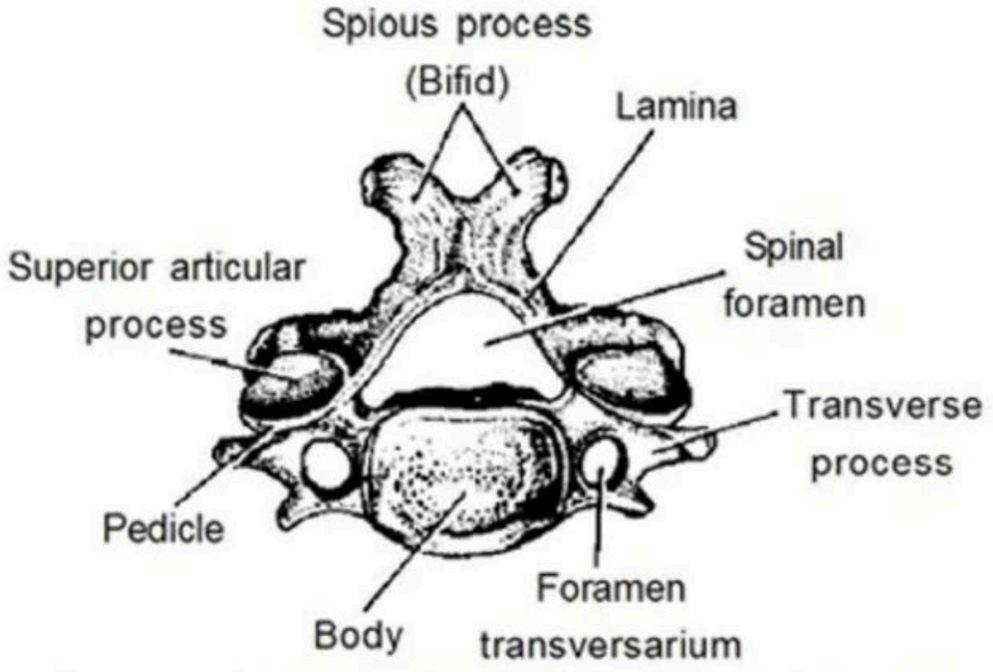
Human Skeleton: Joints

Course on Human Skeleton

Dr Amit Gupta • Lesson 4 • Sept 24, 2021

CERVICAL VERTEBRA (Smallest vertebra)

- All cervical vertebrae have apertures in their transverse process called as Foramina transversalis. Which are alligned to form vertebrarterial canal. Through this canal vertebral artery passes.
- Spinous process of cervical vetebrae is bifid (Except C_7)
- Only C_7 has costal demifacets where upper part of head of 1st rib articulates.



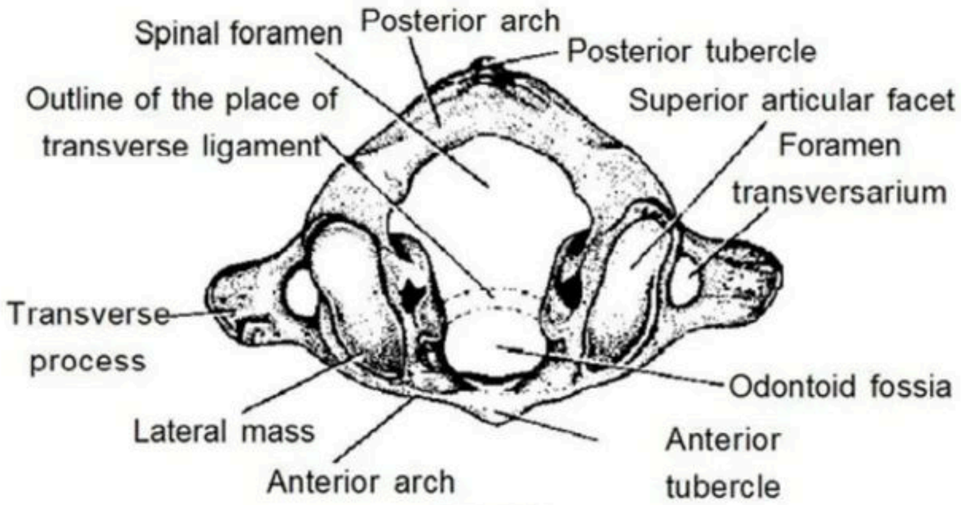
A typical cervical vertebra(superior aspect)

- The number of cervical vertebrae are seven in almost all mammals including human beings.

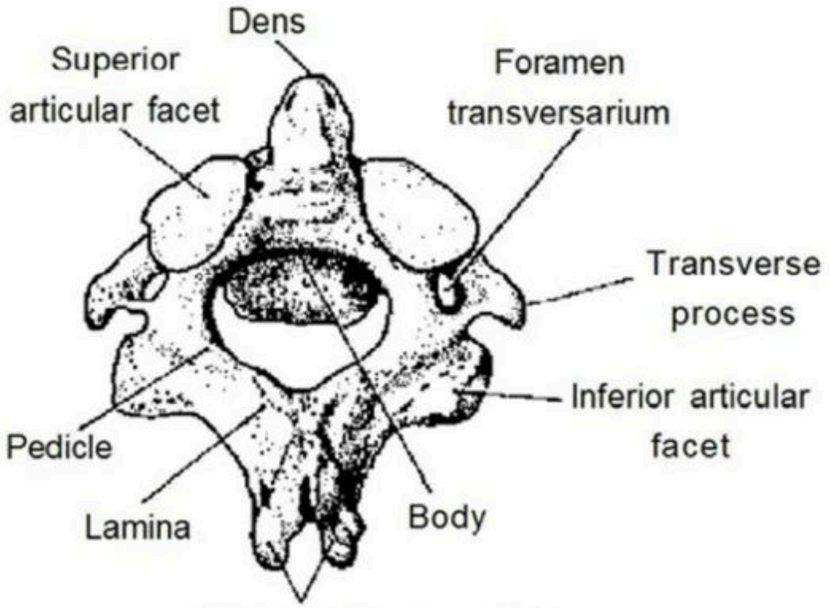
Atlas (C_1) :

- Centrum absent.
- Neural spine less developed.
- Transverse processes are wing shaped.
- The foramen of this vertebrae is divided into two parts by a ligament. In ventral part of this ligament spinal cord is present.
- In donal part of ligament **Odontoid fossa** is present in which odontoid process of axis is fitted to make median atlanto-axial joint (Pivot Joint).
- On both surfaces of atlas a pair of articular facetes are present. In upper pair of articular facetes condyles of skull are fitted to make

  atlanto-occipital joint.
- In lower pair of articular facetes condyles of axis are fitted to make lateral atlanto-axial joint.



ATLAS



Axis (C_2) :

- Centrum present.
- Neural spine well developed and bifid.

At anterior surface of centrum a long **odontoid process** is present which fits in odontoid fossa of attas to make pivot joint.

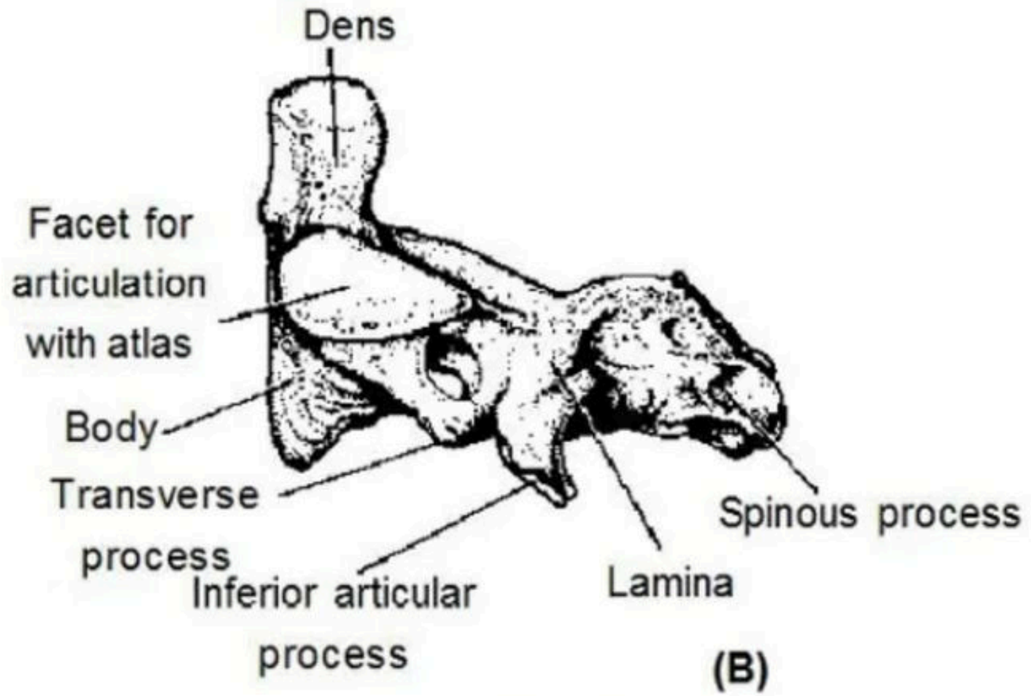
THORACIC VERTEBRA :

They are identified by the presence of costal demifacetes. On the centrum.

