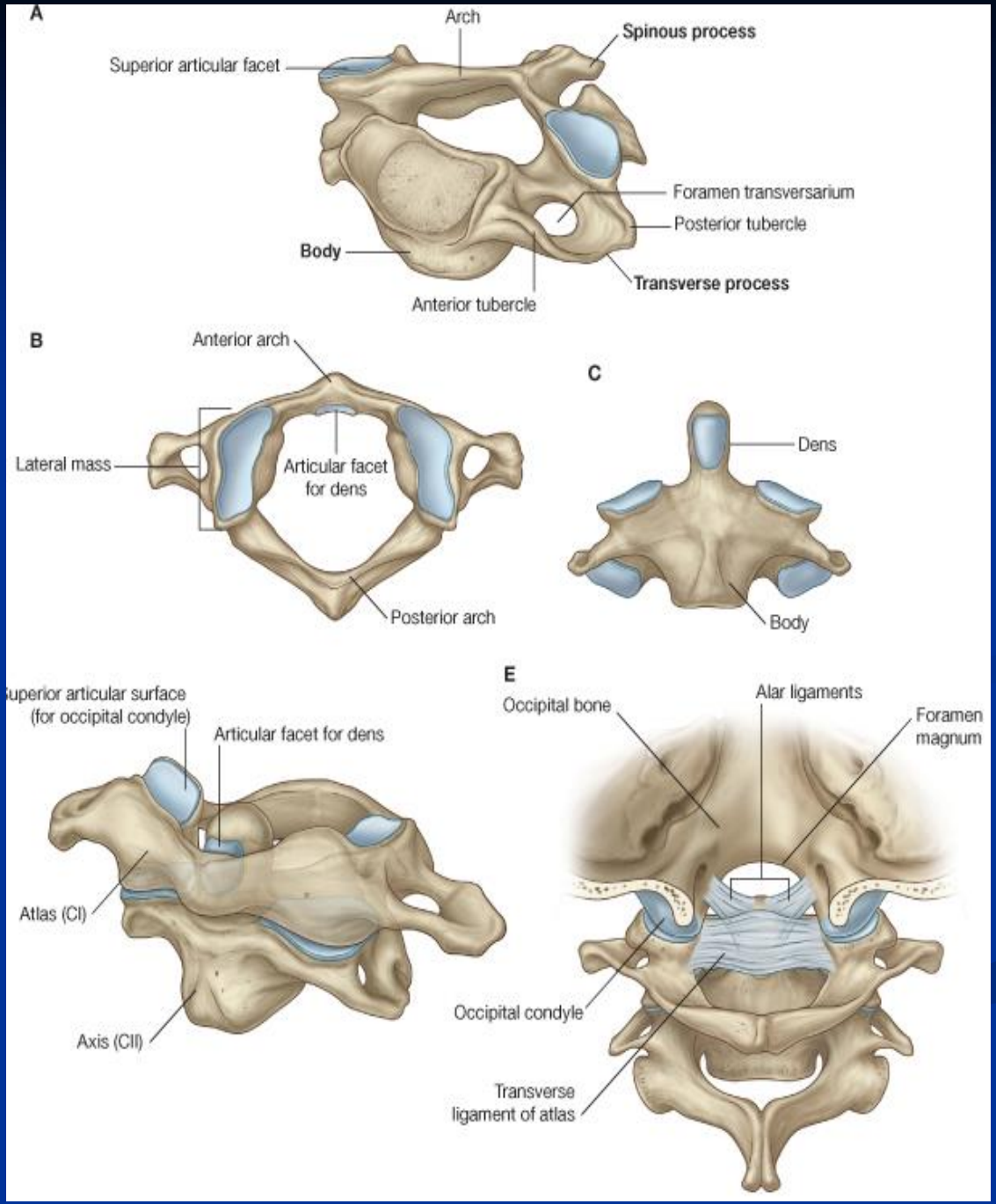
CERVICAL VERTEBRAE

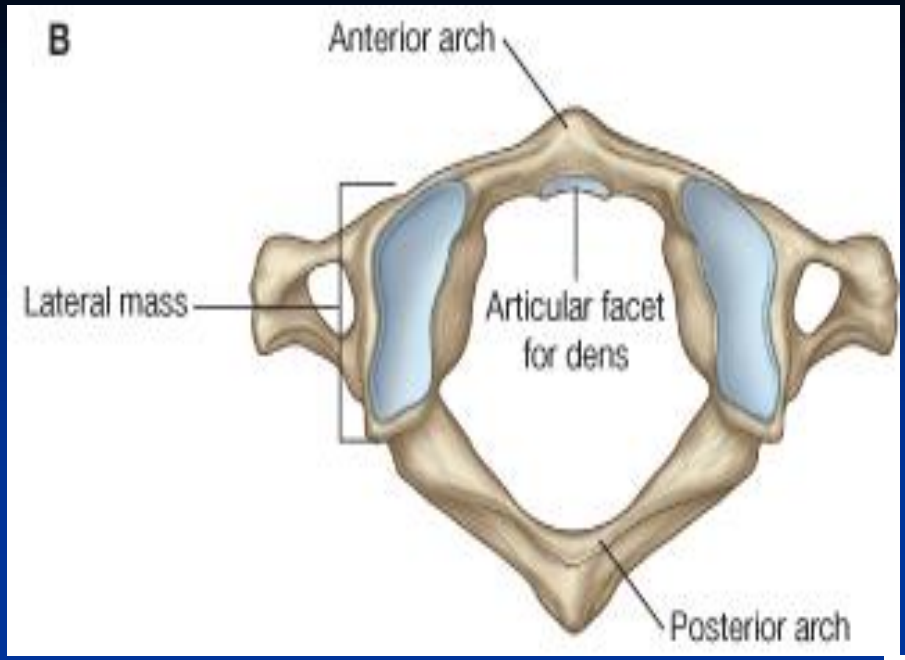


Prof. Saeed Abuel Makarem

Objectives

- ***By the end of this lecture you should be able to:***
- Describe the 7 cervical vertebrae, (**typical & atypical (Non-typical)**).
- Describe the joints between the cervical vertebrae.
- Describe the movement which occur in the region of the cervical vertebrae.
- List the structures which connect 2 adjacent vertebrae together.

CERVICAL SPINES



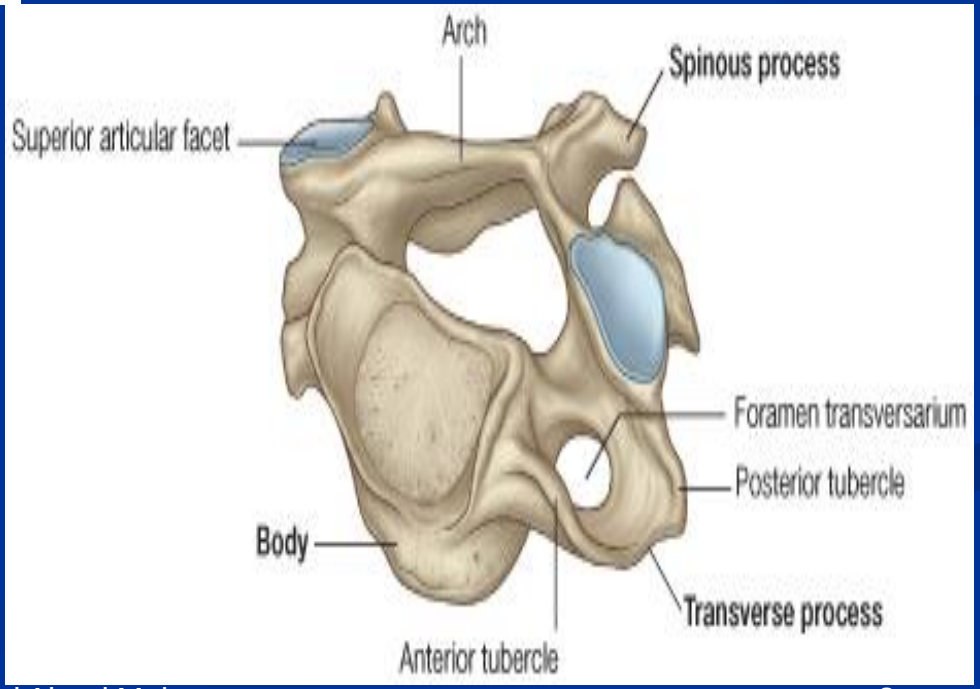
They are **7** in number.

All characterized by presence of **foramen transversarium** in the transverse process.

They are classified into:

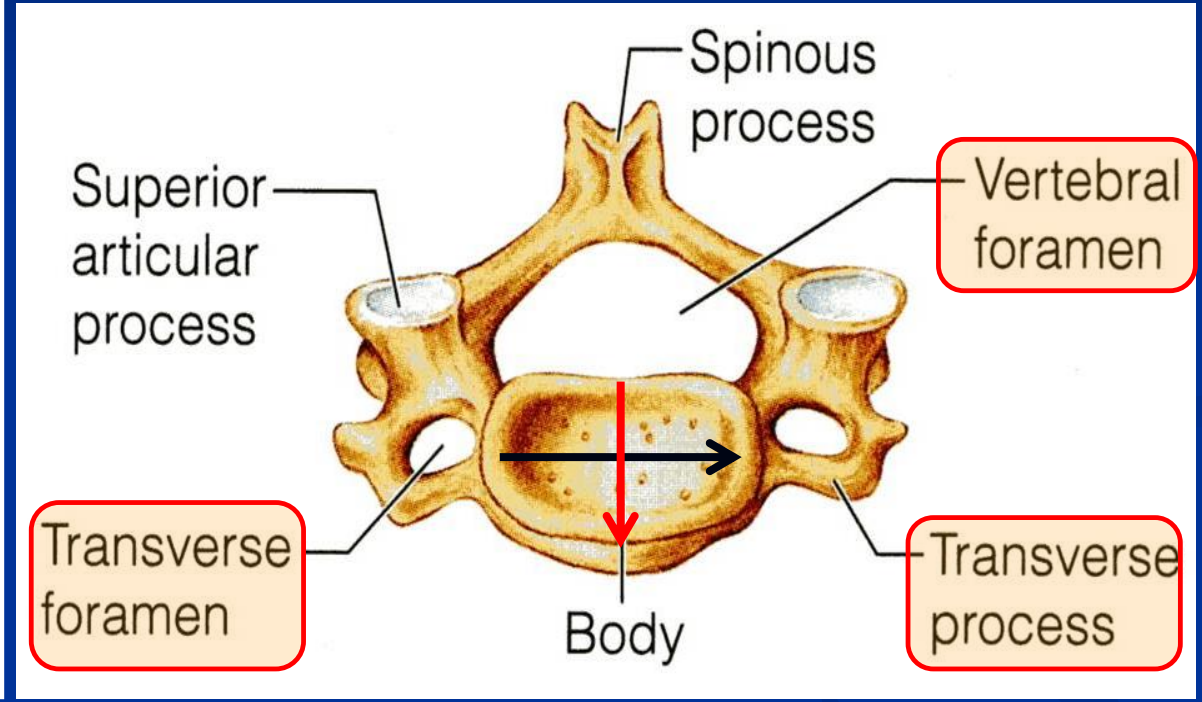
1- **Typical**: 3rd , 4th ,5th & 6th.

