



MUSCULOSKELETAL SYSTEM

Subject : Anatomy

Lec no : Axail 3

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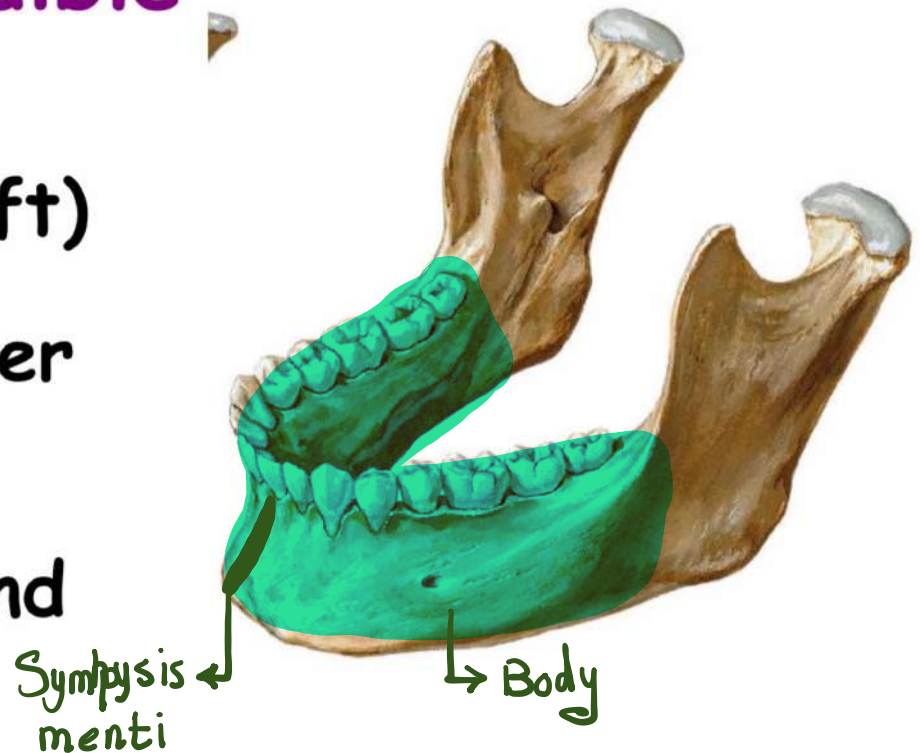
وَقُلْ رَبِّ زِدْنِي عِلْمًا

Mandible ↳ It is the movable part

Mandible

** Is formed of two bones, (right and left) which unite at the **symphysis menti** after the first year.

** The mandible is formed of a **body** and **two rami**.



- The symphysis menti is a secondary cartilaginous joint like the symphysis pubis

- The secondary cartilaginous joints are permanent joints, which are slightly movable and their movements depend upon the sufficient amount of white-fibro cartilage tissues.

Examples of secondary cartilaginous joints are: Intervertebral discs.

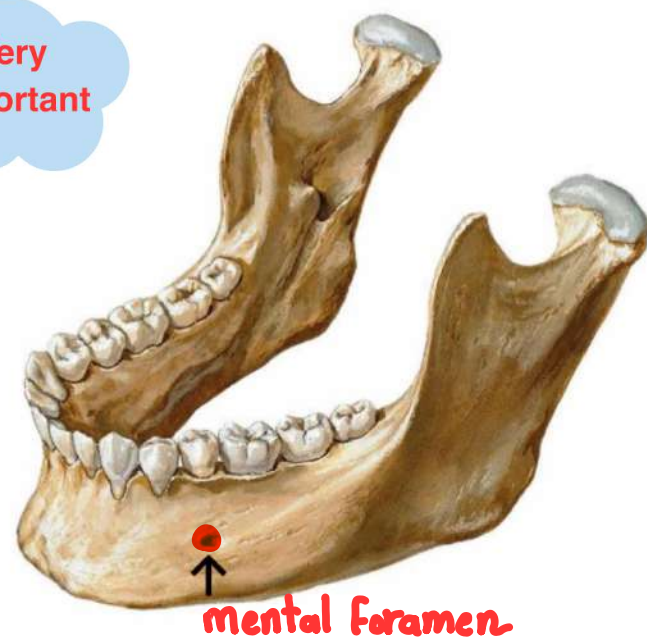
Sacrococcygeal symphysis. Symphysis pubis between the right and left pubic

A. The body

* External surface:

* The **mental foramen** lies **midway between upper & lower borders, below 2nd premolar tooth.**

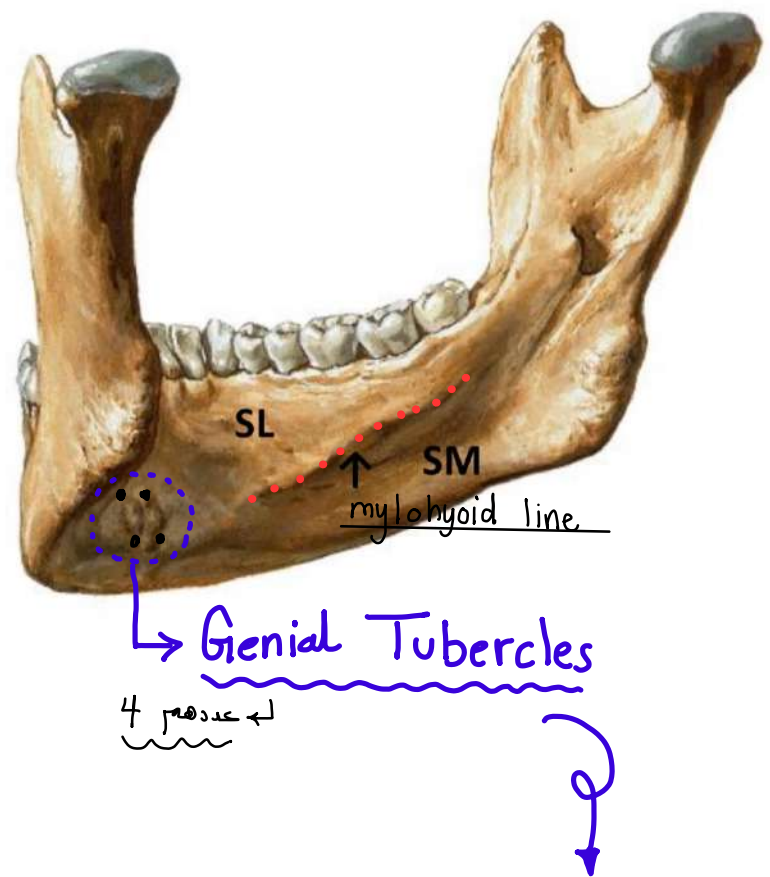
Very important



- The mental foramen also lies between alveolar arch of the mandible and base of the mandible

* Internal surface :

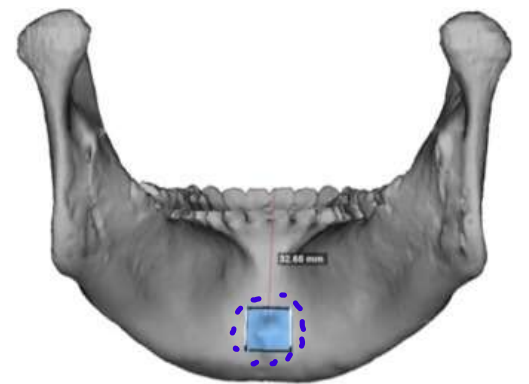
- It shows the **mylohyoid line** (↑).
- Below this line is the **submandibular fossa (SM)**, while above this line is the **sublingual fossa (SL)**.



