King Saud University
College of medicine
Musculoskeletal block

Anatomy Team
433

Thoracolumbar Spine

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Objectives

- Distinguish the thoracic and lumbar vertebrae from each other and from vertebrae of the cervical region
- Describe the characteristic features of a thoracic and a lumbar vertebra.
- Compare the movements occurring in thoracic and lumbar regions.
- Describe the joints between the vertebral bodies and the vertebral arches.
- List and identify the ligaments of the intervertebral joints

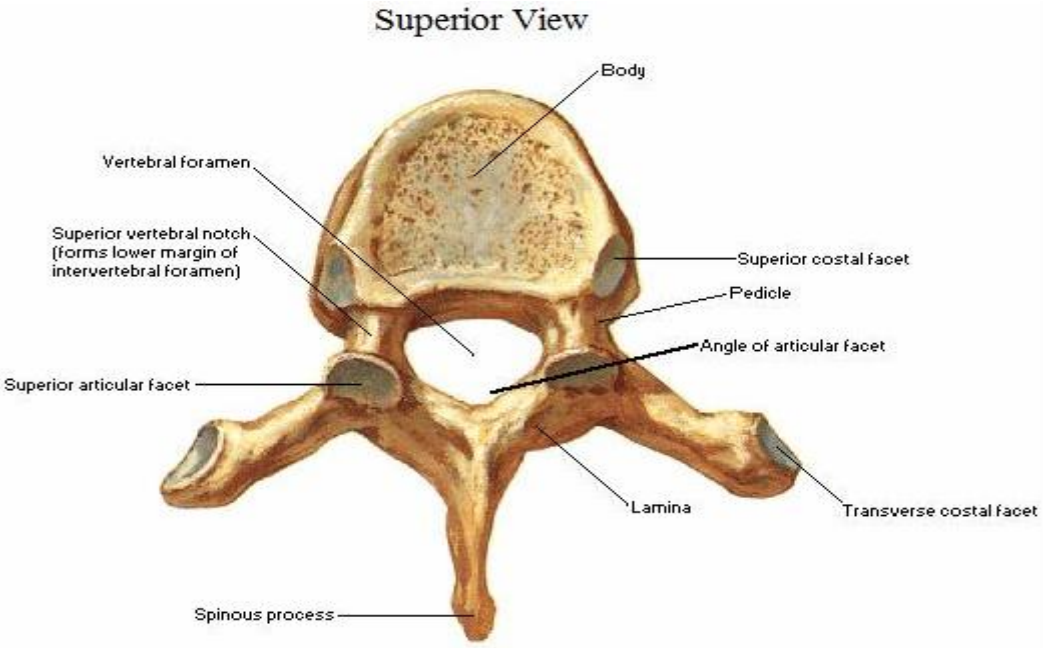
Color Index

- Red: Important.
- Violet: Explanation.
- Gray: Additional Notes.

Other colors are for Coordination

Say " bsm Allah" then start

• Thoracic Vertebrae (12)



Characteristics of a typical thoracic vertebra:

1. **Spinous process:** long and inclined downward.
2. **Lamina:** thick and broad.
3. **Pedicles:** short, thick and strong processes, directed backward, connect the body of the spinal vertebra to the arch.
4. **Vertebral foramen:** small and circular.
5. **Body:** medium size and heart shaped.
6. **Transverse process.**
7. **Transverse Costal facets:** for articulation with the tubercles of the ribs (T11 and 12 have no facets on the transverse processes).
8. **Costal facets (superior & inferior):** present on sides of the body for articulation with the heads of the ribs.
9. **Superior articular processes:** facets face backward and laterally
10. **Inferior articular processes:** face forward and medially (12th rib face laterally)

Notice: The thoracic region made bony cage to protect (heart + lungs) so, it's more rigid than other regions.

• Lumber Vertebrae (5)

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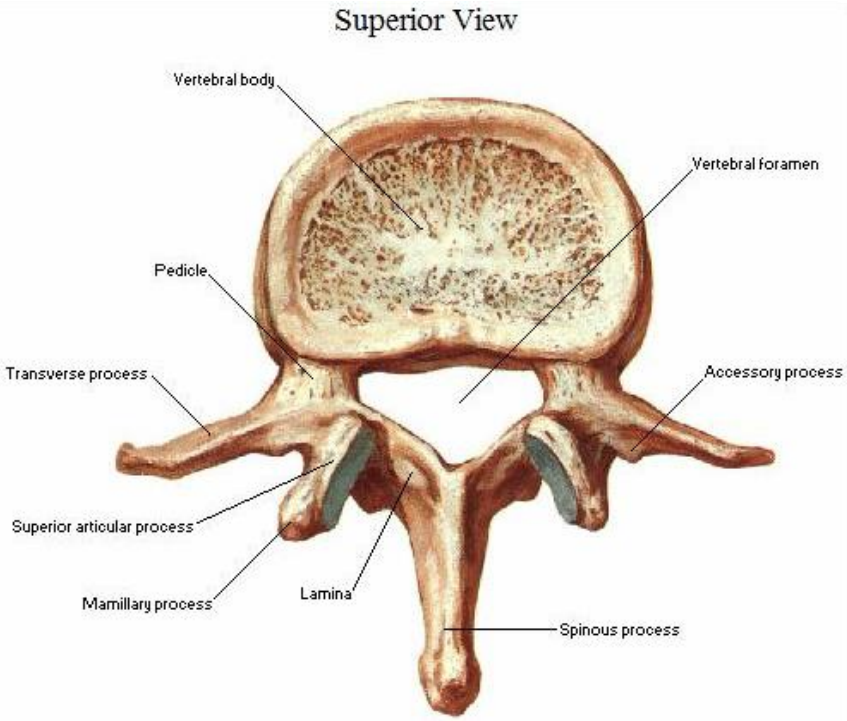