2- **Atypical**: 1st, 2nd and 7th.



TYPICAL CERVICAL VERTEBRAE C3, C4, C5 & C 6

- The **body** is small, longer horizontally than antero-posteriorly
- Its **spinous processes** is short and **bifid.**
- The transverse processes has an oval **foramen transversarium,** through which the vertebral vessels pass.



The vertebral foramen is large & triangular to accommodate the cervical enlargement of the spinal cord.

TYPICAL CERVICAL VERTABRAE (3^{rd}, 4^{th}, 5^{th} and 6^{th}).

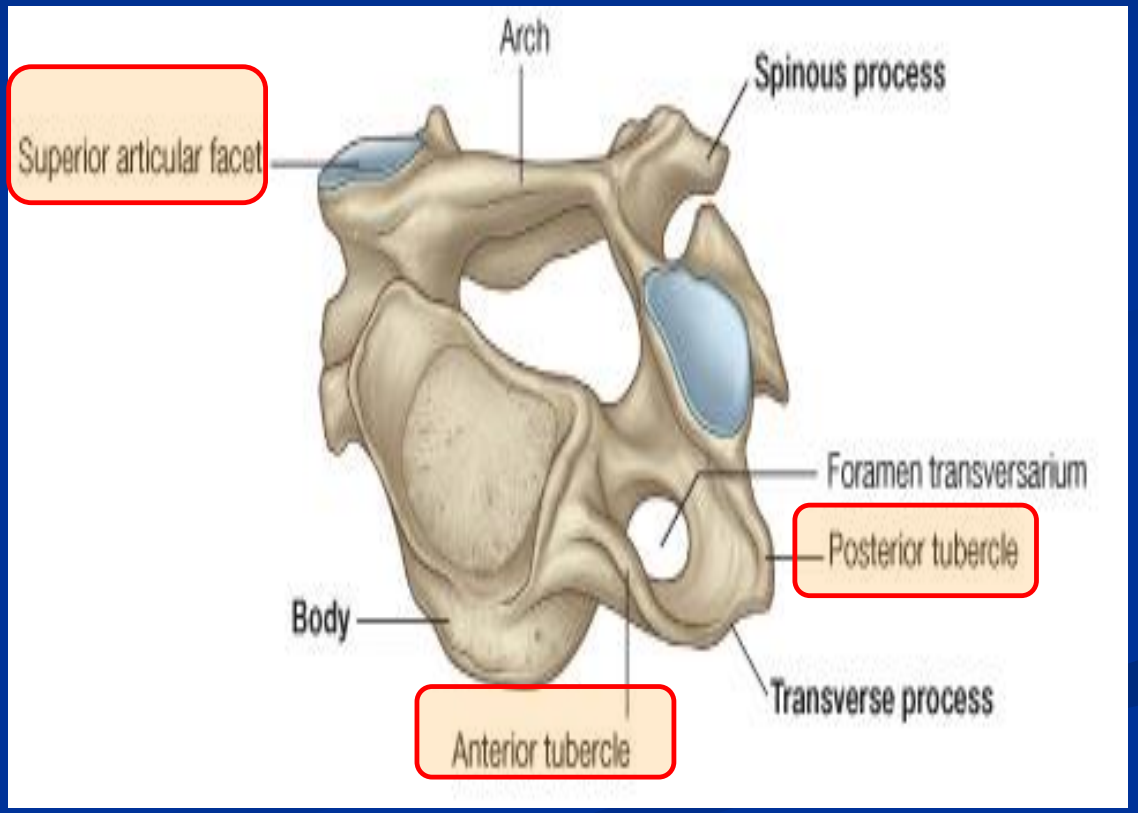
The superior articular processes:

Have a facet that face upward & backward.

The inferior articular processes:

Have a facets that, face downward and forward.

The transverse process has 2 tubercles one infront and one behind the foramen transversarium.

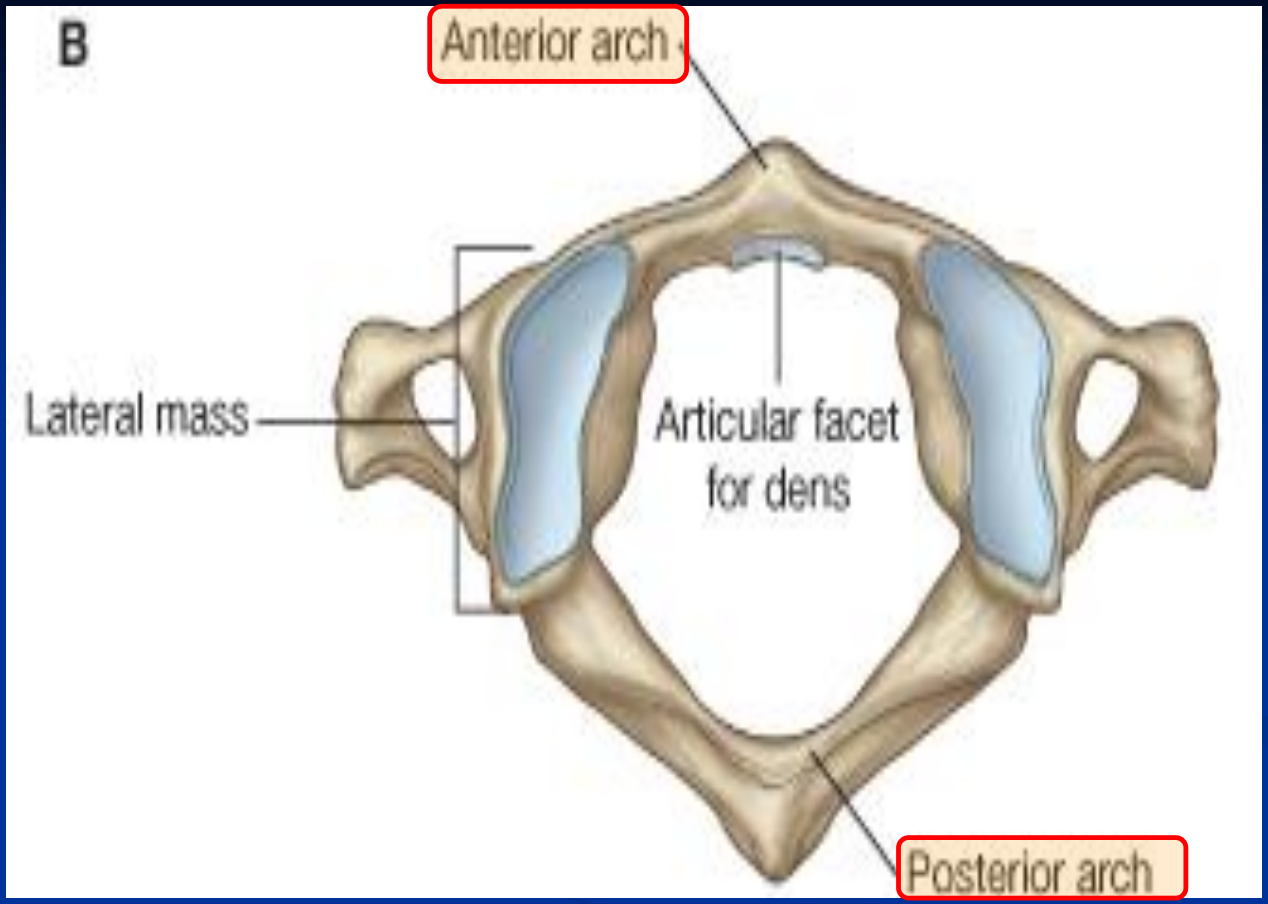


ATYPICAL

C1- ATLAS

It has **No** body, **No** spine.
It has **2** lateral masses connected together by ***small*** anterior arch & **long** posterior arch.

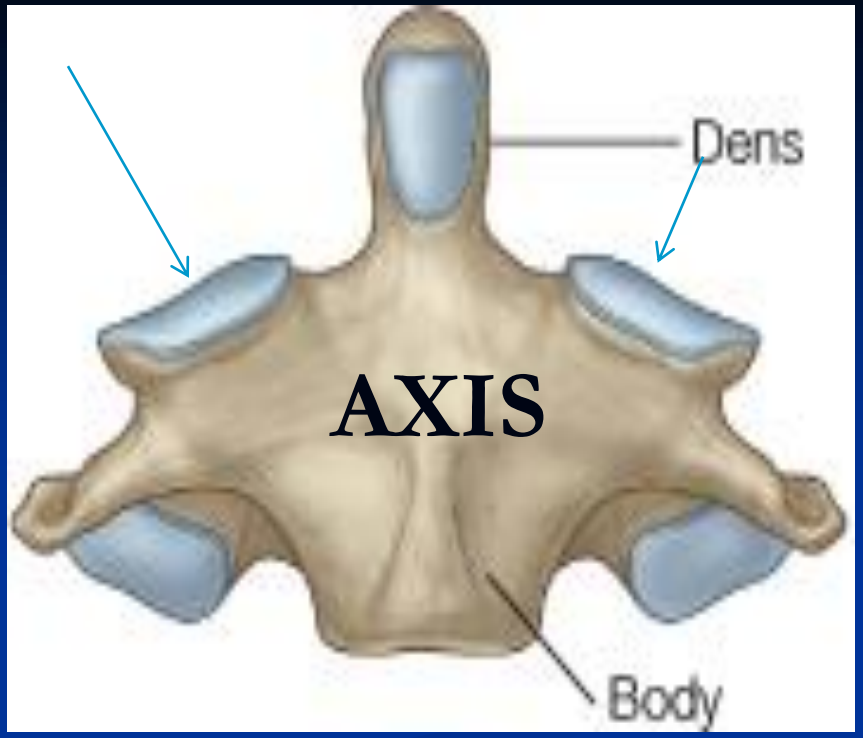
Each lateral mass has articular surface on its upper and lower aspects.