- The genial tubercles act as the insertion for the geniohyoid muscle (lower genial tubercles) and genioglossus muscle (upper genial tubercles).

- The submandibular fossa is related to submandibular gland.

- The sublingual fossa is related to sublingual gland.



B. Ramus of mandible

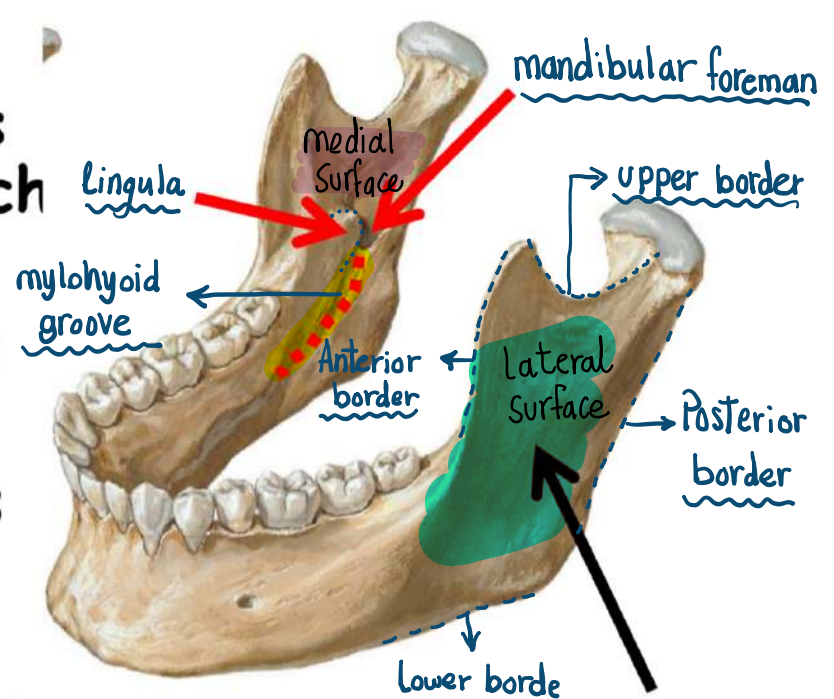
* It has two surfaces.

1. The medial surface: shows the **mandibular foramen** which leads to **mandibular canal**.

• Projecting over the foramen is the **lingula** .

• The **mylohyoid groove** starts at the lower border of the foramen.

2. The lateral surface: is flat



ال mandibular foramen هو بداية ال mandibular canal و ينتهي ب mental foramen

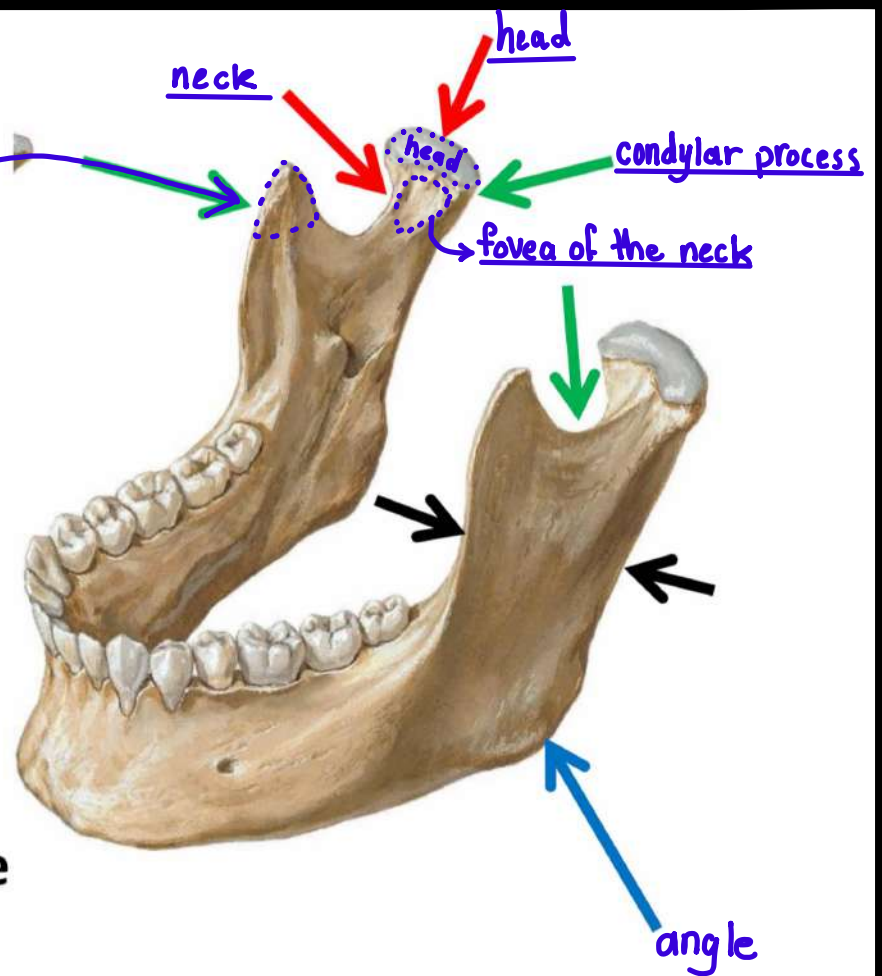
The mylohyoid groove (Sulcus mylohyoideus) is a vasculonervous impression

Musculoskeletal System



** Upper border:

- Shows two process **coronoid** anteriorly and **condylar** process posteriorly and in between the **mandibular notch**.
- The **condylar process** is expanded to form the **head** of the mandible.
- The constricted area below the head is the **neck** → depression.
- **Angle** of the mandible is the area of meeting of body and the ramus .



