

Anatomical Directions

To describe the relative position of body parts and their movements, it is essential to have a universally accepted initial reference position. The standard body position known as the anatomical position serves as this reference. The *anatomical position* is simply the upright standing position with arms hanging by the sides, palms facing forwards (see figure 2). Most directional terminology used refers to the body *as if* it were in the anatomical position, regardless of its actual position. Note also that the terms 'left' or 'right' refer to the sides of the object or person being viewed, and not those of the reader.



Figure 2: **Anterior.**
In front of; toward or at the front of the body.



Figure 3: **Posterior.**
Behind; toward or at the backside of the body.

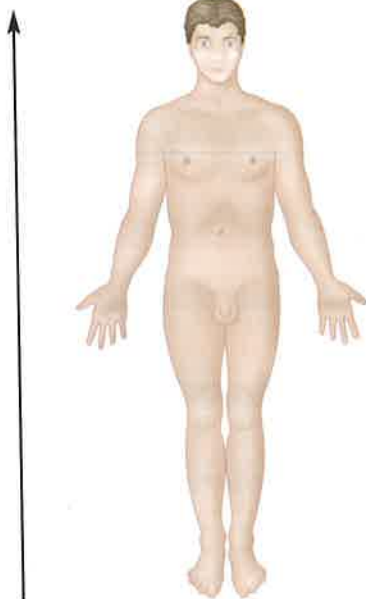


Figure 4: **Superior.**
Above; toward the head or upper part of the structure or the body.

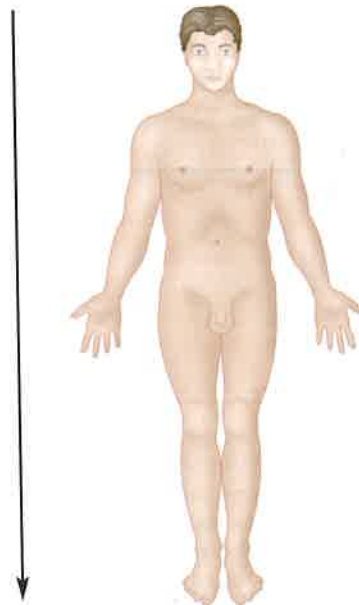


Figure 5: **Inferior.**
Below; away from the head or toward the lower part of a structure or the body.

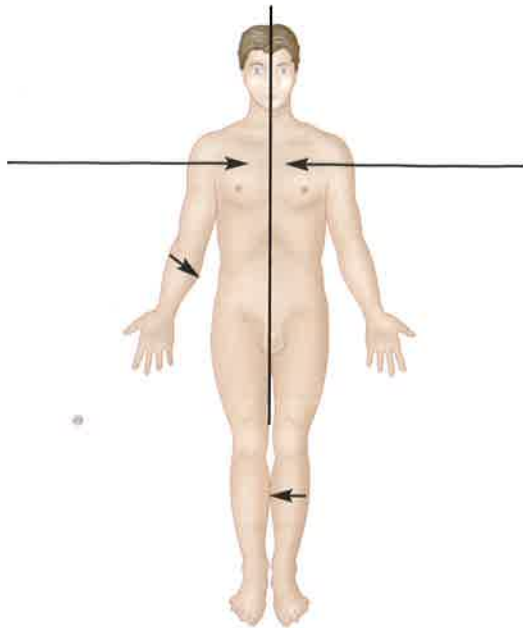


Figure 6: Medial.
 (from *medius* in Latin, meaning middle)
 Toward or at the midline of the body;
 on the inner side of a limb.

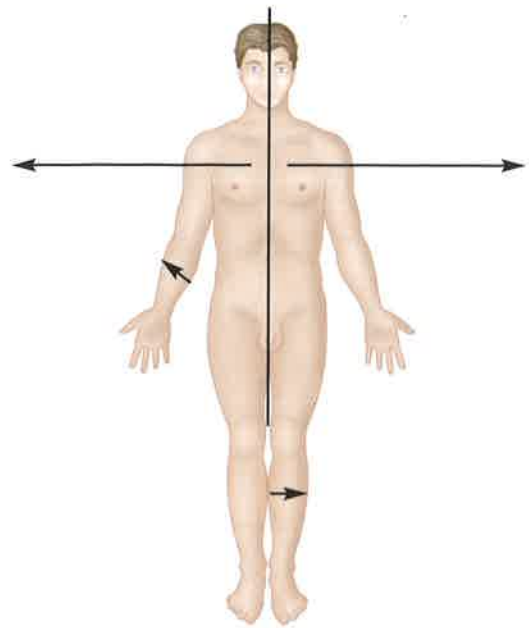


Figure 7: Lateral.
 (from *latus* in Latin, meaning side)
 Away from the midline of the body;
 on the outer side of the body or a limb.

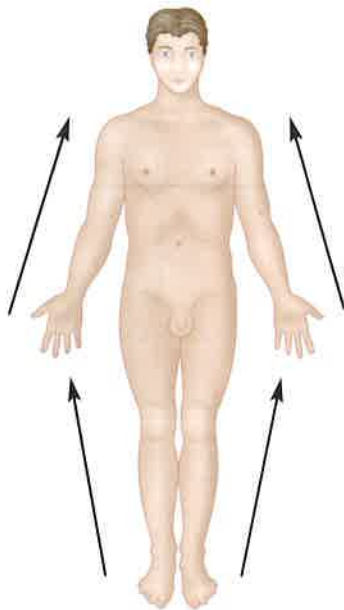


Figure 8: Proximal.
 (from *proximus* in Latin, meaning next to)
 Closer to the centre of the body (the navel), or to the point
 of attachment of a limb to the body torso.