LUMBAR VERTEBRA :

These are the largest sized vertebrae because they have to support the weight of upper body.

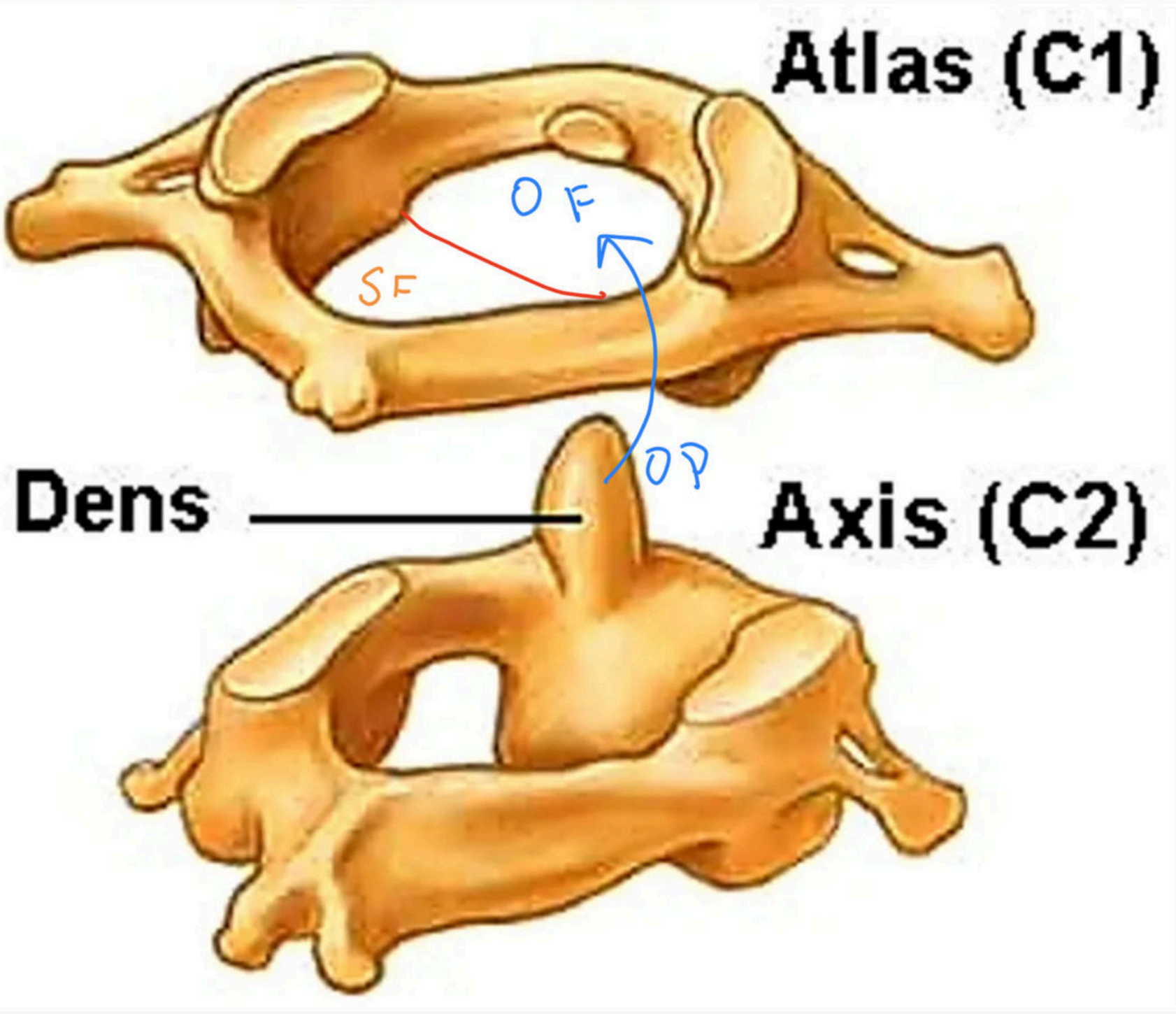
Axis

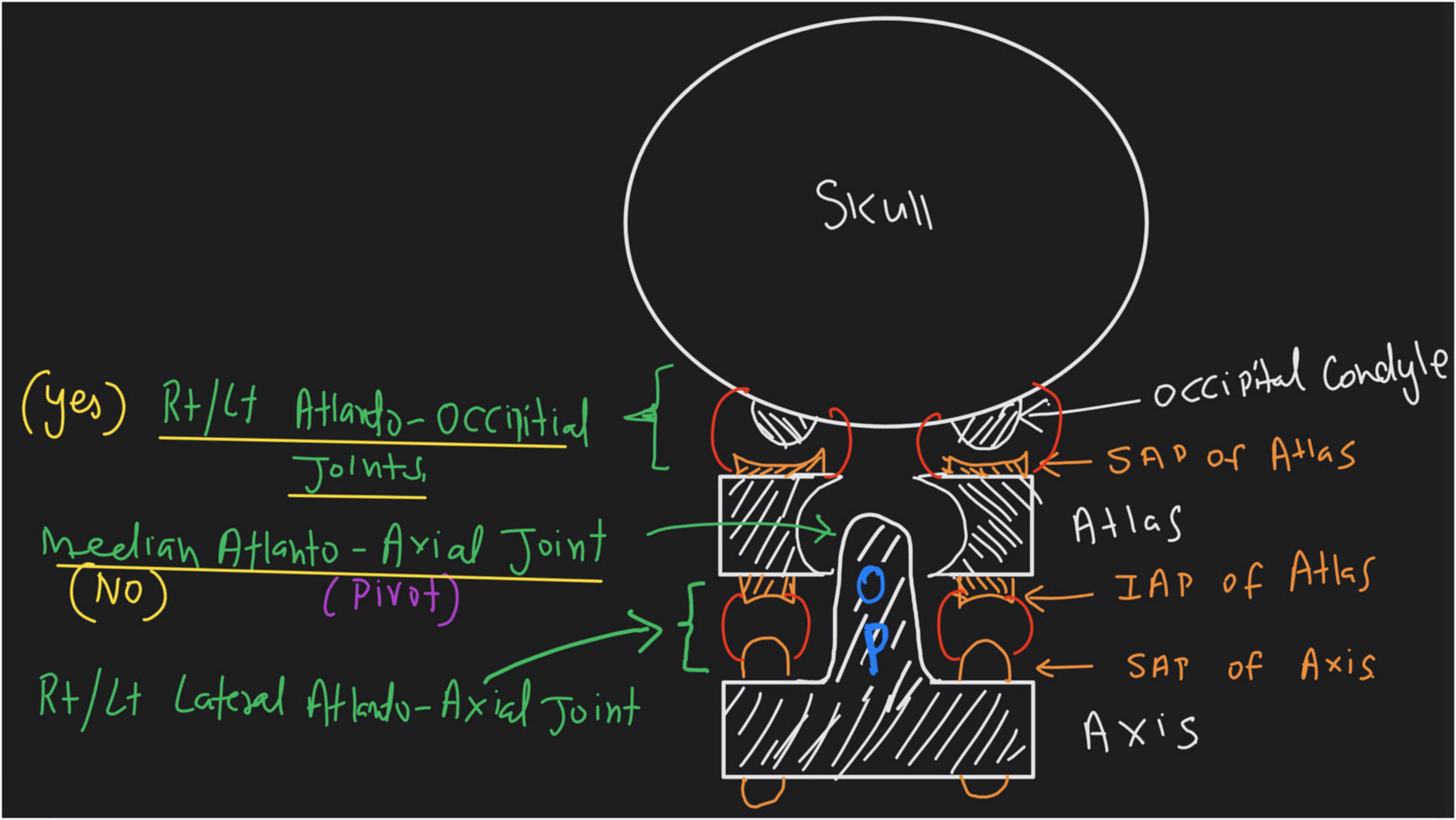


Axis

Second cervical vertebra (Axis or Epistropheos) ;

