Asthi Sharir

Presented By

Dr Abhilasha

CO (Course outcome)	PO(Programme outcome)
CO1 Enlist the number of Asthi according to different Acharyas	PO 1 Describe the fundamentals of Rachana Sharir, interpret and analyze it in relevant context and recognize its significance in Ayurveda PO2 Describe and demonstrate all the bones and joints with attachments of associated structures and its clinical application
CO1 Describe the Asthi Sanghata and Asthi Simanta	

- **vL;rs bfr vfLFk% A**

  It is a hard substance which remains left even after most part of the body decayed.

  fLFkj] dfBu o “kjhj ds vax&izR;axks dks vkdkj o vk/kkj iznku djus okyh jpuk dks vfLFk dgrs gS A

  The hard tissue forming the framework of the body

A white hard substance which constitues the skeleton of the body.

- **jlknzäa rrks ekala ekalkUesn% iztk;rs A esnlks·fLFk rrks eTtk eTt% “kqdza rq tk;rs AA ¼ lq-lw f†@f0½**

  esn /kkrq ls vfLFk /kkrq dh mRifr gksrh gS A

  la[;k &

  pjd & 360

  lqJqr & 300

  vk/kqfud erkuqlkj & 206

- अस्यते इति अस्थिः ।

  It is a hard substance which remains left even after most part o the body decayed.

  स्थिर, कठिन व शरीर के अंग–प्रत्यंगो को आकार व आधार प्रदान करने वाली रचन को अस्थि कहते है ।

  The hard tissue forming the framework of the body

A white hard substance which constitues the skeleton of the body.

- **रसाद्रक्तं ततो मांसं मांसान्मेदः प्रजायते ।**
  मेदसोऽस्थि ततो मज्जा मज्जः शुक्रं तु जायते ।। (सु.सू १४ / १०)

  मेद धातु से अस्थि धातु की उत्पति होती है ।

  संख्या –

  चरक – 360

  सुश्रुत – 300

  आधुनिक मतानुसार – 206

- **lqJqr erkuqlkj**

कुल अस्थियाँ -300

शाखाओं में -120

मध्यशरीर में - 117

शिर एवं ग्रीवा – 63

According to modern- 206 (200+ 6 auditory ossicles)

Upper limbs- 32 x 2 = 64 (Including clavicle and scapula)

Lower limbs- 31 x 2 = 62 (Including Hip bone)

Vertebrae- 26 (33 vertebrae but 5 sacral fuse- 1 sacrum
4 coccygeal fuse- 1 coccyx.)

Ribs- 24 (12 pairs)

Sternum-1

Skull- 29 (Calvaria or skull cap- 8, facial skeleton 14, auditory ossicles- 6, hyoid bone- 1)

Upper limb bones

- 1. Clavicle
- 2. Scapula
- 3. Humerus
- 4. Radius
- 5. Ulna

6. Carpal bone- 8

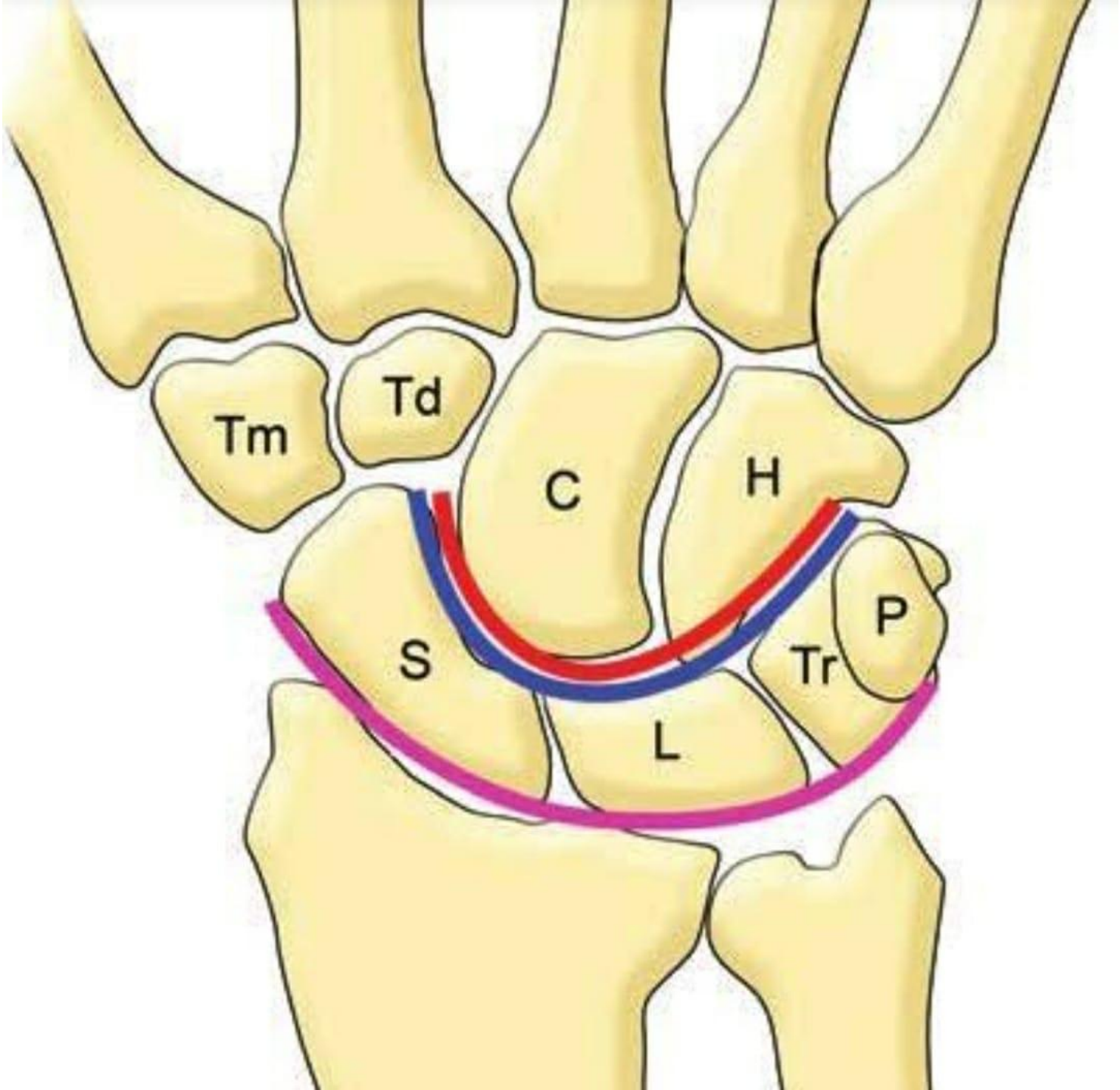
- ✓ Proximal row(lateral to medial)- Scaphoid, lunate, triquetral and pisiform
- ✓ Distal row (radial to ulnar)- Trapizium, trapezoid, capitate, Hamate
- Note- SL trique pc TT catch ho gya

