1.4D: Body Planes and Sections

There are three basic reference planes used in anatomy: the sagittal plane, the coronal plane, and the transverse plane.

Learning Objectives

• Identify the three basic anatomical reference planes

Key Points

• A coronal or frontal plane divides the body into dorsal and ventral (back and front, or posterior and anterior) portions.
• A transverse plane, also known as an axial plane or cross-section, divides the body into cranial and caudal (head and tail) portions.
• A sagittal plane divides the body into sinister and dexter (left and right) portions.
• Body planes have several uses within the anatomy field, including in medical imaging, descriptions of body motion, and embryology.

Key Terms

• **coronal plane**: Any vertical plane that divides the body into anterior and posterior (belly and back) sections.
• **transverse plane**: Any plane that divides the body into superior and inferior parts, roughly perpendicular to the spine.
• **sagittal plane**: Any imaginary plane parallel to the median plane.
What Are Body Planes?

Body planes are hypothetical geometric planes used to divide the body into sections. They are commonly used in both human and zoological anatomy to describe the location or direction of bodily structures. Reference planes are the standard planes used in anatomical terminology and include:

- **The sagittal plane (lateral or Y-Z plane)** divides the body into sinister and dexter (left and right) sides. The midsagittal (median) plane is in the midline through the center of the body, and all other sagittal planes are parallel to it.

- **The coronal plane (frontal or Y-X plane)** divides the body into dorsal and ventral (back and front) portions. It also separates the anterior and posterior portions.

- **The transverse plane (axial or X-Z plane)** divides the body into superior and inferior (head and tail) portions. It is typically a horizontal plane through the center of the body and is parallel to the ground.

While these are the major reference planes of the body, other planes are commonly used in relation to these three. A longitudinal plane is any plane perpendicular to the transverse plane, while parasagittal planes are parallel to the sagittal plane.

The coronal plane, the sagittal plane, and the parasagittal planes are examples of longitudinal planes.

Anatomical Planes in a Human: There are three basic planes in zoological anatomy: sagittal, coronal, and transverse. A human in the anatomical position, can be described using a coordinate system with the Z-axis going from front to back, the X-axis going from left to right, and the Y-axis going from up to down.

Applications of Body Planes

Medical imaging techniques such as sonography, CT scans, MRI scans, or PET scans are one of the primary applications of body planes. By imaging a patient in standard anatomical position, a radiologist can build an X-Y-Z axis.
around the patient to apply body planes to the images. The planes can then be used to identify and locate the positions of the patient’s internal organs. Individual organs can also be divided by planes to help identify smaller structures within that organ.

Body planes are used to describe anatomical motion in the X-Y-Z coordinate system that the body moves through. An anatomist could model a limb’s range of motion by measuring which planes the limb can move through and how far it is able to travel.

Anatomical change during embryological development is also described and measured with body planes. For example, during human embryonic development the coronal plane is horizontal, but becomes vertical as the embryo develops into a fetus. In comparative embryology, body planes provide a basis for comparing the ways in which different types of organisms develop anatomically within the womb.