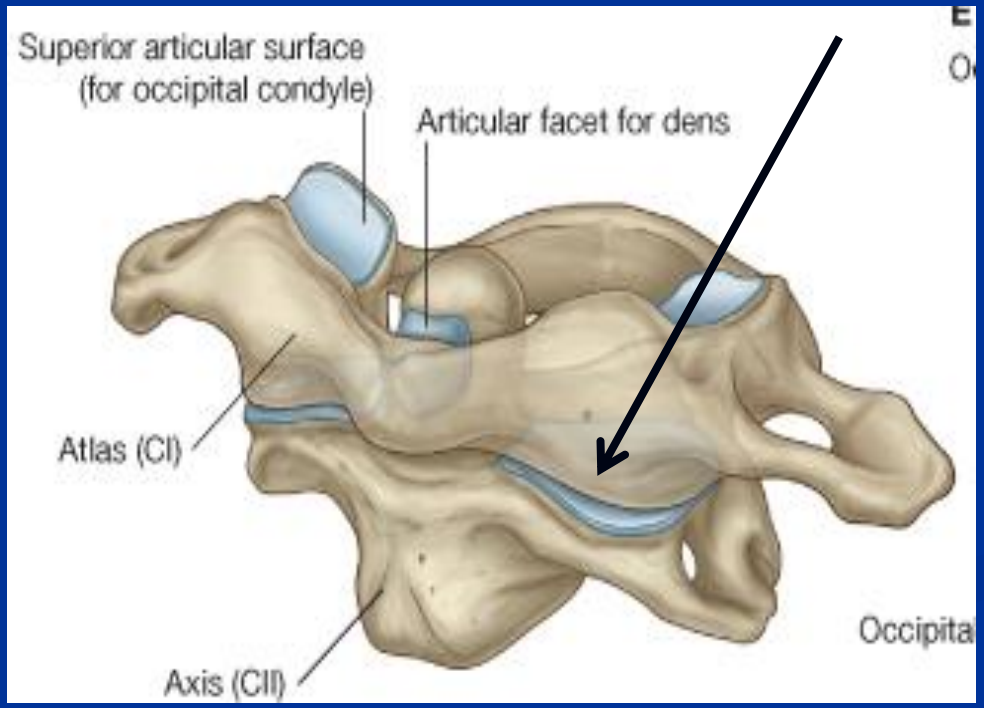


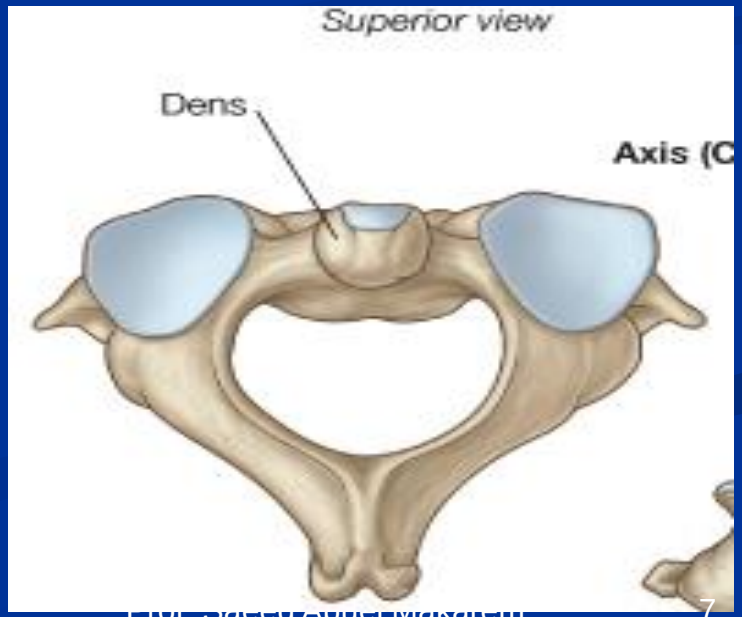
The upper articular surface is kidney-shaped articulates with occipital condyles of the skull.
It forms the **Atlanto-Occipital** joints.
This joint allows you to nod **"say Yes".**

The inferior articular surface of the atlas is circular and articulates with the axis.

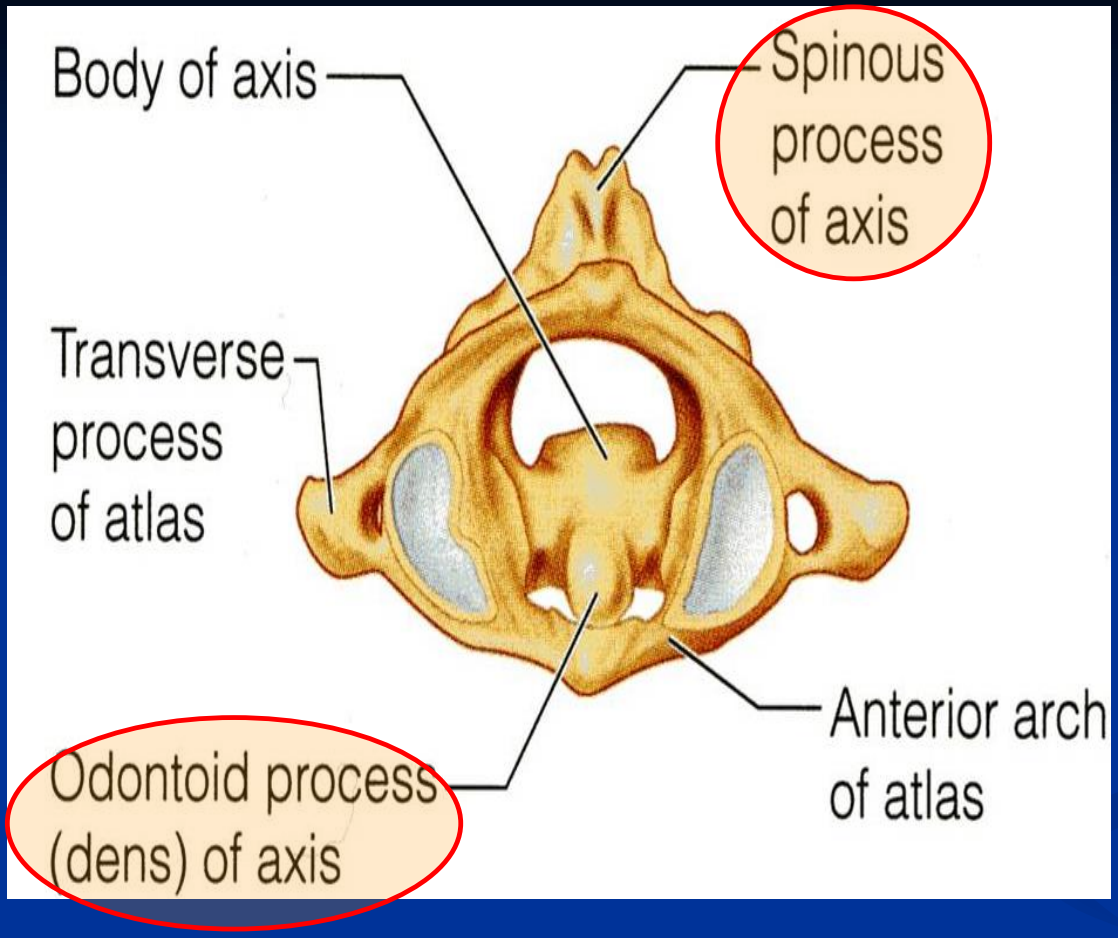
It forms the 2 lateral **Atlanto-Axial** joints. This joint together with the joint between the dens of axis and the anterior small arch of atlas, they allow you to "**Say No " lateral** rotation of the face.