(A) superior aspect; (B) left side view


Atlas (C1)
OF
SF
OP
Dens
Axis (C2)


Skull
(yes) Rt/Lt Atlanto-Occipital Joints
Median Atlanto-Axial Joint
(NO)
(Pivot)
Rt/Lt Lateral Atlanto-Axial Joint
Occipital Condyle
SAP of Atlas
Atlas
IAP of Atlas
SAP of Axis
Axis
O
P

Skull

Skull consist of 29 bones

(i) Cranium – 8

(ii) Face – 14

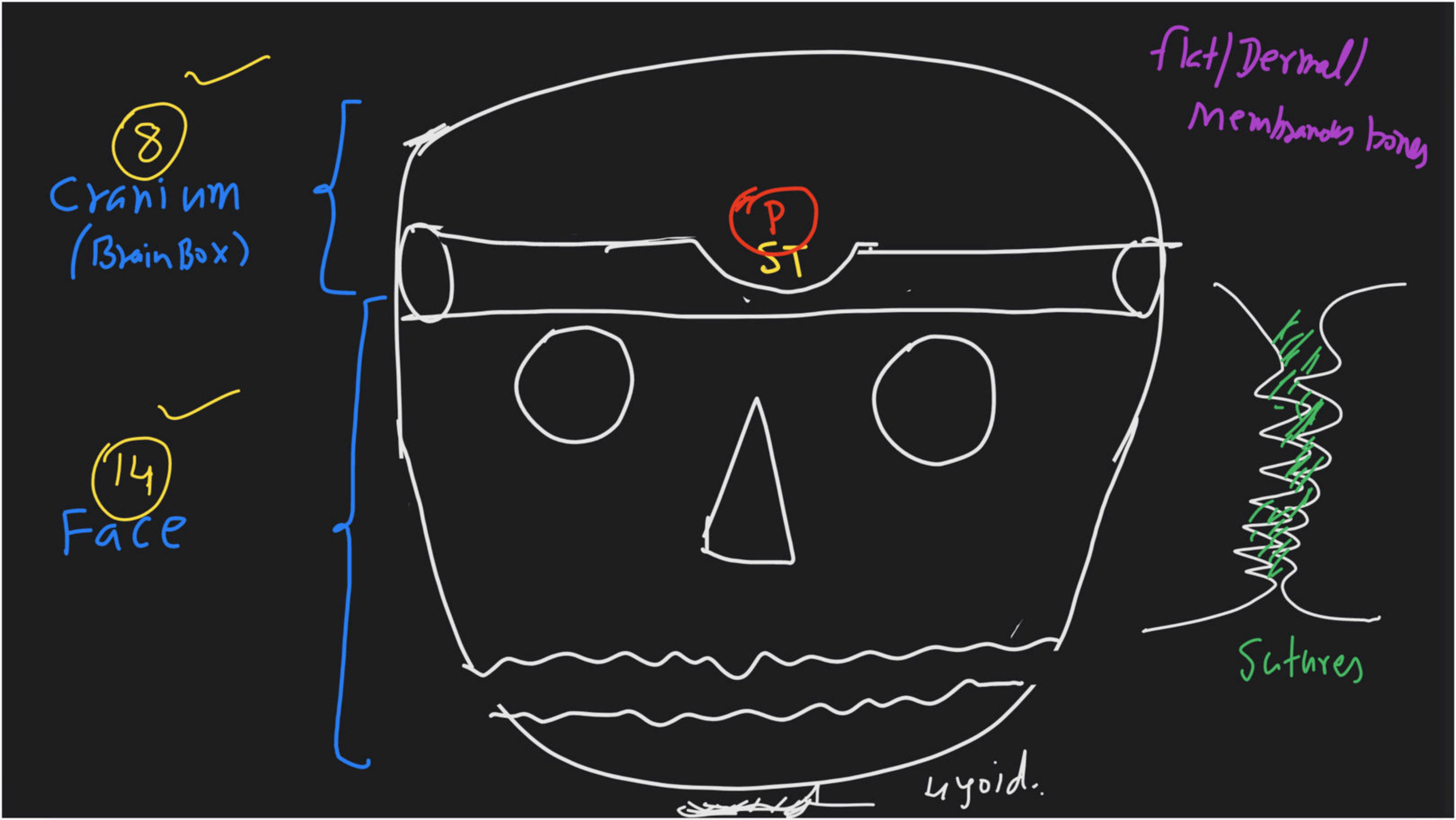
(iii) Ear ossicles – 3 + 3 = 6

(iv) Hyoid – 1

All skull bones (except mandible & ear ossicles) are immovable.

21

(Hyoid)


8
Cranium
(Brain Box)
14
Face
P
ST
flat/Dermal/
Membranous bones
Sutures
Hyoid.

Cranium = 8

face = 1 (movable) 14

22

immovable = 8

immovable (except mandible) = 13

21 Immovable

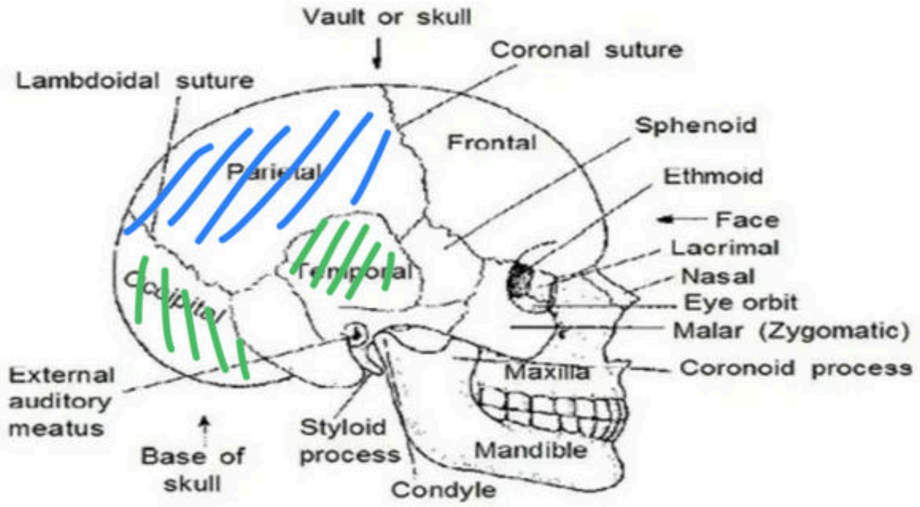
Earossicle = 6 (3+3) — movable

Myoid = 1 (1) — one

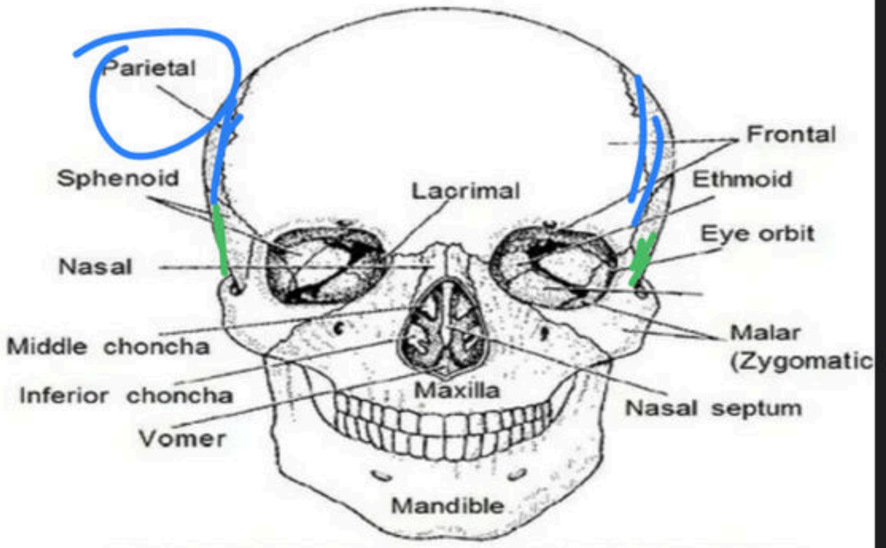
(Tongue bone)

