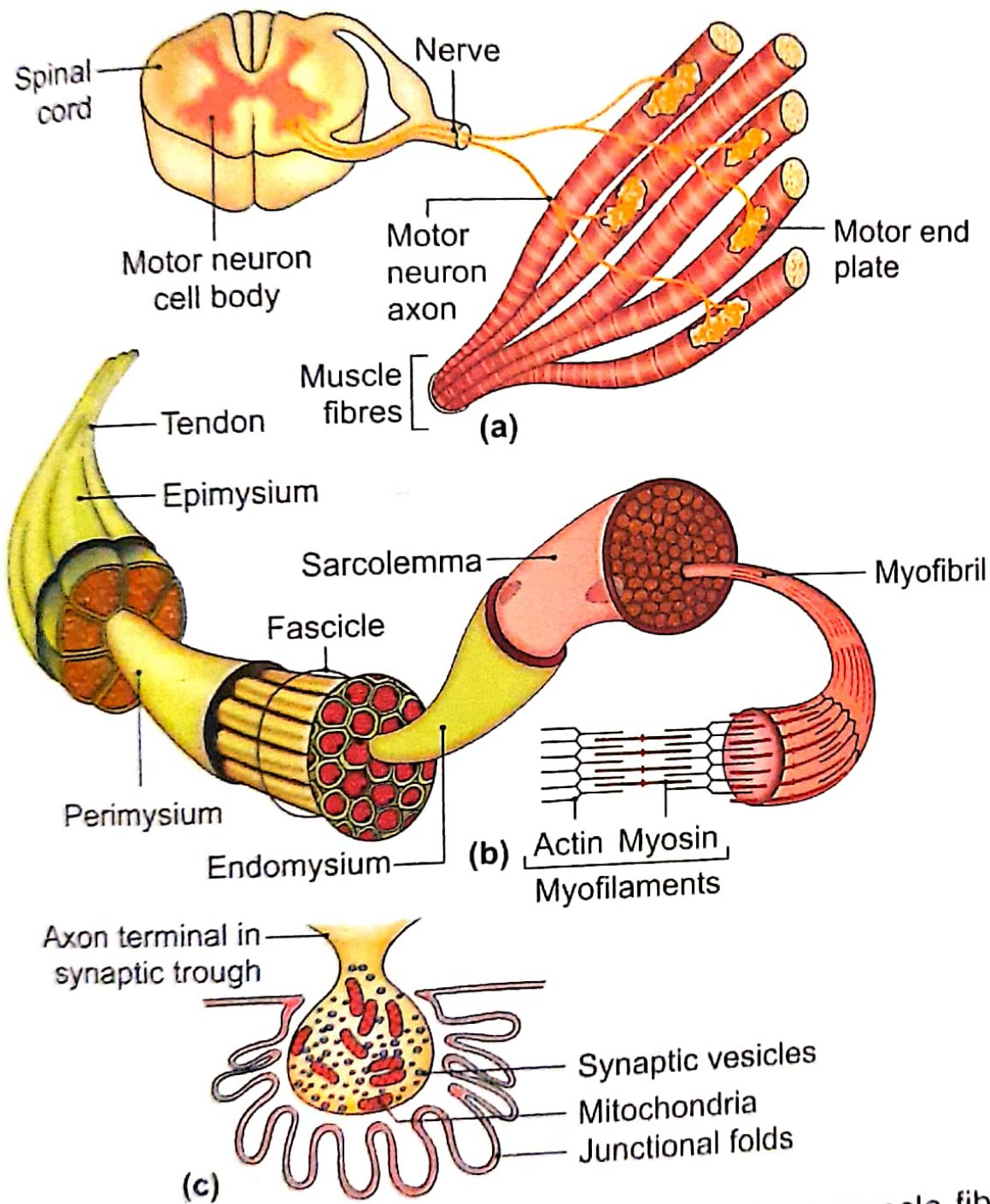


Fig. 4.6: Supporting tissue of a muscle. Nerve supply to muscle fibres also shown (a) nerve supply to muscle fibres; (b) supporting tissue of a muscle; (c) motor end plate

★ Clinical of Muscles →

① Paralysis

→ loss of motor power (power of movement)

Page No.

Date

→ inability of muscles to contract

Q. How?

- (1) either damage to motor neuron pathways (upper & lower motor neuron)
(2) or by inherent disease of muscle (myopathy)

V.M.P

(1) Upper motor neuron damage = spastic Paralysis

have ↓ exaggerated tendon jerk.

(2) Lower motor neuron damage = flaccid

Paralysis

loss of ↓ tendon jerk.

