Lecture 6

Vertebral column Cervical and Thoracic , vertebrae

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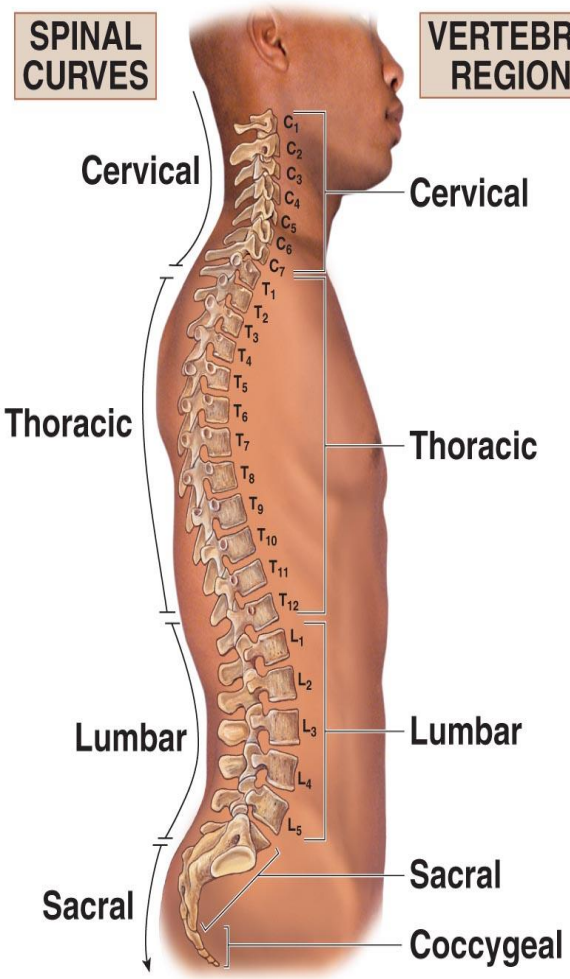
3rd stage \ first semester

Vertebral or Spinal Column

The spinal column (or vertebral column) extends from the skull to the pelvis and is made up of 33 individual bones termed vertebrae. The vertebrae are stacked on top of each other into groups or regions



7 Cervical (C)

12 Thoracic (T)

5 Lumbar (L)

5 Sacral (S)

4 Coccygeal (Co)

Functions of the Vertebral or Spinal Column

- Protection of the spinal cord and nerve roots
- Base for attachment of ligaments, tendons, muscles
- Structural support for the head, shoulders, chest
- Connects upper and lower body for balance and weight distribution
- Flexibility and mobility in four dimensions
- Bones produce red blood cells and store minerals

Cervical spines

The cervical spine is the most superior portion of the vertebral column, lying between the cranium and the thoracic vertebrae.
It consists of seven distinct vertebrae.

The main role or function of the cervical spine is to support and promote the movement of the head and neck.

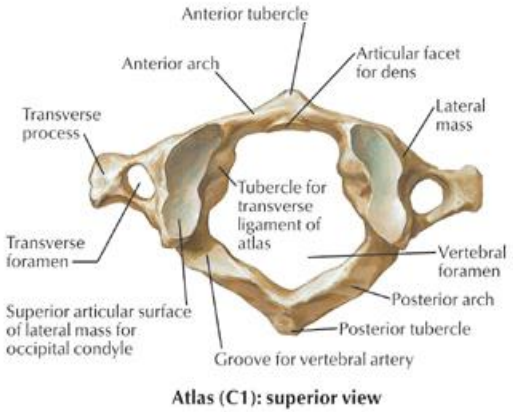
- The first cervical vertebrae (C1)is known as the atlas.
- The second cervical vertebrae (C2) is known as the axis.

The cervical vertebrae have three main features which distinguish them from other vertebrae:

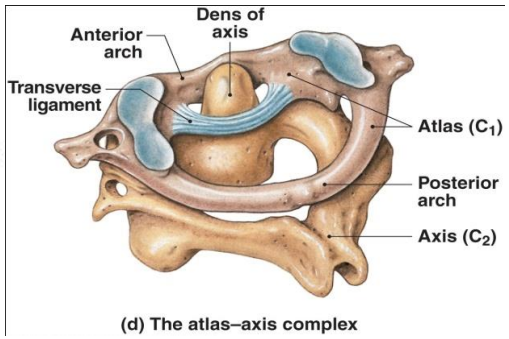
- **Triangular vertebral foramen.**
- **Bifid spinous process – this is where the spinous process splits into two distally.**
- **Transverse foramina – holes in the transverse processes. They give passage to the vertebral artery, vein and nerves .**