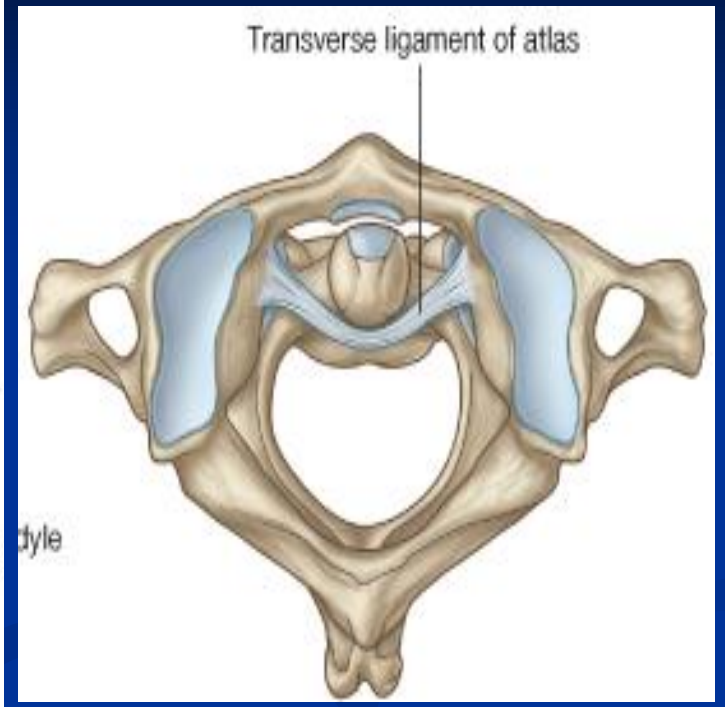






AXIS- C 2





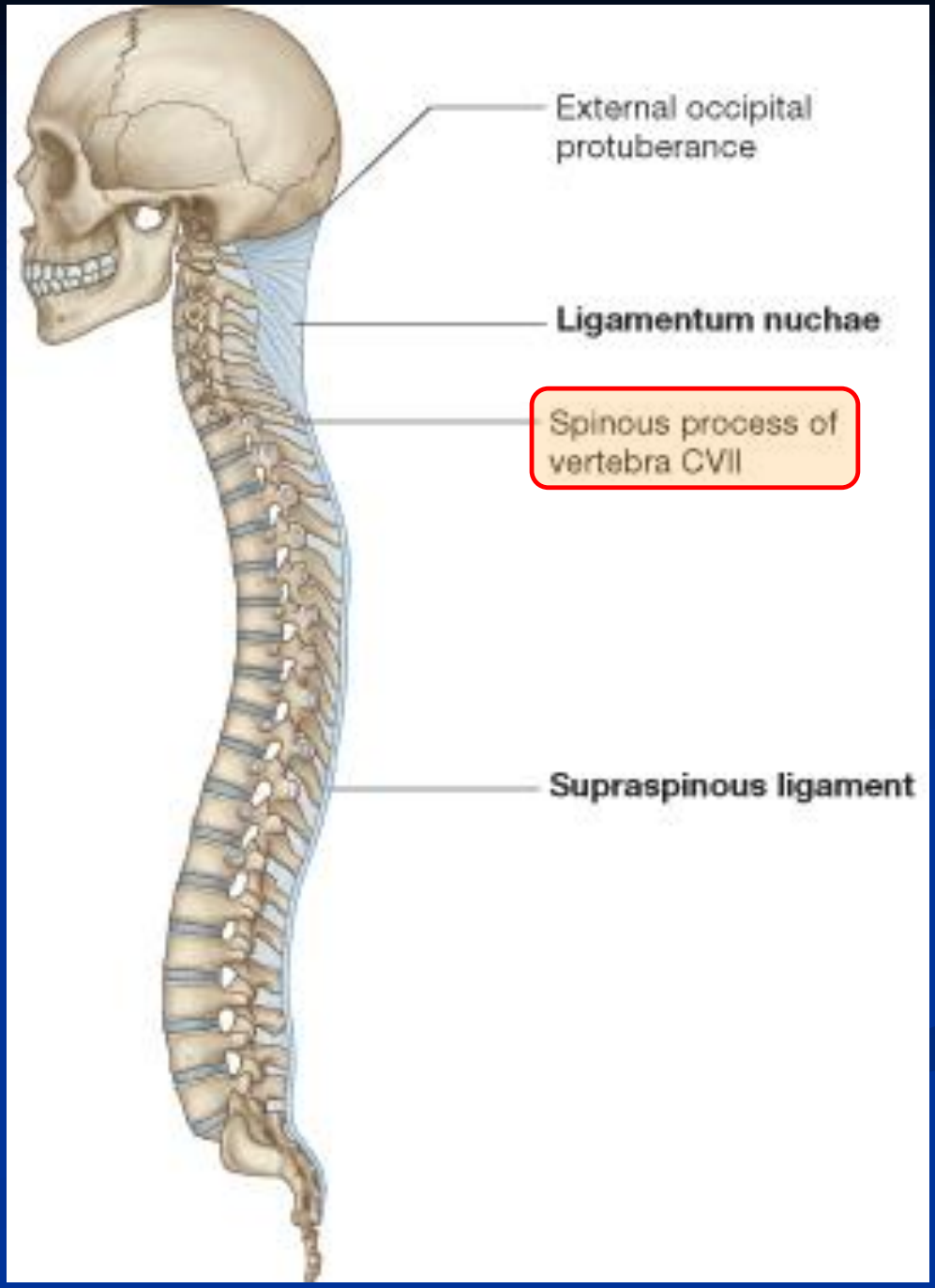
It acts as a **pivot** for the rotation of the atlas (and the skull) above.
It has a large upright peg-like **odontoid process**, or **dens**, which projects upward from the superior surface of the body.
Actually it represents the body of the atlas that has fused with the axis.

7th CERVICAL VERTEBRA OR Vertebra Prominens

It has the **longest** spinous process which is **not bifid**.

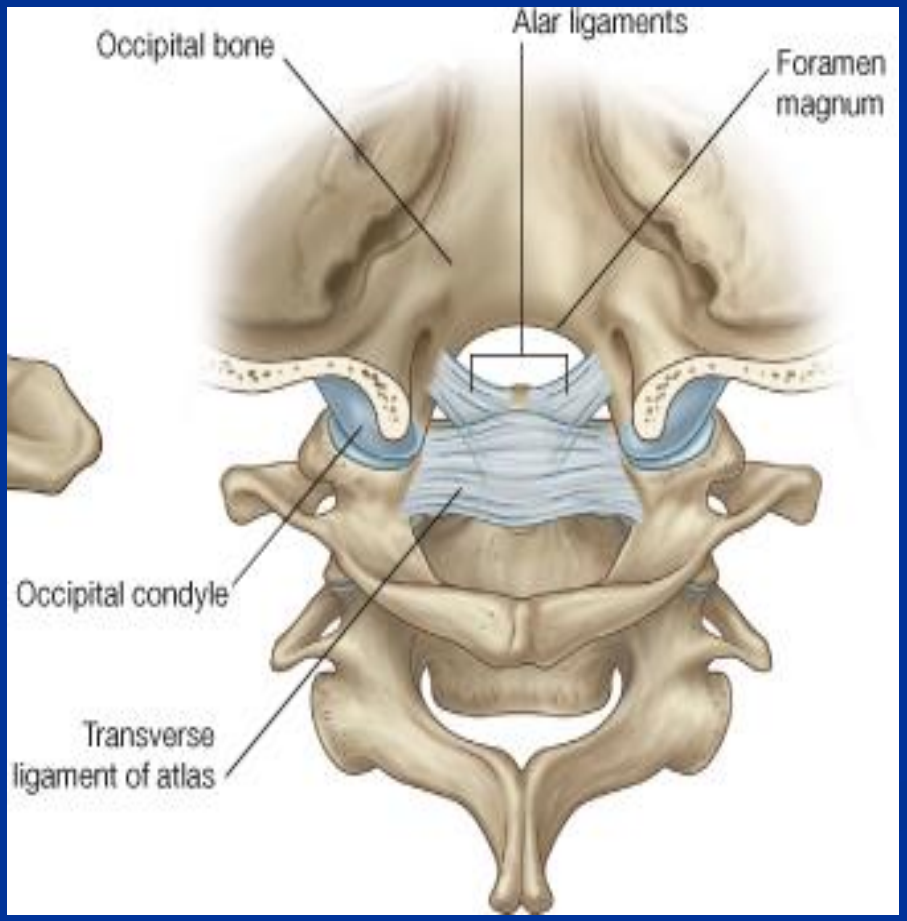
It is the first spine to be felt **subcutaneously** in the root of the back of the neck.

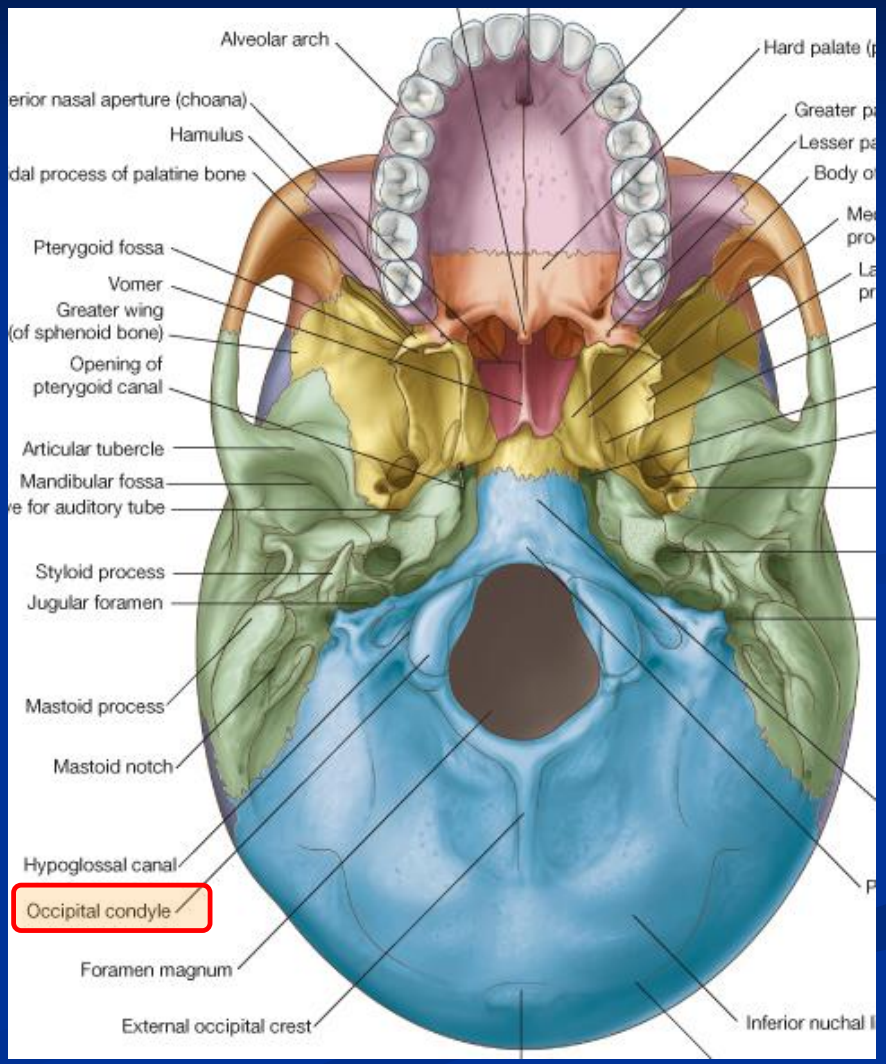
The transverse process is large while its foramen transversaium is small and may be absent, and does not transmit the vertebral artery. (only small accessory vein)