- The head of the condylar process articulates with the base of the skull, and form the TMJ (tempromandibular joint) which is a synovial elipsoid joint (it acts on 2 axis)

Revise mandible by numbers

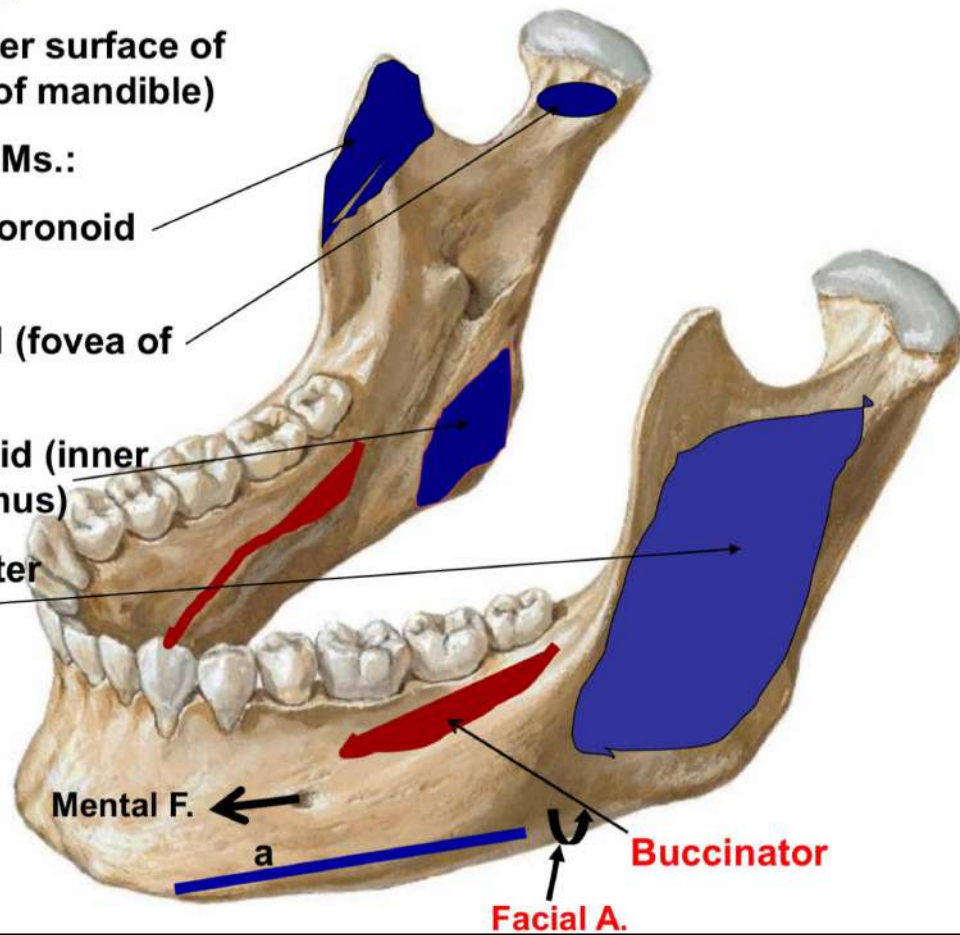
- 10 Ms. are attached (5 insertions & 6 origins).
- 3 main salivary glands are related.

Musculoskeletal System



Ms.: 5 Insertions:

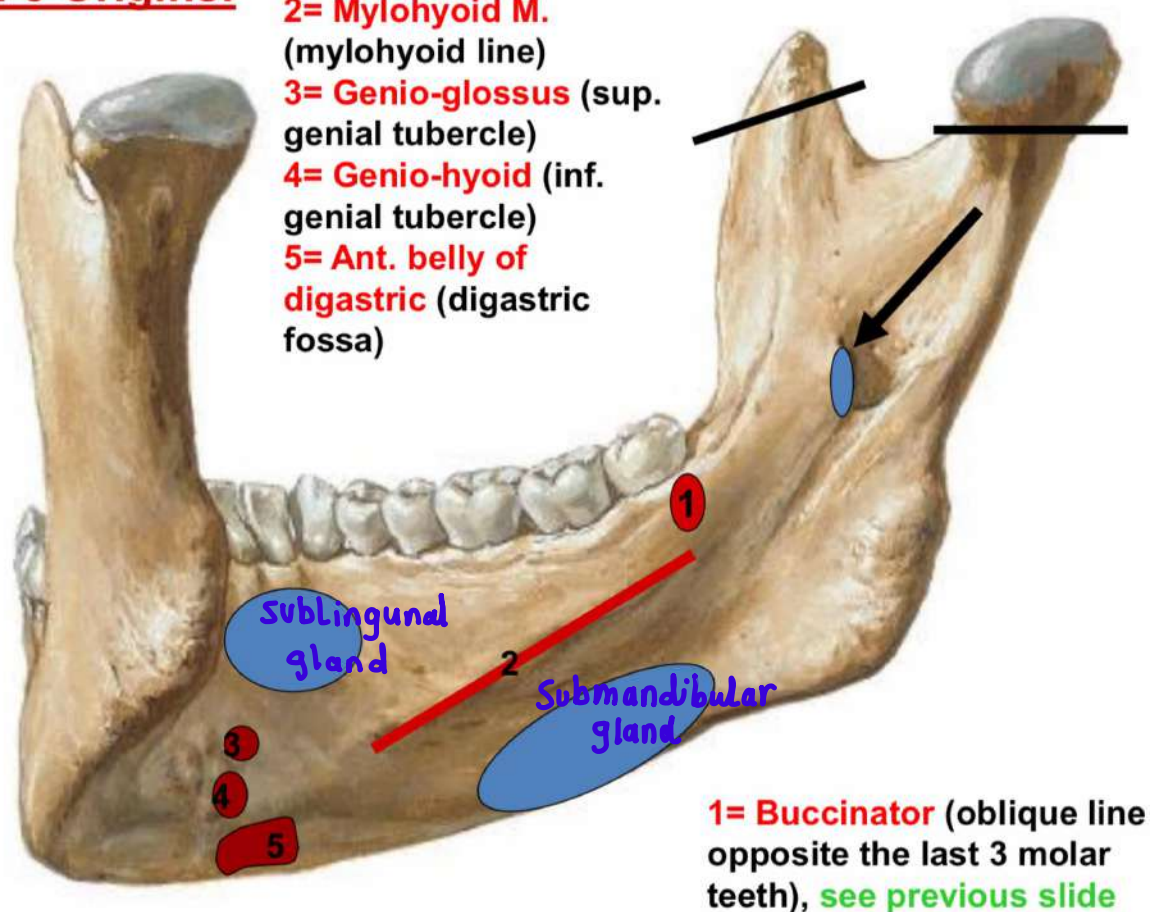
- a. Platysma (outer surface of lower border of mandible)
- b. 4 Mastication Ms.:
 - i. Temporalis (coronoid process)
 - ii. Lat. Pterygoid (fovea of neck)
 - iii. Med. Pterygoid (inner surface of ramus)
 - iv. Masseter (outer surface of ramus)



- The temporalis muscle originates from the temporal fossa and the temporal fascia.
- lateral pterygoid muscle originates from the lateral surface of the lateral pterygoid plate of sphenoid bone.