Atypical cervical vertebrae :- C1 / Atlas

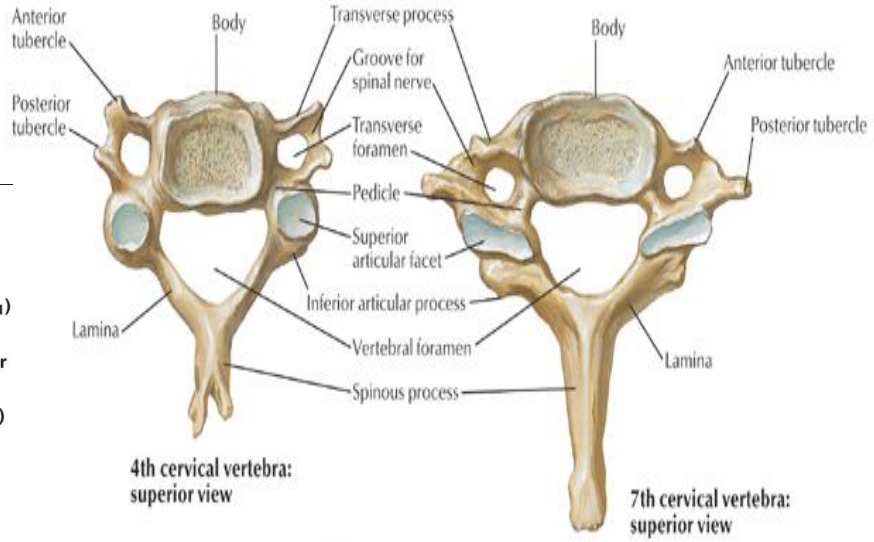
The atlas is the first cervical vertebra and articulates with the occiput of the head and the axis (C2) .Has no vertebral body and no.ssecorp suonips



Atlas (C1): superior view



(d) The atlas–axis complex



•Has lateral masses which are connected by an anterior and posterior arch. Each lateral mass contains a superior articular facet (for articulation with occipital condyles), and an inferior articular facet (for articulation with C2).

•The anterior arch contains a facet for articulation with the dens of the axis. The posterior arch has a groove for the vertebral artery and C1 spinal nerve.

C2 / Axis

The axis (C2) is easily identifiable due to its dens (odontoid process) which extends superiorly from the anterior portion of the vertebra.
The dens articulates with the anterior arch of the atlas, in doing so creating the medial atlanto–axial joint. This allows for rotation of the..

Typical Cervical Vertebra (C3-C6)

C3-C6 are more classic vertebrae, having a body, pedicles, laminae, spinous processes, and facet joints .

Vertebral Body

The bodies of these four vertebrae are small, and transverse diameter is greater than anterio-posterior and height dimensions.

Vertebral Foramen

Large, triangular in shape.

Bony Structures

The **pedicles** are short and project posterolaterally.
The **laminae** are long, narrow, and thinner above than below. They curve posteromedially.
The **spinous process** is short and bifid
The **transverse processes** are short and house the **foramen transversarium**, which, in the upper six vertebrae, gives passage to the vertebral artery and vein, as well as a plexus of nerves

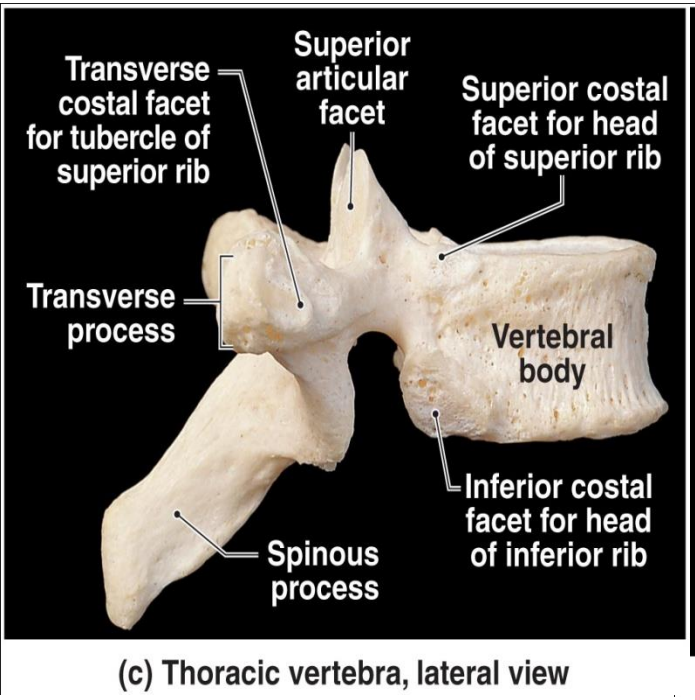
C7: has a much larger and singular spinous process, known as the **vertebra prominens**, which is similar to those in the thoracic vertebrae

Thoracic (T) or Dorsal (D) (mid back) :-
the main function of the thoracic spine is to hold the rib cage and protect the heart and lungs. The twelve thoracic vertebrae are numbered T1 to T12. The range of motion in the thoracic spine is limited.