29

Total



HUMAN SKULL VIEWED FROM RIGHT SIDE



HUMAN SKULL VIEWED FROM IN FRONT

Cranium formed of 8 bones

(membranous bone)

1 Frontal (forehead)

2 Parietal

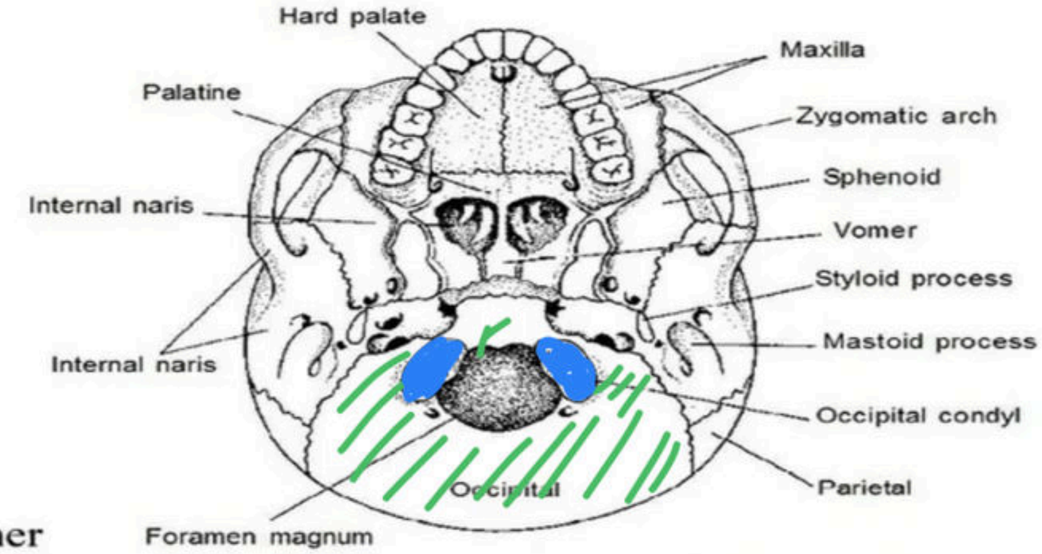
2 Temporal

1 Occipital

1 Sphenoid

1 Ethmoid

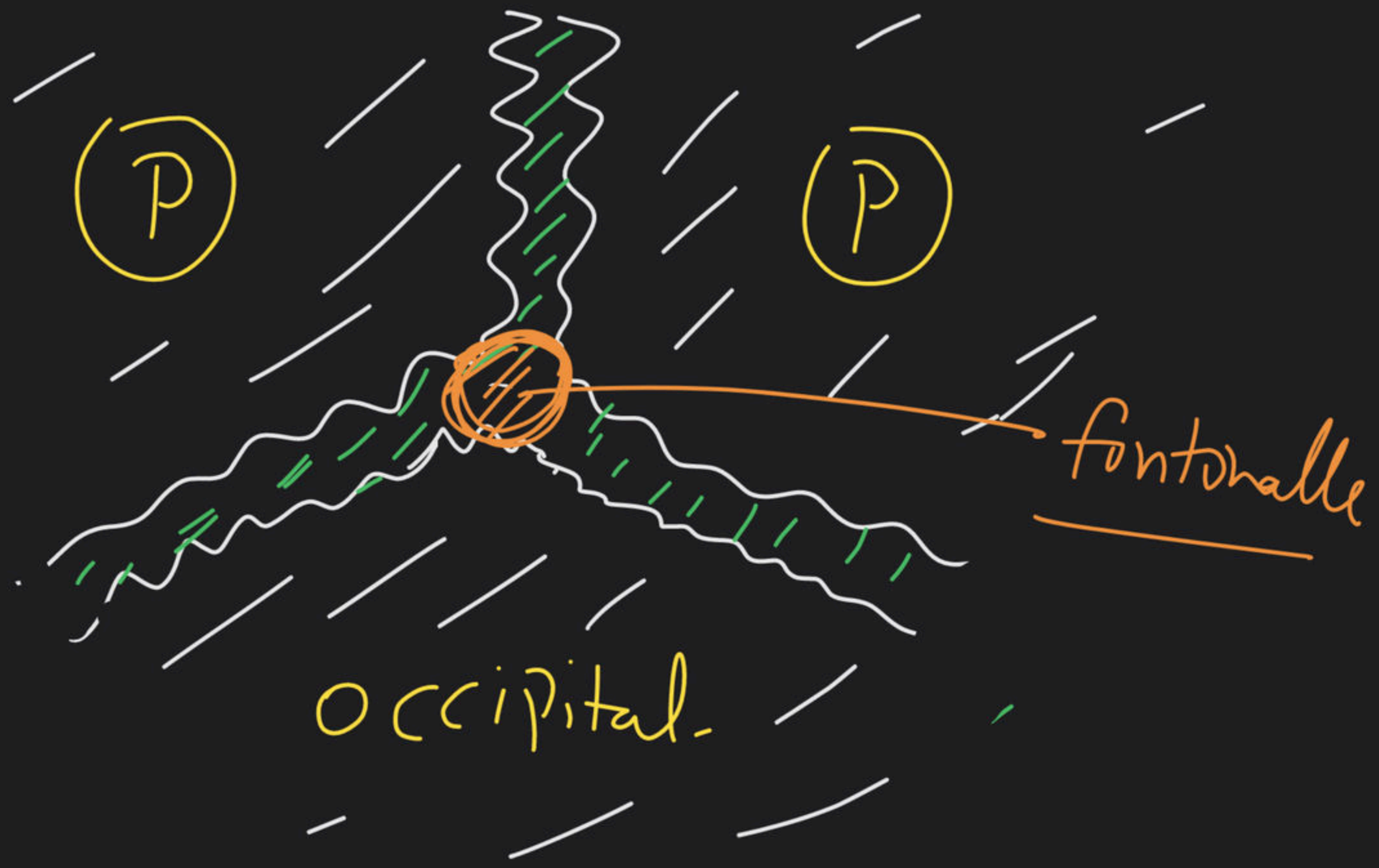
All these bones of skull are joined together by suture.