7. Metacarpal bones- 5

1^{st} , 2^{nd}, 3^{rd}, 4^{th}, 5^{th} Metacarpal

8. Phalanges- 14

Proximal- 5, Middle- 4, Distal- 5


Tm
Td
C
H
S
L
Tr
P

Lower limb bones-

- Hip Bone
- Femur
- Tibia
- Fibula
- Patella
- Tarsal Bones- 7

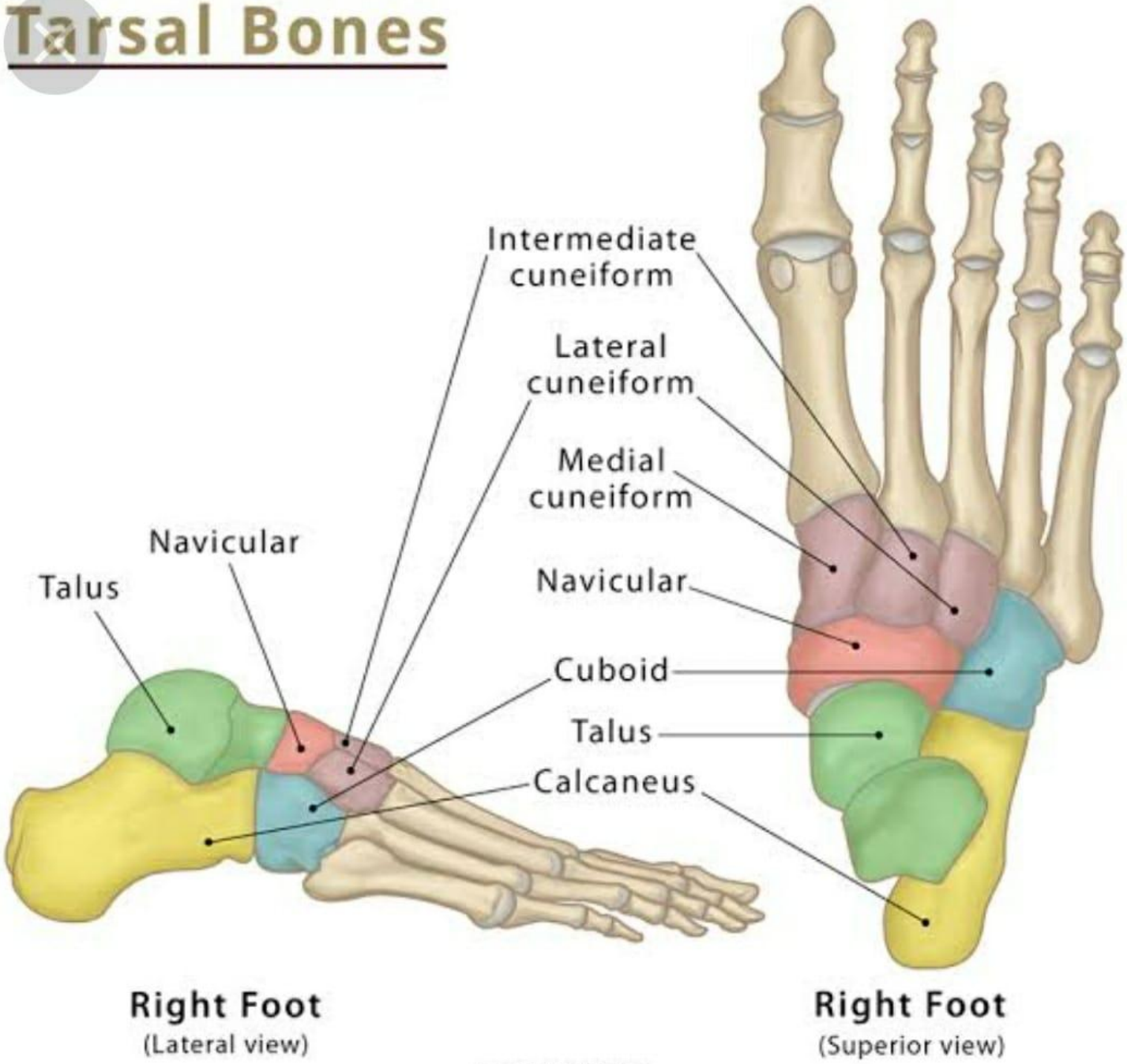
  Proximal row(2)- Talus, Calcaneus

  Middle row(1)- Navicular

  Distal row(4)- (medial to lateral)

  Medial cuneifirm, the intermediate cuneiform, lateral cuneifirm and cuboid

Tarsal Bones



- Meratarsal -5

  1^{st}, 2^{nd}, 3^{rd}, 4^{th}, 5^{th} metatarsal bones

Phalanges-14

Proximal phalanx- 5

middle phalanx- 4

Distal phalanx- 5

Vertebrae- 26

- Cervical vertebrae- 7
- Thoracic vertebrae- 12
- Lumbar vertebrae- 5
- Sacral vertebrae- 5 fuses and form a Sacrum bone
- Coccyx- 1 (4 coccygeal vertebrae fused)

Ribs – 24 (12 pairs)

- True ribs- 7 pair
- False ribs- 3 pairs
- Floating ribs- 2 pairs

STERNUM- 1

Skull- 29

- Skull cap (Calvaria)- 8

  Frontal bone- 1

  Sphenoid bone- 1

  Ethemoid bone- 1

  Parietal bone- 2

  Temporal bone -2

  Occipital bone- 1

Facial bone- 14

- Lalcrimal bone- 2
- Maxilla bone - 2
- Mandible bone - 1
- Nasal bone -2
- Inferior nasal concha -2
- Vomer bone- 1
- Palatine bone- 2
- Zygomatic bone - 2