↓ M.P
★

→ lower motor neuron paralysis occurs in Poliomyelitis.

② Muscle spasm →

- Quite painful
→ Locally, commonly caused by muscle pull.
→ In order to relieve its pain the muscle should be relaxed by appropriate treatment.

- Generalized spasm occurs in
= ① Tetanus
= ② Epilepsy.

Page No.

Date

- ③ Disuse atrophy & hypertrophy →
→ muscle not used for long time become thin & weak → Disuse atrophy.
→ Adequate or excessive use of particular muscle can cause → better development, or hypertrophy

★ NOTE → Muscular 'wasting' → [reduction in size]★
is a feature of lower motor neuron paralysis

- ④ Regeneration of skeletal muscle →
→ skeletal muscle capable of limited regeneration,
→ if large damage → does not occur
→ missing muscle is replaced by connective tissue

- Increased size with ↑ cell no.
⑤ Hyper-plasia → occurs in uterus during pregnancy.

NOTE → Tone is resistance to touch.

⑥ Myasthenia gravis →

→ Autoimmune disorder

→ The nerve impulse transmission

Page No.

Date

to muscle fibre is blocked

Reason → Antibodies bind Acetylcholine receptors

* This causes ^{***} - extensive - progressive muscle weakness
although muscle is normal

NOTE → extraocular and muscle of eyelid
are affected 1st
→ followed by those of neck & limb.

⑦ Poly - myositis →

→ characterised by inflammation of muscle fibres

→ it starts when wbc's invade muscles

* → Muscles close to trunk are mostly affected
result in severe weakness.

→ Polymyositis + skin rash → Dermatomyositis

- ⑧ Fibrillation →
→ Abnormal contraction of cardiac muscle.
→ તે એક સ્તરે & cardiac chambers

Page No.

Date

do not contract as a whole resulting in
disruption of pumping action

Atrial → rapid & unco-ordinated contraction of
Atria.

↓
ineffective pumping & abnormal
contraction of AV-node

Ventricular → very rapid & disorganised contraction
of ventricle
↓
leading to disruption of ventricular
function.

⑨ Angina - pectoris →

- Episode of chest-pain due to temporary ischaemia of cardiac muscle
- relieved by = rest & Nitrites

⑩ Myocardial Ischemia →

- Ischemia due to blockage of more than 1 artery or main artery causes necrosis of cardiac muscle.

V. imp
points

- ① Cardiac muscle → least
Smooth muscle → Intermediate
skeletal muscle → Maximum
Amount and weight

Page No.

Date

② some muscle are vestigial

ex → ① muscles of Auricle

② Palmaris brevis of palm

③ some tendons & ligaments are divorced
part of muscle.

— Palmaris aponeurosis = part of palmaris longus

— Plantar aponeurosis = plantaris

— Tibial collateral lig. = Adductor magnus

— Sacro-tuberous lig. = degenerated tendon of long
head of biceps femoris.

— Sacrospinous lig. = Degenerated part of coccygeus

— Long plantar lig. = part of peroneus longus.

★★ Longest muscle → Sartorius

★★ Longest tendon → Tendocalcaneus

★★ Soleus = peripheral heart contain many
venous sinuses.

★★ Largest muscle → Gluteus maximus.

④ Red muscle fibre is used in marathon

★ ★

Highest-
Nerve

→ Extraocular muscles

Page No.

Date

supply

Reason → due to small motor units.

⑤ Smooth muscle has max. regeneration capacity

⑥ Cardiac muscle do not regenerate.

★ ★

Muscle used for
intramuscular
injection

(i) Deltoid

(ii) Gluteus medius

(iii) Vastus lateralis.

⑦ — Muscle fibre supported by → Endomysium

— muscle fasciculus → Perimysium

— whole muscle → Epimysium

★ → Circulatory system →

- ① BP → systolic BP
→ Diastolic BP
→ pulse pressure

Page No.

Date

- ② Haemorrhage → bleeding results from rupture of blood vessel

Arterial — spurting of blood (रक्त)

Venous — pooling of blood (कल)

- ③ Vascular catastrophes →

* Thrombosis → intravascular clot

* Embolism → rupture & movement of clot

* Haemorrhage

- ④ Arterio-sclerosis →

— In old age arteries become stiff.