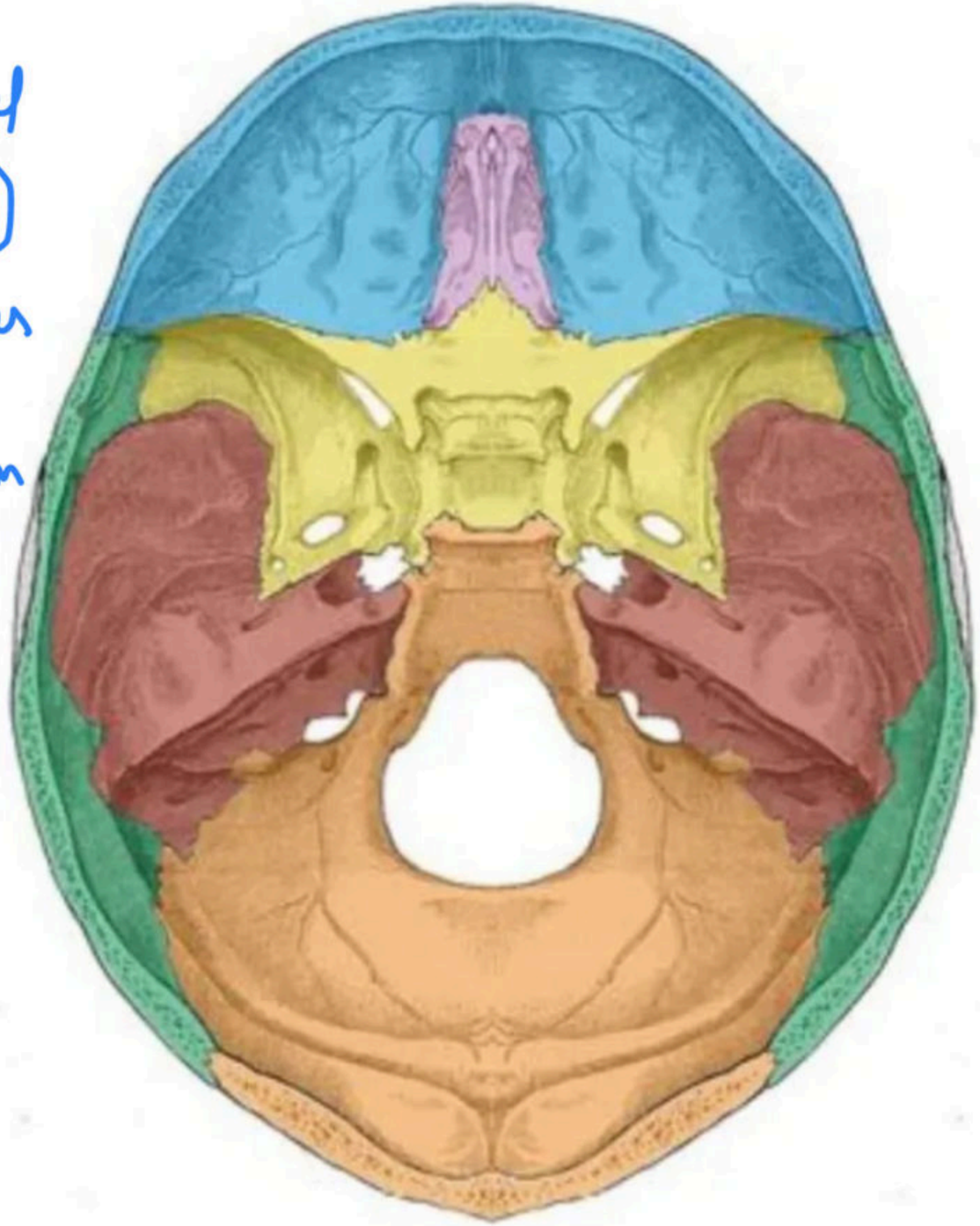
HUMAN SKULL VIEWED FROM BELOW

Eg. (1) Coronal suture : Between the frontal & parietal bone

(2) Lambdoidal suture : Between parietal & occipital


P
P
fontanelle
occipital

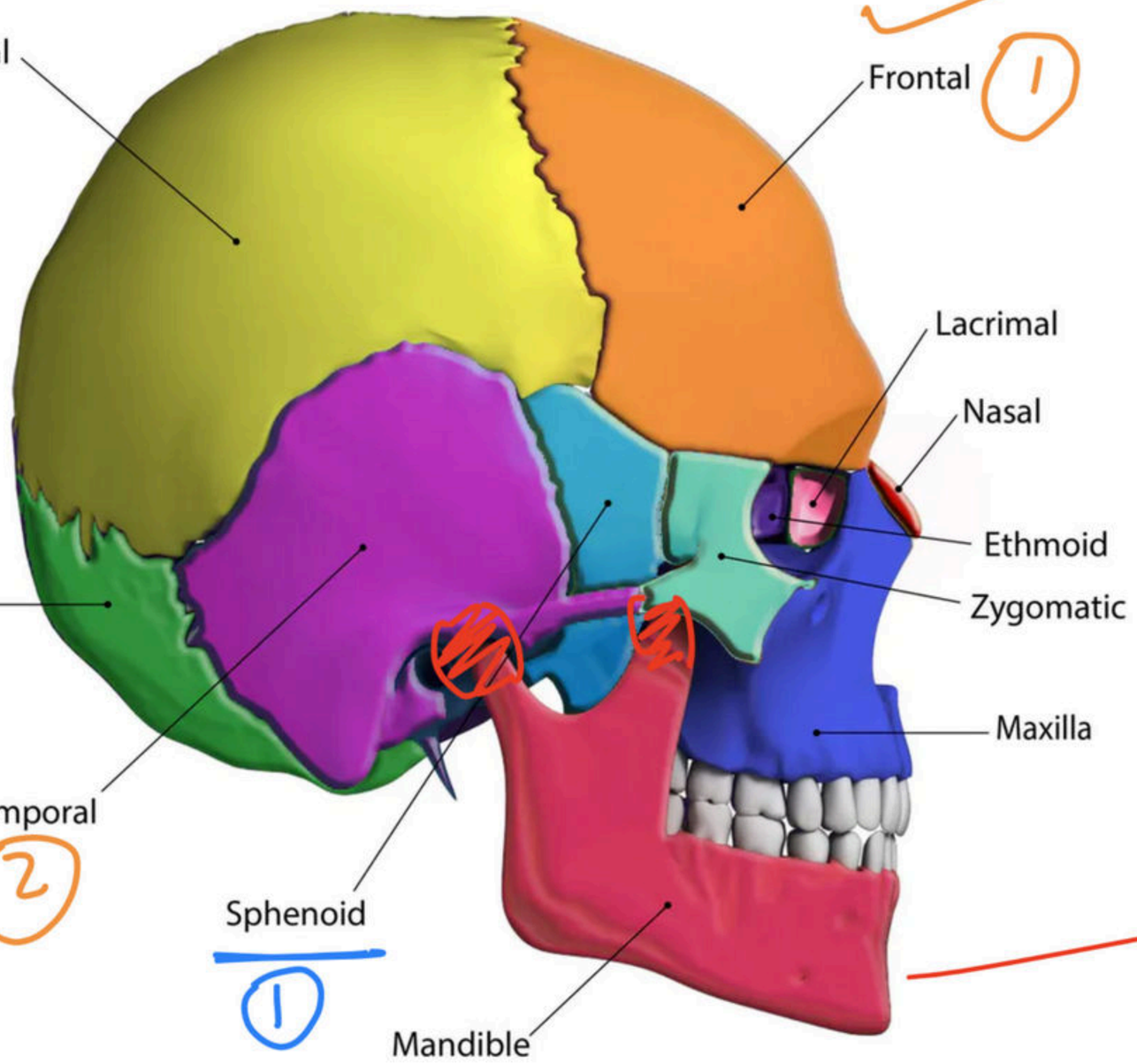
Total 8 Bones in Cranium



1 Frontal
1 Sphenoid
2 Temporal
2 Parietal
1 Occipital
1 Ethmoid

from above

SKULL BONES



Mandible
⇓
जबड़ा

2

1

1

2

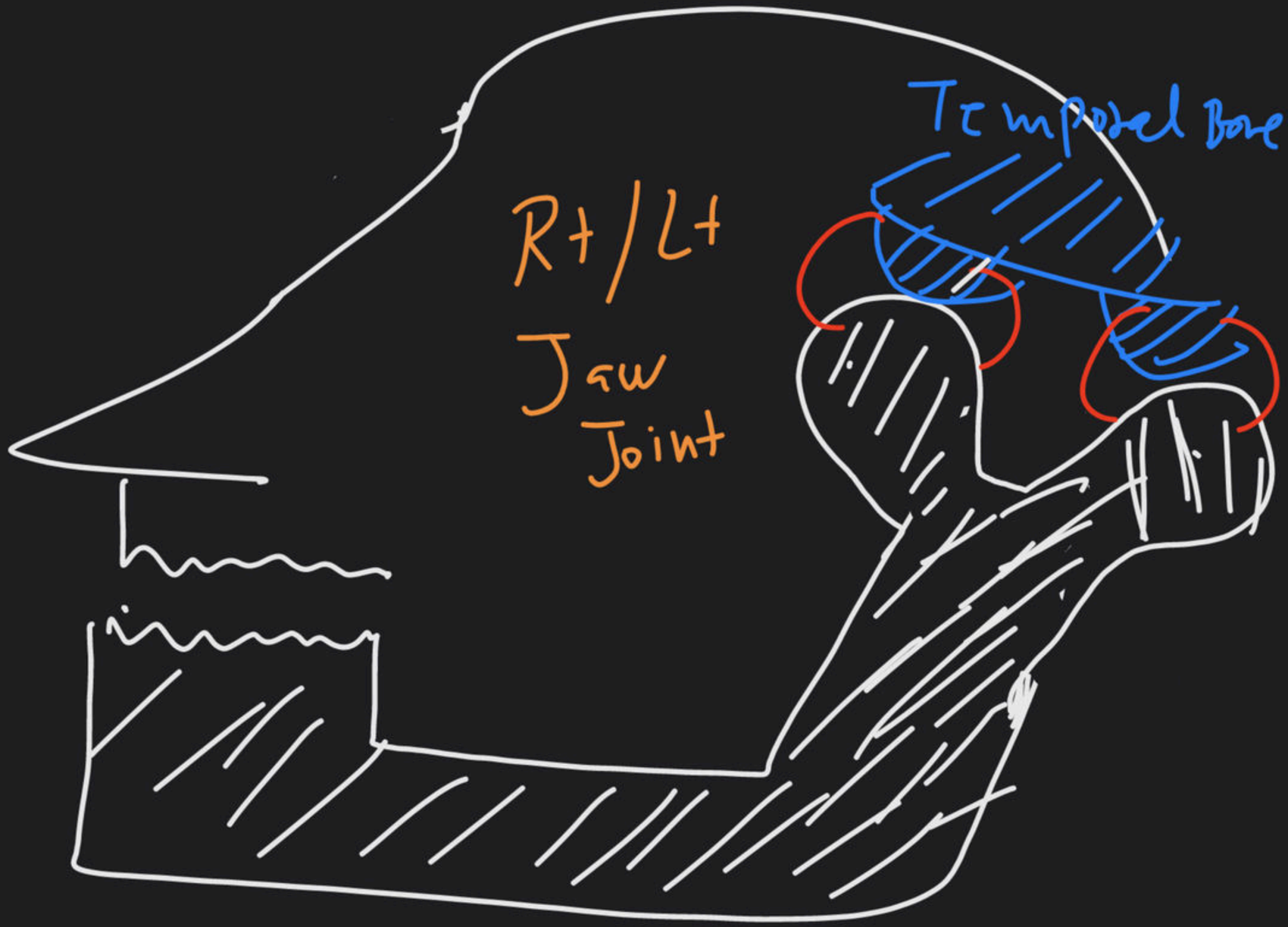
1

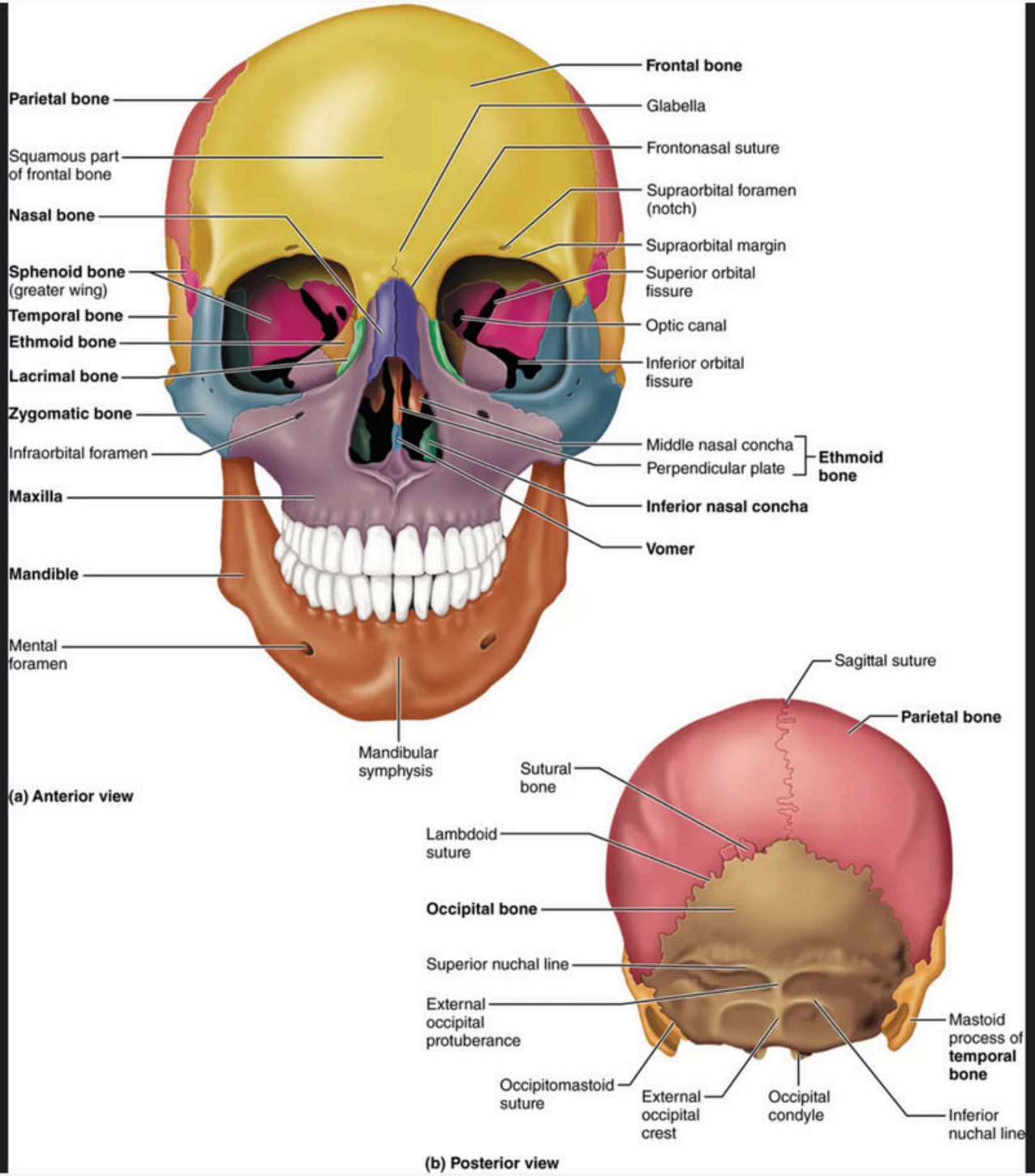
Movable

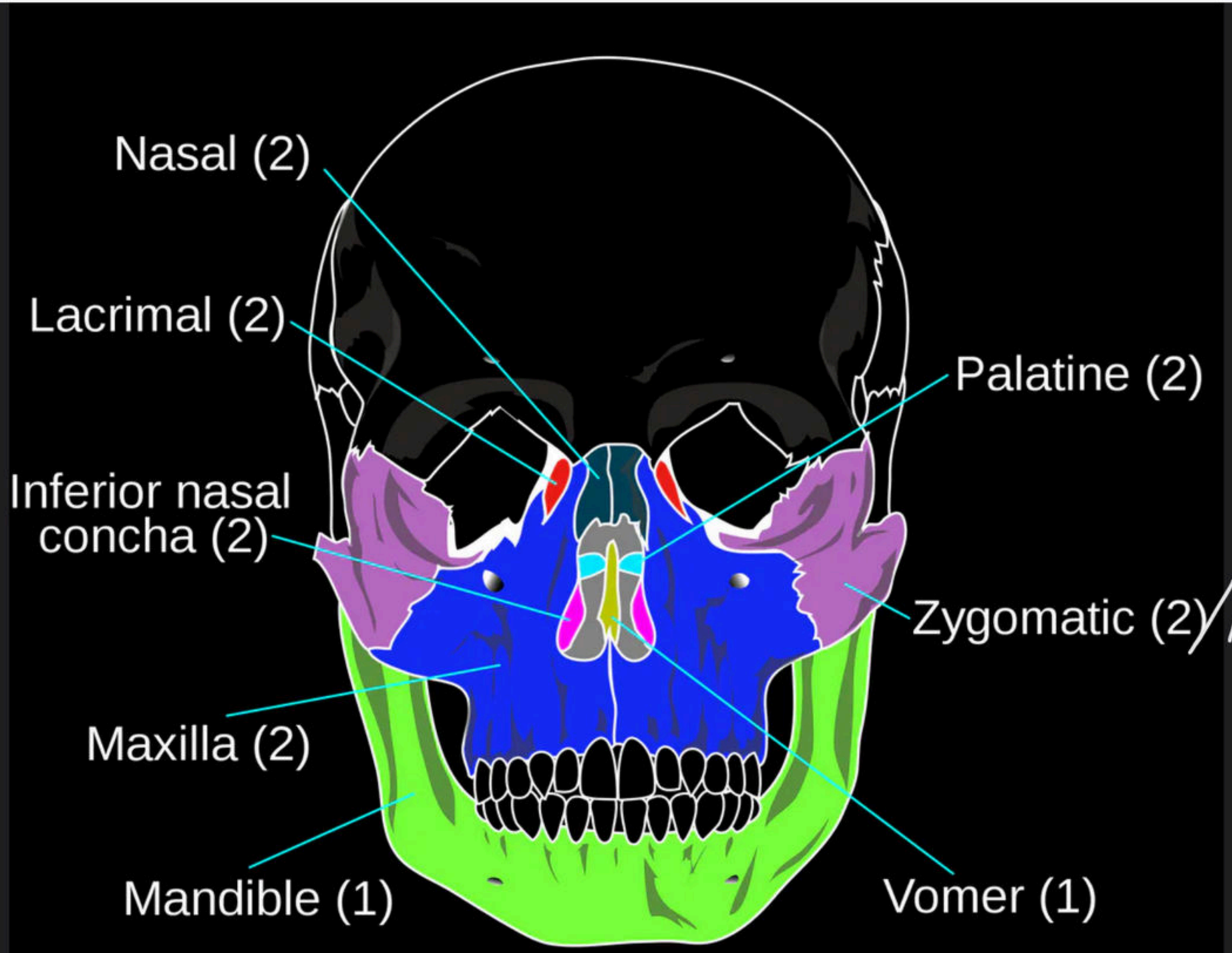
In mammals

⇓

Cranio-Stylic Suspension of Lower jaw




Parietal bone
Squamous part of frontal bone
Nasal bone
Sphenoid bone (greater wing)
Temporal bone
Ethmoid bone
Lacrimal bone
Zygomatic bone
Infraorbital foramen
Maxilla
Mandible
Mental foramen
Mandibular symphysis
(a) Anterior view
Frontal bone
Glabella
Frontonasal suture
Supraorbital foramen (notch)
Supraorbital margin
Superior orbital fissure
Optic canal
Inferior orbital fissure
Middle nasal concha
Perpendicular plate
Ethmoid bone
Inferior nasal concha
Vomer
Sagittal suture
Parietal bone
Sutural bone
Lambdoid suture
Occipital bone
Superior nuchal line
External occipital protuberance
Occipitomastoid suture
External occipital crest
Occipital condyle
Mastoid process of temporal bone
Inferior nuchal line
