



SNS COLLEGE OF ALLIED HEALTH SCIENCES
SNS Kalvi Nagar, Coimbatore - 35
Affiliated to Dr MGR Medical University, Chennai



DEPARTMENT : CARDIAC TECHNOLOGY

COURSE NAME : ANATOMY

UNIT : THORAX

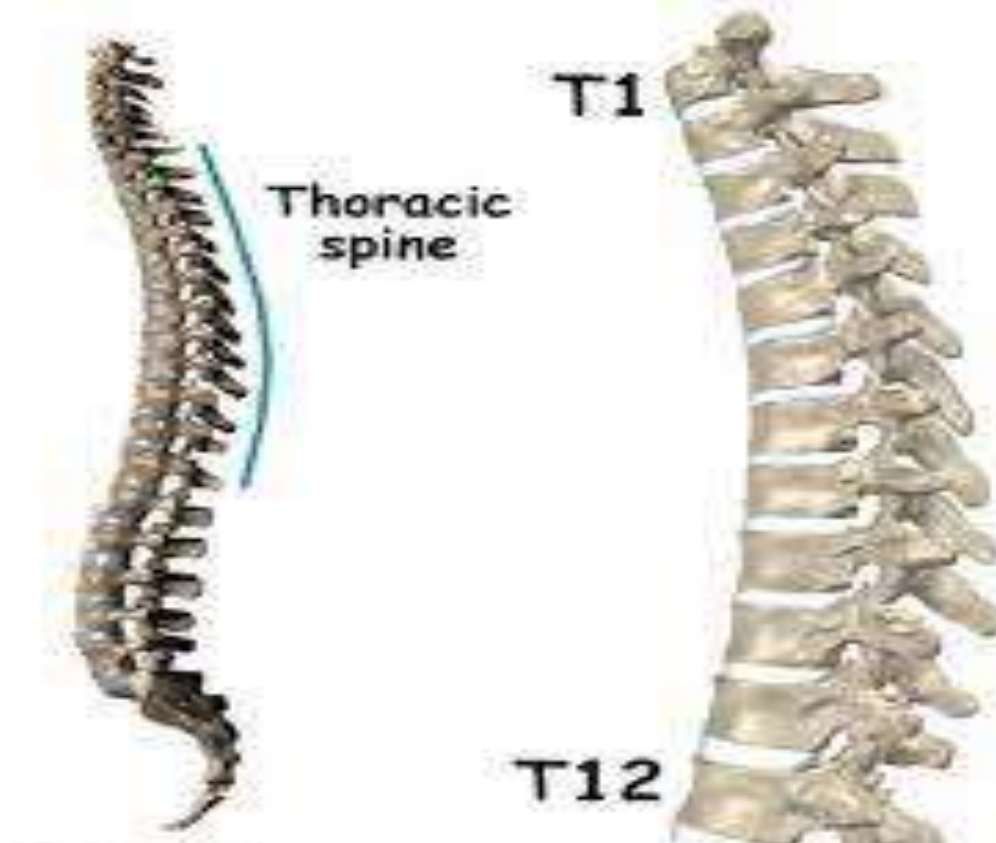
TOPIC : THORACIC VERTEBRAE



THORACIC VERTEBRAE



- The twelve thoracic vertebrae are strong bones that are located in the middle of the vertebral column, sandwiched between the cervical ones above and the lumbar vertebrae below. Like typical vertebrae, they are separated by intervertebral discs.
- However, they are various anatomical features that make them quite distinct compared to other groups of vertebrae.



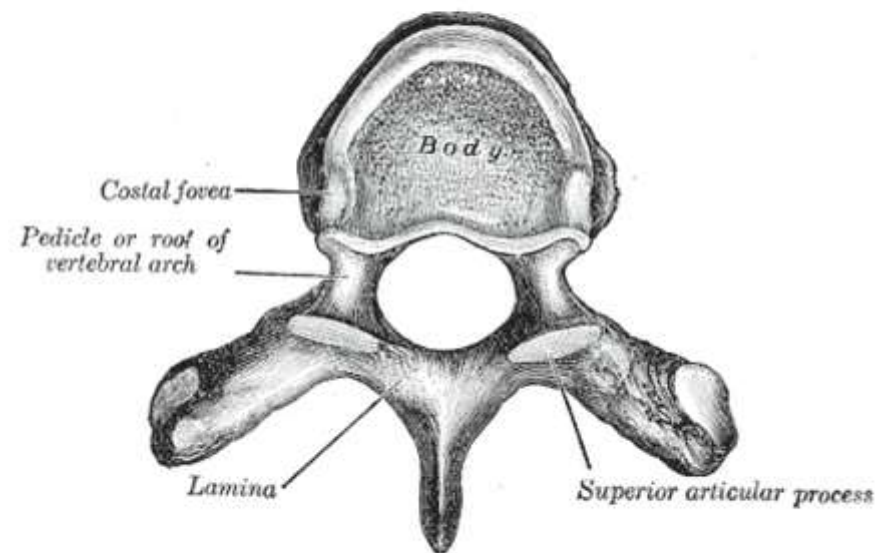


- The thoracic vertebrae are located in the middle section of the vertebral column, specifically inferior to the cervical vertebrae and superior to the lumbar vertebrae. These vertebrae span the large majority of the chest cavity area.