— causes wide decrease in blood supply to tissue & rises systolic pressure

- ⑤ Arteritis & phlebitis →

↓
inflammation
of
Artery

↓
inflammation
of
vein

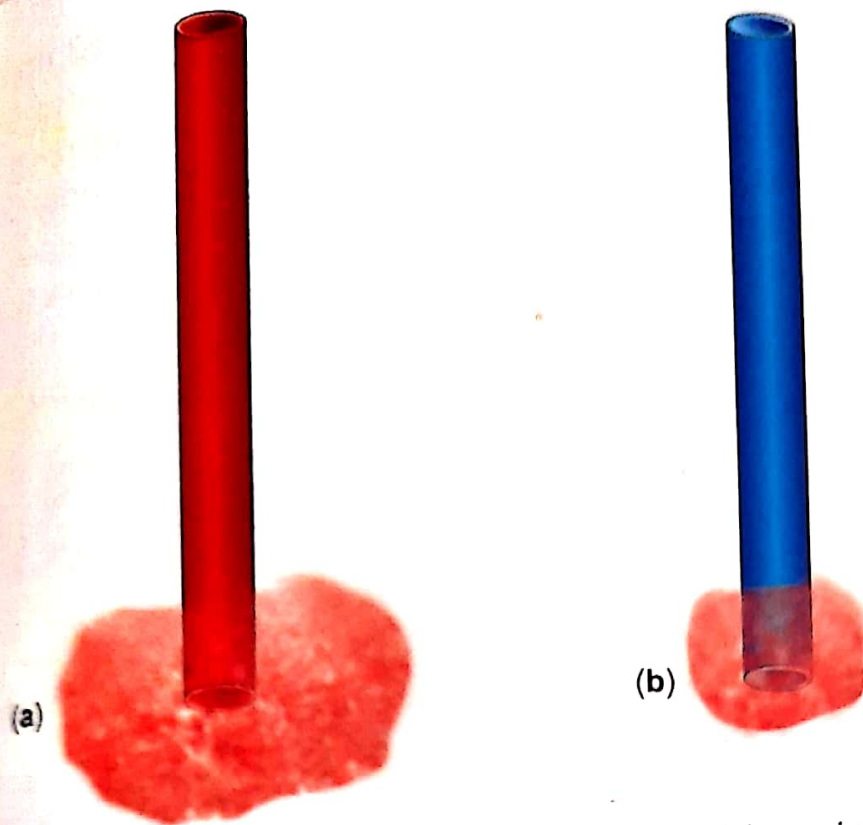


Fig. 5.24: Bleeding from (a) an artery and (b) a vein

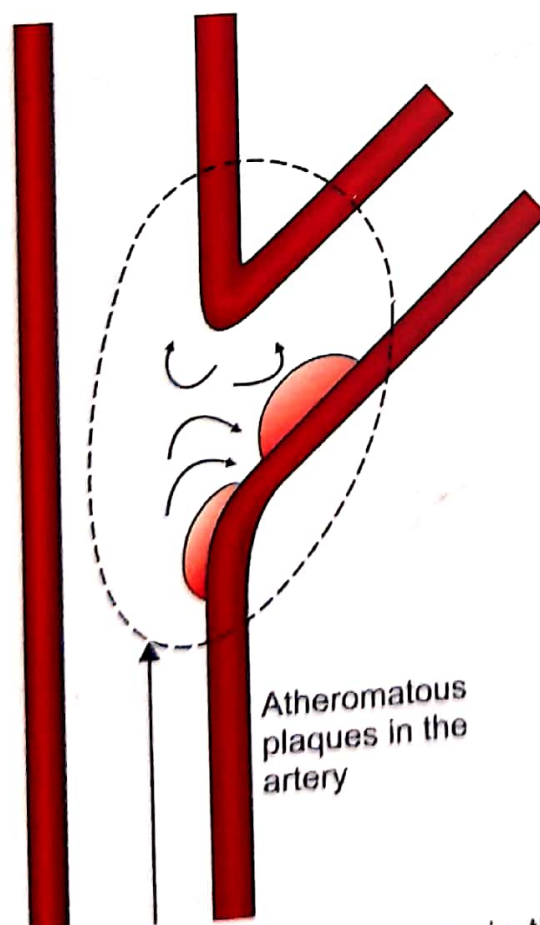


Fig. 5.25: Atheromatous changes in the artery

⑥ Atherosclerosis →

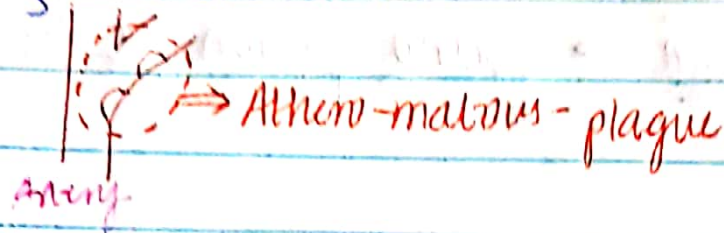
→ Patchy changes in tunica intima of Artery due to

Page No.