(b) Posterior view



14 facial bones

[II] **Sensory capsule :-** Ear is surrounded by bony auditory capsules, middle ear has 3 movable ear ossicles

1. Maleus (Modification of articular bone)
2. Incus (Modification of Quadrate bone)
3. Stapes (smallest bone of body) modification of Hyomandibular bone.

[III] **Face :-** It is made up of 14 bones

Maxilla 2	Vomer - 1	Palatines 2
Mandible - 1	Nasal - 2	Lacrimal - 2
Inferior turbinals - 2	Malar bone (Zygomatic bone) -2	

Mandible is Largest and single bone of lower jaw. It is largest bone of face and strongest bone of axial skeleton of body. It is only movable bone of skull expect ear ossicles. It bears all the teeth of lower jaw. In the posterior part of this bone condyle is present which fit in the cavity of temporal bone so lower jaw is attached with cranium this suspension is called craniostylic.

HYOID BONE [1] (Tongue bone)

A horse shoe-shaped bone is our neck between lower jaw and larynx. It is not articulated to any bone of axial skeleton. The muscles of tongue, larynx, neck and pharynx are attached with this bone.

1 Question minimum
NEET

JOINTS

Joints are essential for all types of movements involving the bony parts of the body. Locomotory movements are no exception to this Joints are points of contact between bones or between bones and