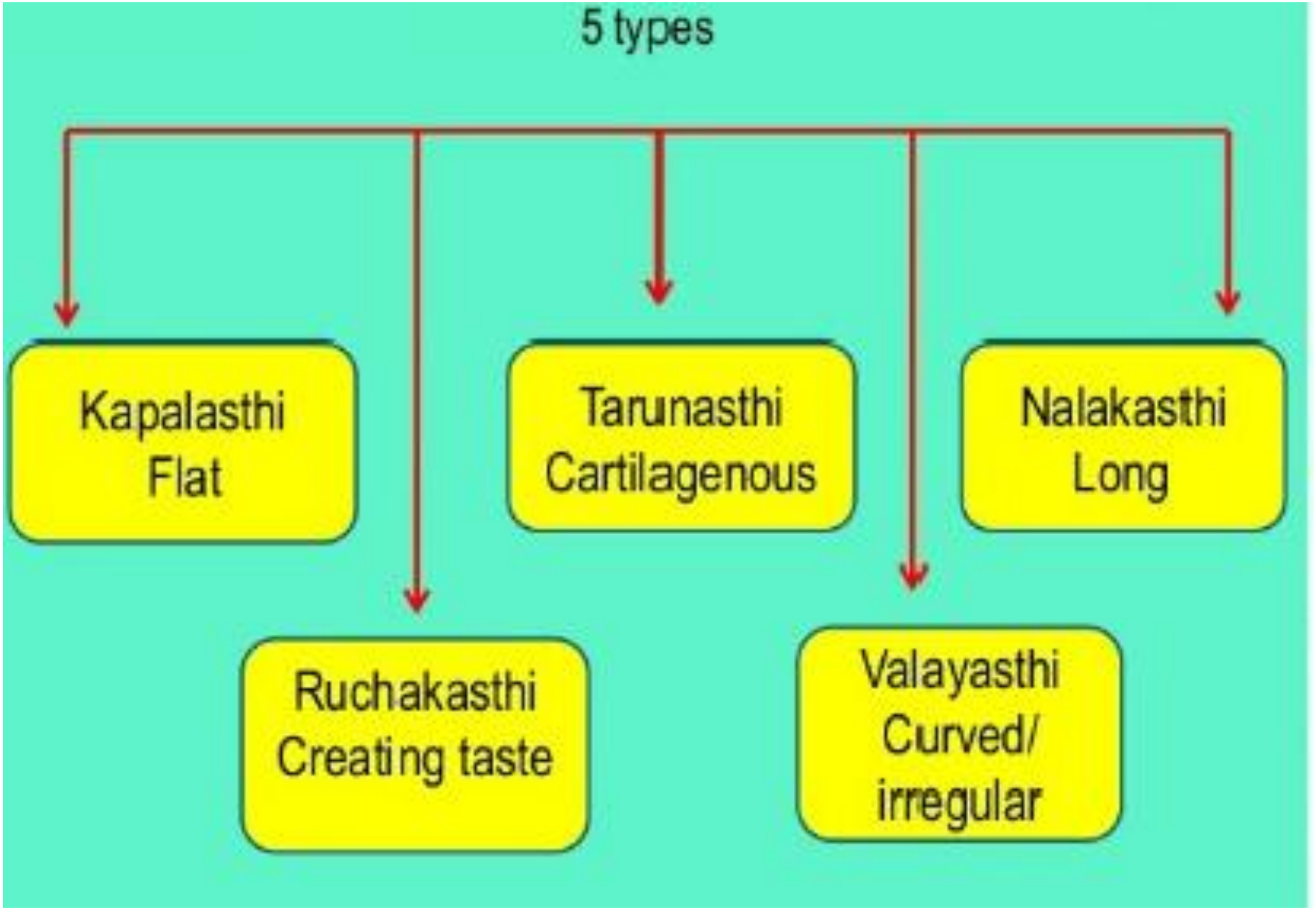
Auditory ossicles- 6

- Malleus- 2
- Incus – 2
- Stapes- 2

HYOID BONE- 1

Classification of Bone

- "एतानि पञ्चविधानि भवन्तिः तद्यथा-
  कपाल- रूचक- तरुण-वलय-नलक संज्ञानि।
  तेषां जानु-नितम्ब-अंस-गण्ड-तालु-शंख-शिरःसु कपालानि,
  दशनास्तु रूचकानि,
  घ्राण-कर्ण-ग्रीवा-अक्षिकोषेषु तरूणानि,
  पार्श्व-पृष्ठ-उरःसु वलयानि,
  शेषाणि नलक संज्ञानि ॥" (सु.शा. ५/२२)

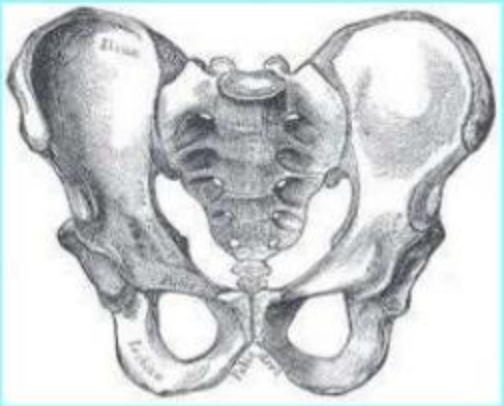

5 types
Kapalasthi
Flat
Ruchakasthi
Creating taste
Tarunasthi
Cartilagenous
Valayasthi
Curved/
irregular
Nalakasthi
Long

Kapalasthi

- These are flat.
- e.g.

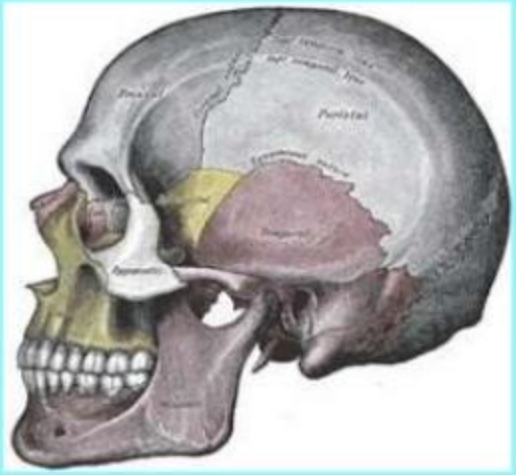
1. Janu(Knee/patella)

2. Nitamba(Pelvis)

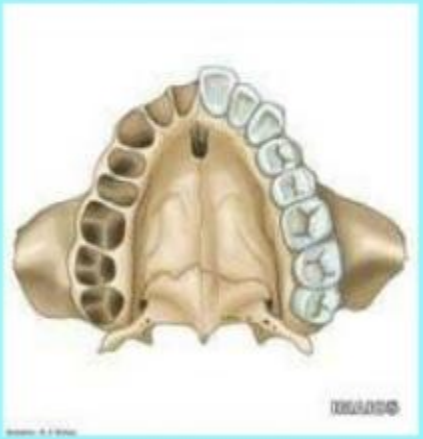


3. Ansa(Scapula)

4. Ganda(Cheek bones)



5. Talu(Palate)



6. Shankha(Pterion area)

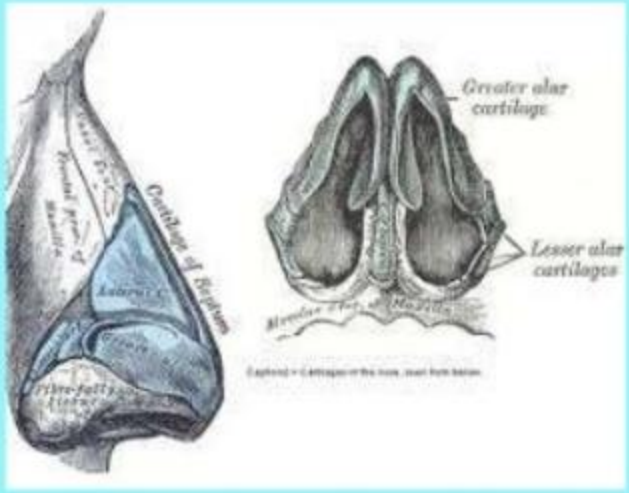
Ruchakasthi

- Ruchak means taste. The teeth are considered under this type as chewing is important for releasing saliva which in turn facilitates the taste sensation.

