

Bone

Before we start

Latin term	Meaning
superior = cranialis	Upper; toward the head (L. cranium, skull).
inferior = caudalis	Lower; toward the lower end of the body (L. cauda, tail).
anterior = ventralis	Front (L. venter, belly).
posterior = dorsalis	Back (L. dorsum, back).
medialis / lateralis	Nearer to / farther from the median plane (L. latus, side).
internus / externus	Inner / outer (sometimes used in the same sense as medial / lateral).
dexter / sinister	Right / left.
superficialis / profundus	Superficial / deep.
proximalis / distalis	Nearer to / farther from the trunk (toward the free end); in some cases replaced by superior / inferior.
anterior / posterior; medialis / lateralis	Front / back (also on forearm and leg); medial / lateral – relative to the median plane, rather for individual structures.
ulnaris / radialis	Medial (toward the ulna) / lateral (toward the radius).
palmaris (older: volaris) / dorsalis	Toward the palm (L. palma) / toward the back of the hand.
tibialis / fibularis	Medial (toward the tibia) / lateral (toward the fibula).
plantaris / dorsalis	Toward the sole (planta) / toward the dorsum of the foot.
medius / intermedius	The middle one, e.g. superior – medius – inferior; medialis – intermedius – lateralis.
oralis / aboralis	Toward the mouth (L. os) / away from the mouth toward the other end of the tube.
Rostralis	Toward the front end (L. rostrum, beak); opposite of caudalis – avoids misleading 'anterior' or 'superior'.

Translate into your native language

Morpheme	Source	Meaning	Translation
abductor	Latin ab “away” + ducere “to lead”	leader-away (from the body or hand axis)	
adductor	Latin ad “toward” + ducere “to lead”	leader-toward	
extensor	Latin ex- “out” + tendere, tensum “to stretch”	stretcher-out, straightener	
flexor	Latin flectere, flexum “to bend” + -or (agent)	bender	
levator	Latin levare “to lift” (as in lever, elevate)	lifter	
opponens	Latin ob “against” + ponere “to place” (present participle)	placing against, opposing	
pronator	Latin pronus “leaning forward, face down”	turner palm-down	
supinator	Latin supinus “lying on the back, face up”	turner palm-up	
brachio-	brachium, the arm (here the humerus as origin)	from the arm	
coraco-	Greek korax “raven”: the coracoid is the raven’s-beak process	from the coracoid	
radialis	Latin radius	to the radius (the insertion)	
bi-	Latin bi- “two”	two	
-ceps	from Latin caput “head” (-ceps “-headed”)	-headed	

Morpheme	Source	Meaning	Translation
tri-	Latin tri- “three”	three	
carpi	genitive of carpus, from Greek karpos “wrist”	of the wrist	
digiti	genitive singular of digitus	of the finger	
digitorum	genitive plural of digitus “finger”	of the fingers	
indicis	genitive of index “pointer, one who shows” (indicare)	of the pointing finger	
pollicis	genitive of pollex “thumb” (perhaps from pollere “to be strong”)	of the thumb	
scapulae	genitive of scapula “shoulder blade” (deeper origin uncertain)	of the shoulder blade	
anterior	Latin, comparative of ante “before”	further forward	
dorsal	Latin dorsum	on the back side	
infra-	Latin infra	below	
inter-	Latin inter	between	
palmar	Latin palma	on the palm side	
profundus	Latin pro- + fundus “bottom”	deep	
sub-	Latin sub	under	
superficialis	Latin superficies “surface”	at the surface	
supra-	Latin supra	above	
anconeus	Greek ankōn “elbow, bend”	elbow muscle	
brachialis	adjective from brachium	of the arm	
brachii	genitive of brachium, from Greek brakhiōn, comparative of brakhys “short” (the upper arm, shorter than forearm plus hand)	of the arm	
-clavius	Latin clavis “key”; clavícula “little key” is the collarbone	of the collarbone	
dorsi	genitive of dorsum “back”	of the back	
-ossei	Latin os, ossis “bone”	the bones	
palmaris	Latin palma “palm”	of the palm	
pectoralis	Latin pectus, pectoris “chest”	of the chest	
-scapularis	Latin scapula	of the shoulder blade	
-spinatus	Latin spina “thorn, spine” (the spine of the scapula)	of the spine	
deltoid	Greek delta (Δ) + -oidēs “like”	triangle-shaped	
lumbricals	Latin lumbricus “earthworm”	earthworm-like	
quadratus	Latin quadrare “to make square”	squared	
rhomboid	Greek rhombos “spinning top, rhombus” + -oidēs	rhombus-shaped	
serratus	Latin serra “saw”	saw-toothed	
teres	Latin teres “rounded, smooth”, from terere “to rub, polish”	round in cross-section	
trapezius	Greek trapezion “small table, four-sided figure”	trapezium-shaped (left and right together)	
radialis	Latin radius “rod, spoke of a wheel, ray”	on the radius (thumb) side	
ulnaris	Latin ulna “elbow, forearm” (related to English ell and elbow)	on the ulna (little-finger) side	
brevis	Latin brevis	short	
latissimus	Latin, superlative of latus “wide”	widest	
longus	Latin longus	long	
major	Latin, comparative of magnus “great”	the larger (of a pair)	
minimi	Latin minimus, superlative, genitive form	of the smallest	