Ms.: 5 Origins:

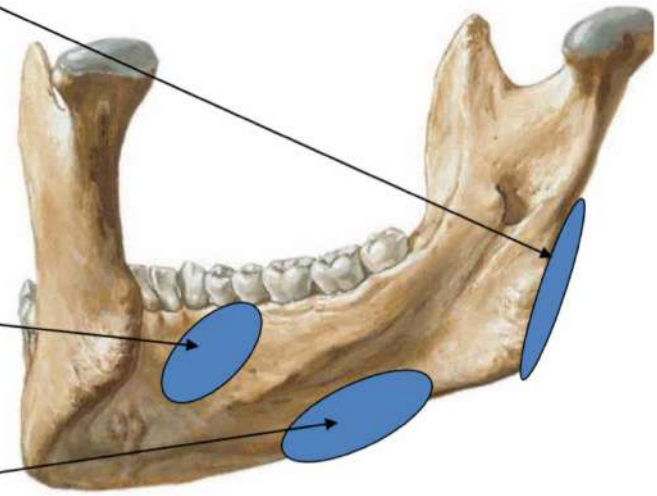
- 2= Mylohyoid M. (mylohyoid line)
- 3= Genio-glossus (sup. genial tubercle)
- 4= Genio-hyoid (inf. genial tubercle)
- 5= Ant. belly of digastric (digastric fossa)



سؤال مهم، شو الفرق لما احكي هاد الجزء او related attached ?
Attached for muscles

3 Salivary glands are related

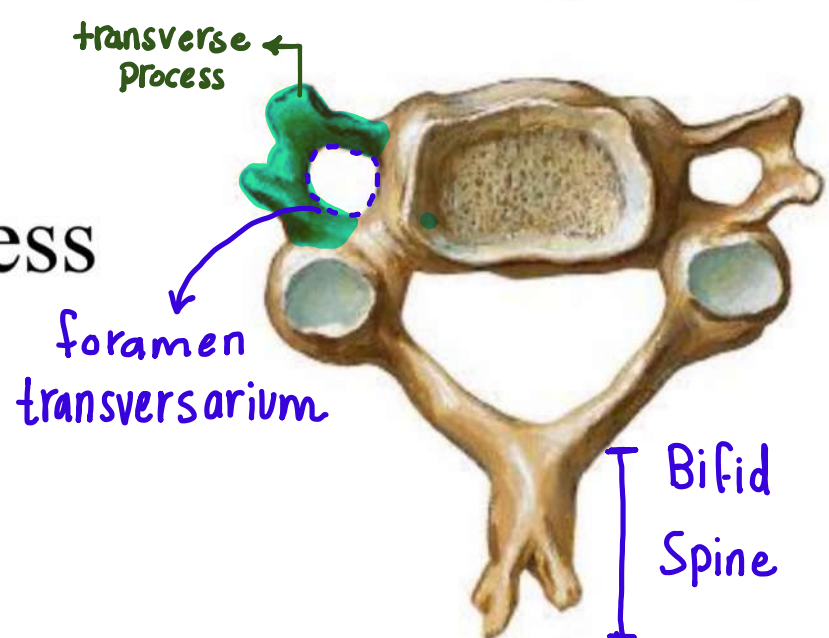
- **Parotid** (on the ramus, but stylo-mandibular lig. is also attached there).
- **Sublingual** (near the upper border).
- **Submandibular** (near the lower border).



Cervical Vertebrae

Typical Cervical Vertebra (3-6)

- * Its spine is bifid.
- * Its transverse process shows a foramen transversarium.

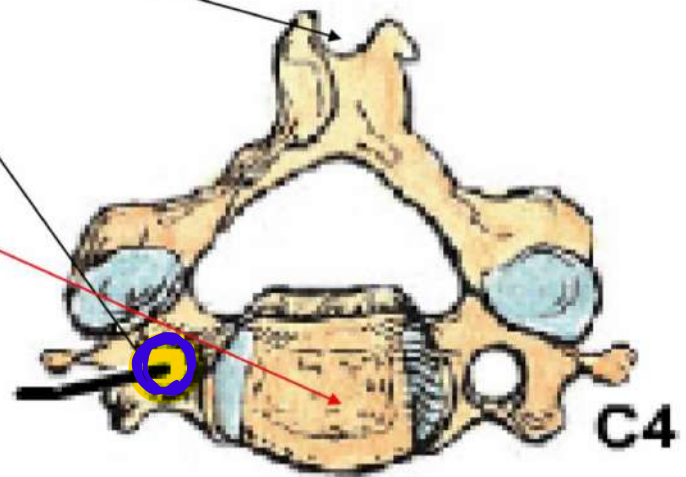


Typical (C3-6) with short bifid spine

- **Spine** --- Lig. nuchae. ↳ attached
- **F. transversarium** --- 3 structures passing (vertebral A. & V. + symp. plexus). ↳ related
- **Body** --- Intervertebral disc (synovial plane).

joint ↳
secondary

الفوها جا

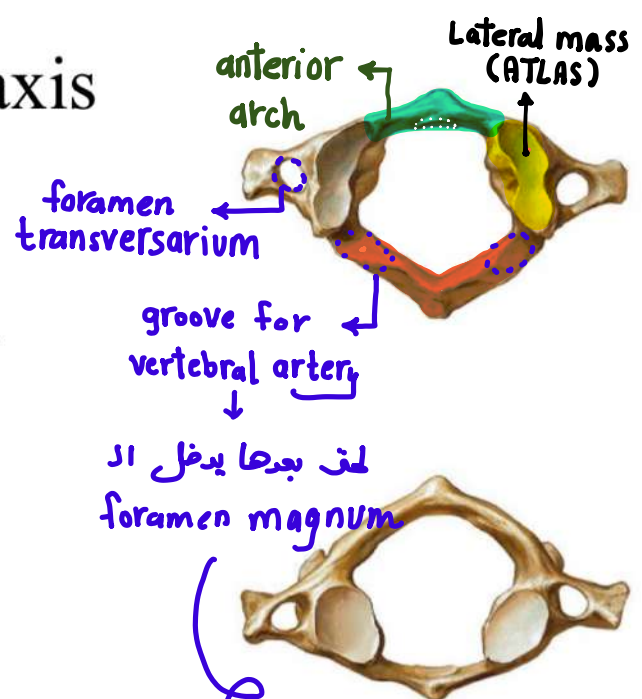


ال structures الموجودة في foramen transversarium بتبدأ من C6 و بعدها بتعتبر من groove بال C1 و بتدخل ال foramen magnum