Date

cholesterol, other lipid compounds

→ The change is called Athero-matous plaque



⑦ Coronary artery blockage →

→ Great- is generally longest vein, great-saphenous vein

or
Anterior thoracic Artery.

⑧ Aneurysm →

— swelling or dilation of blood vessel where part of Artery inflate like a balloon.

— as the wall is weaker & thinner so it is risky and it can burst.

⑨ Coronary Angiogram →

Angiography of coronary Artery.

arteries.
coronary angiogram

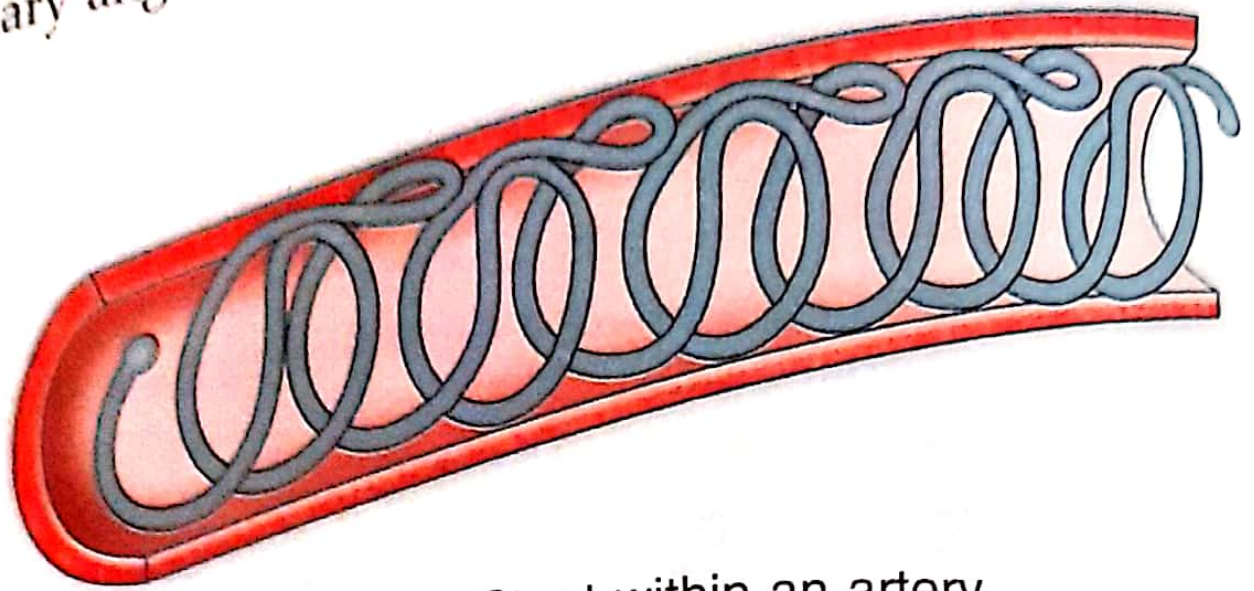


Fig. 5.26: Stent within an artery

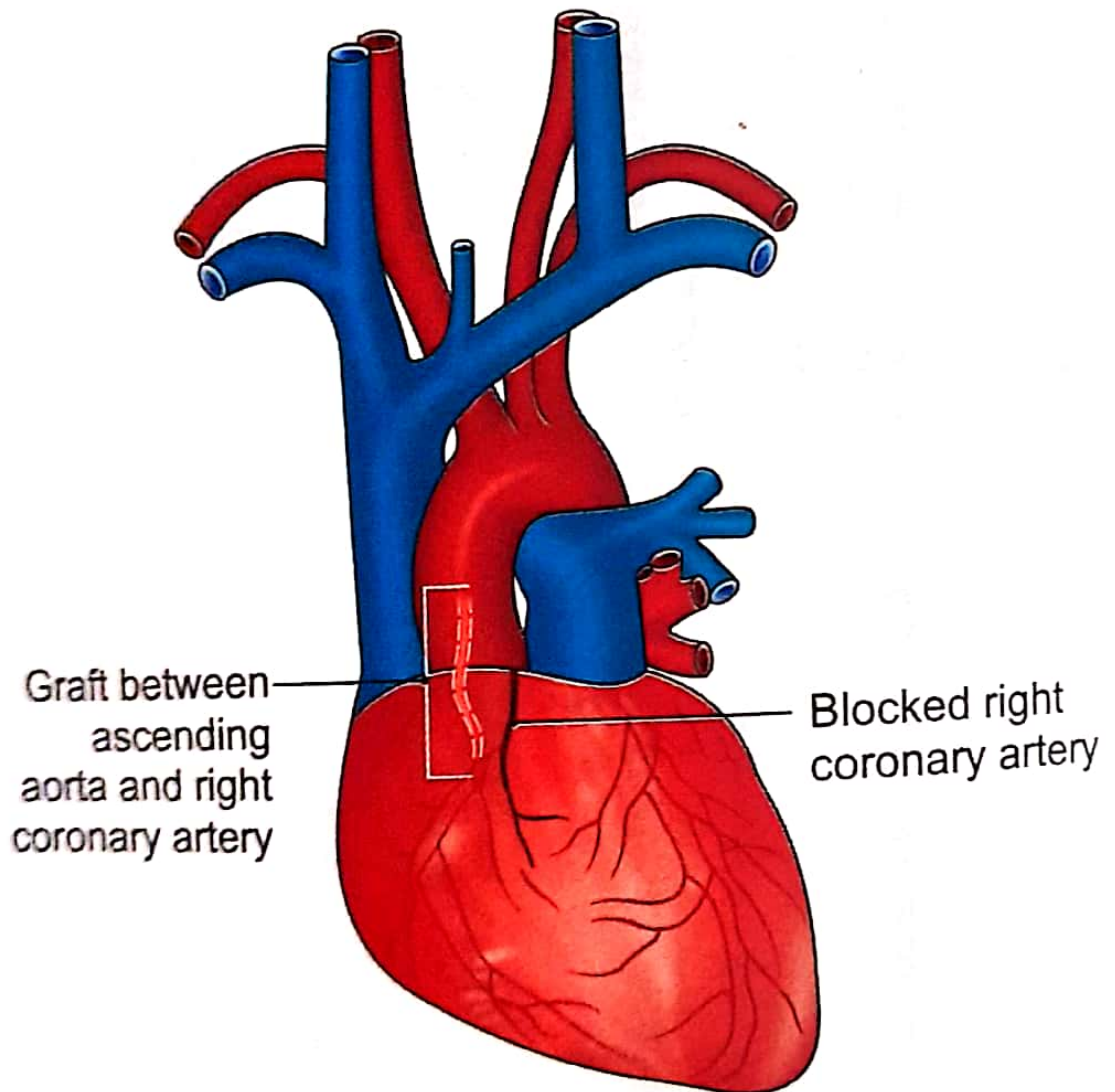


Fig. 5.27: Graft for bypassing the blocked coronary artery

⑩ Buenger's disease

→ Thrombo-angiitis obliterans

Page No.

Date

* very painful

* Inflammation of smaller peripheral arteries of legs.

* victim → young person & heavy smoker.

⑪ Raynaud's phenomenon

→ pallor of fingers

→ due to constriction of smaller arteries & arterioles in response to cold.

⑫ Acute phlebo-thrombosis →

→ veins of lower limbs are affected

→ Due to lack of movement of leg

↓
there is thrombus formation with mild inflammation