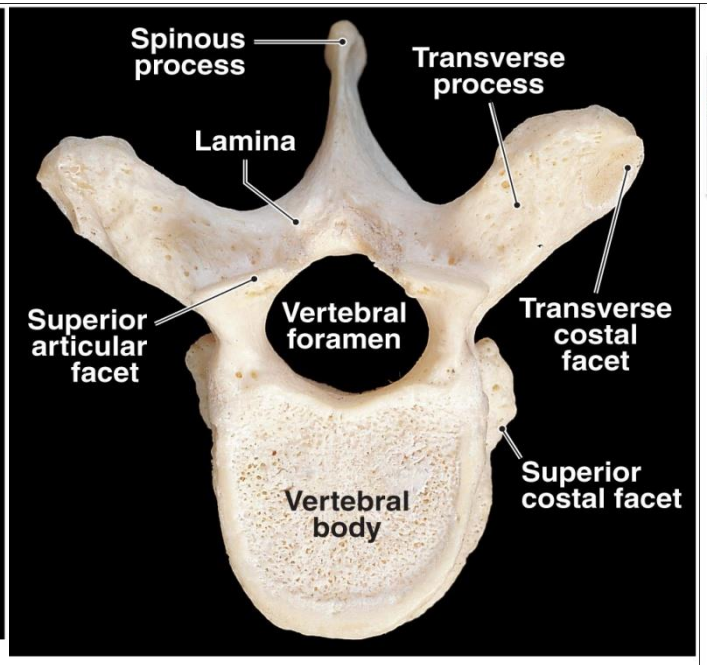
functions:-

•**Protecting spinal cord and branching spinal nerves**: The nerves of spinal cord pass through a large hole (called the vertebral foramen) in the center of all of vertebrae in spine. Taken together, all the stacked vertebrae of spine form a protective central canal that protects spinal cord.

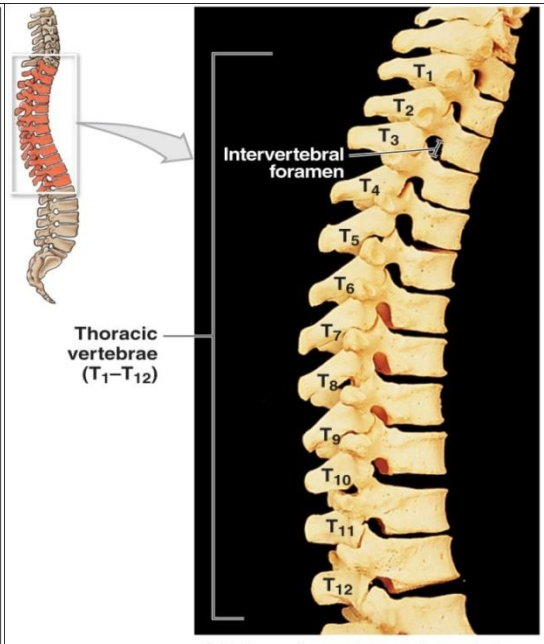
Providing attachments for ribs: Thoracic vertebrae have the role of providing attachments for ribs, except for the two at the bottom of ribcage



(c) Thoracic vertebra, lateral view



(b) Thoracic vertebra, superior view



(a) Thoracic vertebrae, lateral view

Typical thoracic vertebra: (a) lateral view; (b) superior view

Thoracic vertebrae (T_1–T_{12}) or Dorsal vertebrae (D1- D12)

T_1–T_{10} :- Have **transverse costal facets** on thick transverse processes for ribs articulation .