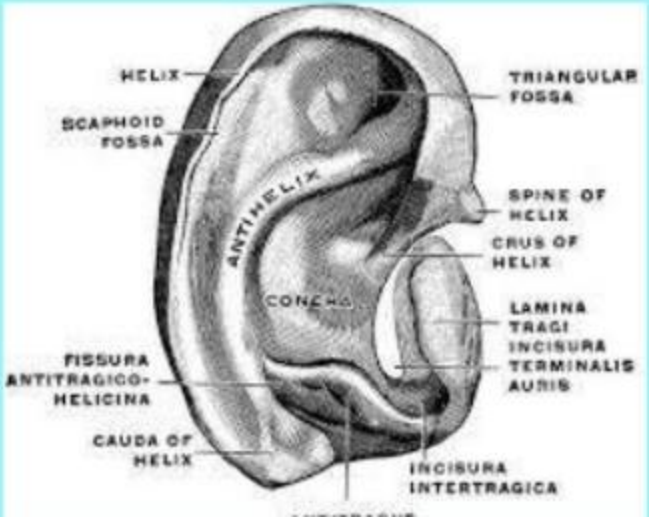
Tarunasthi

- Softer & cartilagenous
- e.g.

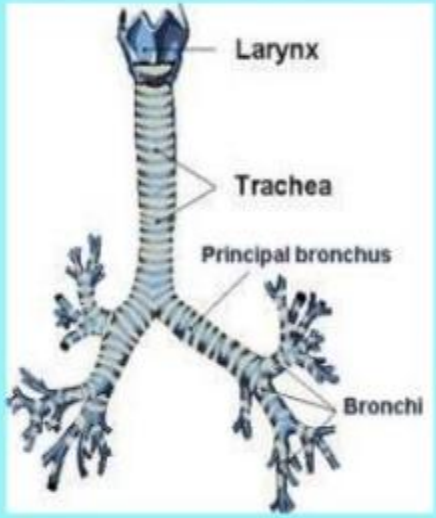
1. Ghrana(Nasal cartilages)



2. Karna(Ear cartilages)



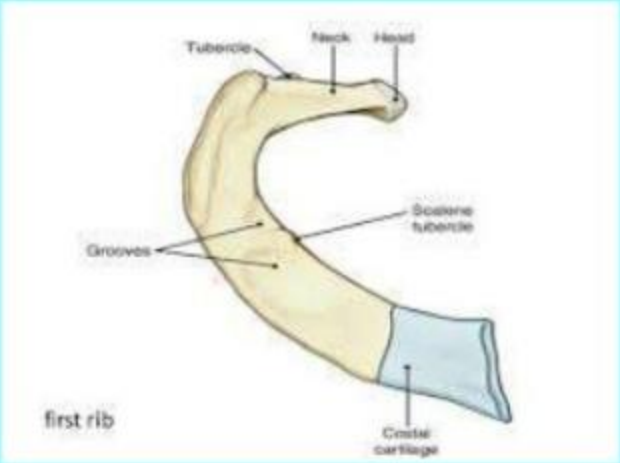
3.Greeva(Neck-larynx & trachea)



4. Akshikosh(Eyeball)

Valayasthi

- Ring like
- Present at parshwa(lateral), prushtha(back), ura(chest)
- e.g.- Ribs