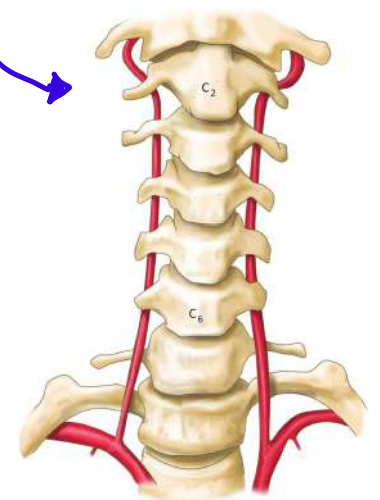
نوع ال joint في ال body هو secondary

Atlas = 1st Cervical Vertebra

- * Articulates with skull above & axis below.
- * Formed of 2 lateral masses connected by anterior & posterior arches.
- * Its transverse process shows a foramen transversarium.



- in this vertebra there is no body and no spine.

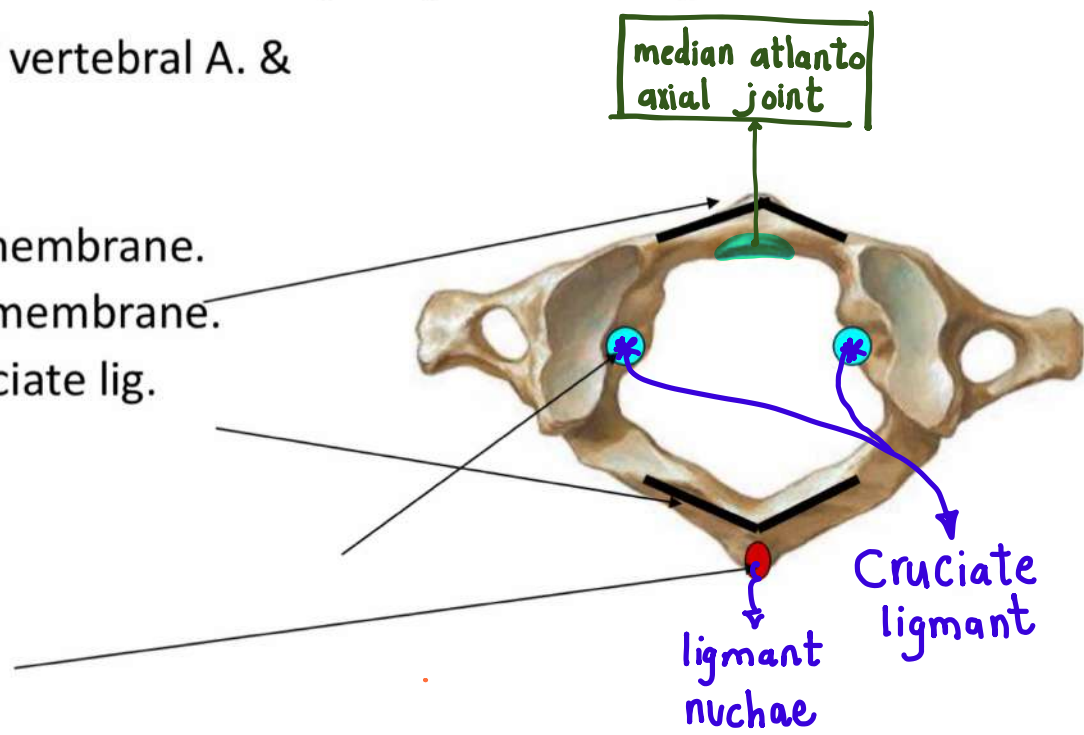


To summarize

III. ATLAS (C1):

1, 5

- **1 groove** for 3rd part of vertebral A. & suboccipital N.
- **5 Ligs.:**
 - 1- Ant. Atlanto-occipital membrane.
 - 2- Post. Atlanto-occipital membrane.
 - 3- Transverse band of cruciate lig.
 - 4- Lig. nuchae
 - 5- Capsule of any J.



Axis = 2nd Cervical Vertebra

↳ Atypical

* Articulates with **atlas** above & 3rd cervical vertebra below.

* It has a well-defined process called dens.

* Its transverse process shows a foramen transversarium.

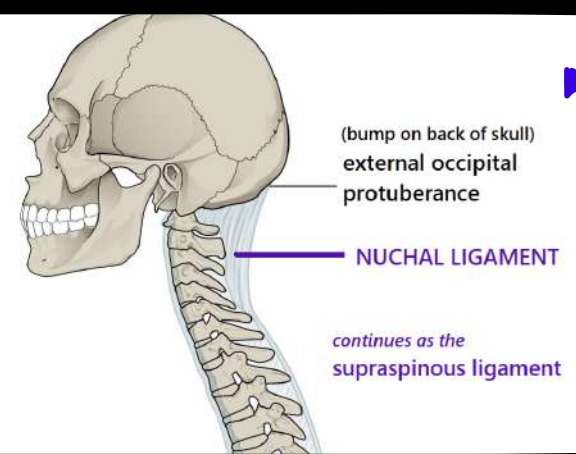
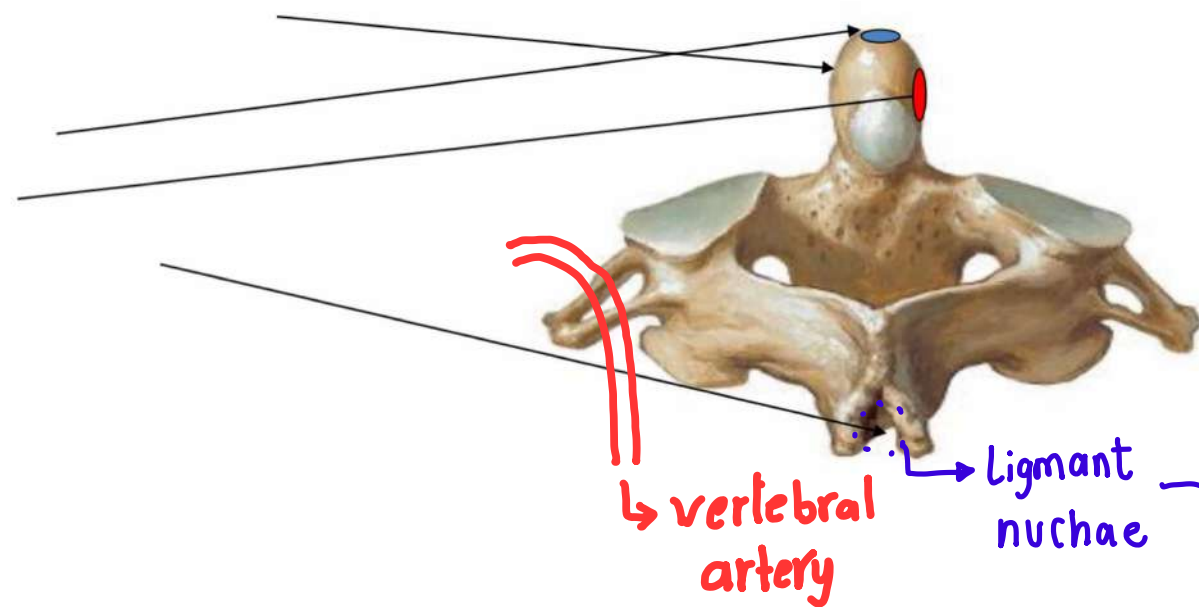