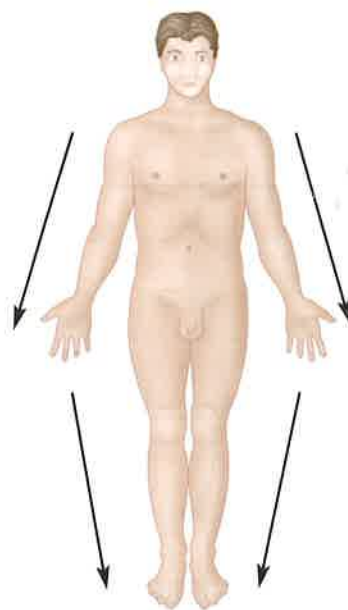


Figure 9: Distal.
 (from *distans* in Latin, meaning distant)
 Farther from the centre of the body, or from the point
 of attachment of a limb to the torso.

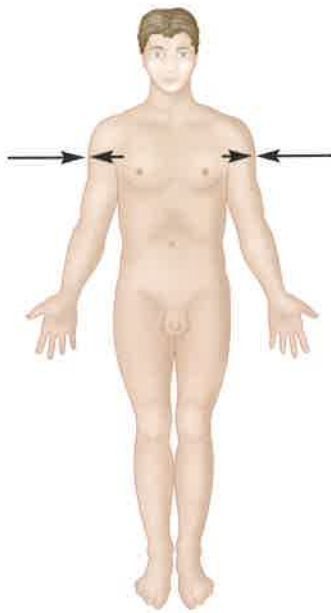


Figure 10: **Superficial.**
Toward or at the body surface.



Figure 11: **Deep.**
Farther away from the body surface;
more internal.



Figure 12: **Dorsum.**
The posterior surface of something,
e.g. the back of the hand;
the top of the foot.



Figure 13: **Palmar.**
The anterior surface of the hand,
i.e. the palm.



Figure 14: **Plantar.**
The sole of the foot.

Regional Areas

The two primary divisions of the body are its *axial* part, consisting of the head, neck and trunk, and its *appendicular* parts, consisting of the limbs that are attached to the axis of the body. Figure 15 shows the terms used to indicate specific body areas. Terms enclosed within brackets refer to the lay term for the area.

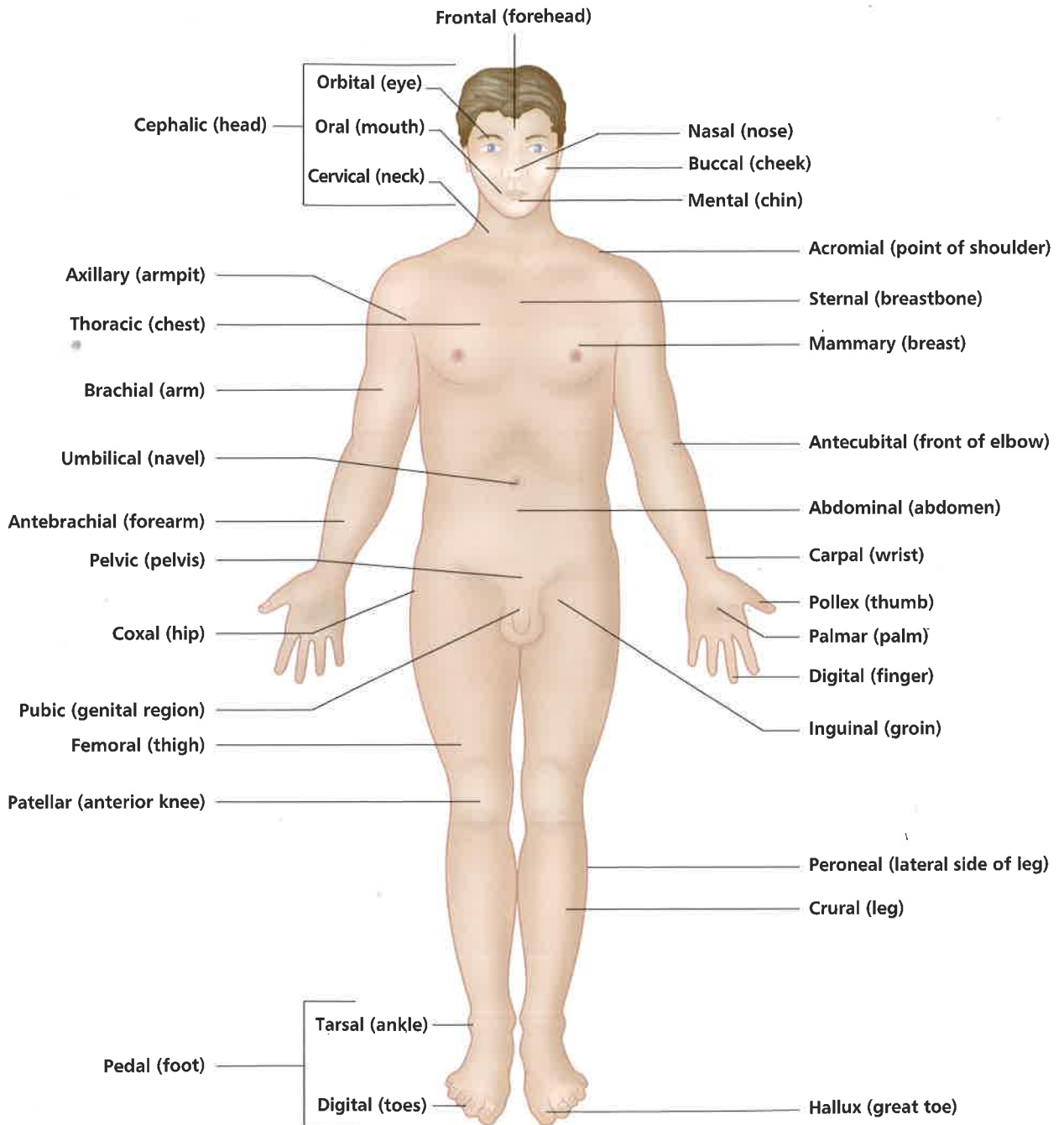


Figure 15: Terms used to indicate specific body areas;
a) anterior view.