Planes

Sagittal plane

Divides

Vertical, running front to back. The median plane is the one sagittal plane in the midline; it divides the body into right and left halves. Any other sagittal plane is parasagittal.

Movement in it

Flexion and extension of the neck and trunk; on the ribs, the forward-and-up swing of the sternum in breathing (pump handle). The movement turns about a transverse (left–right) axis.

Coronal plane

Divides

Vertical, running side to side, at right angles to the sagittal plane. Divides the body into front (anterior) and back (posterior) parts.

Movement in it

Lateral flexion (side bending) of the neck and trunk; the outward swing of the lower ribs in breathing (bucket handle). The movement turns about a sagittal (front–back) axis

Transverse (axial) plane

Divides

Horizontal, at right angles to the long axis. Divides the body into upper (superior) and lower (inferior) parts.

Movement in it

Rotation of the head, neck and trunk about the vertical axis. The movement turns about a vertical (longitudinal) axis.

Step-by-step Questions

1. Enter the letter of the corresponding statement in the space provided beside each item.

- | | | |
|--------------------------|-------|--|
| 1. Compact bone | _____ | a. covers the bone except at the joint surfaces |
| 2. Spongy bone | _____ | b. thickest in the middle of the shaft |
| 3. Red marrow | _____ | c. mostly fat |
| 4. Yellow marrow | _____ | d. enters the shaft through a slanting canal |
| 5. Periosteum | _____ | e. a mesh of fine plates following the lines of load |
| 6. Nutrient vessel | _____ | f. makes blood cells |

2. Circle the one correct option within the parentheses in each statement.

- The bones of the wrist are (long, short, flat, pneumatic) bones.
- A flat bone is built of two plates of compact bone with (marrow only, spongy bone, cartilage, air) between them.
- A sesamoid bone develops inside a (ligament, tendon, muscle belly, joint capsule).
- The largest sesamoid bone is the (pisiform, kneecap, heel bone, talus).
- A shallow hollow on a bone is a (fossa, foramen, fissure, facet).

3. Circle the one correct option within the parentheses in each statement.

- The sheet between the two bones of the forearm is a (suture, syndesmosis, symphysis, synostosis).
- The connection between the two pubic bones is a (suture, synchondrosis, symphysis, synostosis).
- A joint that allows movement around one axis is the (saddle, ellipsoid, hinge, ball and socket).
- A saddle surface is hollow in one direction and (hollow, raised, flat, split) in the other.
- A structure that crosses the whole cavity and divides it into two is a (meniscus, disc, labrum, bursa).