: بنلاحظ وجود 3 joints بين ال atlas و axis
1- 2 lateral atlanto axial joint

IV. AXIS (C2):

1, 3

- 1 PROCESS --- Odontoid process (Dens)
- 3 Ligs. :
 - 1- Apical
 - 2- Alar
 - 3- Lig. nuchae



7th Cervical Vertebra

- * Its spine is long & not bifid.
- * Its transverse process shows a foramen transversarium.

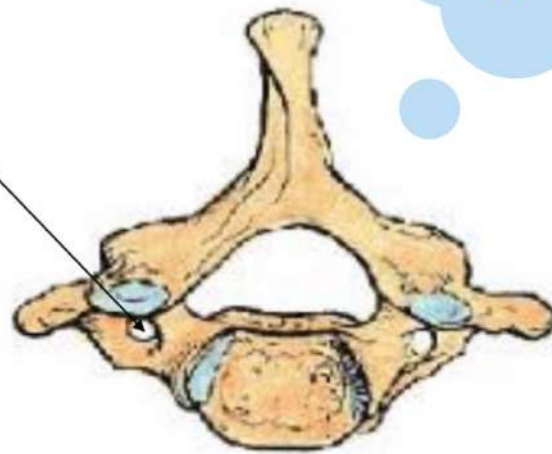


C7 vertebra with long not bifid spine

- F. transversarium transmits accessory vertebral V. only

سؤال متوقع ت

Very important



Important joints of cx. vertebrae

1- Atlanto-occipital joints:

Type: Ellipsoid synovial joint

Articular surfaces:

Above: convex occipital condyles

Below: concave superior articular facets

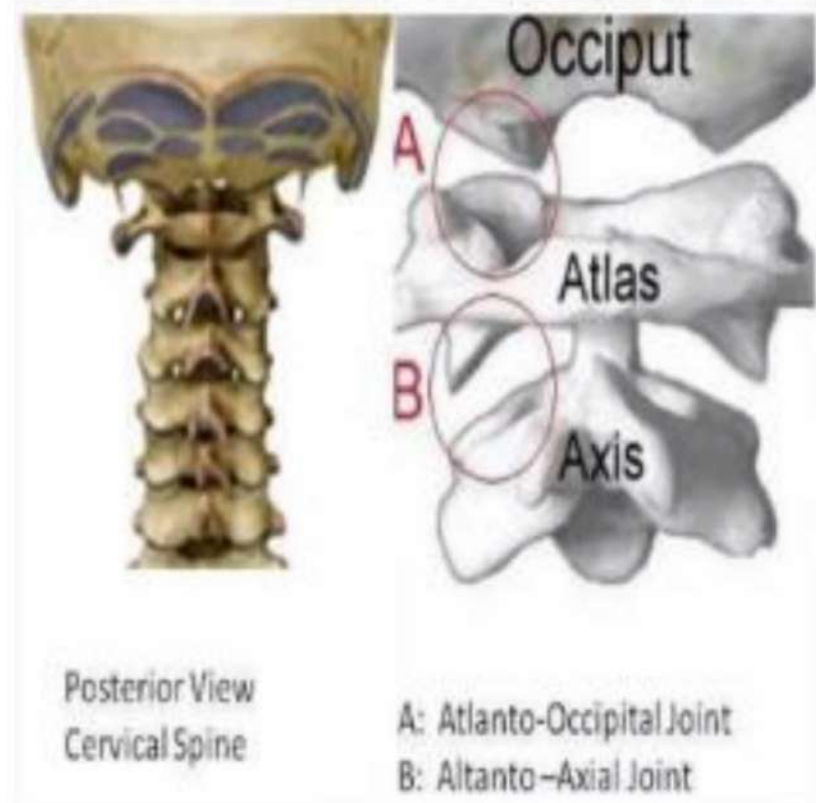
of atlas

Movements: they allow movements around two axes:

1-Flexion & Extension: nodding or yes movement

Occur around transverse axis

2-Lateral flexion around anterosuperior axis



Posterior View
Cervical Spine

A: Atlanto-Occipital Joint
B: Atlanto-Axial Joint

Musculoskeletal System



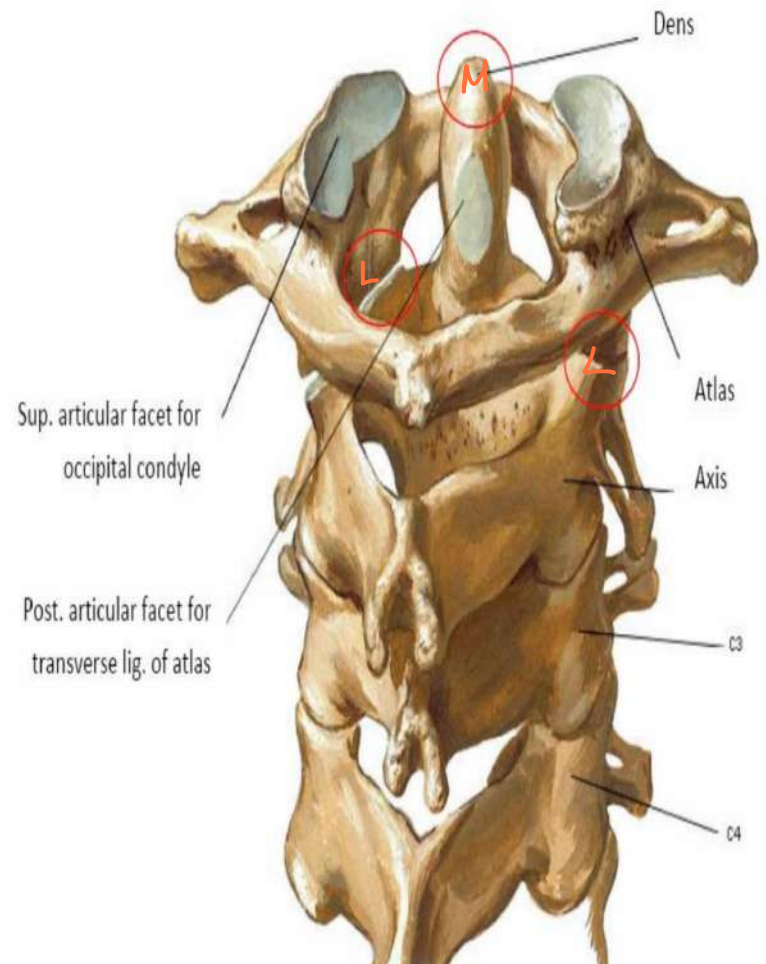
2- Atlanto-axial joints:

Types and articular surfaces:

1- A pair of lateral atlanto-axial joints: between the inferior facets of atlas and superior facets of axis. **These are plane synovial joints**

2- median atlanto-axial joint: between dens of axis and posterior surface of anterior arch of atlas. **It is synovial pivot**

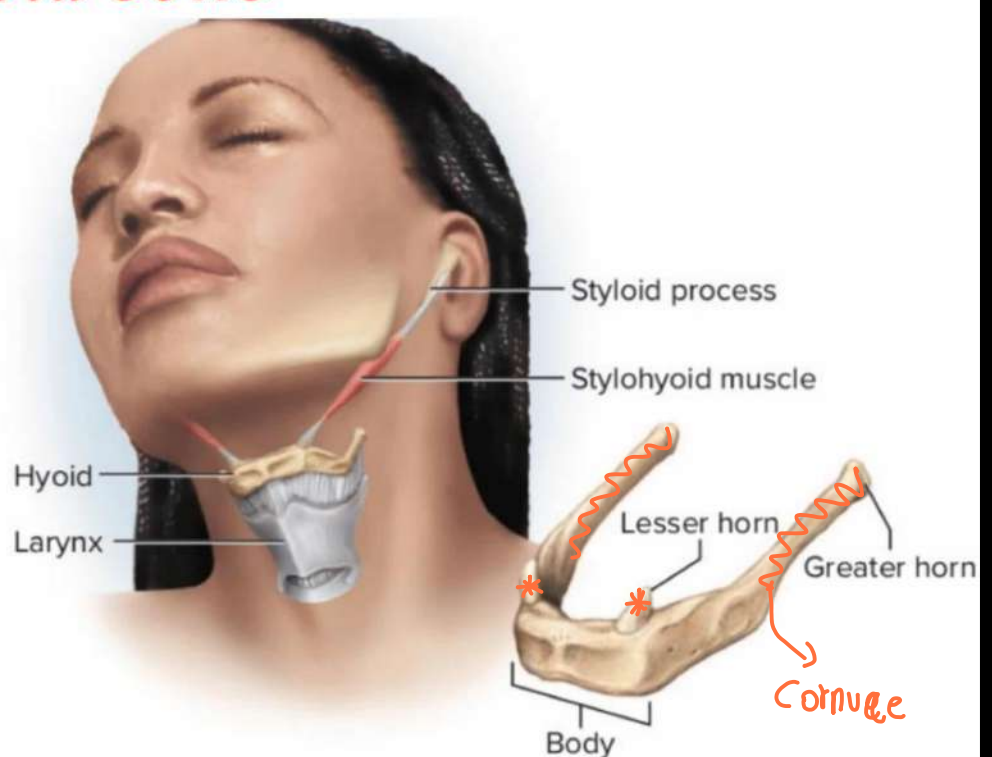
Movement: all 3 joints permit rotatory movements (No movements) of the atlas with skull on the axis vertebra around a vertical axis



Hyoid bone

*Hyoid bone is a U-shaped bone, situated in anterior midline of the neck between chin and thyroid cartilage

* **Consists of: body and two pairs of cornuae (horns) a greater and lesser one**



Muscular Attachments

The hyoid bone is unique in the fact that it does not articulate with any other bones, and is suspended in place by the **muscles and ligaments** that attach to it.

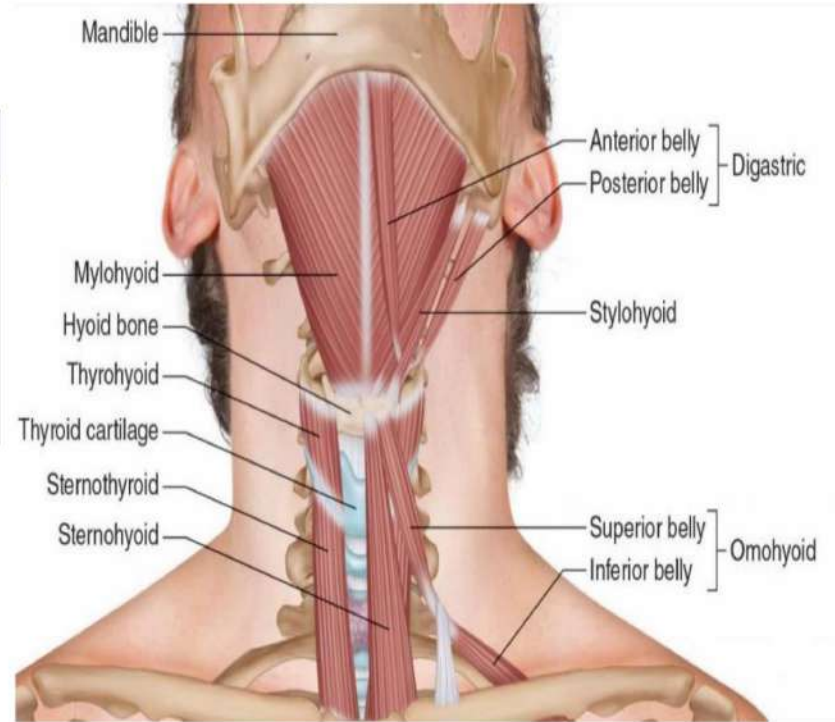
Indeed, it acts as a site of **attachment for many muscles in the neck**.

Oral Cavity and Pharynx	Suprahyoid	Infrahyoid
<ul style="list-style-type: none"> Middle pharyngeal constrictor Hyoglossus Genioglossus 	<ul style="list-style-type: none"> Digastric Stylohyoid Geniohyoid Mylohyoid 	<ul style="list-style-type: none"> Thyrohyoid Omohyoid Sternohyoid

Ligament Attachments

There are three main **ligaments** that attach to the hyoid bone - stylohyoid, thyrohyoid and hyoepiglottic. They act to support the position of the hyoid in the neck.

