The Vertebral Column

The vertebral column is the central bony pillar of the body. It supports the body and transmits body weight to the lower limbs. Within its cavity lie the spinal cord, the roots of the spinal nerves, and the covering meninges, to which the vertebral column gives great protection.

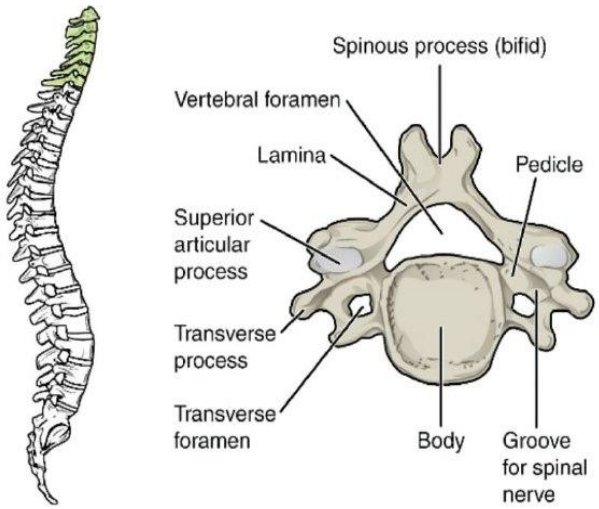
Composition of the Vertebral Column

The vertebral column is composed of 33 vertebrae:
7 cervical, 12 thoracic, 5 lumbar, 5 sacral (fused to form the sacrum), and 4 coccygeal.
That is the vertebral column consist of 26 bones (7C+12T+5L+Sacrum+Coccyx).

Cervical Vertebra

Characteristics of a Typical Cervical Vertebra

■■ The transverse processes possess a **foramen transversarium** for the passage of the vertebral artery and veins (note that the vertebral artery passes through the transverse processes C1 to 6 and not through C7).
■■ The spines are small and bifid.
■■ The body is small and broad from side to side.
■■ The vertebral foramen is large and triangular.

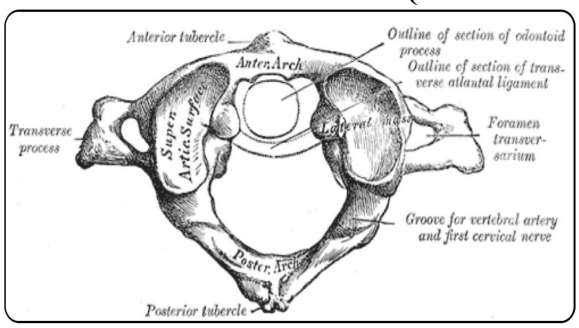


Structure of a typical cervical vertebra

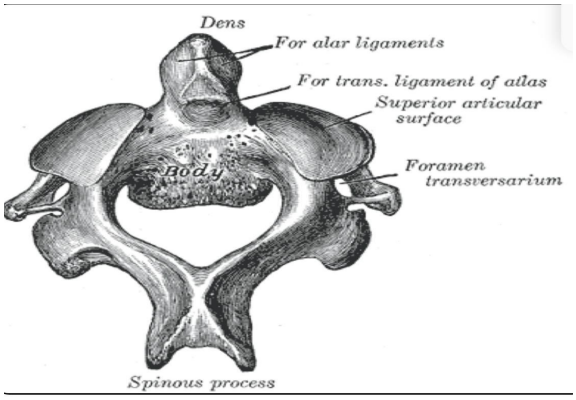
Characteristics of the Atypical Cervical Vertebrae

The 1st, 2nd, and 7th cervical vertebrae are atypical.

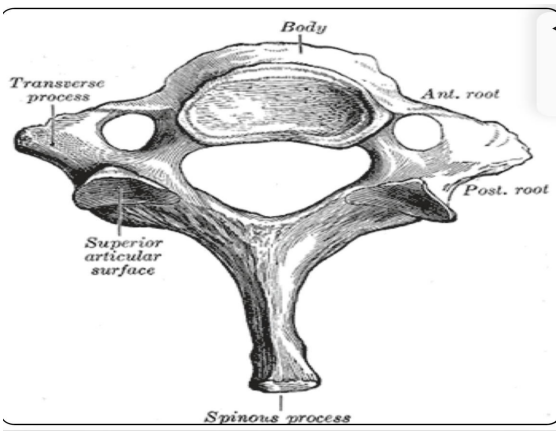
The **1st cervical vertebra,** or **atlas,** does not possess a body or a spinous process. It has an anterior and posterior arch. It has a lateral mass on each side with articular surfaces on its upper surface for articulation with the occipital condyles **(atlantooccipital joints)** and articular surfaces on its inferior surface for articulation with the axis **(atlantoaxial joints).**



The **2nd cervical vertebra,** or **axis,** has a peglike **odontoid process (dens)** that projects from the superior surface of the body (representing the body of the atlas that has fused with the body of the axis).



