

# Joint Anatomy and Actions

A Short Lesson in the Kinesiology of Exercise

## The Spine

The spinal column is a unique and well designed structure. It has a total of 24 vertebrae, and because each vertebrae must support the weight of all the body parts above it, the lower vertebrae are much larger than the upper ones. Attached to the thoracic (chest) vertebrae are 12 pairs of ribs which form the skeleton of the thorax (chest cavity).

Cartilaginous intervertebral discs are located between the vertebrae. The discs are composed of a jell-like mass surrounded by a heavy, strong layer of fibrocartilage. The discs permit motion between the vertebrae and also provide a cushion for them. The vertebrae are held together by muscles and ligaments which extend from the skull down to the sacrum.

The spine has four normal curves which can be seen when it is viewed from the side. The cervical (neck) and lumbar (lower back) curves are concave to the rear, and the thoracic (chest) and sacral (pelvic) curves are convex to the rear. There is a smooth transition from one curve into another. This arrangement gives effective support to the spine and allows for independent movement of different sections of the spine.

Movements of the spine take place by compression and deformation of the elastic intervertebral discs and by the gliding of the articular processes of the vertebrae (protrusions at the top and bottom of each vertebrae) upon one another. The range of movement of each individual spinal (vertebral) joint is very small. However, when many vertebrae are involved at one time, the total movement of all the joints can appear to be very large. The limited range of interspinal motion is due to the tight ligaments and the shape and positioning of the interlocking parts of the vertebrae. In the thoracic area the ribs limit the range of motion.

### Basic Movements of the Spine



#### Extension

Return from a position of flexion to the anatomical position of the spine.



#### Flexion

Forward bending of the spine.



#### Lateral Flexion

Bending sideways to the right or left.



#### Rotation

Rotation of the shoulders around the spine.

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