Exercise walk-through

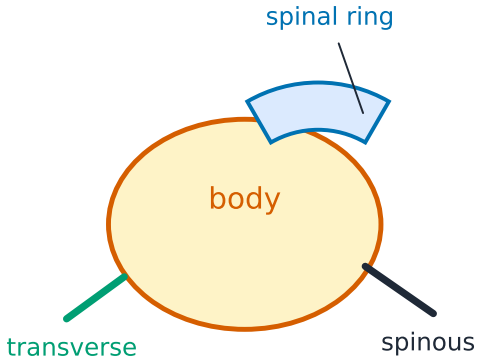
3.8
Back and vertebral column

University Medicine

Back and vertebral column - the stack

1. **Stack** 7 cervical, 12 thoracic, 5 lumbar, 5 sacral, 4 coccygeal = 33 bones, 24 movable; alternating curves.
2. **Levels** Cord ends L1-2 (conus); below is **cauda equina**. Bony level $\neq$ neural level - differ by two.
3. **Ladder** Thumb C6, nipple T4, umbilicus T10, big toe L5, perianal S2-4: five rungs read a level.

Back - vertebra and dermatome ladder



vertebra, superior view

the dermatome ladder

- thumb — C6
- nipple — T4
- umbilicus — T10
- big toe — L5
- perianal — S2–4

cord ends L1–2 — below is cauda equina

One vertebra in superior view; the **dermatome** ladder beside it.

Check yourself

- How many movable vertebrae? (24 of 33.)
- Forehead involvement in facial weakness means? (Peripheral VII.)
- The three gut arteries? (Coeliac, superior mesenteric, inferior mesenteric.)
- Cord ends at what level? (L1-2; below is **cauda equina**.)

Exercises 2.1·2.3

2.1 Where does the adult spinal cord end? [3]

2.2 Which dermatome is the umbilicus? [3]

2.3 Why is lumbar puncture performed at L3/4? [3]

Exercises 2.1·2.3

2.1 Where does the adult spinal cord end? [3]

2.1

- Conus medullaris at L1–2.

2.2 Which dermatome is the umbilicus? [3]

2.2

- T10 ✓.

2.3 Why is lumbar puncture performed at L3/4? [3]

2.3

- Below the conus the canal holds only roots (cauda equina), which move aside from a needle – the cord is safe.

Exercises 3.1·3.2

3.1 After a T10 vertebral fracture, sensation is lost below the umbilicus.

State the dermatomal level and the likely cord segment (two-level rule). Explain the rule from development. State what imaging level to request and why. [7]

3.2 Back pain with saddle numbness and urinary retention (fictional).

Name the syndrome and the structure compressed. Explain why bladder signs appear early (S2–4 roots). State the urgency and its reason. [7]

Exercises 3.1·3.2

3.1 After a T10 vertebral fracture, sensation is lost below the umbilicus.

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3.1

- Sensory level T10 dermatome; bony T10 ≈ cord L1–2 segment (rule of two).
- The vertebral column outgrows the cord: roots elongate downward, so bony and neural levels diverge.
- Image the fracture site (T10) but expect the lesion at the lower cord/conus segment.

3.2 Back pain with saddle numbness and urinary retention (fictional).

Name the syndrome and the structure compressed. Explain why bladder signs appear early (S2–4 roots). State the urgency and its reason. [7]

3.2

- Cauda equina syndrome: roots of the lumbar cistern compressed (e.g. L4/5 disc).
- S2–4 roots carry bladder and perineal fibres – among the first caught.
- Urgency: hours – decompression before permanent sphincter loss.