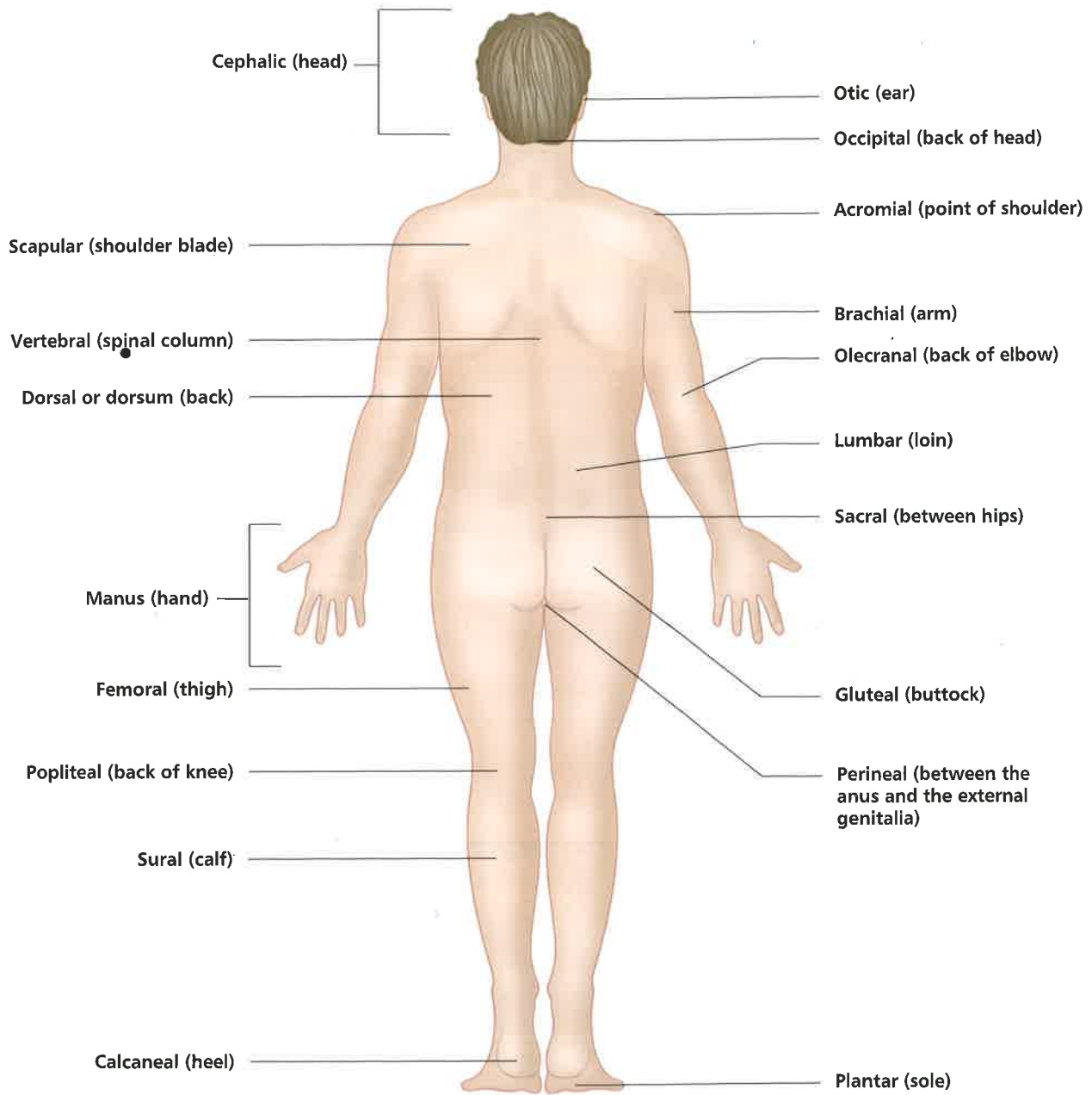


Figure 15: Terms used to indicate specific body areas;
b) posterior view.

Planes of the Body

Planes refer to two-dimensional sections through the body, to give a view of the body or body part, as if it has been cut through an imaginary line.

- The sagittal planes cut vertically through the body from anterior to posterior, dividing the body into right and left halves. The illustration shows the mid-sagittal plane.
- The frontal (coronal) planes pass vertically through the body, dividing the body into anterior and posterior sections, and lie at right angles to the sagittal plane.
- The transverse planes are horizontal cross sections, dividing the body into upper (superior) and lower (inferior) sections, and lie at right angles to the other two planes. Figure 16 illustrates the most frequently used planes.