Typical thoracic vertebra

(superior view)





Typical vertebrae:

T5-T8 tend to be the most “typical” in that they contain features present in all thoracic vertebrae. T5-T8 have the greatest rotation ability of the thoracic region.



Atypical vertebrae:

- T1 - superior costal facets are “whole” costal facets. They alone articulate with the first rib; C7 has no costal facets. T1 does, however, have typical inferior demifacets for articulation with the second rib. Vertebral prominens name given to long prominent spinous process found at T1.
- T11 and T12 are atypical - contain a single pair, “whole,” costal facet that articulate with the 11 and 12 ribs, respectively. They also lack facets on the transverse processes.



INDIVIDUAL THORACIC VERTEBRAE



- First thoracic vertebrae (T1)
- Second thoracic vertebrae (T2)
- Third thoracic vertebrae (T3)
- Fourth thoracic vertebrae (T4)
- Fifth thoracic vertebrae (T5)
- Sixth thoracic vertebrae (T6)
- Seventh thoracic vertebrae (T7)
- Eighth thoracic vertebrae (T8)
- Ninth thoracic vertebrae (T9)
- Tenth thoracic vertebrae (T10)
- Eleventh thoracic vertebrae (T11)
- Twelfth thoracic vertebrae (T12)



STRUCTURES



Bodies

- The bodies of the thoracic vertebrae are medium sized and heart shaped. They are all weight-bearing and generally increase in size from superiorly to inferiorly with an increase in the amount of weight that needs to be supported. They possess articular facets on their sides for articulation with the heads of the ribs.



Pedicles

These project from the posterolateral surfaces of the bodies of the ribs and meet posteriorly with the laminae. The pedicles and laminae on either side form the neural arch which together with the posterior surface of the body enclose the vertebral foramen. The pedicles are notched on their superior and inferior surfaces, in the articulated thoracic spine, these notches form the intervertebral foramina for the passage of the thoracic spinal nerves.



Laminae

- Run posteriorly from their junction with the pedicles and meet in the posterior midline to form the spinous process of each thoracic vertebra.



Transverse Process

There are two for each vertebra, these are long and thin and provide an articular surface for the tubercle of the rib as well as attachment sites for ligaments and muscles of the thoracic region. They run laterally from the junction between the pedicle and the lamina on either side.



Articular Processes

Each vertebra has a superior articular process on each side that has a smooth surface (articular facet) for articulation with the corresponding inferior articular facet of the inferior articular process of the superior vertebra.



Vertebral Canal

The body and neural arch of each vertebra enclose the vertebral foramen, in an articulated thoracic spine, the vertebral foramina of the stacked vertebrae form a continuous vertebral canal for the passage of the spinal cord and the meninges surrounding it, as well as the arteries and veins supplying these structures.



Spinous Process

The spinous processes of thoracic vertebra project posteriorly but mainly downwards. In palpation of the posterior midline in the thoracic region, it will be important to note that the tip of the thoracic spine will lie level with the body of the subjacent vertebra, for example, the spine of the seventh thoracic vertebra C7 will lie roughly at the level of the body of the eighth thoracic vertebra C8.



JOINTS



- Costovertebral joints
- Costotransverse Joints
- Intervertebral Joints



INTERVERTEBRAL DISC



- The intervertebral discs (IVD) Intervertebral discs act as cushions of fibrocartilage and are the main joints between adjacent vertebrae. In the thoracic region, there are 12 such discs.
- Their primary role is to provide flexibility and absorb shock, preventing vertebrae from grinding against each other.



LIGAMENTS



- Anterior Longitudinal Ligament - This ligament runs lengthwise down the front of the vertebral bodies and provides stability during extension movements.
- Posterior Longitudinal Ligament - Located on the back of the vertebral bodies, this ligament runs the full length within the spinal canal and helps resist hyperflexion.
- Ligamentum Flavum - This is a long elastic band that connects to the front surface of the lamina bones and also runs the full length within the spinal canal. It helps preserve the curvature of the spine.



- Supraspinous Ligament A strong fibrous cord that connects the apices of the spinous processes from the seventh cervical vertebra to the 3rd or 4th lumbar vertebrae.
- Ribs and Transverse Processes - Thick ligaments connect the ribs to the transverse processes of the thoracic spine, adding to the overall structural stability.



MUSCLES



- Superficial Layer
Closes to the skin, muscles like Trapezius, Rhomboids, Latissimus Dorsi run from the vertebrae to the Scapula.
- Middle Layer - Erector Spinae
- Deep Layer - Transversospinalis
- Specialised Connective Tissue and Respiratory Muscles



NERVE SUPPLY



- T1 and the Brachial Plexus - The first thoracic nerve (T1) is part of the brachial plexus and plays a role in controlling the upper limbs.
- Sympathetic Chain - This chain runs alongside the spinal column and is essential for autonomic functions such as the fight-or-flight response.



- Intercostal Nerves - Branching from the spinal nerves, these run along the ribs and are key for sensation and muscle control in the thoracic region.
- Vagus Nerve - Although it doesn't originate in the thoracic region, the vagus nerve traverses it and is vital for functions like heart rate and digestion.



APPLIED ANATOMY



- Compression Fractures
- Scoliosis
- Thoracic Disc Herniation
- Spondylolisthesis
- Spinal Tumors
- Spinal Stenosis
- Ankylosing Spondylitis



ASSESSMENT



- What is the Structure of Thoracic Vertebrae ?
- What is the Nerve supply of Thoracic Vertebrae ?