Vertebral Column
- 33 vertebrae, functional entity - axis of the axial skeleton.
- Protects soft or hollow structures that travel vertically (longitudinally).
- **Examples:** spinal cord; vertebral arteries and veins;
- Movement of the vertebral column results from compressibility and elasticity of the Intervertebral discs (fibrocartilage)
- Capable of flexion, extension, lateral flexion and extension, rotation.
- Movement is limited by multiple factors:
  - Condition of IV discs
  - Shape and orientation of zygapophysial (facet) joints
    - Facet joints: between the articular processes of two adjacent vertebrae
    - Cervical facet joints are sitting in the horizontal plane, look like stacked joints (saddle)
    - Lumbar is more vertical
    - Tension of the facet joint capsules
    - Resistance of back musculature and connective tissues
    - Thoracic rib cage
    - Bulk of surrounding tissue
- Movement is freer in cervical and lumbar region - thoracic spine is relatively immobile (connected to ribs) and herniated disc here is rare
  - Watch out for new onset thoracic pain, with no history of trauma
    - With osteoporosis a slight fall or bump can break a bone
    - Ex: 75 yo female: osteoporosis leading to compression fracture
- Curvatures - 4 curvatures in adults, thoracic and sacral are primary and develop in the fetus.

Typical Vertebra Structure
- Vertebral body: anterior, supports body weight
  - Trabecular bone enclosed by thin layer of compact bone, highly active red bone marrow
- Vertebral arch: posterior to body, consisting of pedicles and laminae, forming the vertebral foramen
- Vertebral notches - indentations superior and inferior to pedicles, forming the intervertebral foramina - location of posterior root ganglia and exiting spinal nerves
- Vertebral processes: spinous process typically overlaps the next distal vertebra.
  - 2 transverse processes: muscle and rib attachment,
  - 4 articular processes - 2 superior and 2 inferior, each with an articular facet, forming zygapophysial (facet) joints.
    - Facet joints: articulate with superior and inferior vertebrae
    - Facet syndrome vs. spondolosis or soft tissue in the back
    - Facet joint injection under live flouro
- Regional Characteristics of Vertebrae
  - Cervical - CA fig. 4.5
  - Smaller size and bear less weight.
  - IV disks are relatively thick compared to the vertebral body size.
  - Articular facets are nearly horizontal in orientation.
  - Greatest range of motion and variety of movement: less surrounding body mass and above reasons.
  - Transverse foramen located in the transverse process → vertebral arteries and veins pass.
  - Transverse process with 2 lateral projections
    - anterior and posterior tubercle: attachment of levator scapulae and scalenes.
  - Vertebral foramina: large compared to body size to accommodate cervical enlargement of spinal cord.
  - Spinous processes of C3-C6 are usually bifid in white males.
  - C7 spinous process is long (vertebra prominens), and most prominent in 70% of population.
  - Thoracic - CA fig. 4.7
    - Costal facets (transverse, inferior and superior): articulation for the ribs.
    - Limited Motion (flexion, extension, lateral flexion): are in Costal facets, vertical orientation of articular facets, and overlapping spinous processes.
    - Transverse foramen is circular and smaller.
    - Transverse processes extend posterolaterally with diminished length from T1 to T12 (called long and strong).
    - Articular facets nearly vertical.
    - Spinal processes long, directed postero-inferiorly with tips overlapping adjacent vertebral body.
      - To get between → place pt. in recumbent position.
    - T12 is transitional, with superior aspect resembling thoracic vert., and inferior aspect resembling lumbar vert.
      - Adds stress to T12 → most common risk for fracture.
  - Lumbar
    - Large kidney-shaped vertebral bodies for supporting increasing weight.
    - Vertebral foramen: triangular and medium in size.
    - Articular facets are nearly vertical, with mammillary processes on posterior surface of the superior articular facet (attachment for multifidus and intertransversarri muscles).
    - Transverse processes long and slender, projecting posterosuperiorly and laterally.
    - Spinous processes short, thick and broad (hatchet shaped).
    - L5: massive body and transverse processes
      - Anterior body is taller, resulting in the lumbosacral angle.
      - Body weight is transmitted from L5 to the base of the sacrum.