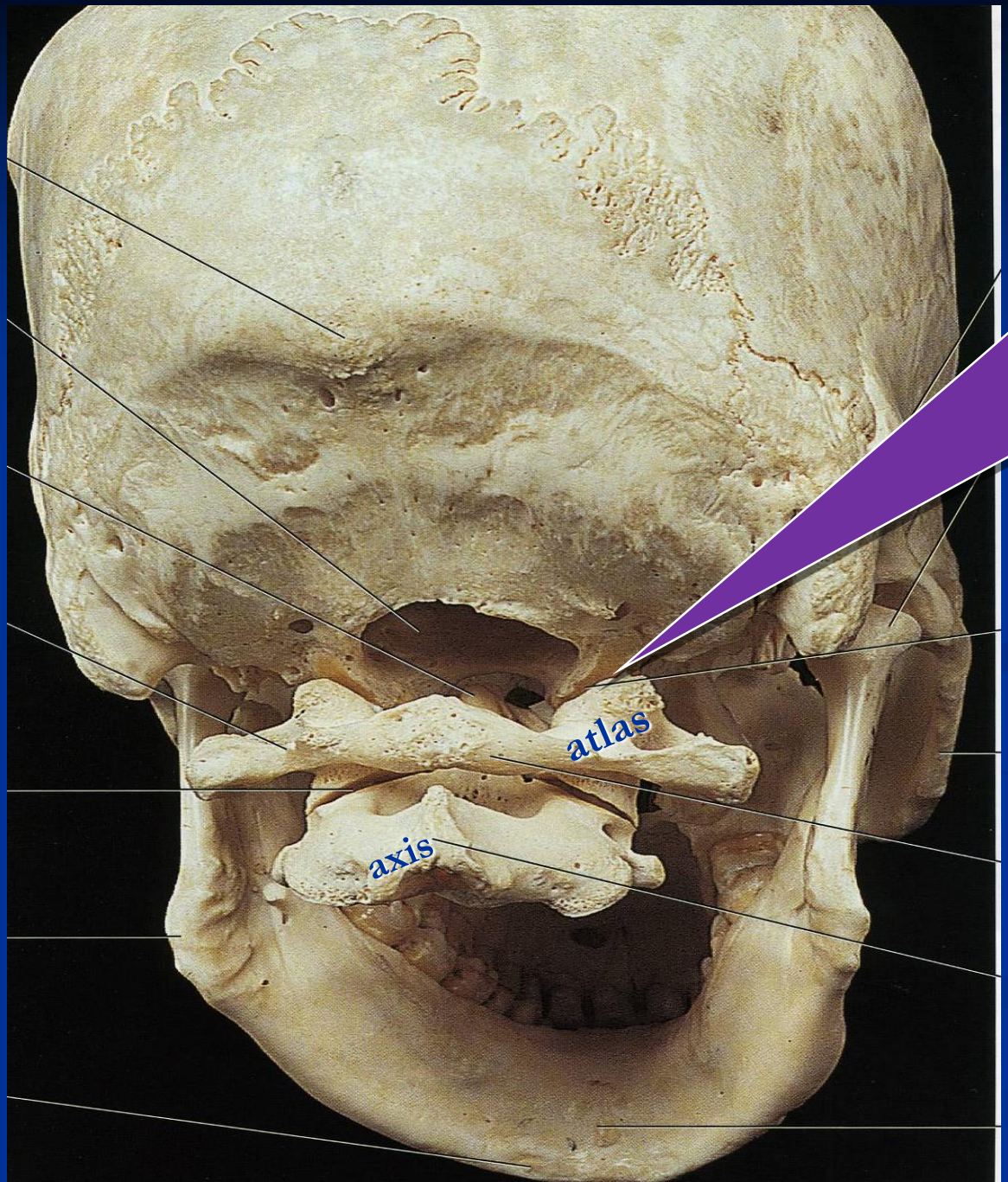


Joints of Cervical Vertebrae

- **Atlanto-Occipital joints**:
- Synovial joints between the occipital condyles of skull and the upper facets on the lateral mass of the atlas.







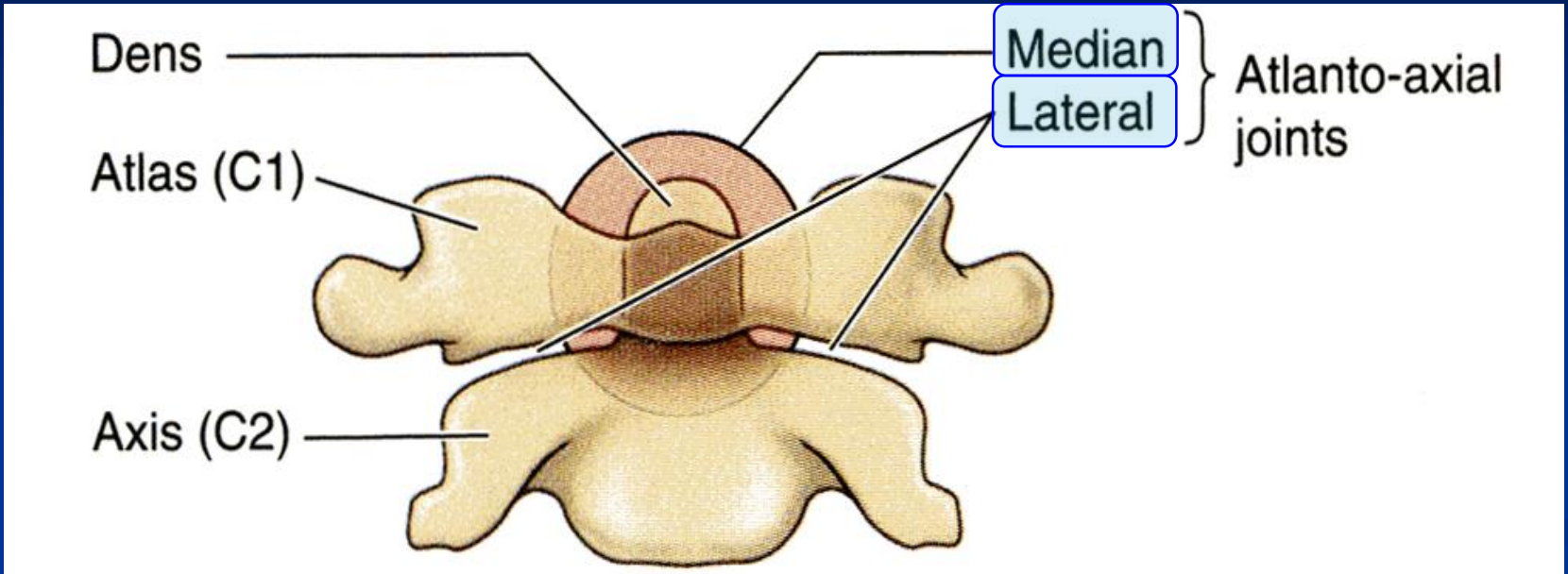
The **Atlanto-occipital joints** are synovial joints between the occipital condyles, and the facets on the superior surfaces of the lateral masses of the atlas below.

MOVEMENTS IN THE ATLANTO-OCCIPITAL JOINT

The joints are capable of:

- Flexion,
- Extension, and
- Lateral flexion;
- **They do not rotate.**

ATLANTO-AXIAL JOINTS



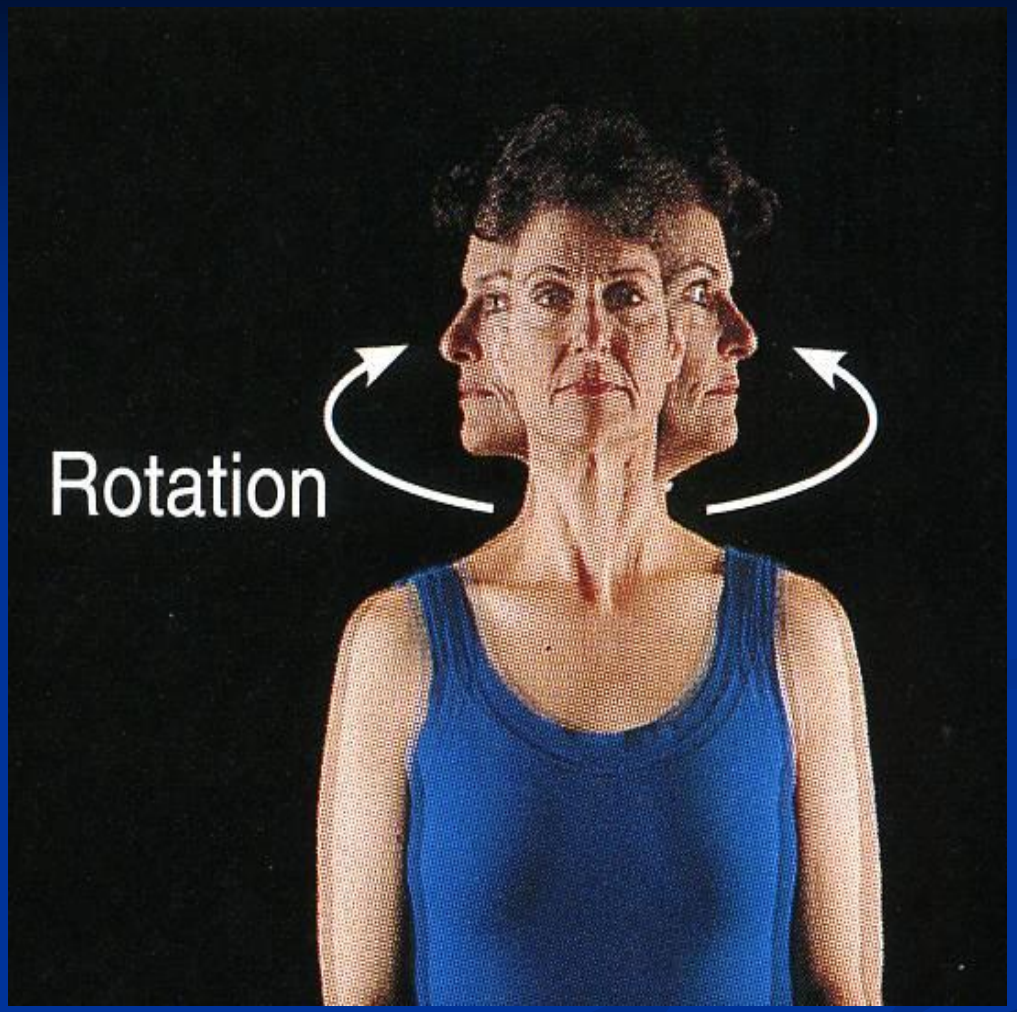
The Atlanto-axial joints are ***three synovial joints:***

- One median, between the odontoid process and the anterior small arch of atlas.
- Two are lateral and lie between the lateral masses of the atlas and superior facets on the body of the axis.

MOVEMENTS

Extensive rotation of the atlas and the skull (and thus of the head on the axis).