↓
3rd part embolism is started & can block any other artery.



 Healthism

Buerger's Disease | Healthism

[Visit](#)

× 5 Causes for Raynaud's Disease or Raynaud's Phenomenon



1. Diseases of the arteries (atherosclerosis)
2. Drugs that cause narrowing of the arteries (amphetamines, some beta-blockers, some cancer drugs, some migraine medications)
3. Certain autoimmune conditions (SLE, lupus, scleroderma, sjogrens, RA)
4. Smoking
5. Repeated injury or usage (i.e., typing, piano, heavy use of hand tools)

(13)

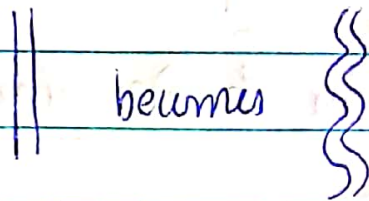
Varicose veins →

→ vein में static pressure दो-
for longer period of time

Page No.

Date

↓
there is Atrophy of muscle and elastic tissue
with fibrous replacement



Treatment → putting leg on stool higher
than trunk तब static venous return
comes to normal

→ varicose vein may occur at-

- ✓ lower end of Oesophagus
- ✓ Anal canal.

(14)

At times → Parenteral
nutrition → given through right-
subclavian vein.

(15)

blood vessels in retina can be examined by

→ Ophthalmoscope

* → In Diabetes & Hypertension.