The **7th cervical vertebra,** or **vertebra prominens**, is so named because it has the longest spinous process, and the process is not bifid. The transverse process is large, but the foramen transversarium is small and transmits the vertebral vein or veins.



Thoracic Vertebra

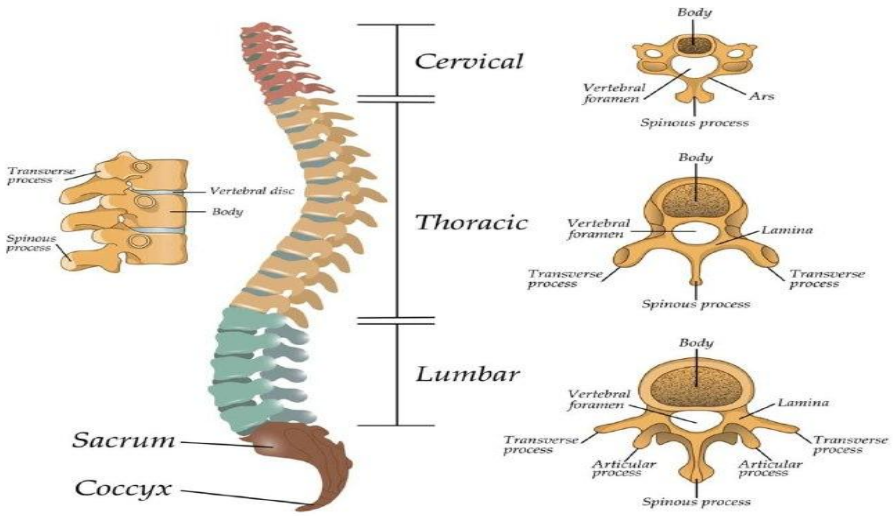
Characteristics of a Typical Thoracic Vertebra

■■ The body is medium size and heart shaped.
■■ The vertebral foramen is small and circular.
■■ The spines are long and inclined downward.
■■ Costal facets are present on the sides of the bodies for articulation with the heads of the ribs.
■■ Costal facets are present on the transverse processes for articulation with the tubercles of the ribs (T11 and 12 have no facets on the transverse processes).
■■ The superior articular processes bear facets that face posteriorly and laterally, whereas the facets on the inferior articular processes face anteriorly and medially.

Lumbar Vertebra

Characteristics of a Typical Lumbar Vertebra

■■ The body is large and kidney shaped.
■■ The pedicles are strong and directed backward.
■■ The laminae are short in a vertical dimension.
■■ The vertebral foramina are triangular.
■■ The transverse processes are long and slender. 6
■■ The spinous processes are short, flat, and quadrangular and project posteriorly.
■■ The articular surfaces of the superior articular processes face medially, and those of the inferior articular processes face laterally.
Note that the lumbar vertebrae have no facets for articulation with ribs and no foramina in the transverse processes.



Sacrum

The sacrum consists of five rudimentary vertebrae fused together to form a wedge shaped bone, which is concave anteriorly. The upper border, or base, of the bone articulates with the 5th lumbar vertebra. The narrow inferior border articulates with the coccyx. Laterally, the sacrum articulates with the two iliac bones to form the **sacroiliac joints**.

The vertebral foramina are present and form the **sacral canal.** The laminae of the 5th sacral vertebra, and sometimes those of the 4th also, fail to meet in the midline, forming the **sacral hiatus**. The sacral canal contains the anterior and posterior roots of the sacral and coccygeal spinal nerves.

The anterior and posterior surfaces of the sacrum each have four foramina on each side for the passage of the anterior and posterior rami of the upper four sacral nerves.

Coccyx

The coccyx consists of four vertebrae fused together to form a single, small triangular bone that articulates at its base with the lower end of the sacrum. The first coccygeal vertebra is usually not fused or is incompletely fused with the second vertebra.