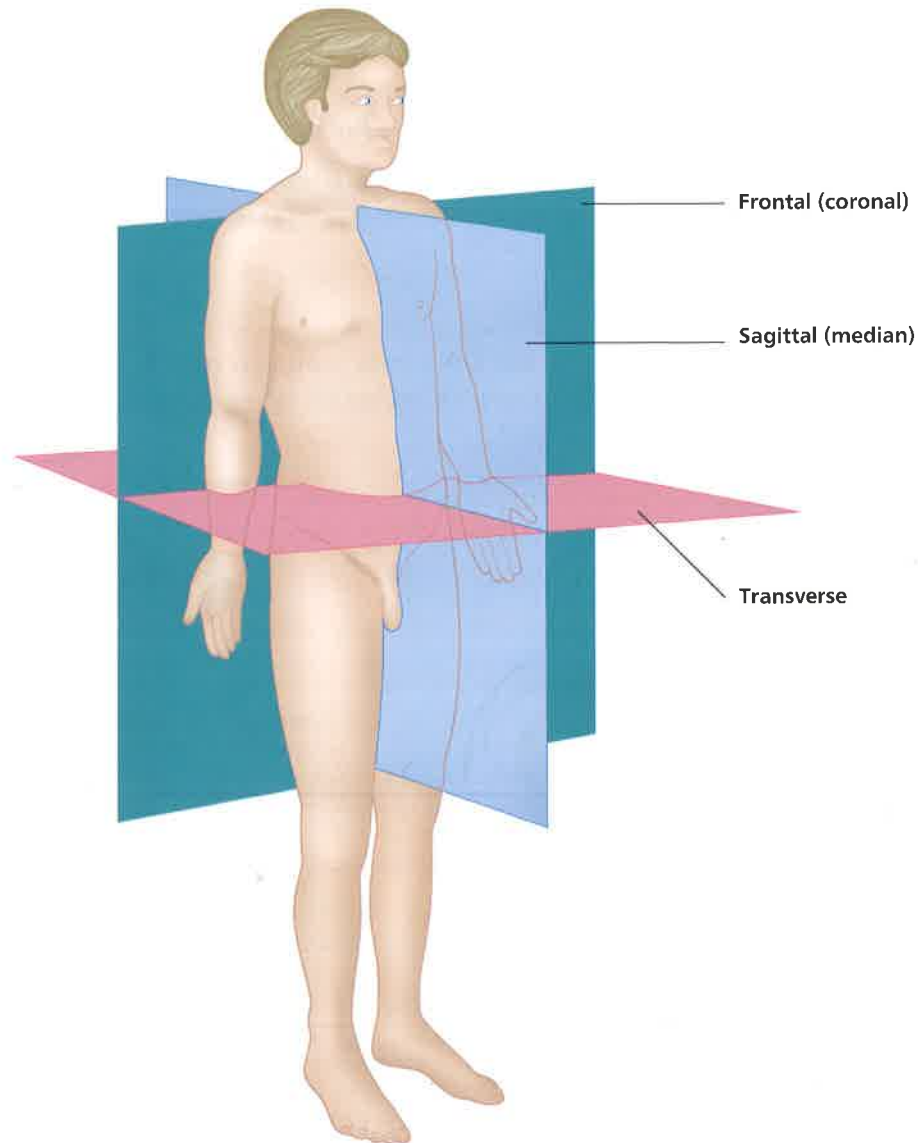


Figure 16: Planes of the body.

Anatomical Movements

The direction that body parts move is described in relation to the foetal (fetal) position. Moving into the foetal position results from flexion of all the limbs. Straightening out of the foetal position results from extension of all the limbs.

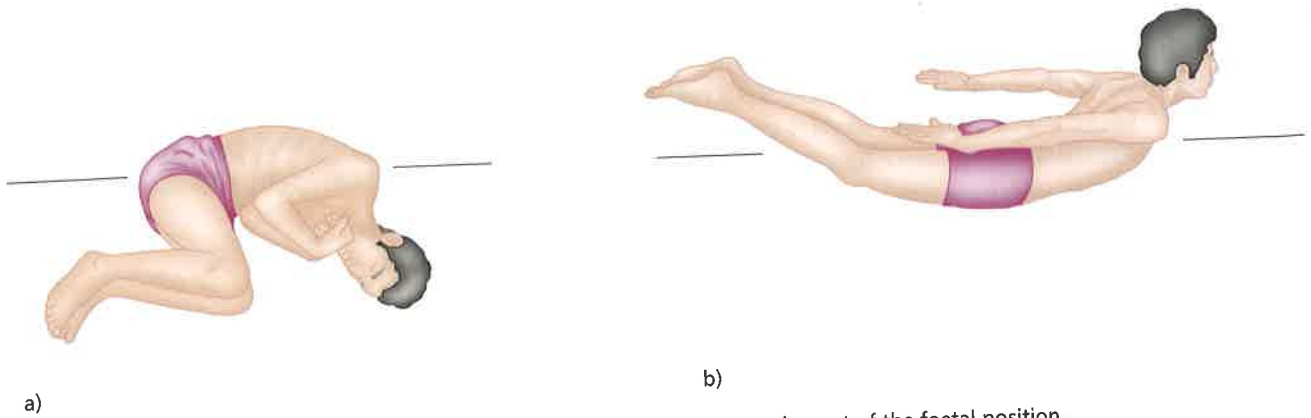


Figure 17: a) Flexion into the foetal position; b) extension out of the foetal position.

Main Movements

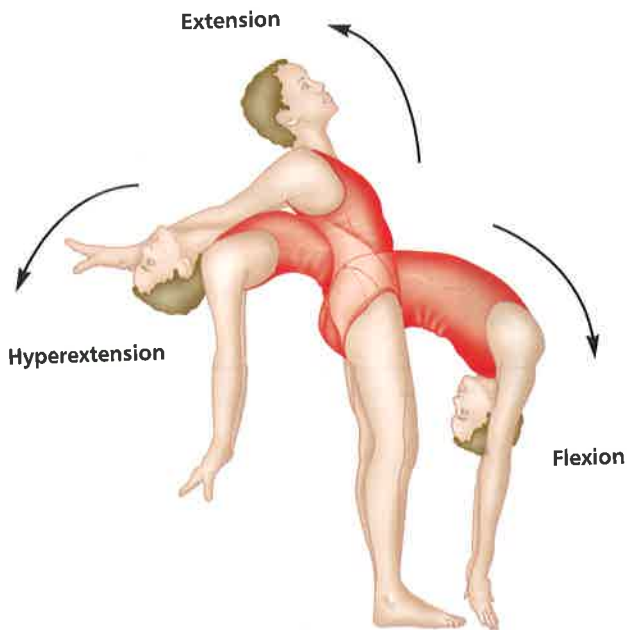


Figure 18: **Flexion:** Bending to decrease the angle between bones at a joint. From the anatomical position, flexion is usually forward, except at the knee joint where it is backward. The way to remember this is that flexion is always toward the foetal position.