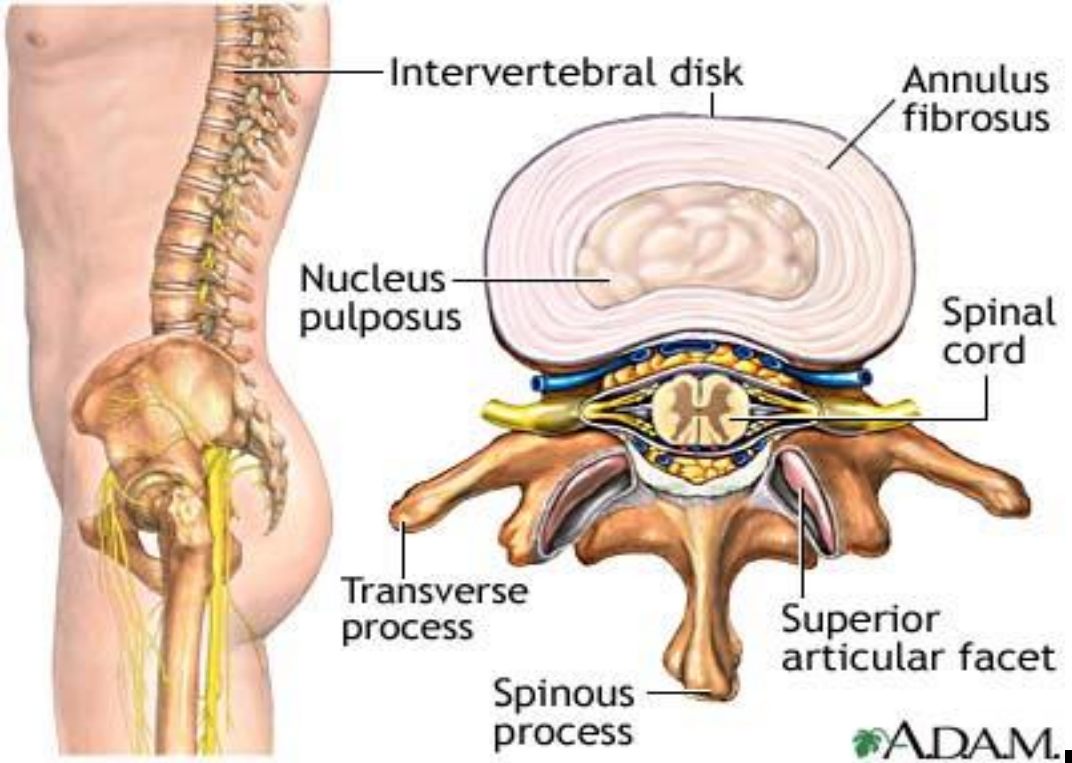
T_1–T_8 articulate with two pairs of ribs at *superior* and *inferior costal facets while* T_9–T_{11} articulate with one pair of ribs

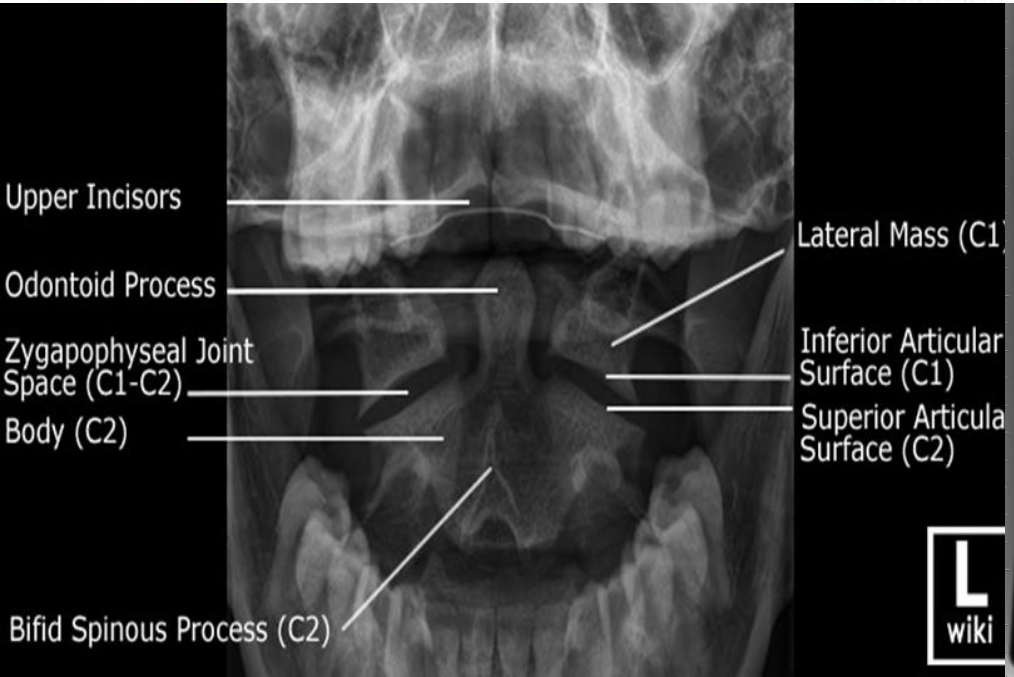
Throcic vetevrae properties :-

1- Body :- medium , heart shape , with flat facetes for rib articulations .
2-vetebral foramen :- smaller than cervical vetebral foramen
3-spinous process :- long , slender , not split , pointed inferiorly .
4-Transverse process all have transverse process but T11 and T12 have facet articulation