4. Match

- | | | |
|---------------------------------|-------|---|
| 1. Body | _____ | a. the hole inside the arch |
| 2. Pedicle | _____ | b. points backward, felt under the skin |
| 3. Vertebral foramen | _____ | c. the thick weight-carrying block in front |
| 4. Spinous process | _____ | d. carries the small joint surfaces |
| 5. Articular process | _____ | e. the window for the spinal nerve |
| 6. Intervertebral foramen | _____ | f. the short foot joining arch to body |

5. Enter the letter of the corresponding statement in the space provided beside each item.

- | | | |
|-----------------------------|-------|---|
| 1. Uncus of the body | _____ | a. runs through the transverse foramen |
| 2. Transverse foramen | _____ | b. the raised edge on the body surface |
| 3. Vertebral artery | _____ | c. a leftover of a rib |
| 4. Front hump | _____ | d. the long spine of the seventh vertebra |
| 5. Carotid tubercle | _____ | e. the hole in the transverse process |
| 6. Vertebra prominens..... | _____ | f. the large front hump of the sixth vertebra |

6. Choose the one correct option within the parentheses in each statement.

1. The atlas is missing its (arch, body, transverse process, joint surfaces).
2. The upper joint surfaces of the atlas are shaped like a (circle, kidney, triangle, square).
3. The dens belongs to the (atlas, axis, third neck vertebra, skull).
4. When the atlas turns, it drops downward by about (two, five, ten, twenty) millimeters.
5. The back surface of the dens rests against the (alar, transverse, nuchal, radiate) ligament.
6. The true ribs are pairs (1 to 7, 8 to 10, 11 to 12, 1 to 10).
7. The floating ribs end in the (breastbone, cartilage above, muscles of the belly wall, spine).
8. The head is divided by a crest in ribs (1 to 5, 2 to 9, 8 to 12, 11 to 12).
9. The angle is missing on the first rib and on the (second, fifth, last two, seventh) ribs.
10. The ribs are longest at the (first, third, sixth to eighth, twelfth) rib.

7. Supply the term omitted from each blank.

1. The socket for one rib head is made by the pit of one body, the pit of the _____, and the _____ between them.
2. The transverse processes of the chest point _____ and to the _____.
3. The joint surfaces of the chest are more _____ than those of the neck.
4. The bodies of the chest are deep from _____ to _____.
5. The spines of the lower chest become _____ and flatter.