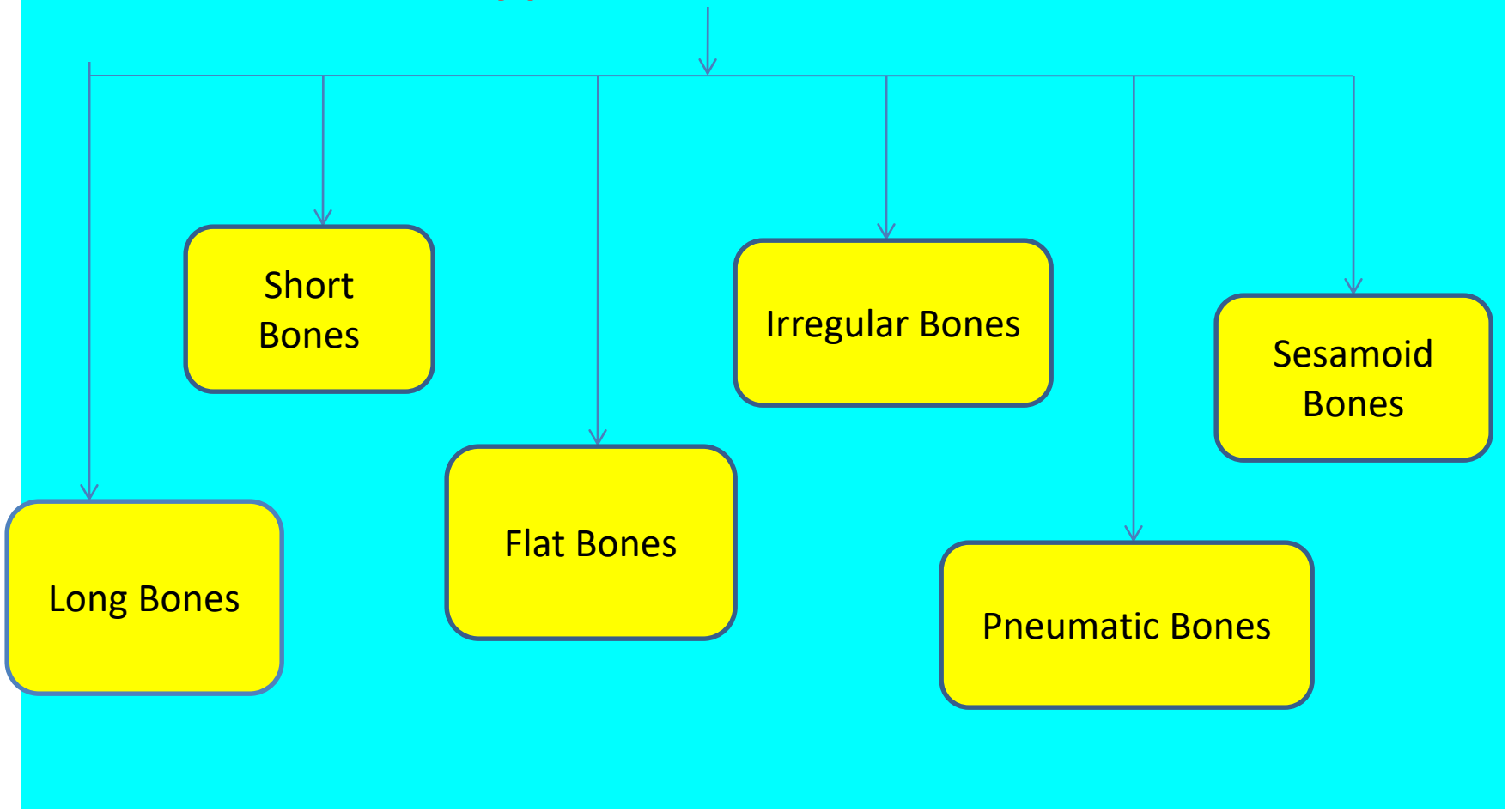


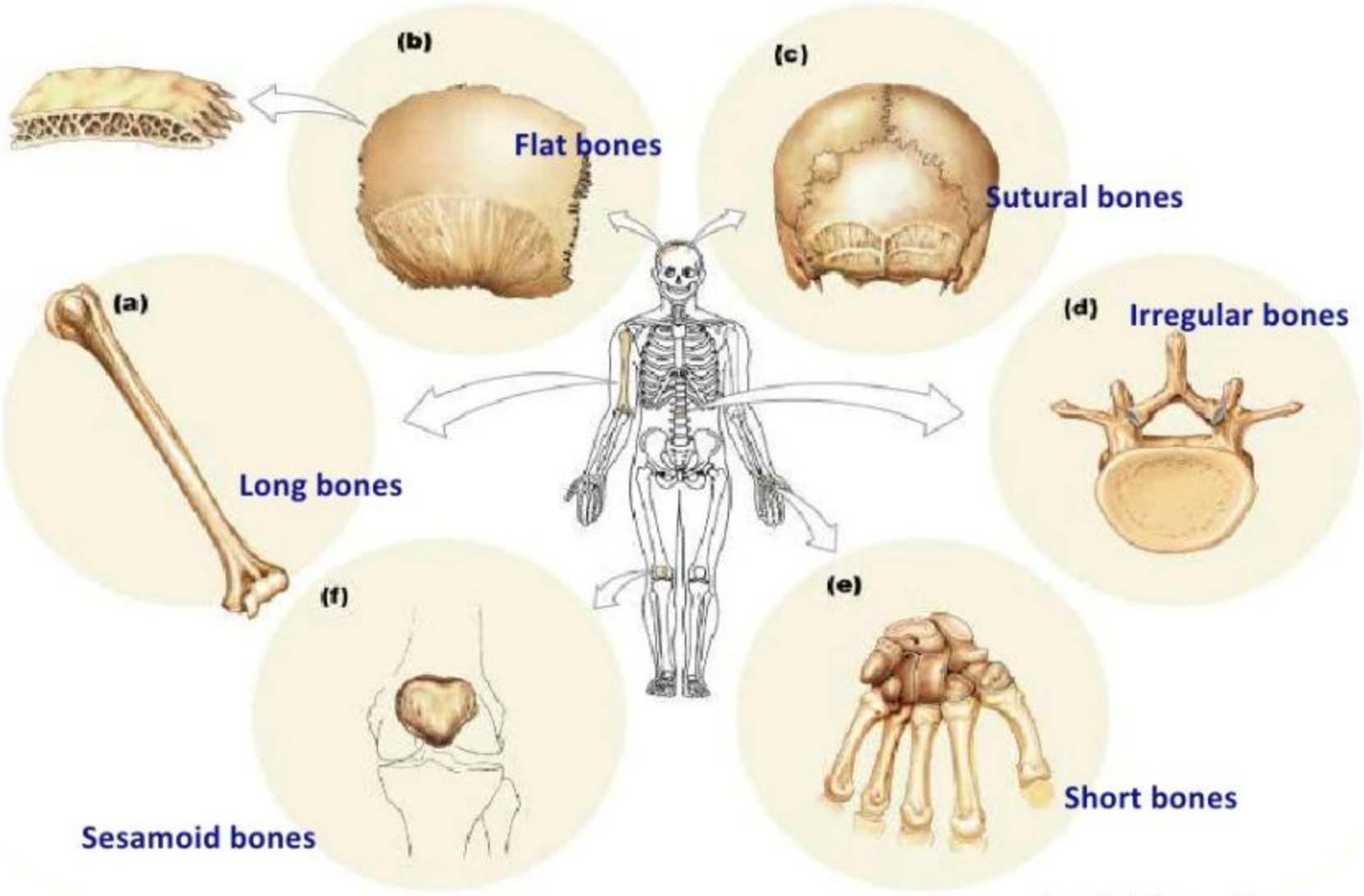
Nalakasthi

- All the other bones excluding above types.
- These are long & rounded
- e.g. Humerus

According to modern

6 Types(According to shape)




(b)
Flat bones
(c)
Sutural bones
(a)
Long bones
(d)
Irregular bones
(f)
Sesamoid bones
(e)
Short bones

अस्थि का स्वरुप-

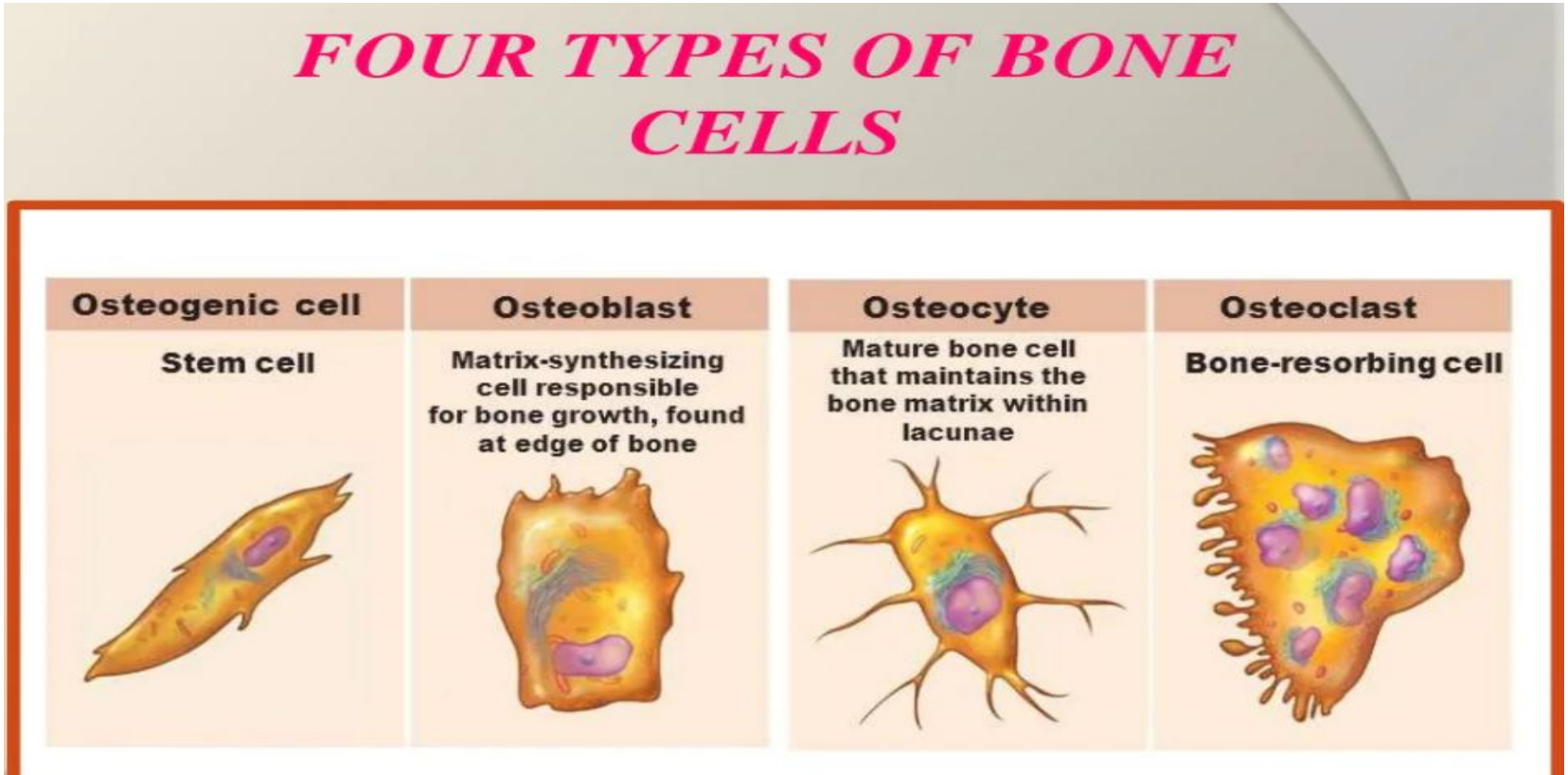
यस्मात् चिरविनष्टेषु त्वङ्मांसेषु शरीरिणाम् ।
अस्थीनि न विनश्यन्ति साराण्येतानि देहिनाम् ।।