Intervertebral discs (IVD)

Most of vertebrae are separated by intervertebral discs of fibrocartilage, which are flexible cartilage discs located between the bodies of two adjacent vertebrae that allow movement in the spine and have a shock absorbing or cushioning function as well.
An intervertebral disc consists of an inner gelatinous **nucleus pulposus** surrounded by a ring of fibrocartilage, the **annulus fibrosus**.
In total, the adult human body typically has 23 discs, with the first found between cervical vertebrae 2 and 3, and the last one is found between the lumbar vertebra and the sacrum. In addition to providing shock resistance and cushioning, the discs also help bind adjacent vertebrae together.


Intervertebral disk
Annulus fibrosus
Nucleus pulposus
Spinal cord
Transverse process
Superior articular facet
Spinous process
A.D.A.M.


Upper Incisors
Odontoid Process
Zygapophyseal Joint Space (C1-C2)
Body (C2)
Lateral Mass (C1)
Inferior Articular Surface (C1)
Superior Articula Surface (C2)
Bifid Spinous Process (C2)
L
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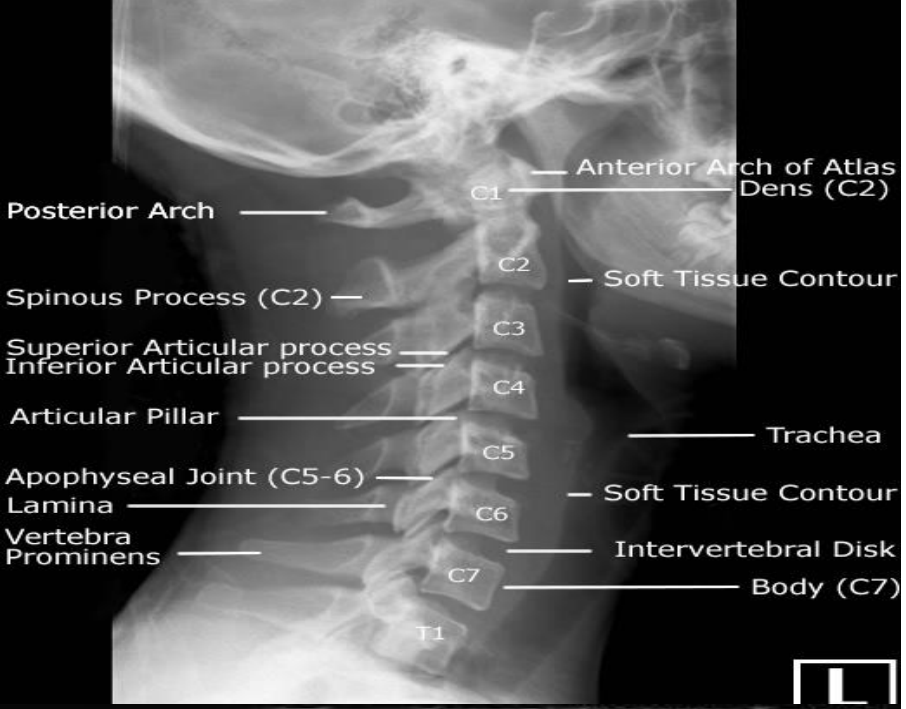
Anterior Arch of Atlas
C1
Dens (C2)
Posterior Arch
C2
Soft Tissue Contour
Spinous Process (C2)
C3
Superior Articular process
Inferior Articular process
C4
Articular Pillar
Trachea
C5
Apophyseal Joint (C5-6)
Soft Tissue Contour
Lamina
C6
Vertebra Prominens
Intervertebral Disk
C7
Body (C7)
T1
L


Cervical Body 4
C4
Intervertebral Disk Space
Superior Articular Process
C5
Trachea
C6
Spinous Process
Pedicle
C7
Inferior Articular Process
Cervical Body 7
T1
1st Rib
Thoracic Body 1
T2
T3
T4
L


sww:1436 wl:673
1:1, All
Value [0]
A
P
I


S
ww:766 wl:338
1:1, All
Value [0]
0 cm
R
L
12 cm
I