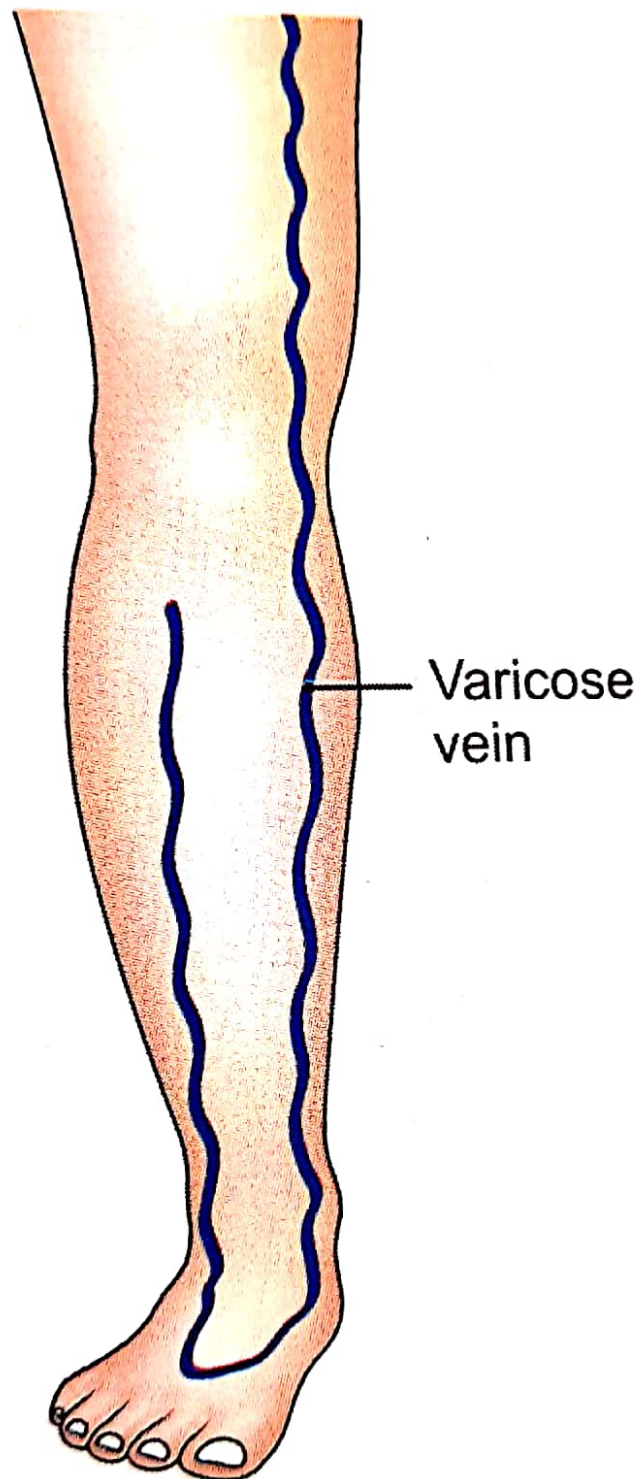


Fig. 5.28: Varicose veins in lower limb

NOTE

→ Arteries have
thickest

→ Tunica media

→ Veins have
thickest

→ Tunica Adventitia

Page No.

Date

★★

Some Palpable
Arteries

→ Radial, common carotid,
facial, superficial Temporal

V. imp

Lymphatic system →

★

ये एक drainage system है जो veins से
साथ-साथ चलता है।

→ होता ये है जो artery का blood होता है
supplying organ through capillaries the
blood is sent back into veins.

↓
ये होते समय tissue fluid होता है
which is absorbed by → venous end of capillaries
→ & post-capillary venules

→ Along with it about (10-20%) is
absorbed in lymphatics.