Extension: To straighten or bend backward away from the foetal position.

Hyperextension: To extend the limb beyond its normal range.

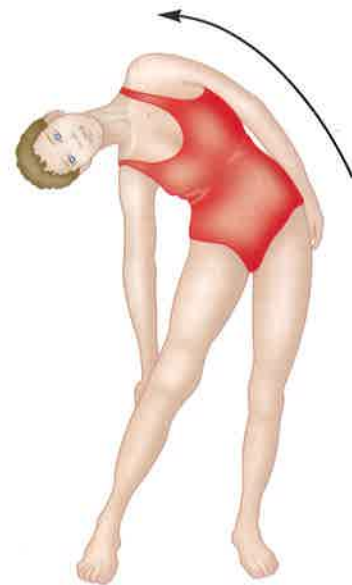


Figure 19: **Lateral flexion.** To bend the torso or head laterally (sideways) in the frontal (coronal) plane.

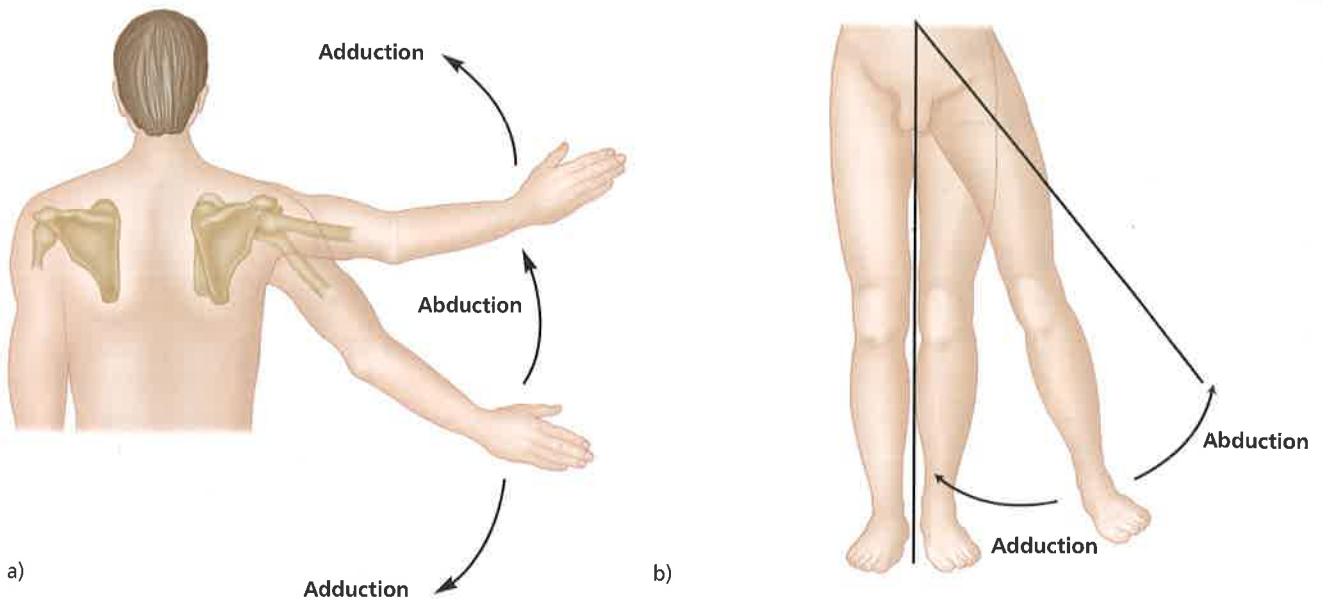


Figure 20: **Abduction:** Movement of a bone away from the midline of the body or the midline of a limb.
Adduction: Movement of a bone towards the midline of the body or the midline of a limb.

NOTE: for abduction of the arm to continue above the height of the shoulder (elevation through abduction, see page 19), the scapula must rotate on its axis to turn the glenoid cavity upwards (see figure 28b).

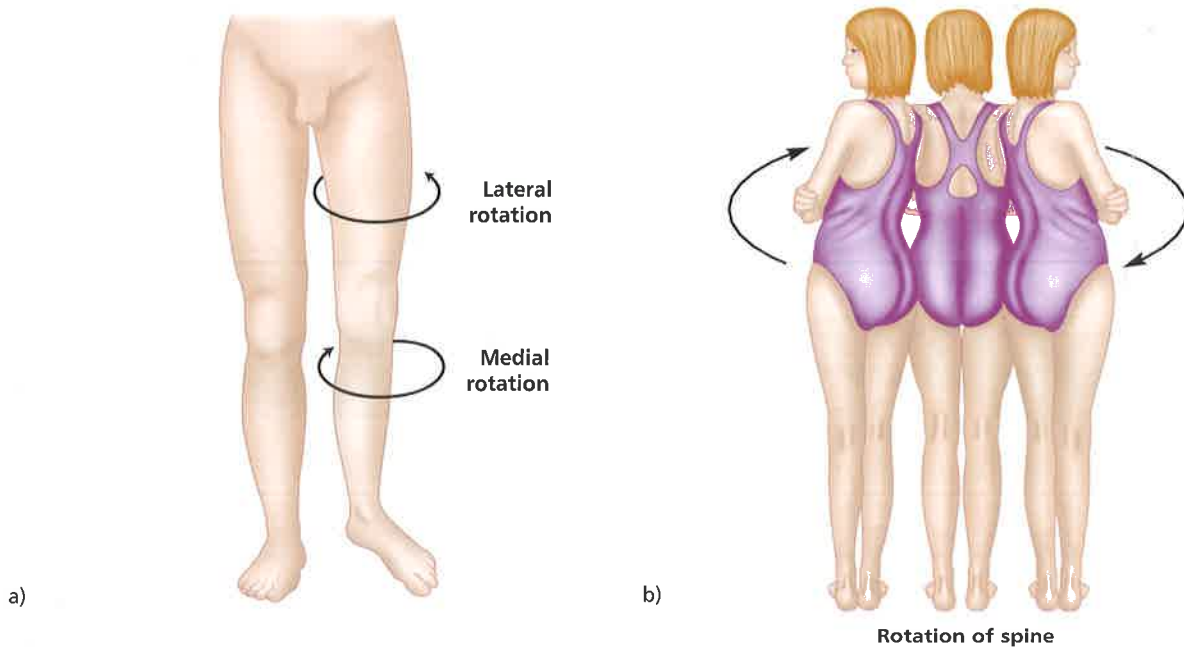


Figure 21:
Rotation: Movement of a bone or the trunk around its own longitudinal axis.
Medial rotation: to turn in towards the midline.
Lateral rotation: to turn out, away from the midline.

