LUMBAR VERTEBRAE

LEARNING OBJECTIVES
➢ At the end of the lecture, students should be able to:

- Differentiate between typical & atypical vertebrae.
- Describe characteristics of typical lumbar vertebrae.
- Explain characteristics of atypical lumbar vertebrae.
- Define lumbar spinal stenosis.
- Lumbar spinal stenosis

VERTEBRAL COLUMN
- The vertebrae are thirty-three in number, and are grouped under the names cervical, thoracic, lumbar, sacral, and coccygeal, according to the regions they occupy;
- there are seven in the cervical region,
- twelve in the thoracic,
- five in the lumbar,
- five in the sacral,
- and four in the coccygeal.

LUMBAR VERTEBRAE
- The lumbar vertebrae are characterized by
  • the absence of the foramen transversarium within the transverse process
  • by the absence of facets on the sides of the head.
- upper four vertebrae are typical & fifth is atypical

TYPICAL LUMBAR VERTEBRAE
- Each lumbar vertebra consists of a
  - Vertebral body and
  - A vertebral arch.
- The vertebral arch, consisting of
  - A pair of pedicles and
  - A pair of laminae (encloses the vertebral foramen).
BODY OF LUMBAR VERTEBRAE

- The vertebral body of each lumbar vertebra is large, wider from side to side than from front to back, and a little thicker in front than in back.
- It is flattened or slightly concave above and below, concave behind, and deeply constricted in front and at the sides.

ARCH OF LUMBAR VERTEBRAE

- The pedicles are very strong, directed backward from the upper part of the vertebral body.
- The pedicles change in morphology from the upper lumbar to the lower lumbar.
- They increase in sagittal width from 9 mm to up to 18 mm at L5.
- They increase in angulation in the axial plane from 10 degrees to 20 degrees by L5.

SUPERIOR AND INFERIOR ARTICULAR PROCESSES

- The superior and inferior articular processes are well-defined, projecting respectively upward and downward from the junctions of pedicles and laminae.
- The facets on the superior processes are concave, and look backward and medialward; those on the inferior are convex, and are directed forward and lateralward.
- The former are wider apart than the latter.
TRANSVERSE PROCESSES

- The transverse processes are long and slender.
- They are horizontal in the upper three lumbar vertebrae and incline a little upward in the lower two.
- In the upper three vertebrae they arise from the junctions of the pedicles and laminae, but in the lower two they are set farther forward and spring from the pedicles and posterior parts of the vertebral bodies.
- They are situated in front of the articular processes instead of behind them as in the thoracic vertebrae, and are homologous with the ribs.

MAMMILLARY PROCESS.

Mammillary process.
- Of the three tubercles noticed in connection with the transverse processes of the lower thoracic vertebrae, the superior one is connected in the lumbar region with the back part of the superior articular process, and is named the mammillary process.
- The inferior is situated at the back part of the base of the transverse process, and is called the accessory process.

A lumbar vertebra from above and behind
FIRST LUMBAR VERTEBRA

- Some individuals have four lumbar vertebrae, while others have six.
- Lumbar disorders that normally affect L5 will affect L4 or L6 in these individuals.
- The first lumbar vertebra is level with the anterior end of the ninth rib.
- This level is also called the important transpyloric plane, since the pylorus of the stomach is at this level.

FIFTH LUMBAR VERTEBRAE

- The fifth lumbar vertebra is characterized:
  - By its body being much deeper in front than behind,
  - By the smaller size of its spinous process
  - By the wide interval between the inferior articular processes; and
  - By the thickness of its transverse processes, which spring from the body as well as from the pedicles.
- The fifth lumbar vertebra is by far the most common site of spondylolysis and spondylolisthesis.
Orientation of vertebral column on surface. T3 is at level of medial part of spine of scapula. T7 is at inferior angle of the scapula. L4 is at highest point of iliac crest. S2 is at the level of posterior superior iliac spine. Furthermore, C7 is easily localized as a prominence at the lower part of the neck.

Internal aspects of vertebral body and vertebral canal

LUMBAR SPINAL STENOSIS

- Lumbar spinal stenosis describes a stenotic (narrow) vertebral foramen in one or more lumbar vertebrae.
- This condition may be a hereditary anomaly that can make a person more vulnerable to age-related degenerative changes such as IV disc bulging.
- The narrowing is usually maximal at the level of the IV discs. However, stenosis of a lumbar vertebral foramen alone may cause compression of
one or more of the spinal nerve roots occupying the inferior vertebral canal.

- Electromyography can confirm that the denervation is restricted to muscles innervated by the lumbosacral nerve roots. Surgical treatment of lumbar stenosis may consist of decompressive laminectomy.
- When IV disc protrusion occurs in a patient with spinal stenosis it further compromises a vertebral canal that is already limited, as does arthritic proliferation and ligamentous degeneration.

Lumbar spinal stenosis.

A. Normal and stenotic vertebral foramina are compared.
B. The lumbar myelogram and CT scan demonstrate a high-grade stenosis caused by the IV disc bulging at the L4 & L5 space.