No
to the arteries, but

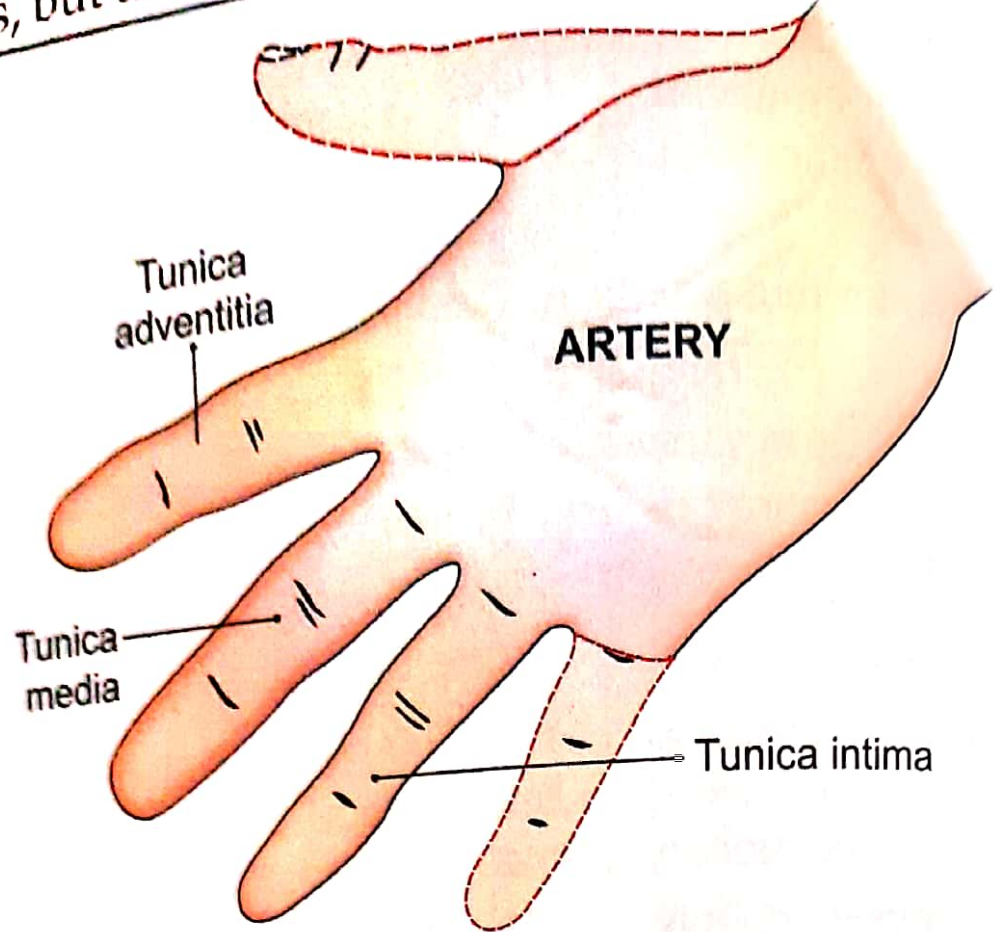


Fig. 5.9: Artery with thick tunica media

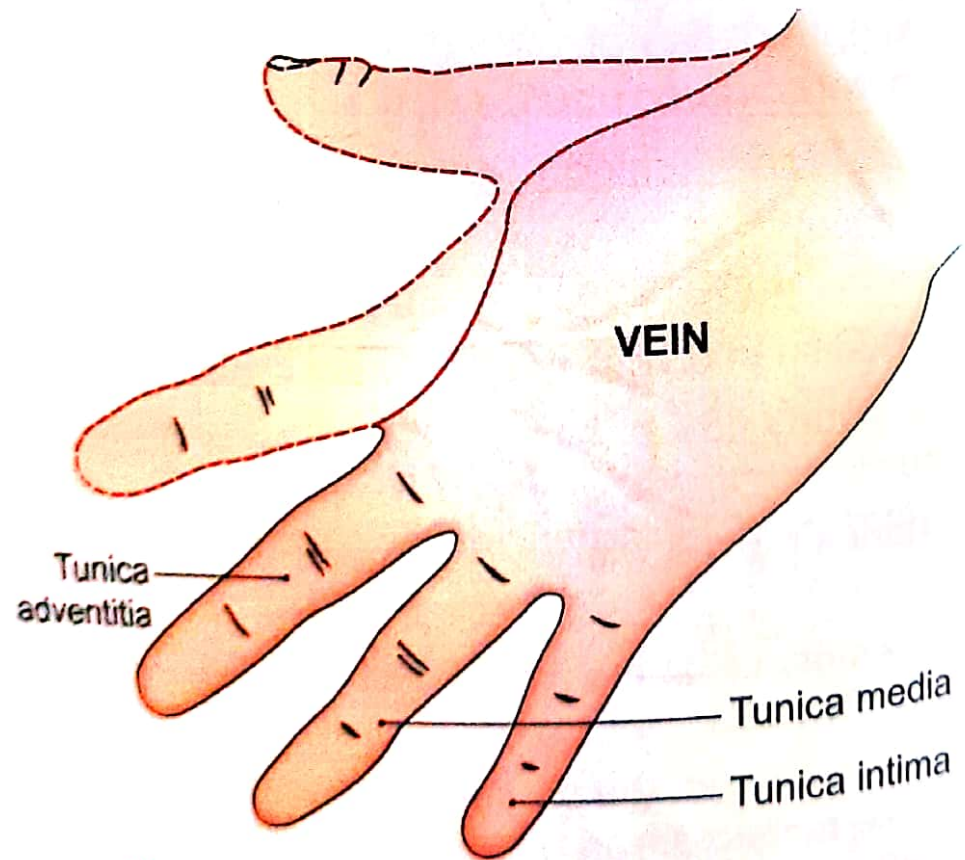