- **Stylohyoid ligament** - extends from the **styloid process** of the temporal bone to the lesser horn of the **hyoid bone**.
- **Thyrohyoid membrane** - originates from the superior border of the **thyroid cartilage** and attaches to the posterior surface of the **hyoid bone** and the greater horns.
- **Hyoepiglottic ligament** - connects the **hyoid bone** to the anterior aspect of the **epiglottis**.

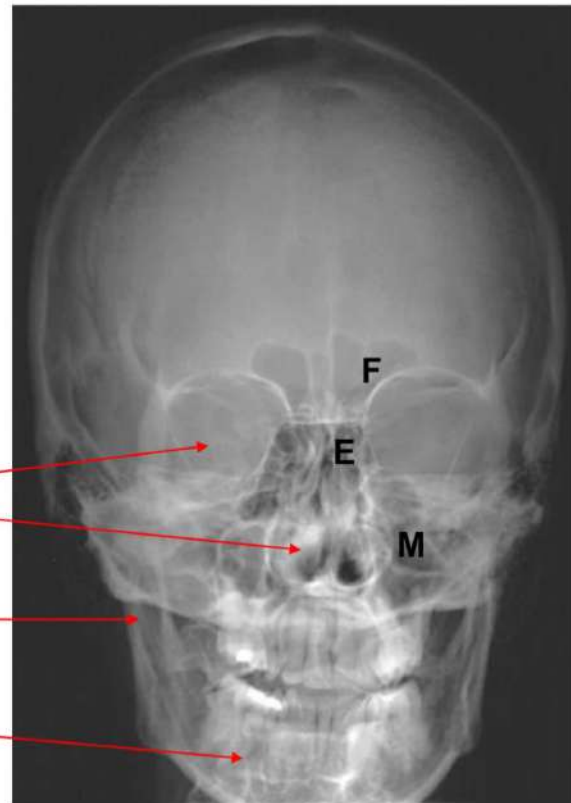


Radiology of Head & Neck

I. ANTEROPOST. VIEW

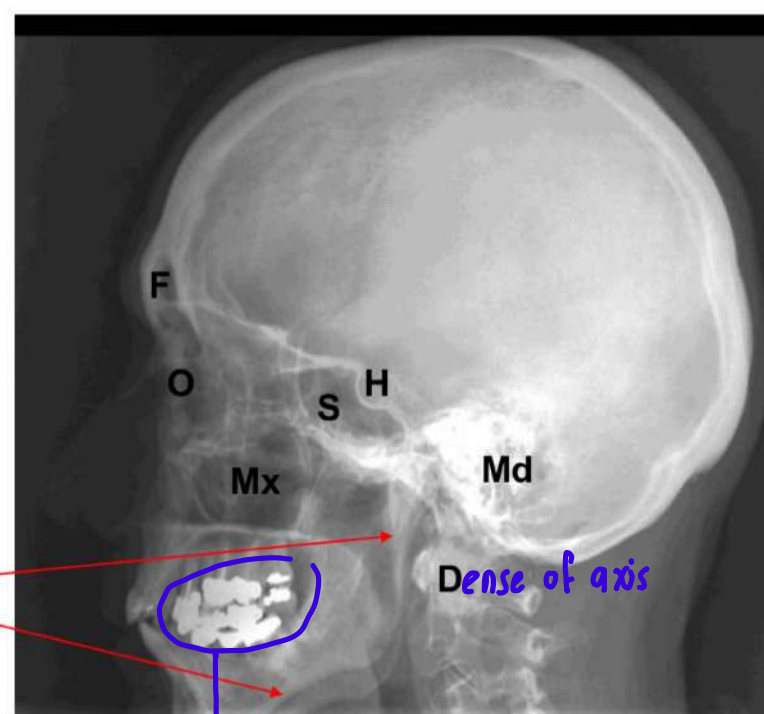
(1 structure, 2 orifices, 3 sinuses)

- 3 Sinuses:
(Frontal, Ethmoidal & Maxillary)
- 2 Orifices:
1- Nose
2- Orbit.
- 1 Bone = Mandible (ramus & body).



II. LAT. VIEW

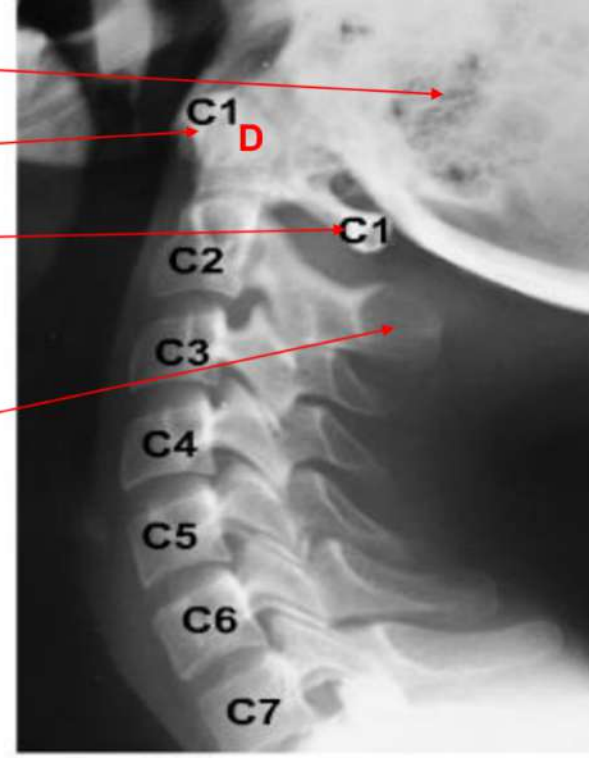
- Frontal air sinus.
- Orbit.
- Maxillary air sinus.
- Sphenoidal air sinus.
- Hypophyseal fossa \rightarrow pituitary gland
- Mandible (body & ramus).
- Mastoid process.



حشوات بالاسنان

III. Lat. View of Cervical vertebrae

- Mastoid process.
- Ant. arch of Atlas.
- Post. „ „ „
- **D**ens of Axis.
- Body „ „ (C2)
- Spine „ „
- Cervical vertebra (? No.).



Lateral View

اللهم أطفء باخواننا
المسلمين المستضعفين
في فلسطين

اللهم كن لهم مؤيداً ونصيراً ومعيناً وظهيراً
اللهم اجعل لهم من كل هم فرجاً
ومن كل ضيق مخرجاً ومن كل بلاء عافية