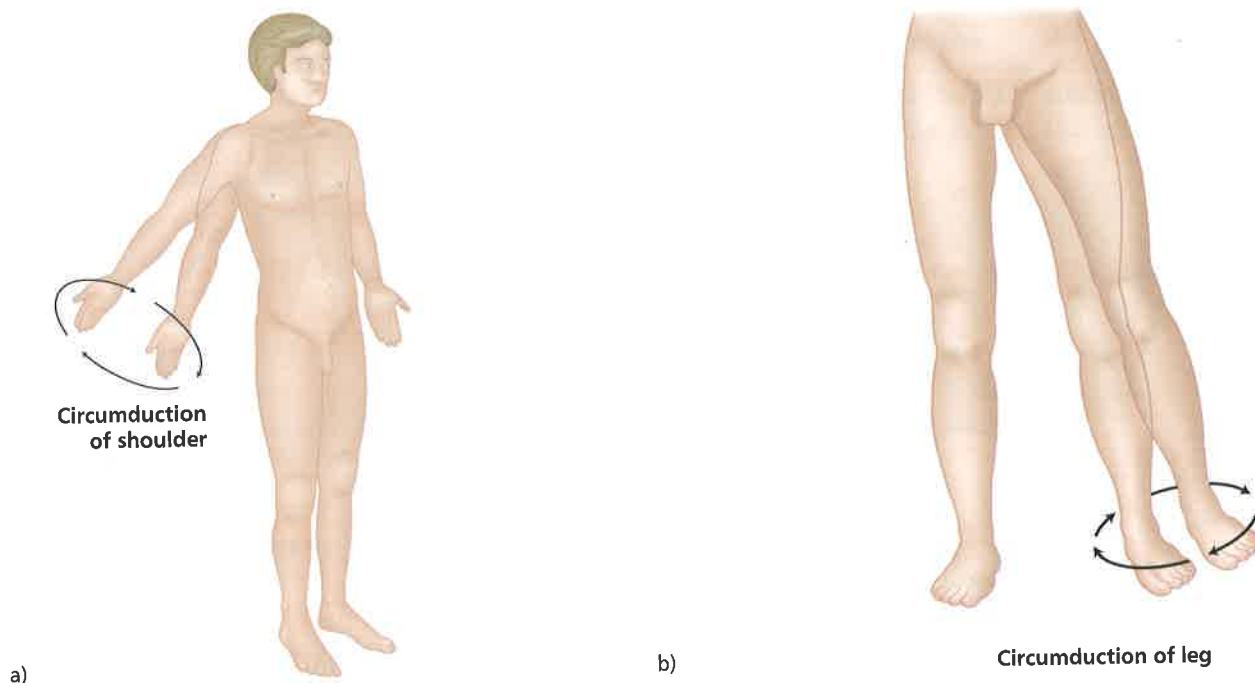
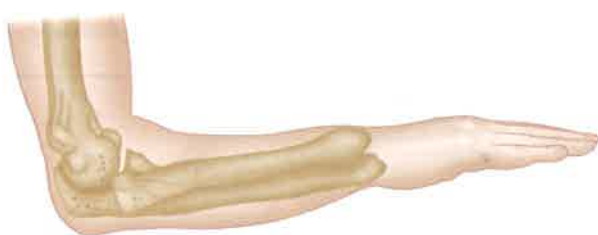


Figure 22: Circumduction.
 Movement in which the distal end of a bone moves in a circle, while the proximal end remains stable; the movement combines flexion, abduction, extension, and adduction.

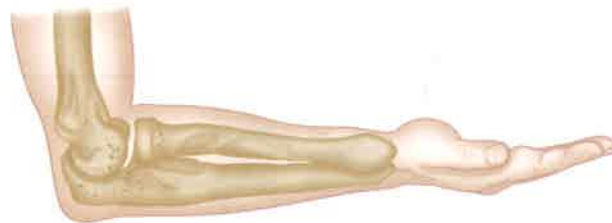
Other Movements

Movements in this section are those that occur only at specific joints or parts of the body, usually involving more than one joint.



a)

Figure 23a: Pronation.
 To turn the palm of the hand down to face the floor (if standing with elbow bent 90°, or if lying flat on the floor), or away from the anatomical and foetal positions.



b)

Figure 23b: Supination.
 To turn the palm of the hand up to face the ceiling (if standing with elbow bent 90°, or if lying flat on the floor), or toward the anatomical and foetal positions.

