

CHAPTER 1



ANATOMY OF THE SPINE

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The spine consists of bones that encircle and protect the spinal cord. These bones are responsible for allowing the spine to move whilst protecting the spinal cord. To allow for movement and stability, the bones interlock with each other with a joint on either side, one on the left and one on the right. The bones are also separated from each other intervertebral discs.

The discs are made of a type of cartilage. The disc is made up of a soft, gel-like centre, called the nucleus pulposus and this gel is kept in position by a tough outer fibrous layer called the annulus fibrosus. The bones of the spine are further kept in position by an array of ligaments. Muscles attach to the bones and nerves exit the spinal canal, formed by the bones, through small openings called the neural foraminae.

There are 7 neck (cervical) vertebrae, 12 chest (thoracic) vertebrae, 5 lower back (lumbar) vertebrae and 5 sitting bone (sacral) vertebrae. The sacral vertebrae are fused into a single mass called the sacrum or sitting bone.

It is unusual for the thoracic spine to undergo wear and tear changes as it is stabilised by the rib cage that is attached to it. The cervical spine and the lumbar spine on the other hand are subject to a lot of movement and is where the most of the wear and tear takes place. The bottom of the neck where the neck attaches to the rigid thoracic spine, stabilised by the ribs, is under a lot of biomechanical stress.

It is therefore usual that more wear and tear takes place at the bottom end of the cervical spine. The same is true for the lumbar spine. The bottom end of the lumbar spine is attached to the sitting bone and the pelvis which is rigid and does not move. The same type of mechanical stresses are found here as well as where it attaches at the top to the thoracic spine.

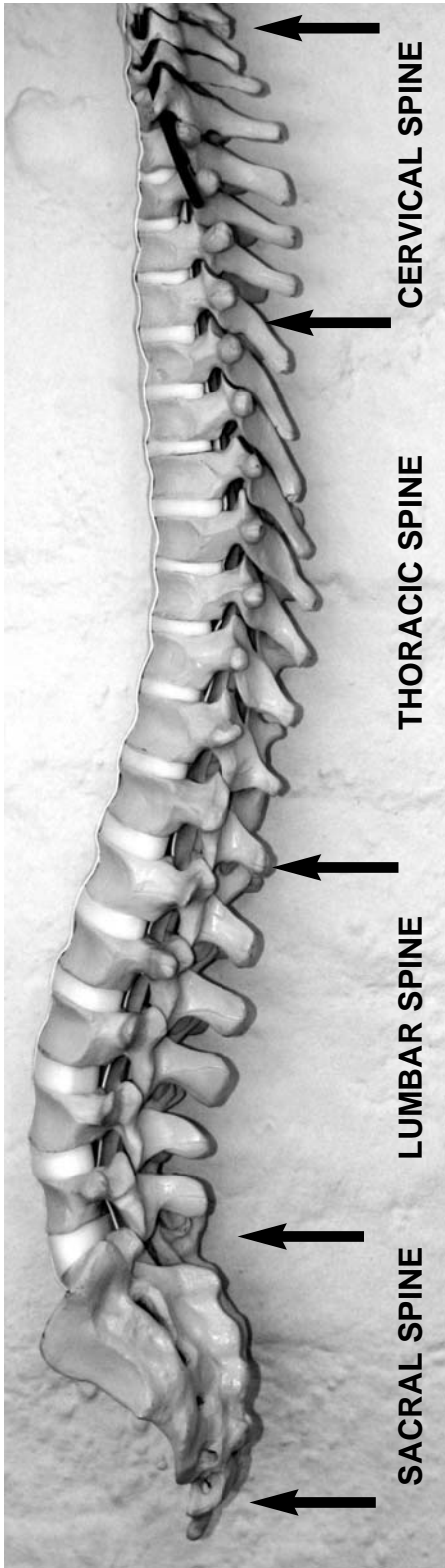


Figure 1.1

This photo is a side-on view of the whole spine.

Note that the spine consists of bones stacked on top of each other. There are 7 cervical vertebrae, 12 thoracic vertebrae, 5 lumbar vertebrae and 5 sitting bone (sacral) vertebrae. The sacral vertebrae are fused into a single mass called the sacrum

There are three curves, one is where the neck (cervical spine) and the chest (thoracic spine) meet. The lower curve is where the thoracic spine and the lower back (lumbar spine) meet. The third curve is a natural bend in the thoracic spine.