That is to say **NO**

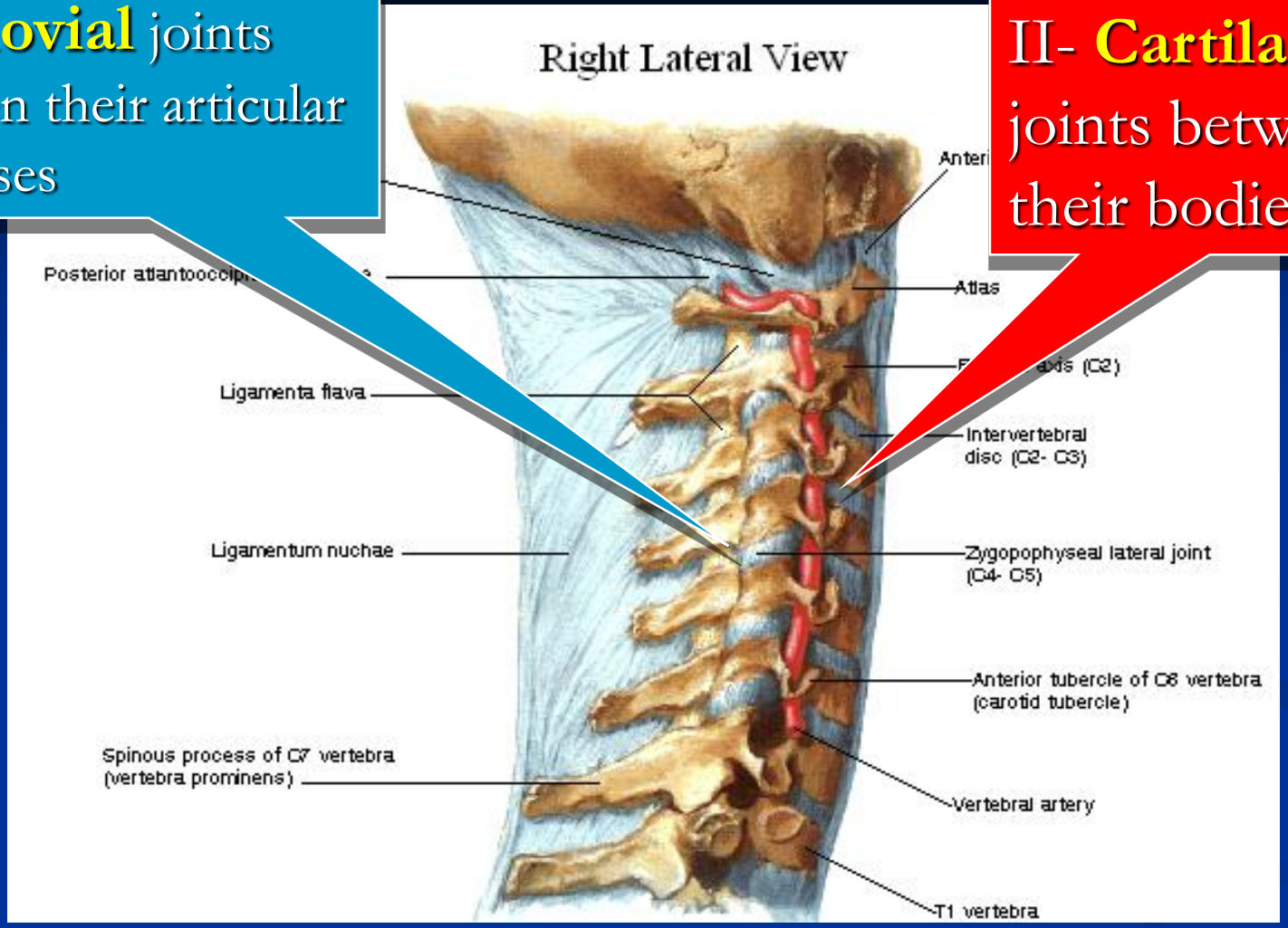


JOINTS OF THE VERTEBRAL COLUMN BELOW THE AXIS

JOINTS BETWEEN TWO VERTEBRAL BODIES

I- **Synovial** joints between their articular processes

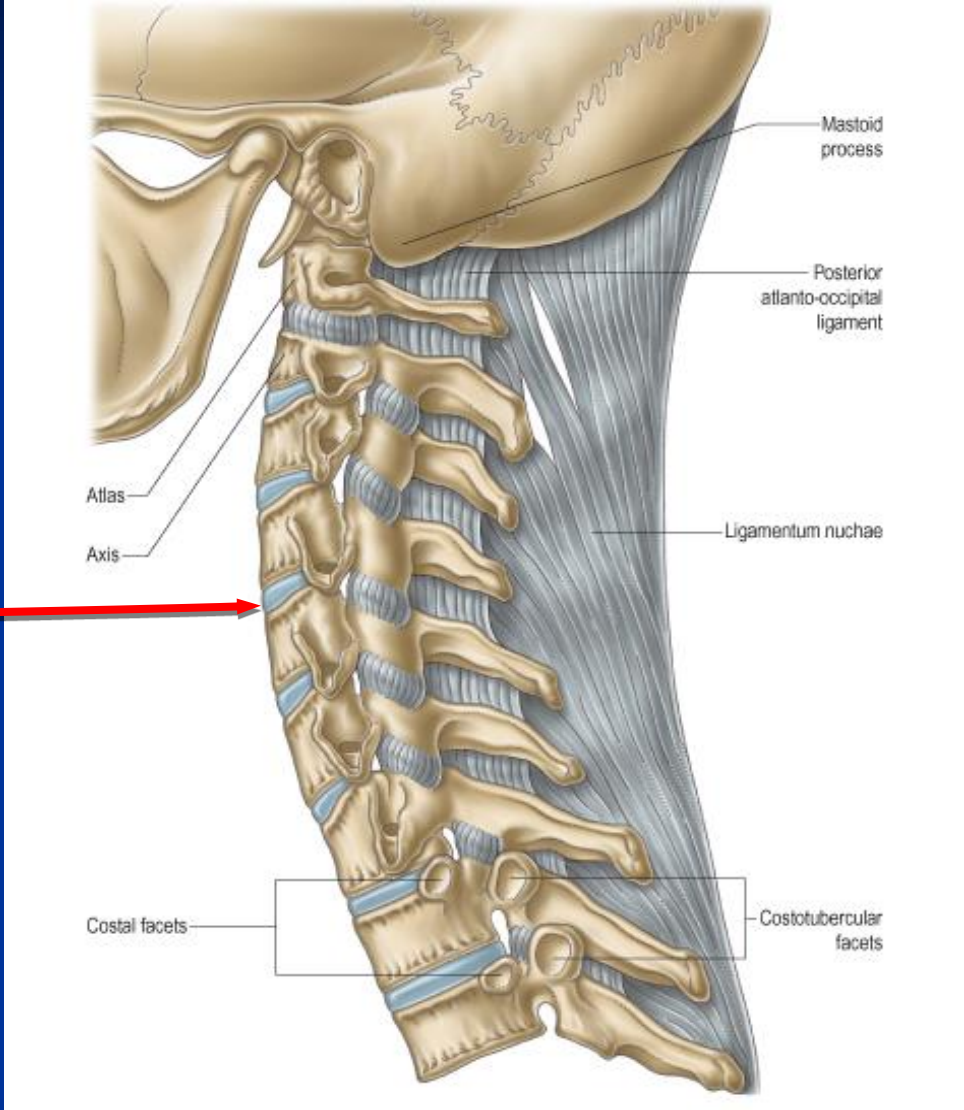
II- **Cartilaginous** joints between their bodies .



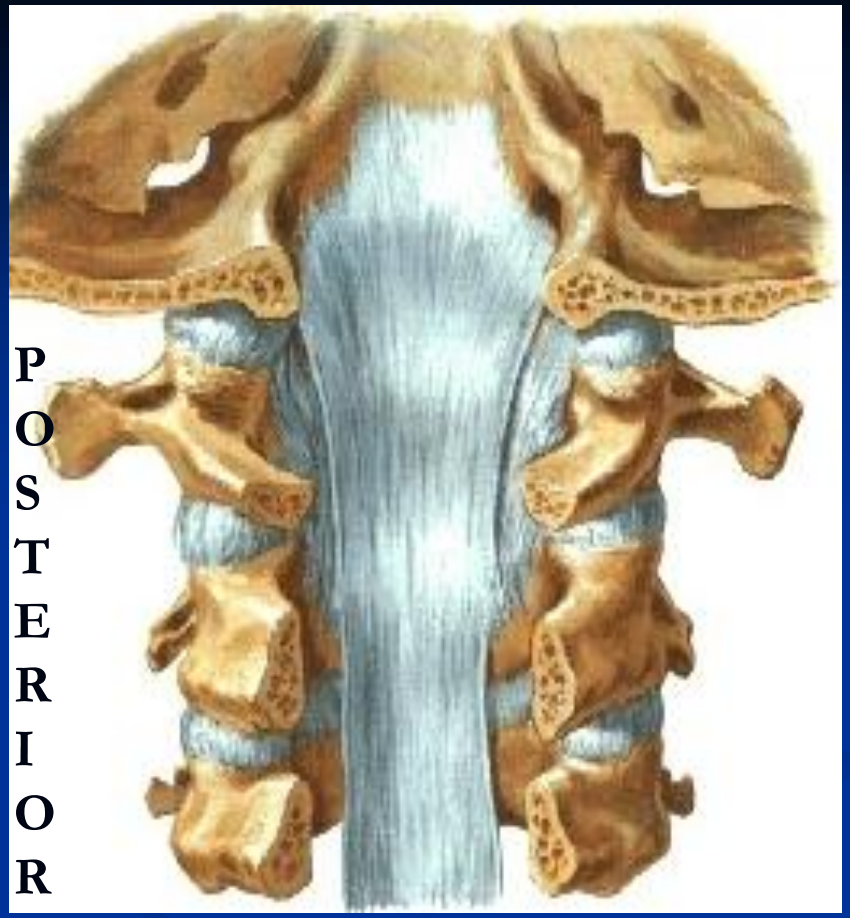
With exception of the first two cervical vertebrae, the other cervical vertebrae articulate with each other by means of:

I- Intervertebral disc

- The upper and lower surfaces of the bodies of two adjacent vertebrae are covered by thin plates of **hyaline cartilage**.
- Between the plates of hyaline cartilage is an **intervertebral disc** of **fibrocartilage.**
- The collagen fibers of the disc strongly connect the bodies of the two vertebrae.