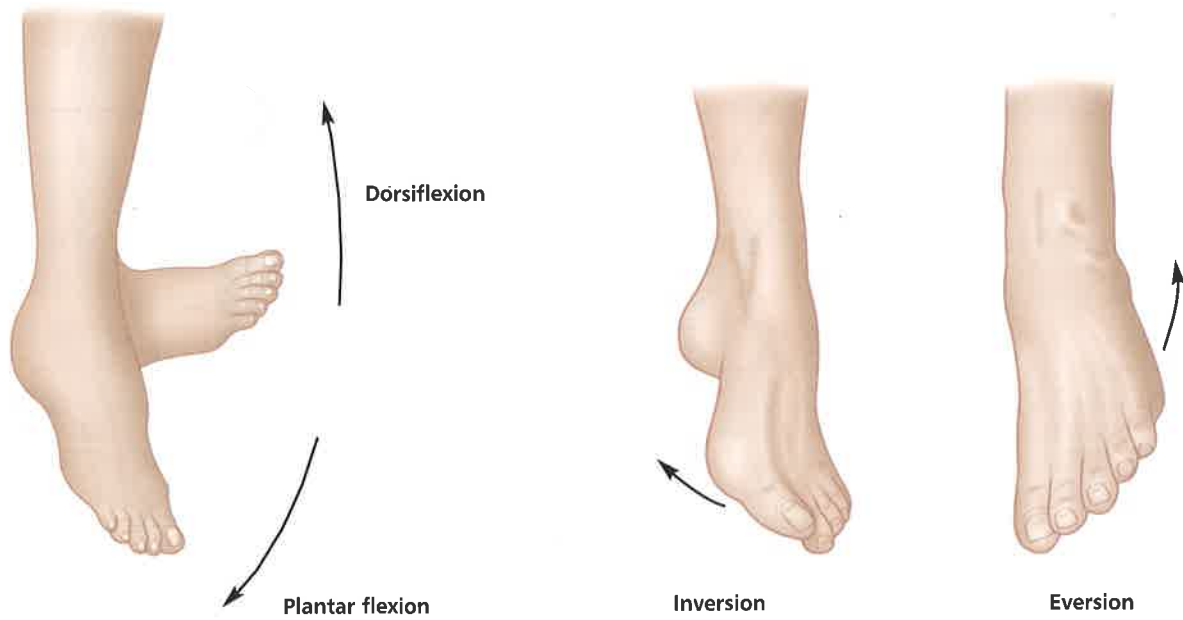


Figure 24: **Plantar flexion:** To point the toes down towards the ground. **Dorsiflexion:** To point the toe towards the sky.

Figure 25: **Inversion:** To turn the sole of the foot inward, so that the soles would face towards each other. **Eversion:** To turn the sole of the foot outward, so that the soles would face away from each other.

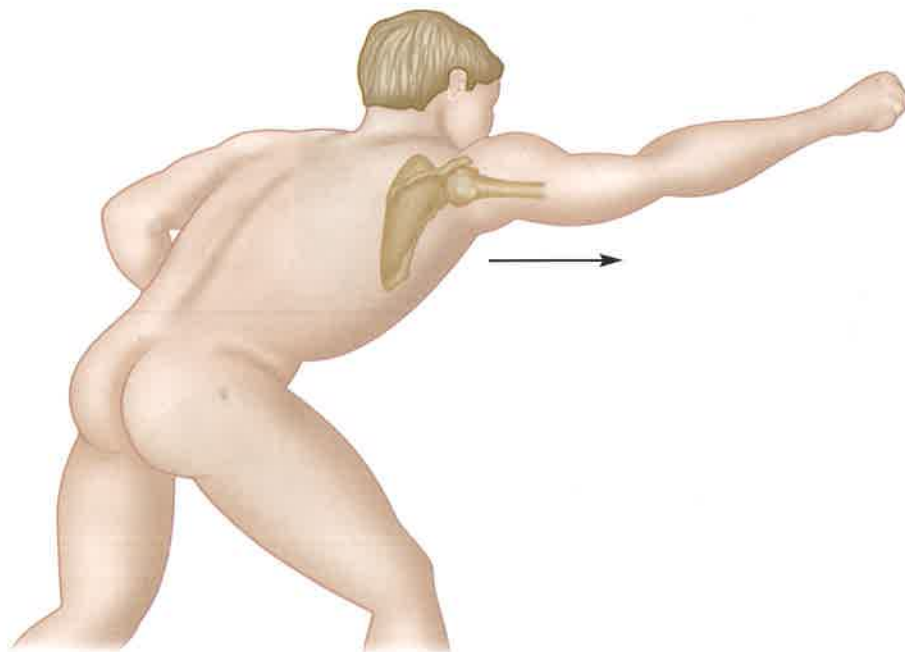


Figure 26: **Protraction.**
Movement forwards in the transverse plane.
For example, protraction of the shoulder girdle, as in rounding the shoulder.

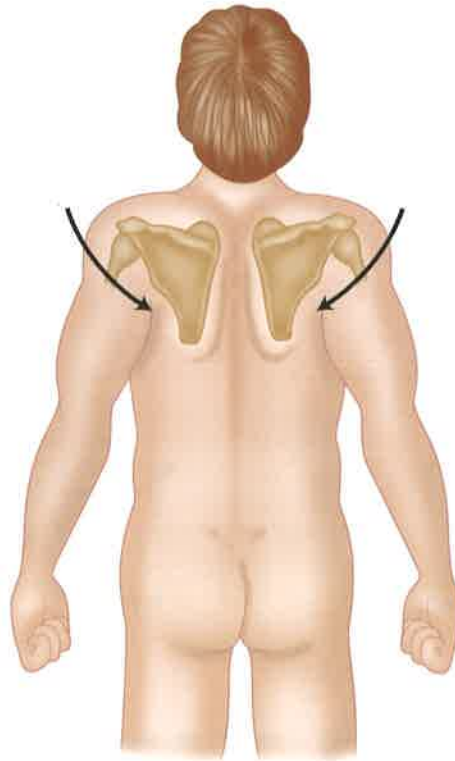


Figure 27: Retraction.
Movement backward in the transverse plane,
as in bracing the shoulder girdle back, military style.