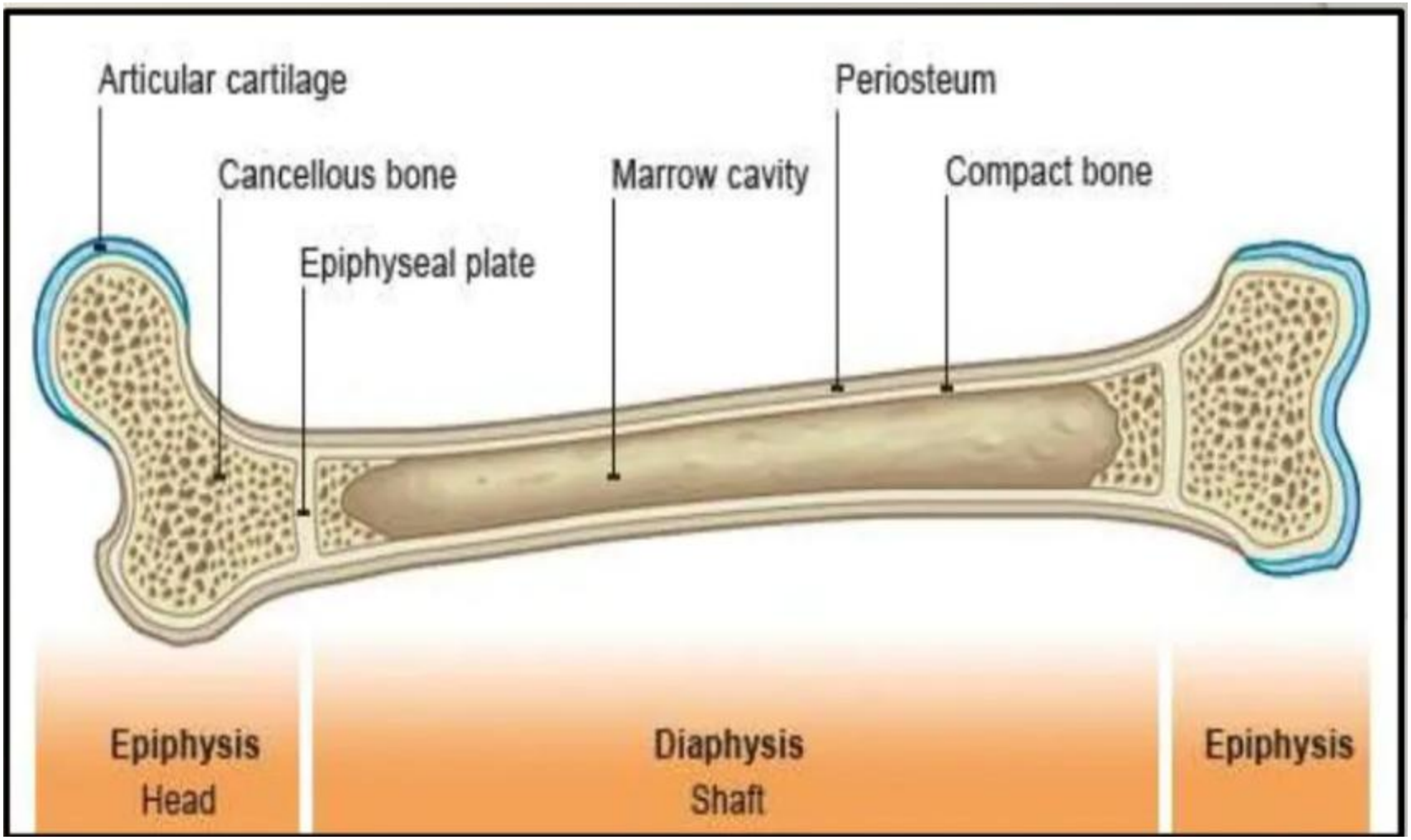
(सु.शा. ५ / २४)

इसलिए प्राणियों की त्वचा, मांस तथा शरीर की अन्य अस्थिविरहित मृदु धातुएँ देर से नष्ट होने पर भी अस्थियाँ नष्ट नहीं होतीं, क्योंकि ये प्राणियों के शरीर में सार हैं।

Structure of Bone

- The basic structural unit of a human skeleton is bone.
- It is highly vascular, living, constantly changing mineralized connective tissue.
- Bone consists of cells and intercellular matrix.




Articular cartilage
Cancellous bone
Epiphyseal plate
Marrow cavity
Periosteum
Compact bone
Epiphysis
Head
Diaphysis
Shaft
Epiphysis

DIAPHYSIS	• *THE SHAFT OR MAIN PORTION OF THE BONE*
EPIPHYSIS	• *THE EXTREMETIES OR ENDS OF THE BONE*
METAPHYSIS	• *THE REGION IN A MATURE BONE WHERE DIAPHYSIS JOIN EPIPHYSIS*
ARTICULAR CARTILAGE	a thin layer of hyaline cartilage covering the epiphysis where bone forms a joint with another bone.