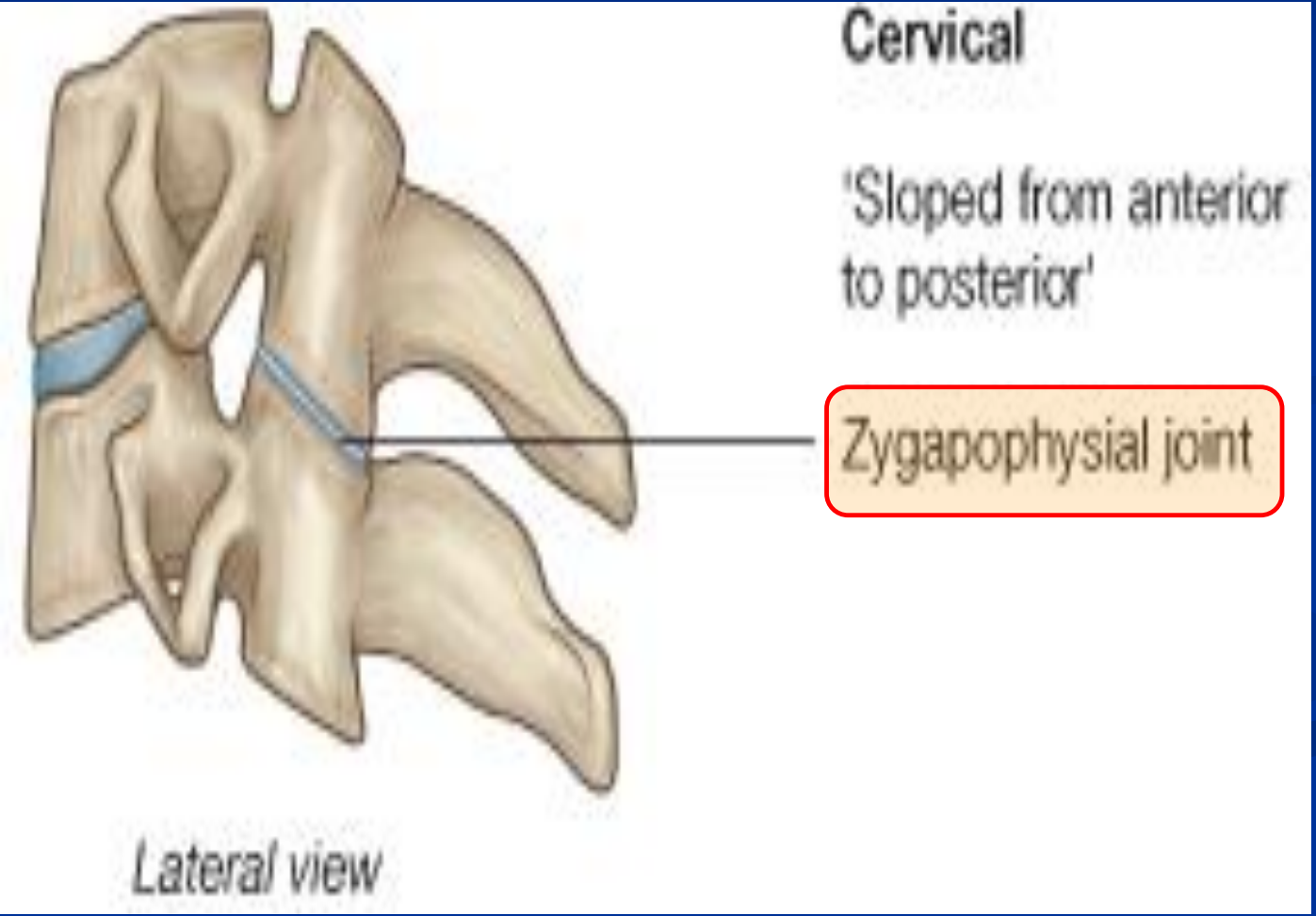


LIGAMENTS



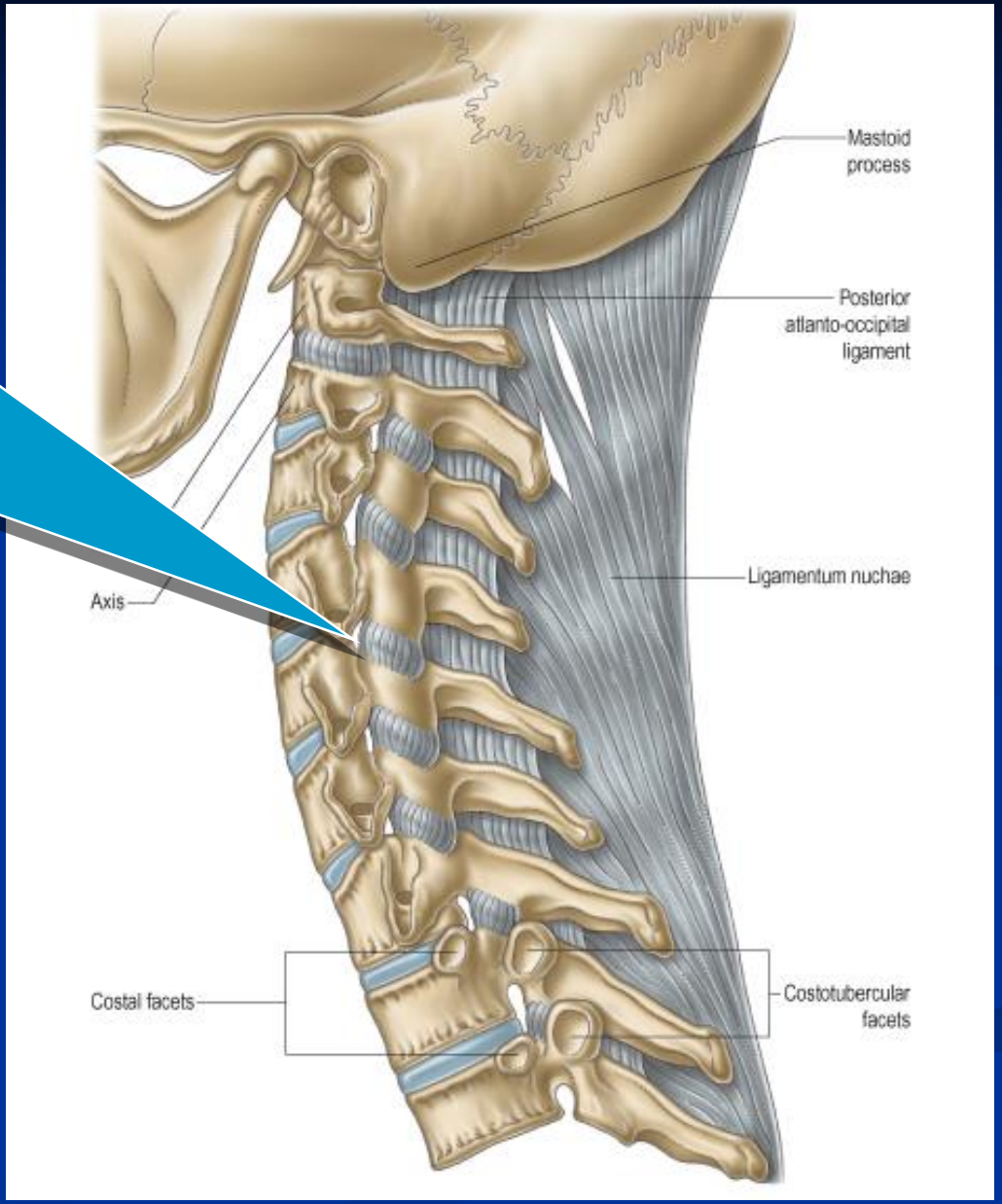
- The anterior and posterior longitudinal ligaments run as continuous bands along the anterior & posterior surfaces of the vertebral bodies.
- These ligaments hold the vertebrae firmly together but at the same time permit a small amount of movement to take place.

JOINTS BETWEEN TWO VERTEBRAL ARCHES



The joints between two vertebral arches consist of synovial joints between the superior and inferior articular processes of adjacent vertebrae.

The articular facets are covered with hyaline cartilage, and the joints are surrounded by a capsule.



OTHER LIGAMENTS

Supraspinous ligament:

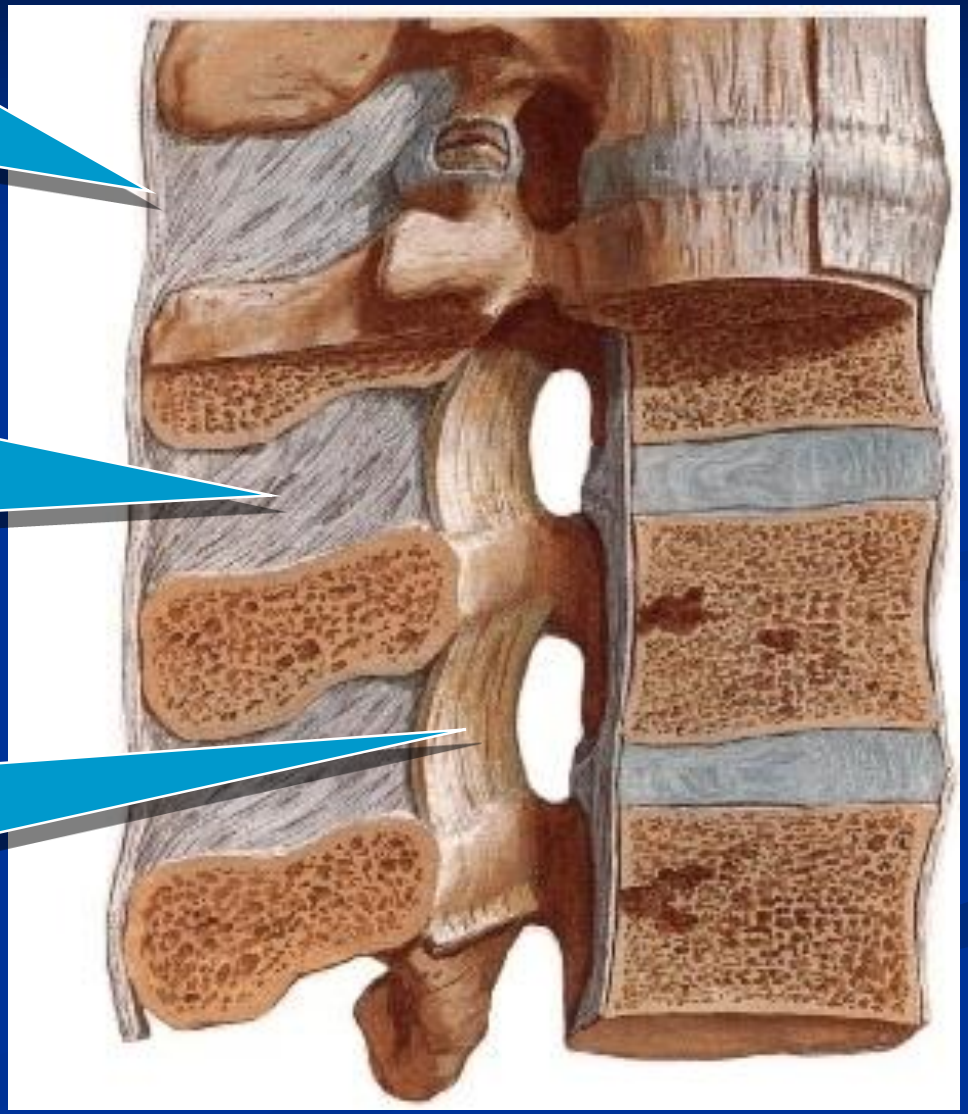
It runs between the tips of adjacent spines.

Interspinous ligament:

It connects adjacent spines.