Characteristics of a typical lumbar vertebra:

1. **Spinous process**: short, flat, & quadrangular and project backward.
2. **Vertebral foramen:** triangular
3. **Body:** large and kidney shaped.
4. **Lamina:** thick
5. **Transverse processes:** long and slender.
6. **Pedicles**: strong and directed backward.
7. **Superior articular processes:** face medially.
8. **Inferior articular processes:** face laterally.

Notice:

- There are no costal facets.

- (more flexible region, designed to be strong).

A table explains the Bones of the Back Region:

http://anatomy.uams.edu/anatomyhtml/bones_back.html

• Joints

1. Between two vertebral bodies

- Cartilaginous joint
- Upper and lower surface covered with hyaline cartilage

❖ Intervertebral Disks

- One fourth of the length of the vertebral column
- Thickest in the cervical and lumbar regions (most movable)
- Consists of:

1. Anulus fibrosus: Peripheral, composed of fibrocartilage, may rupture cause the Nucleus pulposus to herniate pressing on the surrounding nerves.
2. Nucleus pulposus: Central, gelatinous material, large amount of water, small number of collagen fiber, few cartilage cells.
   (No discs between the first & second cervical vertebrae + in the sacrum or coccyx)
   - Function:
     Allow movement (flexion and extension of the vertebral column), shock absorbers

2. Between two vertebral arches

Synovial joints between the superior and inferior articular processes of adjacent vertebrae.

• Ligaments

- **The anterior longitudinal ligaments:** from the skull to the sacrum, wide, strongly attached to the front and sides of the vertebral bodies and to the intervertebral discs.
- **The posterior longitudinal ligaments:** from the skull to the sacrum, weak, narrow and is attached to the posterior borders of the discs.
- **Ligamentum flavum:** connects the lamina of adjacent vertebrae.
- **Interspinous ligament:** connects adjacent spines.
- **Supraspinous ligament:** runs between tips of adjacent spines.
- **Intertransverse ligaments**: runs between adjacent transverse processes.

• Curvatures

❖**Normal:**

- Primary (Thoracic & Sacral)
- Secondary (Cervical & Lumbar)

❖**Abnormal Curvatures**

- Exaggerated Thoracic curvatures (Kyphosis)
- Exaggerated lumbar curvature (Lordosis)
- Lateral curvature (Scoliosis)

• Movement

- **Thoracic region**

Rotation by the semispinalis and rotator muscles, assisted by the oblique muscles of the anterolateral abdominal wall.

- **Lumbar region**:

1. **Flexion** by the rectus abdominis and the psoas muscles.
2. **Extension** by the postvertebral muscles.
3. **Lateral flexion** by the postvertebral muscles, the quadratus lumborum, and the oblique muscles of the anterolateral abdominal wall. The psoas may also play a part in this movement.
4. **Rotation** by the rotator muscles and the oblique muscles of the anterolateral abdominal wall.

• Vertebra L5

❖ Largest movable vertebrae.
❖ Carries the weight of the whole upper body.
❖ Body: Massive، thick transverse processes، responsible for the lumbosacral angle between the long axis of the lumbar region of the vertebral column and that of the sacrum
❖ Body weight is transmitted from it to the base of the sacrum, formed by the superior surface of S1 vertebra

❖ SUMMARY

- There are 12 thoracic vertebrae that articulate with the rib cage
- There are 5 lumbar vertebrae that are strong and highly flexible
- Superior articular processes facets face backward and laterally, where as the Inferior articular processes face forward and medially
- Cartilaginous joint between the bodies of the vertebrae and synovial joints between the vertebral arches
- Only movement in the thoracic region is rotation, where as the lumber region has a variety of movements

Remember that

- ✓ No discs between the first & second cervical vertebrae and in the sacrum or coccyx.
- ✓ Rupture o f the Anulus fibrosus may cause the nucleus pulposus to herniate pressing on the surrounding nerves.
- ✓ Normal curvatures in thoracic and lumbar spine.

Multiple Choice Questions

Which one of the following has a short spine?

a) L1 b) T7 c) S3 d) C5

What type of movment dose the thoracic vertabrea do?

a)extension b)circumduction c)rotation d)flexion

Which one of these ligaments connects the tips of adjacent spines?

a) Ligamentum flavum b) Intertransverse ligaments

c) Supraspinous ligament. d) The superior longitudinal ligaments

The Nucleus pulposus may be composed of all of the following except.

a) Water b)fibrocartilage c)collagen fibers d)cartilage

A fracture is also called

a) Osteoporosis b) spondylolisthesis c)sphalospholisis d) spondylolysis

The intervertebral disk exist in the sacrum region

a)T b)F

6-b 5-d 4-b 3-c 2-c 1-a

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Good luck

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For any comments

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