PERIOSTEUM

- The tissue covering the outer surface of bone. It consists of two layers. The outer fibrous layer is rich in blood vessels, lymphatic vessels, and nerves that pass into the bone and inner layer is composed of osteoblasts surrounded by osteoprogenitor cells.

MEDULLARY OR MARROW CAVITY

The space within the diaphysis that contains the fatty **yellow marrow** in adults. Yellow marrow consists primarily of fat cells and a few scattered blood cells. Thus, yellow marrow functions in fat storage.

ENDOSTEUM

- A layer of osteoprogenitor cells and osteoblasts that lines medullary cavity and also contains scattered osteoclasts

अस्थियों के कार्य

- आयुर्वेद के अनुसार

अभ्यन्तरगतैः सारैर्यथा तिष्ठन्ति भूरूहाः ।
अस्थिसारैस्तथा देहा ध्रियन्ते देहिनां ध्रुवम् ।।
यस्मात् चिरविनष्टेषु त्वङ्मांसेषु शरीरिणाम् ।
अस्थीनि न विनश्यन्ति साराण्येतानि देहिनाम् ।।
मांसान्यत्र निबद्धानि सिराभिः स्नायुभिस्तथा ।
अस्थीन्यालम्बनं कृत्वा न शीर्यन्ते पतन्ति वा ।। (सु. शा. ५/२३-२५)

FUNCTIONS OF BONES

Our bones perform following functions:

- **Support:-** Bones provide a framework that supports the body and cradles its soft organs. For example, bones of the lower limbs act as pillars to support the trunk body when we stand, and the rib cage supports the thoracic wall.
- **Protection:-** The fused bones of the skull protect the brain.and the rib cage helps protect the vital organs of thethorax.
- **Movement:-**Skeletal muscles, which attach to bones by tendons, use bones as levers to move the body and its parts. As a result, we can walk, grasp objects, and breath. The design of joints determines the types of movements possible.

- **Mineral and growth factor storage:-** Bone is a reservoir for minerals, most importantly calcium and phosphate.
- **Blood cell formation:-**Most blood cell formation,or hematopoiesis, occurs in the marrow cavities of certain bones.

CLAVICLE

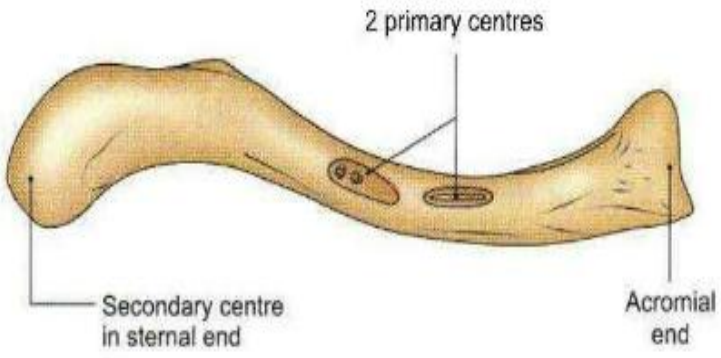
- Clavicle is also called **collar bone / Beauty bone**
- Supports the shoulder so that the arm can swing clearly away from the trunk.
- The clavicle transmits the weight of the limb to the sternum.

Parts Of Clavicle

- Cylindrical part – **shaft**
- 2 ends – **Medial end**
  - Lateral end

Peculiarities of the Clavicle

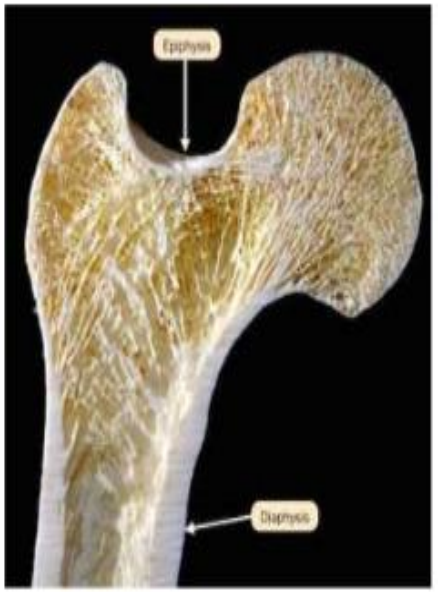
1. It is the only long bone that lies horizontally.
2. It is subcutaneous throughout.
3. It is the first bone to start ossifying.(5 th – 6 th week of gestation)
4. It is the only long bone which ossifies in membrane.
5. It is the only long bone which has two primary centres of ossification.