There is one last curve, but this curve is fixed and does not move and is the sitting bone (sacral) curve and consists of the sacral vertebrae fused together.

The three mobile curves are important for the normal biomechanical balance of the spine. The integral stability and movement of the whole body is dependant on the spine that acts as our central core.

The second and equally important function of the spine is to protect the nerves that come from the brain and travel to the brain and control all the functions of our body.

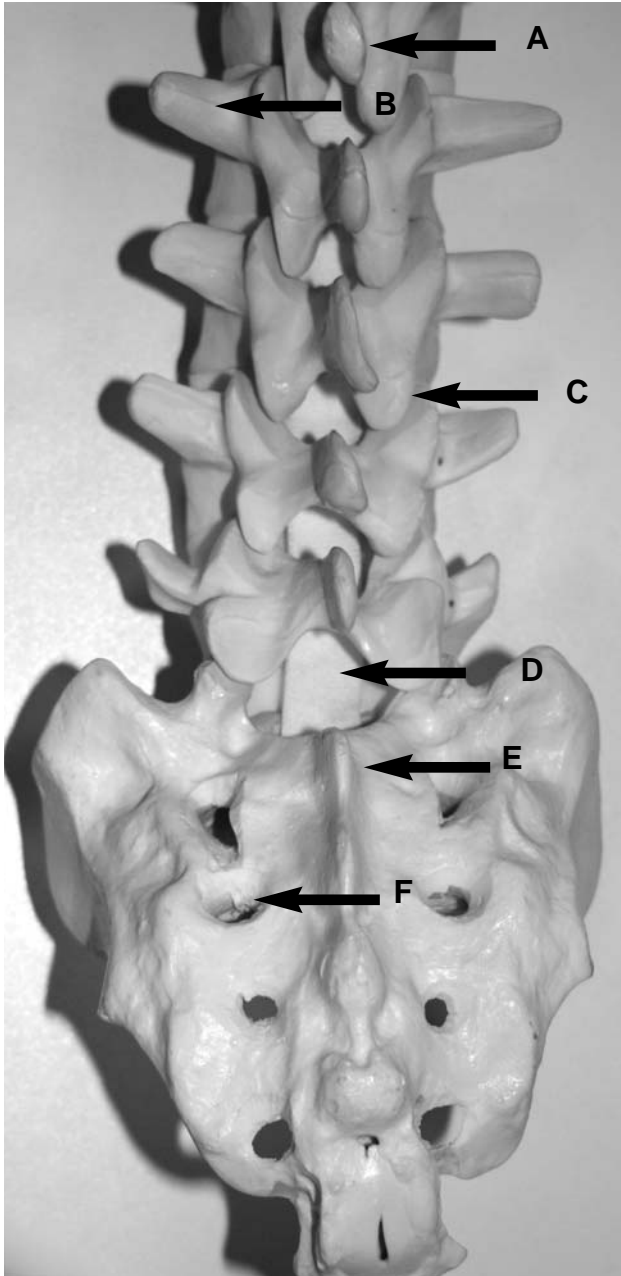


Figure 2.1

This photo is a back to front view of the lumbar spine.

A: This is the spinous process of the first lumbar vertebra.

B: This is the transverse process of the second lumbar vertebra.

C: This is the joint on the left between the third and the fourth lumbar vertebra.

D: This is the spinal canal in which the spinal cord and spinal nerves run.

E: This is the spinous process of the first sacral vertebra, it is obvious that it is fused to and continuous with the spinous process of the second and other sacral vertebrae.

F: This is the second sacral hiatus and the second sacral nerves leaves the spine from here and moves to the lower part of the body.



Figure 3.1

This photo is a side-on view of the lumbar spine.

A: This shows a spinous process of the lumbar spine. These are present on the back side of all vertebrae and can be felt through the skin of your back.

B: This shows the joint between two vertebrae and each vertebrae in the spine is joined to the vertebra below and above by these joints on the side, the disc separates the vertebrae in the front and the back of the vertebrae are connected by ligaments between the spinous processes.

C: These are the intervertebral discs and these act as shock absorbers and allow for a certain amount of movement between the vertebrae.

D: These are called the foraminae and are where the nerves that come from the spinal cord exit the spine on their way to legs. The nerves that exit through these foraminae control movement in the legs and allow sensation to pass from the legs to the spinal cord and from there to the brain.