Fig. 5.10: Vein with thick tunica adventitia

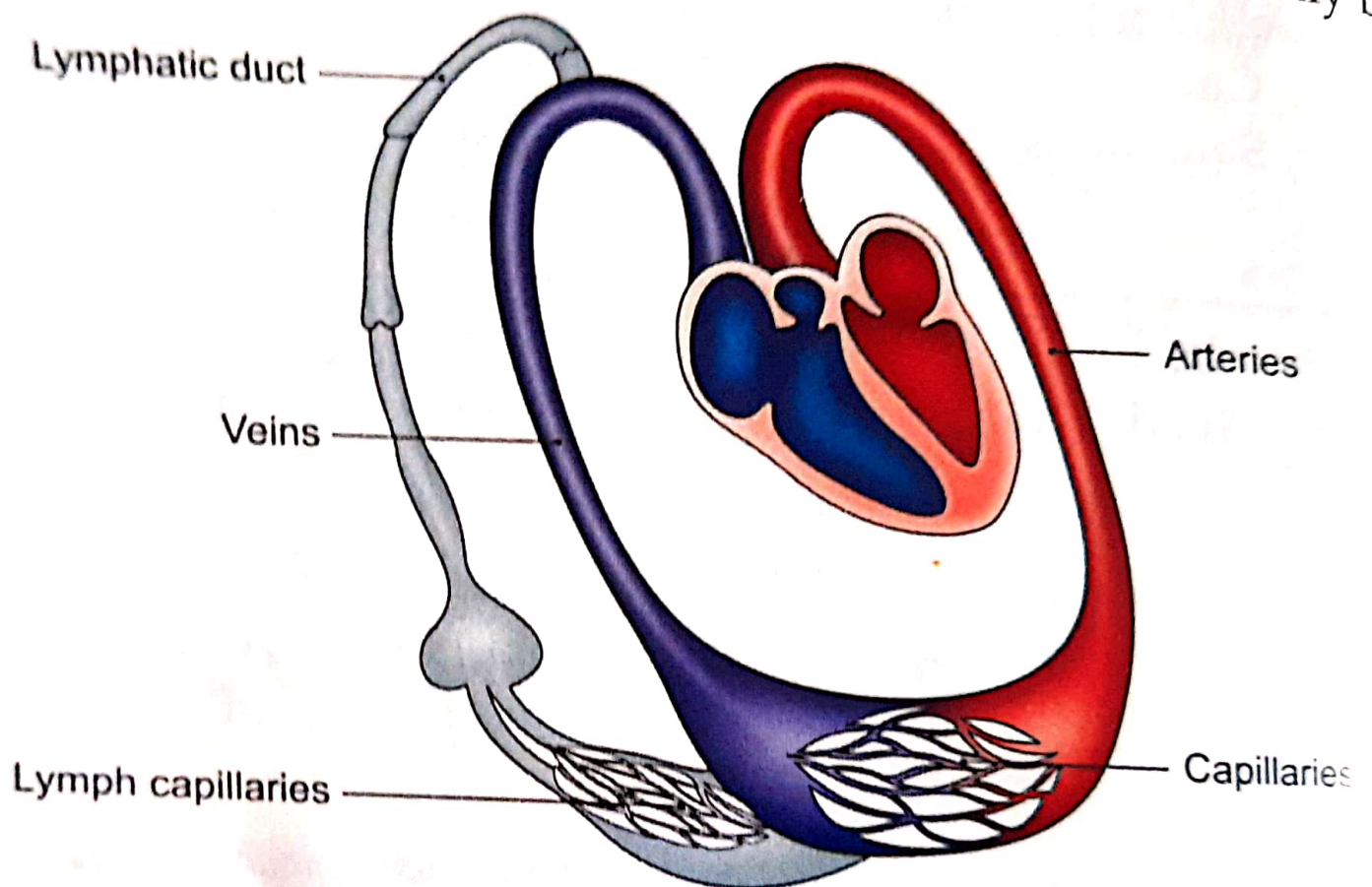


Fig. 6.1: Beginning and termination of lymph vessels