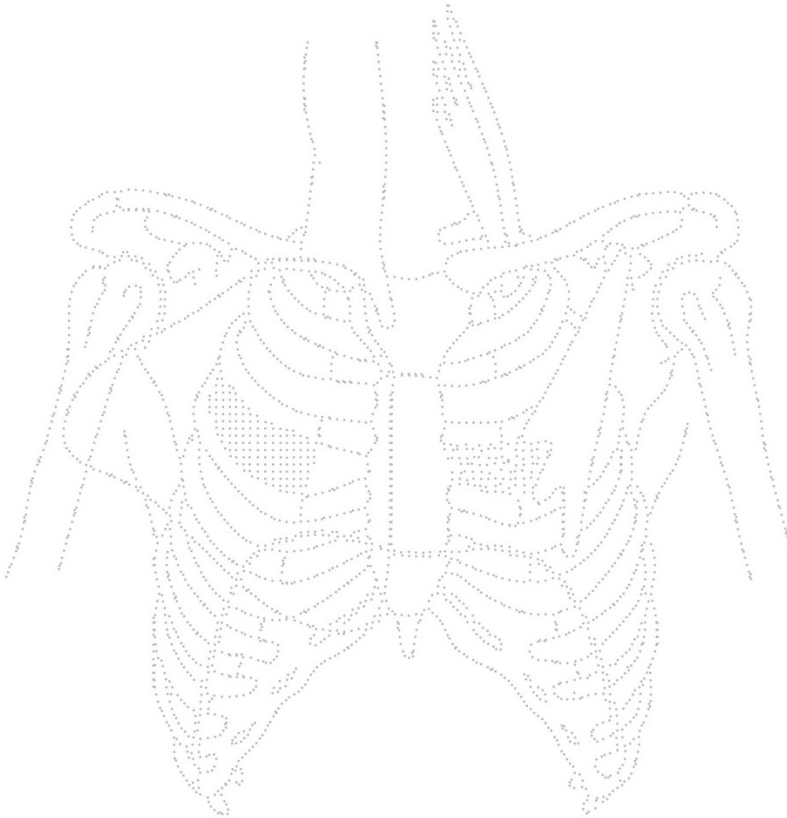
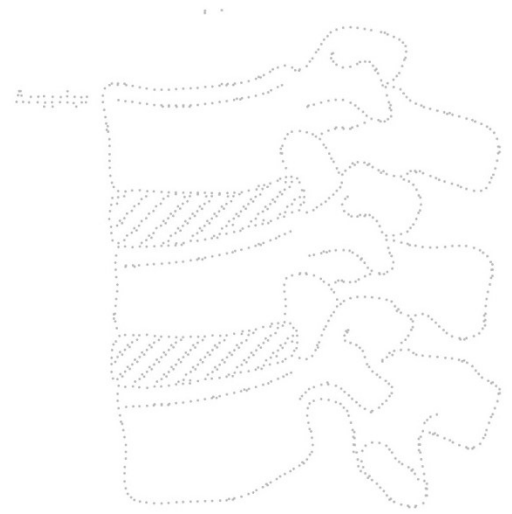
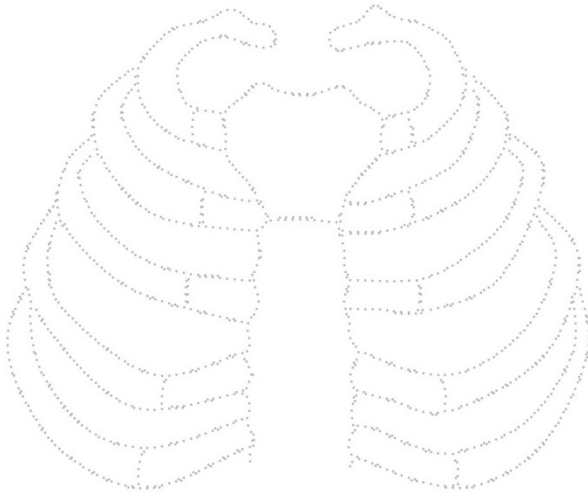
8. Choose the one correct option within the parentheses in each statement.