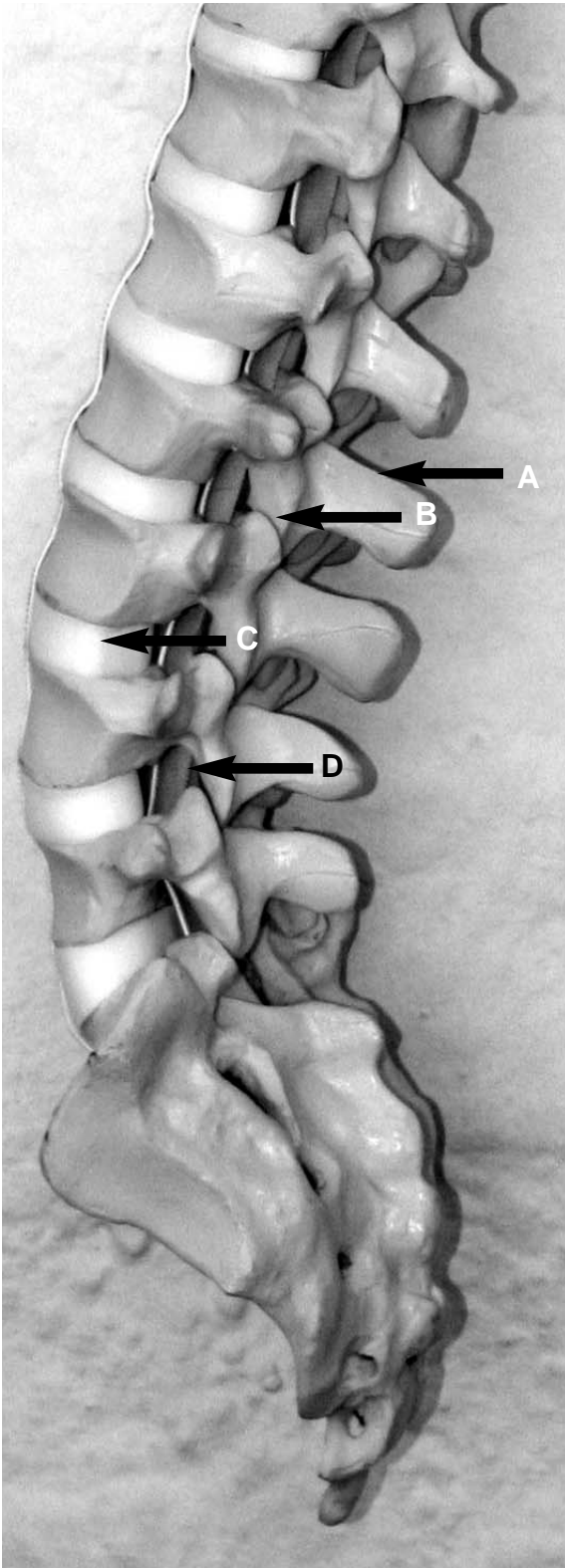




Figure 4.1

This photo is a side-on view of the cervical and thoracic spine.

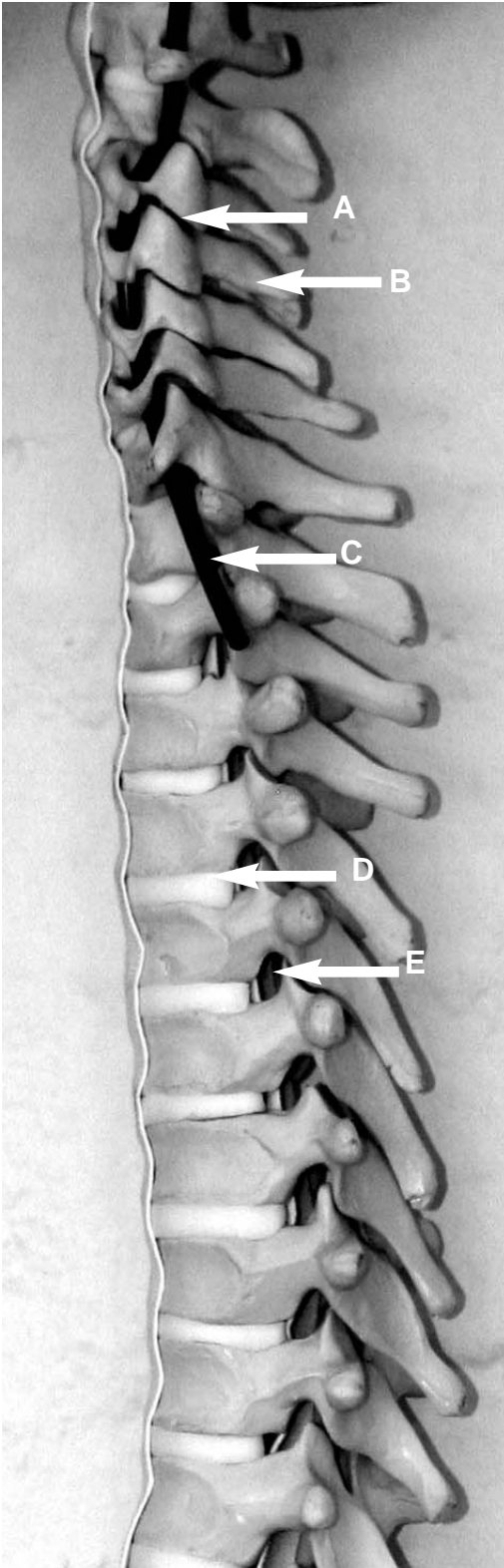
A: This shows a joint in the cervical spine. These are the same joints that we find in the lumbar and thoracic spine. Their proper names are facet joints.