cartilages. Force generated by the muscles is used to carry out movement through joints, where the joint acts as fulcrum. The movability at these joints vary depending on different factors. Joints have been classified into three major structural forms, namely, fibrous, cartilaginous and synovial.

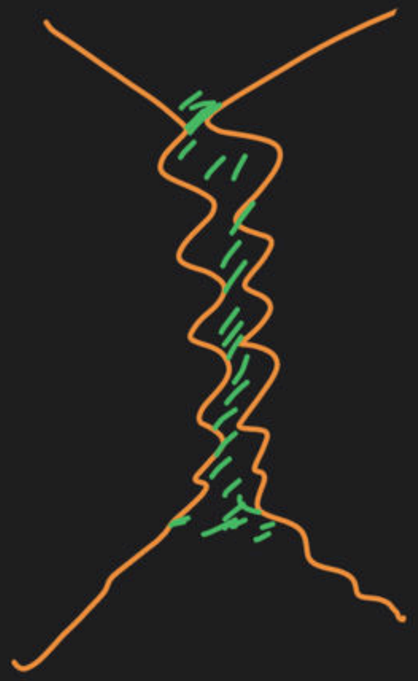
Classification of Joints

Degree of mobility	Immovable Joints	Slightly Moveable	Highly Movable
Joining Tissue	fibrous tissue	Cartilage / fibrocartilage	Ligaments
Type	Fibrous Joints	Cartilagrnous Joints	Synovial Joints
Also Called as	Synarthrosis	Amphiarthrosis	Diarthrosis
Function	Support	Support & some degree of internal movement	Movement & Locomotion

immovable → I) Fibrous Joints

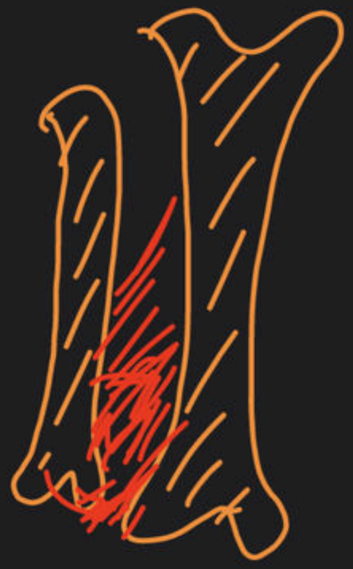
(i) Sutures

Eg- Skull



(ii) Syndesmosis

Eg- Tibio-fibular Joint

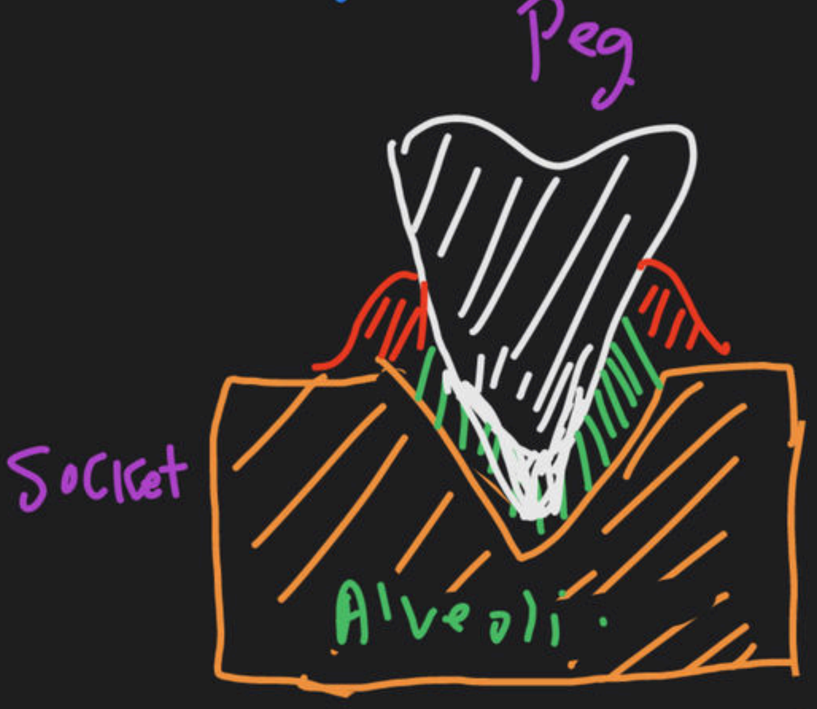


fibrous ligament joining bone so tightly that no movement is possible

Peg & socket Type

(iii) Gomphosis

Eg- Tooth



Slightly Movable ⟶ II) Cartilagenous Joints

Eg→ Joints b/w
① Epiphysis & Shaft of Long bone
② Sacrum ③ Coccyx
④ Hip bone

(i) Primary
(Synchondrosis)
(These Dissapear After Certain Age)

(ii) Secondary
(Symphysis)
(These Persist throughout life)

Eg → ① Pubic Symphysis
② b/w bodies of cervial or Thoracic or Lumbar vertebra.