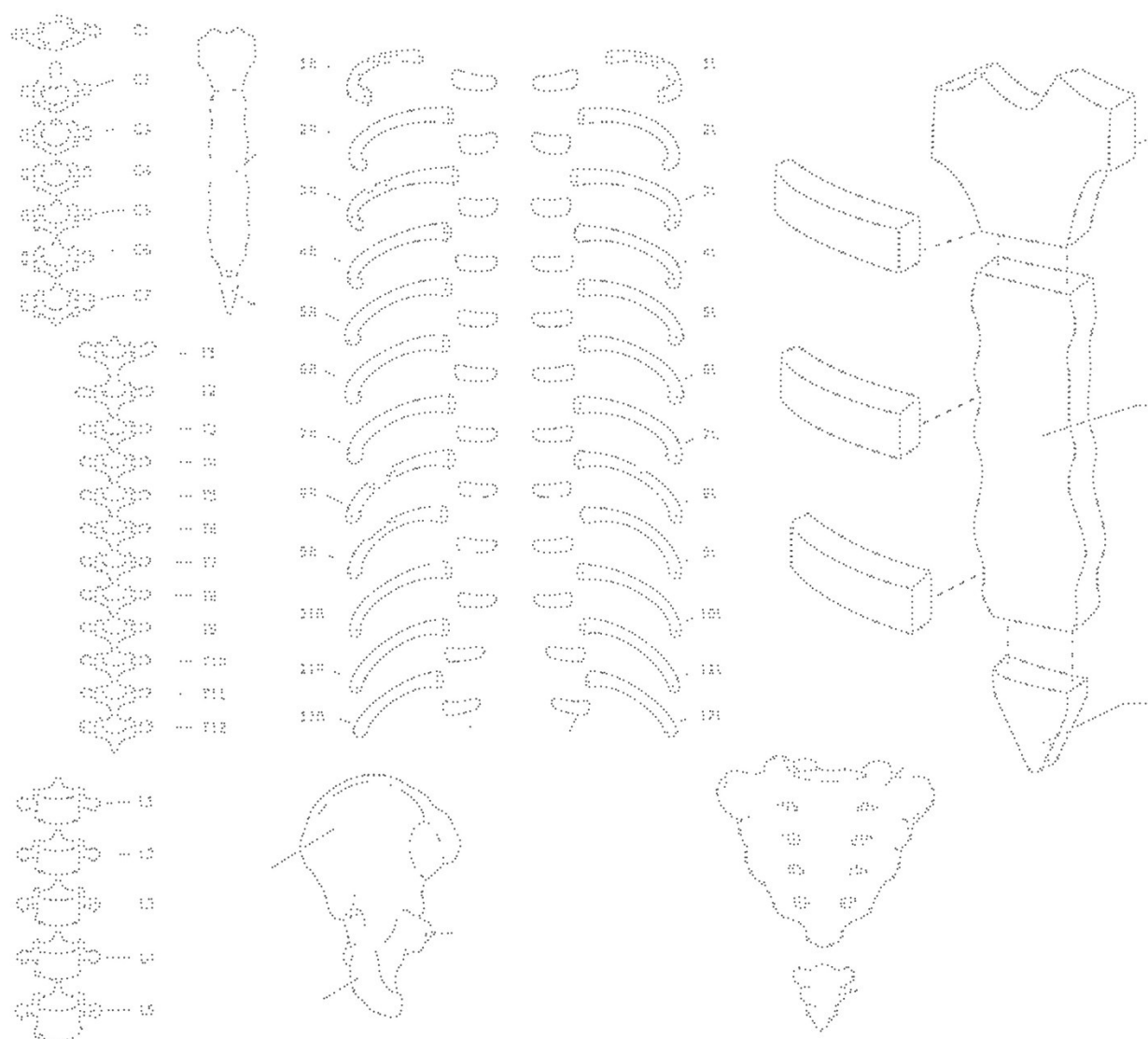
1. The largest vertebrae of the spine are the (neck, chest, low back, sacral) vertebrae.
2. The hole of the arch in the low back is (round, triangular, oval, square).
3. The long side projection of a low back vertebra is a leftover (rib, muscle, arch, disc).
4. The joint surfaces of the low back mainly prevent (bending forward, bending backward, turning, all movement).
5. The bodies become thicker from (above downward, below upward, front to back, side to side).