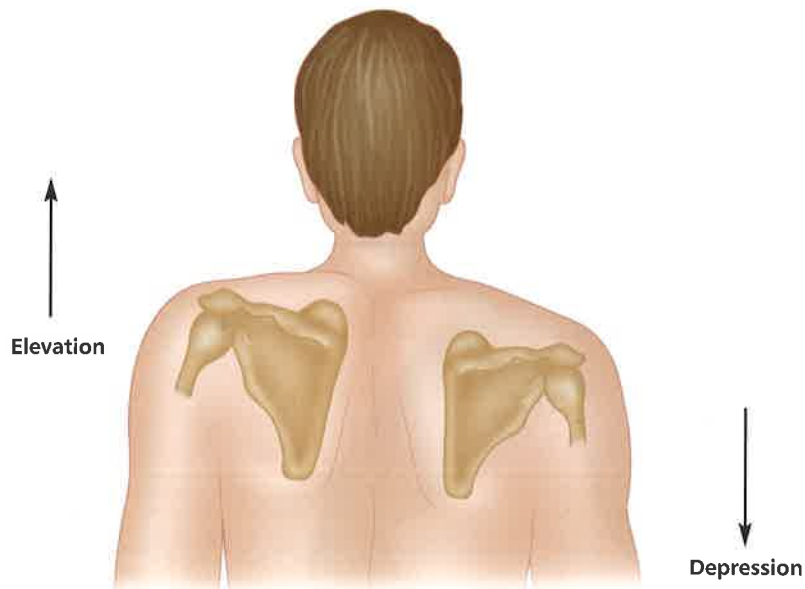


Figure 28a:
Elevation: Movement of a part of the body upwards along the frontal plane.
For example, elevating the scapula by shrugging the shoulders.
Depression: Movement of an elevated part of the body downward to its original position.

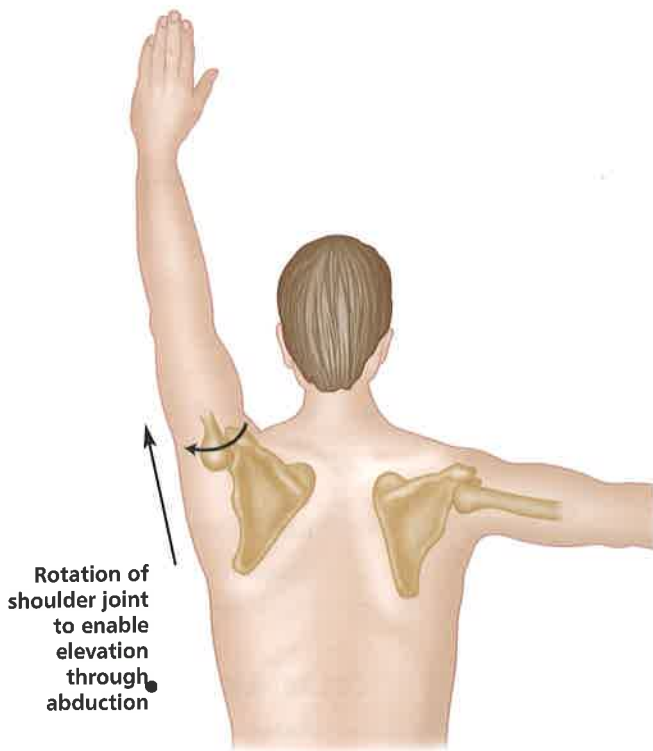


Figure 28b: Abducting the arm at the shoulder joint, then continuing to raise it above the head in the frontal plane can be referred to as **elevation through abduction**.

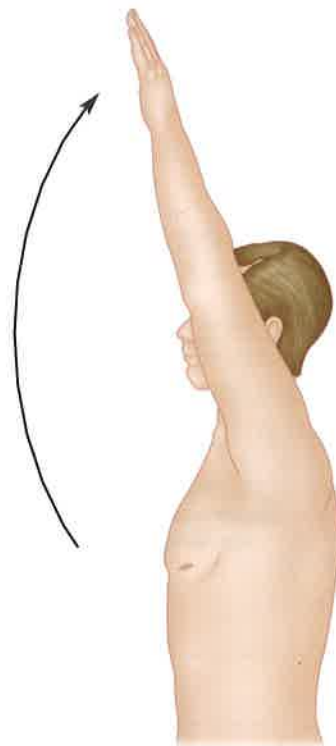


Figure 28c: Flexing the arm at the shoulder joint, then continuing to raise it above the head in the sagittal plane can be referred to as **elevation through flexion**.

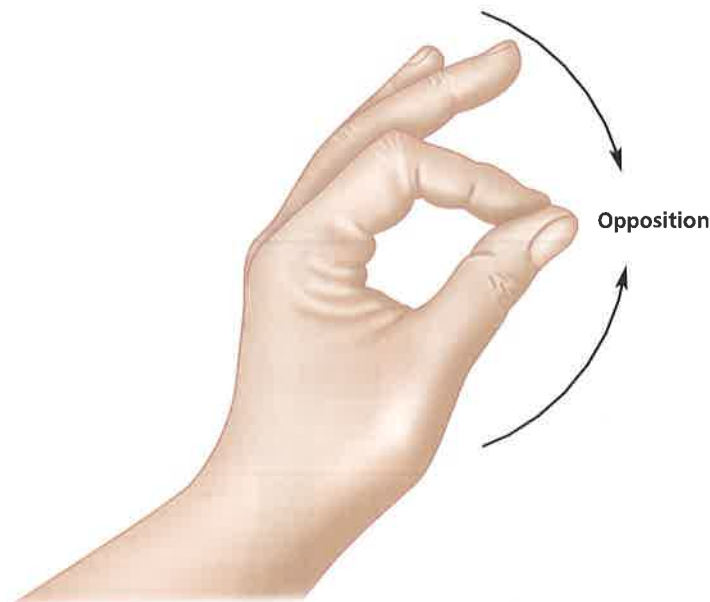


Figure 29: Opposition.
A movement specific to the saddle joint of the thumb, that enables you to touch your thumb to the tips of the fingers of the same hand.