

The fourth lumbar vertebra (L4) is a typical lumbar vertebra. Lumbar vertebral bodies carry considerable weight, and consequently they have large, **kidney-shaped bodies**. The body is concave posteriorly and wider from side to side than from front to back. The bodies are flat with the end-plates parallel to each other. The **triangular (or possibly trefoil) vertebral foramen** is larger than at the thoracic levels but smaller than at cervical levels. It is formed by the vertebral body anteriorly, by the pedicles laterally and the laminae posteriorly.

The vertebral arch is formed by paired pedicles and laminae. The pedicles of **L4** are short, thick and rounded processes, extending posteriorly from the postero-lateral aspect of the upper third of the vertebral body. The pedicles are grooved above and below forming shallow superior and deep inferior vertebral notches. The flat, narrow laminae project postero-medially, fusing with each other in the midline to form the spinous process.

Laminae of adjacent lumbar vertebrae are widely separated; the spaces between them are occupied by the ligamentum flavum. The broad quadrangular spinous process is wider anteriorly than posteriorly and projects horizontally backwards. With the inferior slope of the laminae, the tip of the spinous process lies at the level of the lower half of the corresponding vertebral body below. The posterior margin of the **spinous process** can be palpated through the skin.

Long, thin and flattened transverse processes project postero-laterally from the junction between the vertebral body and pedicle. The thick bases extend onto the posterior part of the lateral aspect of the vertebral body. A small accessory process is located postero-medially at the root of each transverse process (lateral tubercle).

Superior and inferior pairs of articular processes arise near the junction between the pedicles and laminae. Each bears a facet for articulation with the adjacent vertebra. The articular surfaces are reciprocally curved in the horizontal plane. The superior articular facets are concave and face postero-medially; the inferior articular facets are convex and face antero-laterally. The superior articular facets are more widely set than the inferior articular facets. On the posterior surfaces of the superior articular processes are rounded mamillary processes.

Each pars interarticularis runs obliquely from the lateral to the superior border of the lamina, between ipsilateral superior and inferior articular processes. The cortical bone in the pars is thick so as to withstand the forces transmitted through it from the vertically orientated lamina to the horizontally positioned pedicle. Inability of the pars interarticularis to withstand sudden or excessive forces may lead to fracture (spondylolysis).

Ossification

The centrum and each half of the vertebral arch ossify from single centers that are established by the 12th to 14th weeks in-utero. The arches unite during the first year and then fuse with the vertebral body by the sixth year. Secondary ossification centers in the ring apophyses (epiphyseal ring) are formed by 12 years and fuse with the rest of the vertebral body by the age of 25 years. At puberty, secondary ossification centers appear in the tips of the spinous and transverse processes and in the mamillary processes (and rarely in the tips of the inferior articular processes). These centers also fuse with the remainder of the vertebra by 25 years.