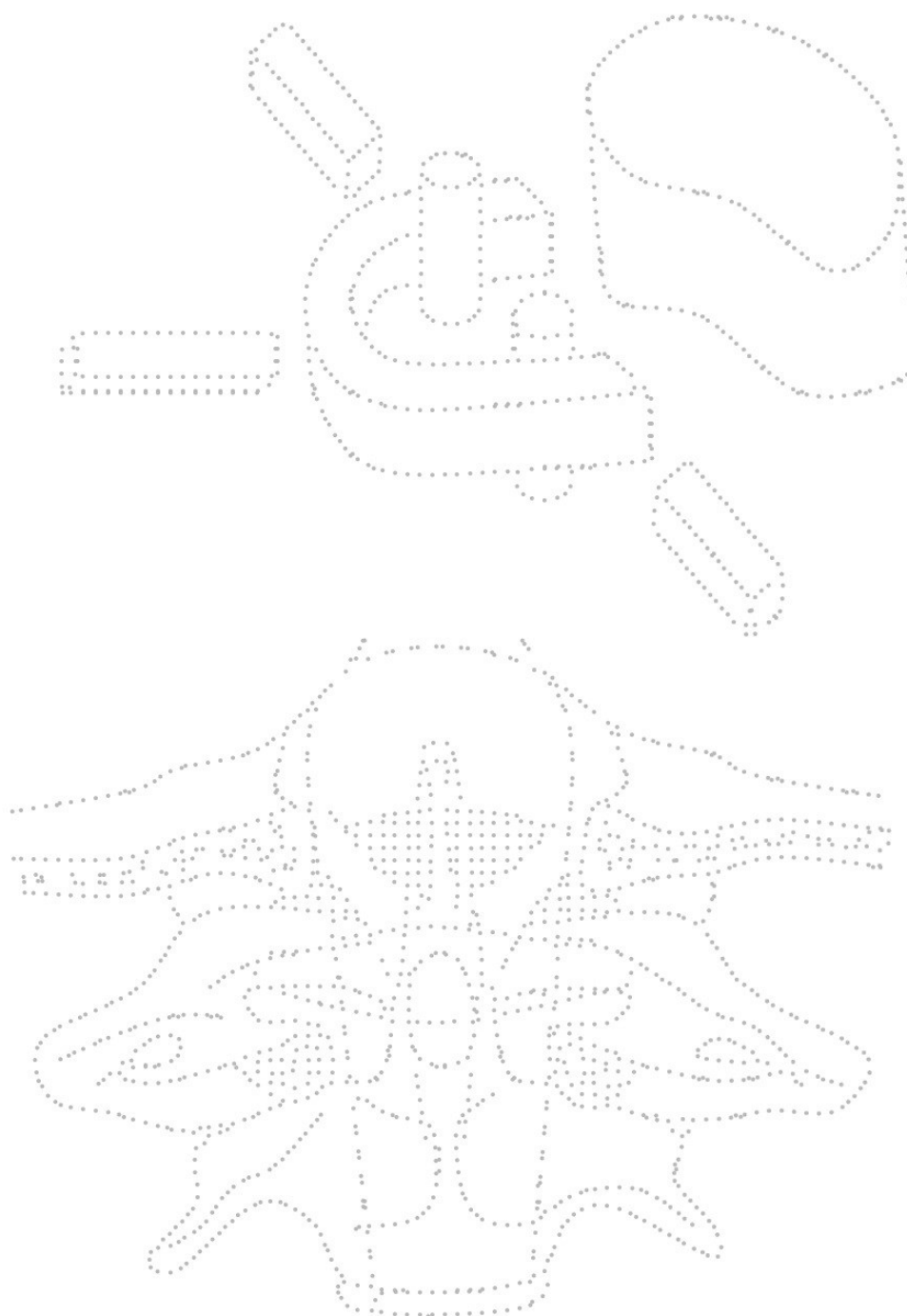
9. Enter the letter of the corresponding statement in the space provided beside each item.

- | | | |
|---|-------|--|
| 1. Middle ridge of the back surface | _____ | a. the unclosed arch of S5 |
| 2. Sacral hiatus | _____ | b. formed by fused spinous processes |
| 3. Ear-shaped surface..... | _____ | c. holds the ligaments of the sacroiliac joint |
| 4. Sacral tuberosity | _____ | d. leftovers of ribs |
| 5. Side parts of the sacrum | _____ | e. meets the hip bone |
| 6. Sacral horns | _____ | f. lie at the edges of the hiatus |