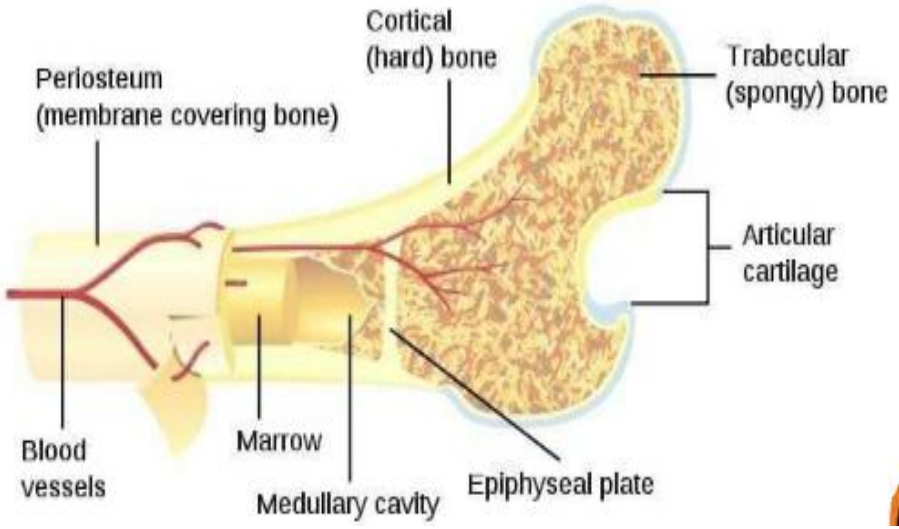


6. There is no medullary cavity.

7. It is occasionally pierced by the middle supraclavicular nerve.

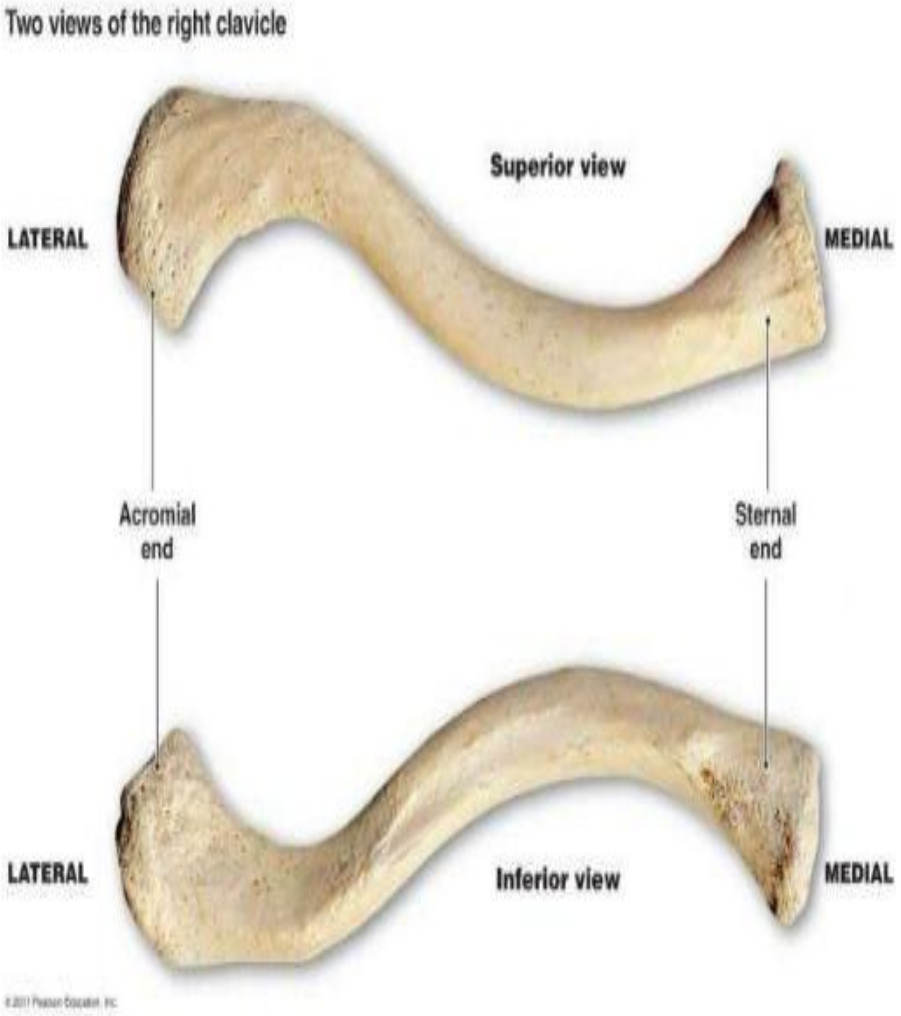
8. It receives weight of upper limb via lateral one-third through coracoclavicular ligament and transmits weight of upper limb to the axial skeletal via medial two-third part





Side Determination :

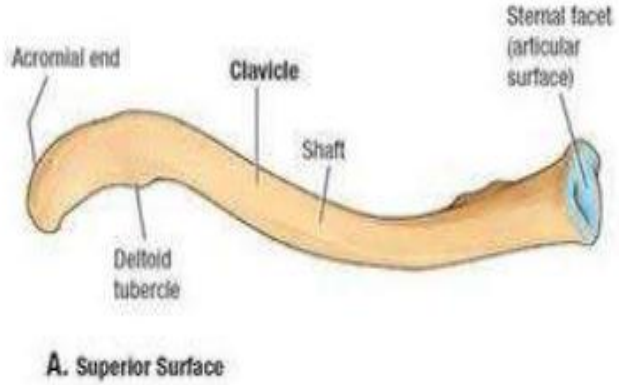
1. The lateral end is flat, and the medial end is large and quadrilateral.
2. The shaft is slightly curved, so that it is convexforwards in its medial two-thirds, and concaveforwards in its lateral one-third



SHAFT:

The shaft is divided into

1. **Lateral one-third**
2. **Medial two-third**



A. Superior Surface

The lateral one-third

flattened from abovedownwards.

It has two borders :

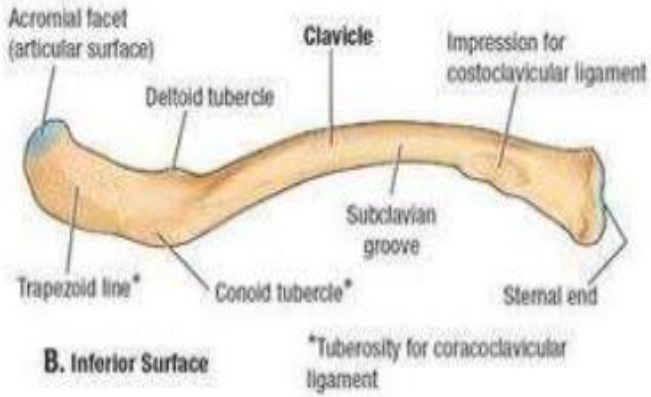
Anterior – Concave forward

Posterior – Convex Backward

It has two surfaces :

Superior – Subcutaneous

Inferior – Conoid tubercle and trapezoid ridge



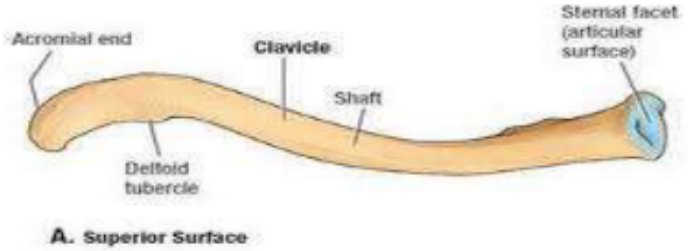
B. Inferior Surface

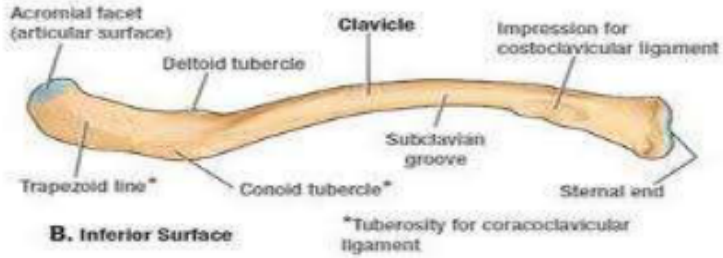
*Tuberosity for coracoclavicular ligament

Medial two-third:

Shaft is rounded

It has four surfaces:





Anterior surface - convex forwards

Posterior surface - smooth.

Superior surface - rough in its medial part.

Inferior surface - rough oval impression at the medial end.

lateral half of this surface has a longitudinal subclasubclavian groove.The nutrient foramen lies at the lateral end of the groove.

Clavicle Ends:

1. **Lateral or acromial** (Greek peak of shoulder) **end**
2. **Medial or Sternal end**

Lateral/Acromial end:

flattened from above downwards.

It bears a facet that articulates with the acromion process of the scapula to form the acromioclavicular joint.

Medial / Sternal end:

- It is quadrangular andarticulates with the clavicular notch of the manubrium sterni to form the sternoclavicular joint.

- The articular surface extends to the inferior aspect,for articulation with the first costal cartilage.