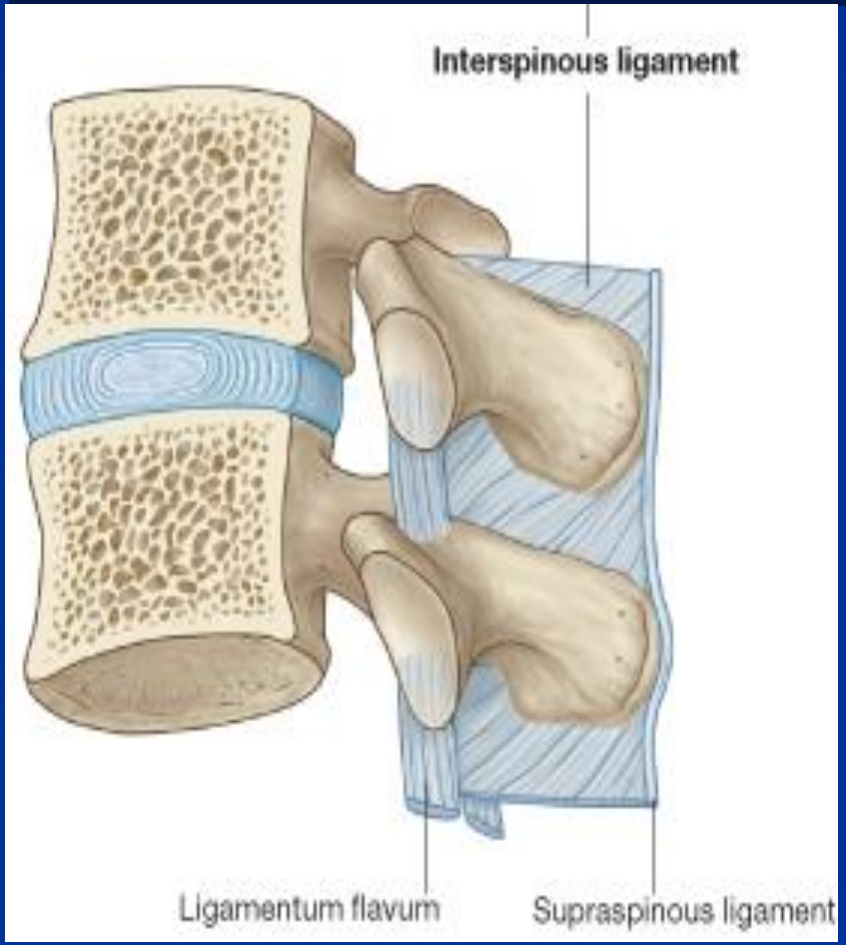
Ligamentum flavum:

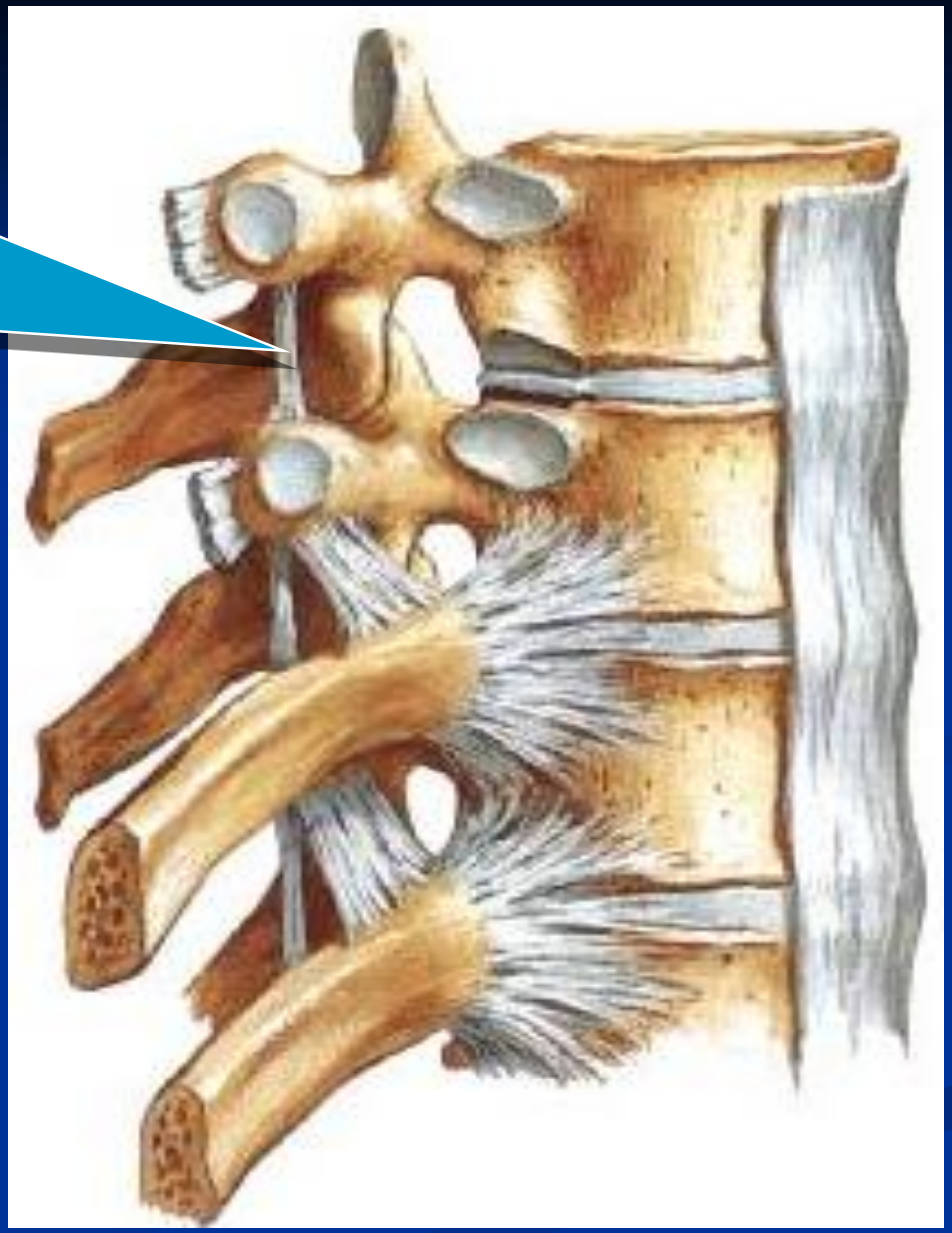
It connects the laminae of adjacent vertebrae.



Intertransverse ligaments:

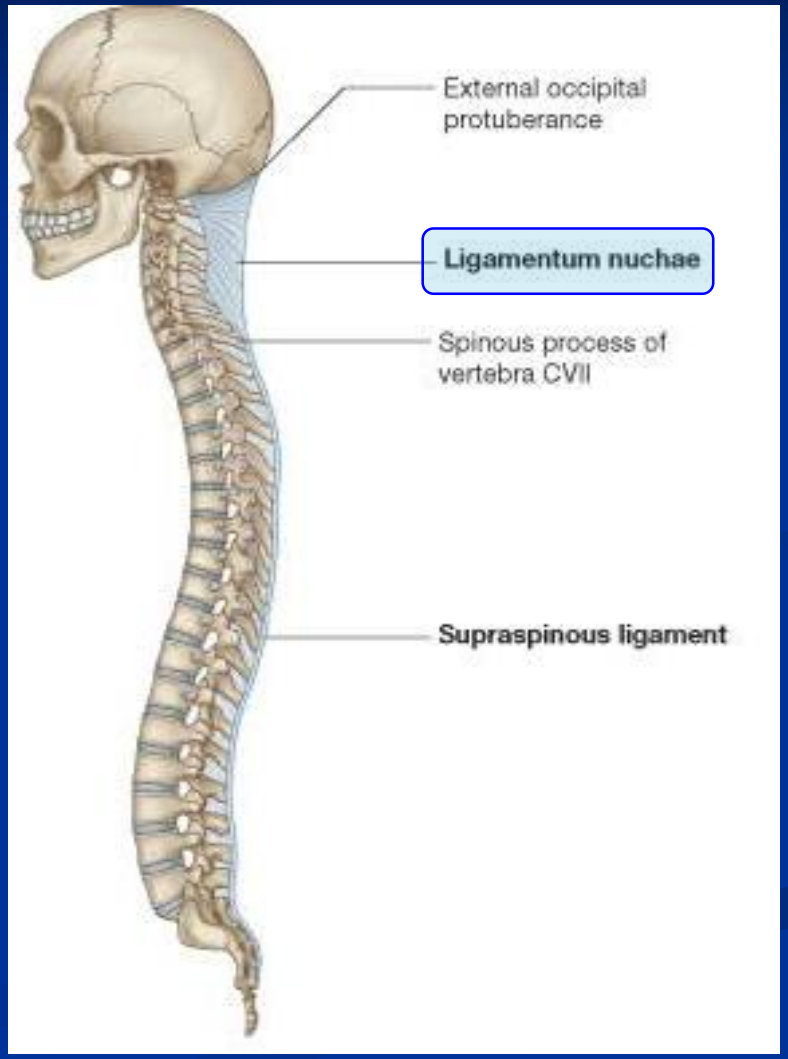
They run between adjacent transverse processes.





LIGAMENTUM NUCHAE

- In the cervical region, the Supraspinous and Interspinous ligaments are greatly thickened to form the strong **ligamentum nuchae.**
- It extends from the external occipital protuberance of the skull to the spine of the seventh cervical vertebra.
- Its anterior border is strongly attached to the cervical spines in between.



Summary

- The cervical vertebrae are 7 in number, classified into typical & atypical (non-typical) vertebrae.
- **All the typical vertebrae** have a foramen transversarium and bifid spinous processes.
- **Atypical vertebrae (1,2,7) :**
- **1st (Atlas) :** has no body nor spine, has short anterior arch and long posterior arch.
- **2nd (Axis):** has odontoid process (dens).
- **7th (Cervica Prominens) :** has **longest not bifid** spinous process, which can be felt **subcutaneously.**
- **Atlanto-Occipital joints are :** 2 synovial joints, the function: flexion and extension, and lateral flexion, This joint allows you to say **"Yes".**
- **Atlanto-Axial joints are :** 3 synovial joints, the function : extensive rotation, this joint allows you to say **" No"**.

Summary

- **JOINTS BELOW THE AXIS are:**

I- **Synovial** joints between their articular processes.

II- **Cartilaginous** joints between their bodies (intervertebral disc of fibrocartilage).

- **Ligaments of cervical spines:**
- **Supraspinous ligament, between tips of spines.**
- **Interspinous ligament, between adjacent spines.**
- **Supraspinous & Interspinous ligaments are thickened to form ligamentum nuchae.**
- **Ligamentum flavum, between laminae.**
- **Intertransverse ligaments, between transverse processes.**