B: This is a cervical spinous process. Note how both the joints and the spinous processes are smaller than in the lumbar spine.

C: The black tube-like structure is the vertebral artery that runs through the side of the cervical vertebrae. This artery supplies the brain with blood.

D: This shows a thoracic disc (intervertebral disc)

E: This shows the foramina through which the nerve runs to reach the chest wall.



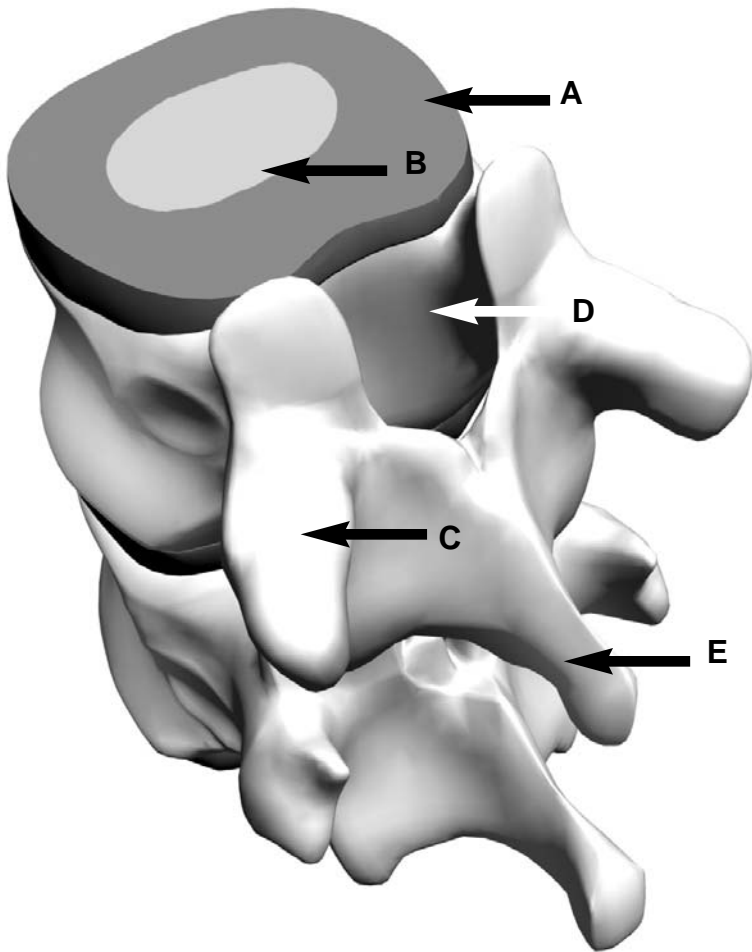


Figure 5.1

This drawing illustrates what an intervertebral disc looks like.

A: This is the outer, tough part of the disc called the annulus fibrosus. This is the bit that tears when a patient develops a slipped disc.

B: This is the soft, gel-like centre of the disc called the nucleus pulposus

C: This is the transverse process and is the bit at the back of the vertebra that sticks out to the side. In the thoracic spine the ribs attach on to this process.

D: This arrow points to the canal formed by the vertebrae in which the spinal cord and nerves run.

E: This is the spinous process of the vertebra.