26 pieces (24) Secondary

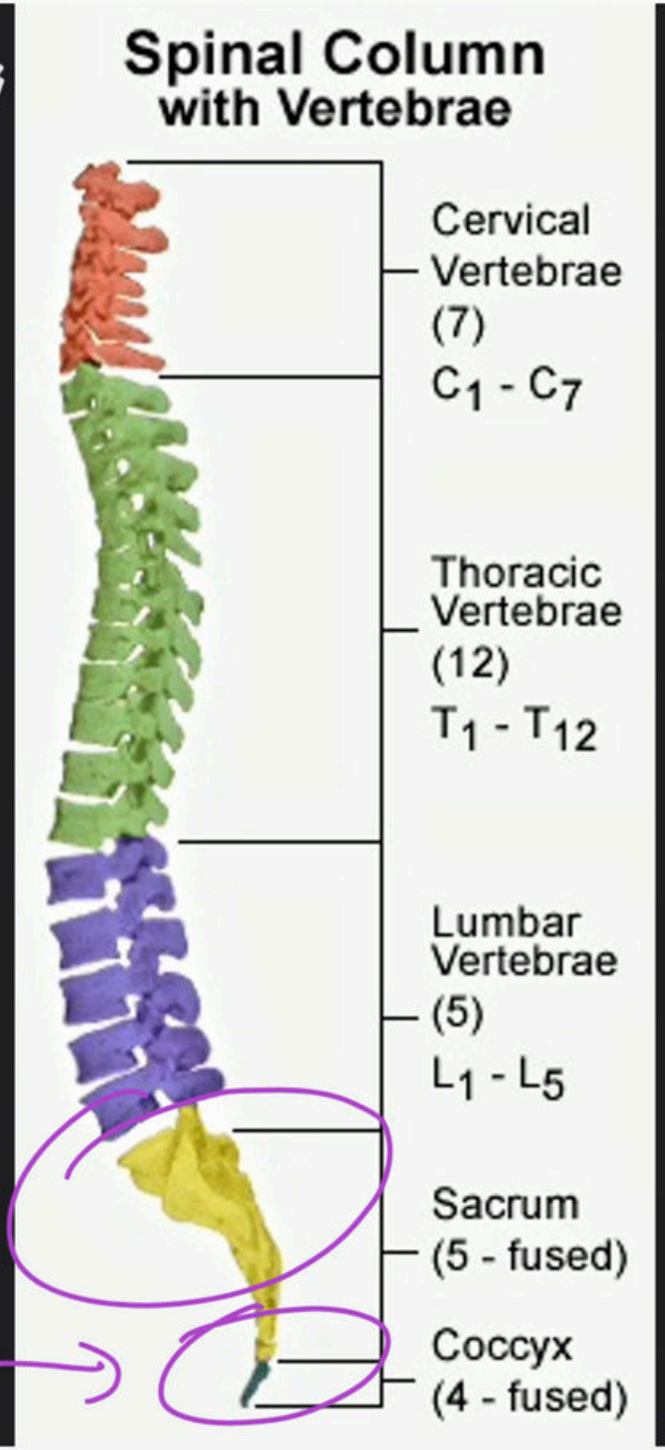
25th 26th

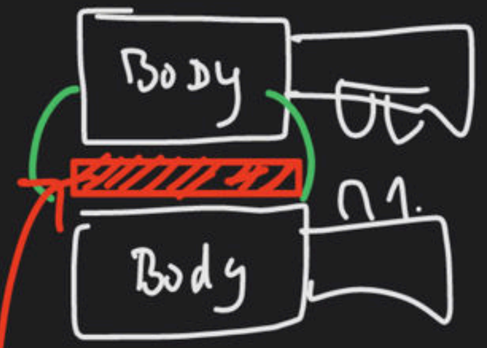
Primary

Secondary (24)

(25) Primary

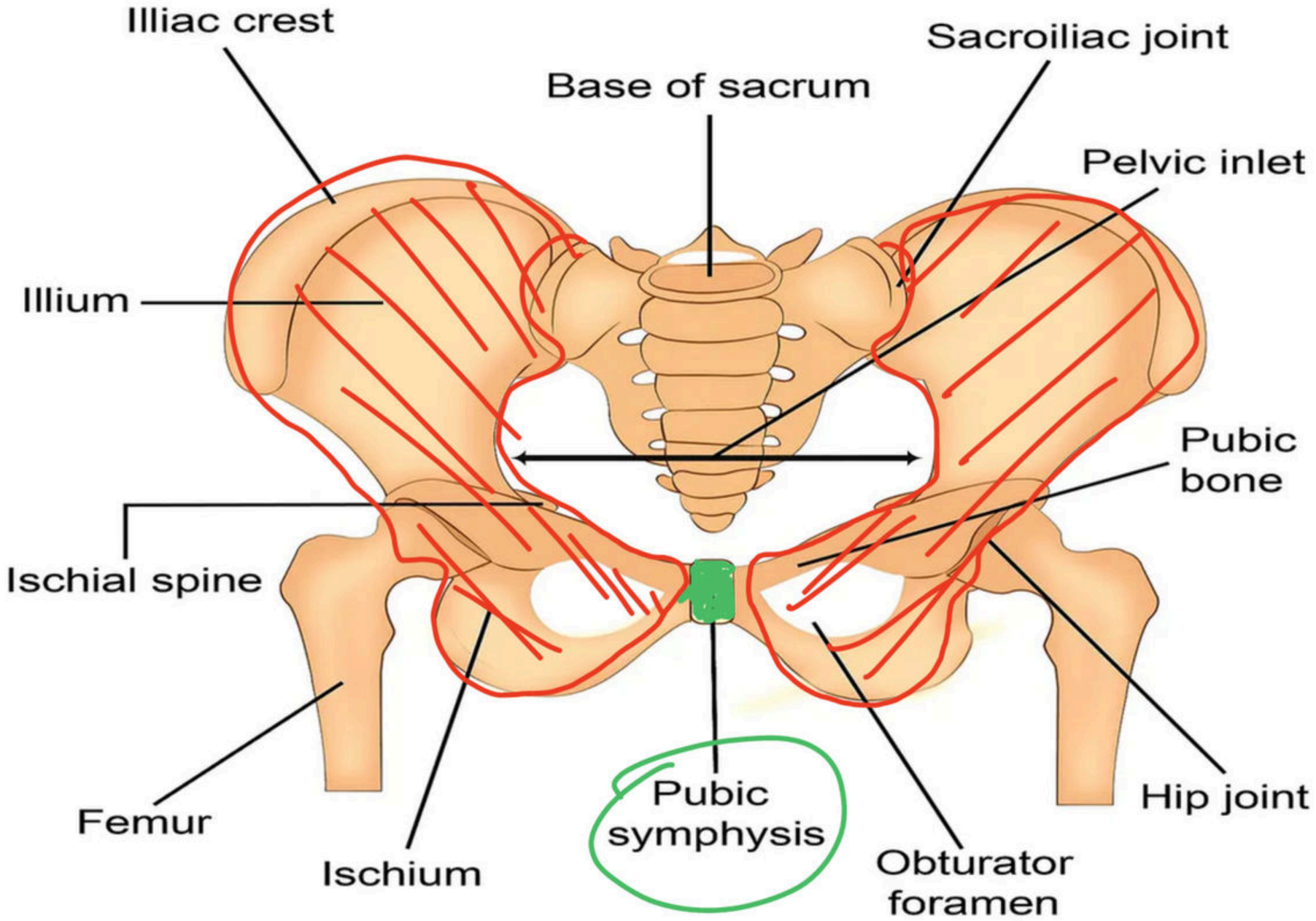
(26) Primary





FibroCartilage Disc [Secondary Cartilage Joint]

Pelvic Girdle



Synovial Joint