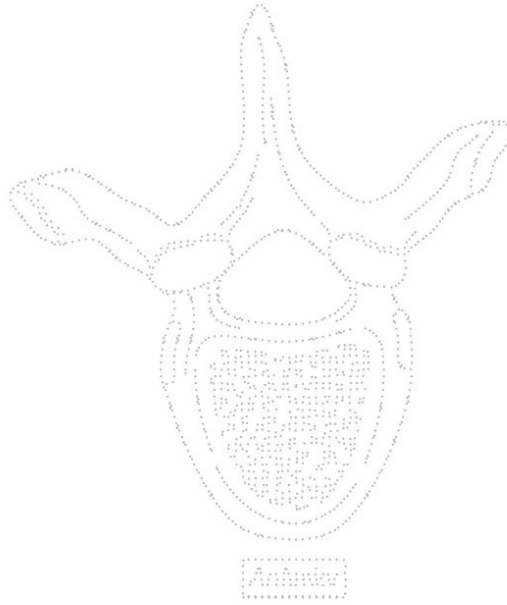
Draw and label



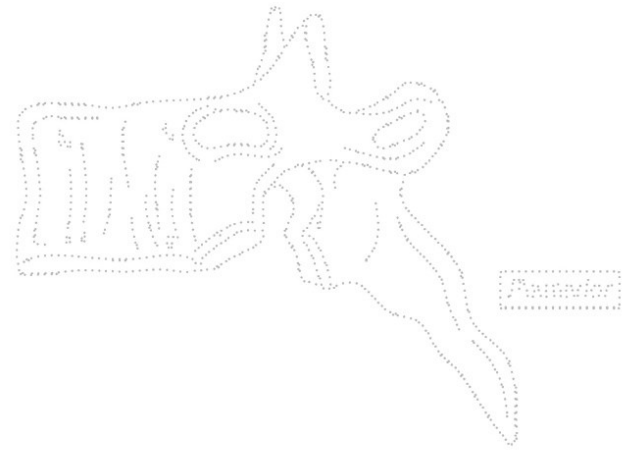




Superior view



Lateral view



Comparisons

	Cervical (C3–C6)	Thoracic (T2–T9)	Lumbar	Sacral
Body	Small, wider than deep; uncinat processes on the upper lateral rims (C3–C7)	Heart-shaped, depth close to width; costal facets on each side	Large, kidney-shaped, wider than deep	Five bodies fused; S1 carries the promontory
Vertebral foramen	Large, triangular (cervical enlargement of the cord)	Small, round	Triangular; holds the cauda equina below L1–L2	Sacral canal, ending at the hiatus
Transverse process	Transverse foramen, anterior and posterior tubercles	Long, strong, with a costal facet (T1–T10)	Long, thin costal process; accessory process at its root	Fused as the lateral sacral crest
Spinous process	Short and bifid (C3–C6); long at C7	Long, sloping steeply down (mid-thoracic)	Short, broad, horizontal	Median sacral crest
Facet plane	45° to the transverse plane, parallel to the coronal plane	60° to the transverse plane, 20° behind the coronal plane	90° to the transverse plane, about 45° to the coronal plane	L5–S1 facets often more coronal
Segmental range, summed	flexion + extension 136°; side bending 61°; rotation 77° (C0 to T1)	76°; 78°; 74° (T1 to L1)	74°; 29°; 9° (L1 to S1)	none within the bone; small nutation at the sacro-iliac joints
What it does best	Rotation (half of it at C1–C2) and nodding (C0–C1)	Rotation, braced by the ribs; protects the heart and lungs	Flexion and extension; carries the most load	Transfers the load of the trunk to the pelvis

T/F Questions

1. The cartilages of ribs 8–10 join the cartilage of the rib above.
2. The angle of the rib is distinct on the 11th and 12th ribs.
3. The free ends of the costal cartilages form articular surfaces.
4. On the middle ribs, the external surface faces the same direction along the whole rib.
5. The scalene tubercle of the first rib gives attachment to the scalenus anterior.
6. A cleft rib doubles along its body and then reunites.
7. A rudimentary rib is longer than a normal rib.
8. A bony bridge between neighbouring ribs usually lies close to the spine.
9. Lumbar ribs represent a reduction in the number of ribs.
10. Variations of the ribs are difficult to detect on radiographs.
11. The body of the sternum is usually widest in its upper quarter.
12. The jugular notch bounds the jugular (suprasternal) fossa.
13. The sternal angle arises because the manubrium is inclined backwards relative to the body.
14. The xiphoid process may remain partly or entirely cartilaginous.
15. The median primordium of the manubrium corresponds to the episternum of lower vertebrates.
16. The sternal bars first attach cranially to the base of the manubrium.
17. The first two ossification centres of the sternal body are paired.
18. The manubrium ossifies from a single centre from the very beginning.
19. A conspicuously wide and short sternum is called an orangoid sternum.
20. The joints of the heads of the ribs are innervated by the dorsal rami of the thoracic nerves.
21. The superior costotransverse ligament comes from the transverse process of the vertebra below.
22. The lumbocostal ligament connects the 12th rib with the iliac crest.
23. The sternocostal joints are highly mobile joints.
24. The radiate sternocostal ligaments continue into the sternal membrane.
25. The internal intercostal membrane lies between the ribs near the sternum.