

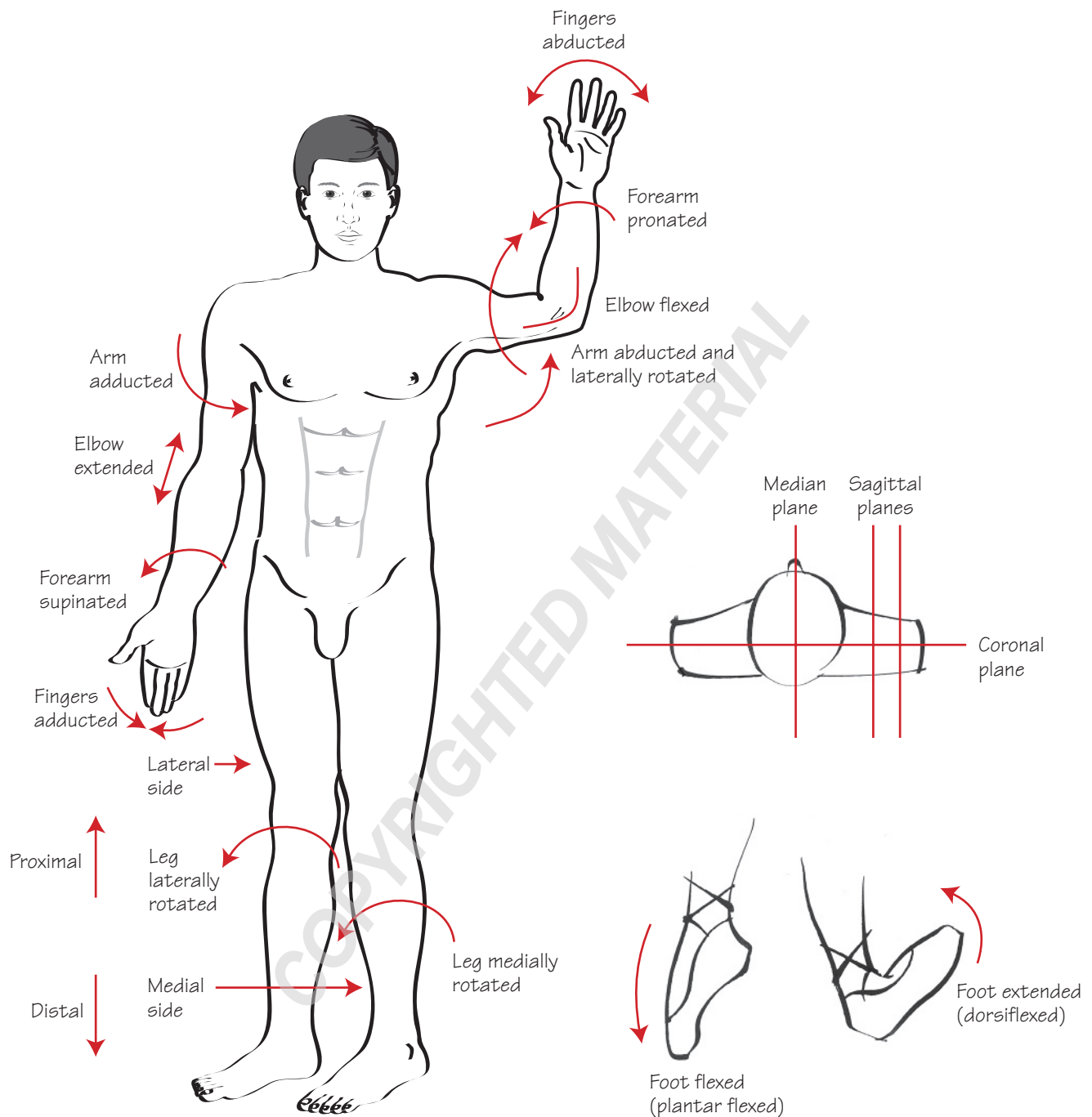


Fig.1.1 Some anatomical terminology

Correct use of anatomical terms is essential to accurate description. These terms are also essential in clinical practice to allow effective communication.

Anatomical position

It is important to appreciate that the surfaces of the body, and relative positions of structures, are described, assuming that the body is in the 'anatomical position'. In this position, the subject is standing upright with the arms by the side with the palms of the hands facing forwards. In the male the tip of the penis is pointing towards the head.

Surfaces and relative positions

- **Anterior/posterior:** the anterior surface of the body is the front, with the body in the anatomical position. The shin, for example, is referred to as the anterior aspect of the leg, regardless of its position in space. The term 'posterior' refers to the back of the body. These terms can also be used to describe relative positions. The bladder, for example, may be described as being anterior to the rectum, or the rectum posterior to the bladder.
- **Superior/inferior:** these terms refer to vertical relationships in the long axis of the body, between the head and the feet. Superior refers to the head end of the body, inferior to the foot end. These terms are most commonly used to describe relative position. The head, for example, may be described as superior to the neck. It is important to remember that the anatomical position refers to a standing subject. When a patient is lying down, their head remains superior to their neck.
- **Medial/lateral:** these terms refer to relationships relative to the midline of the body. A structure which is medial is nearer the midline, and a lateral structure is further away. So, for example, the inner thigh may be referred to as the medial part of the thigh, and the outer thigh as the lateral part. These terms are also used to describe relationships; the lung may be described as lateral to the heart, or the heart may be described as medial to the lung. In some parts of the body, these terms may cause confusion. The mobility of the forearm in space means that it is easy to get confused about which side is medial or lateral. The terms 'radial' and 'ulnar', referring to the relationship of the forearm bones, are often used instead.
- **Proximal and distal:** these terms are used to refer to relationships of structures relative to the middle of the body, the point of origin of a limb or the attachment of a muscle. These terms are commonly used to describe relationships along the length of a limb. A proximal structure is nearer the origin and a distal one further away. The hand is distal to the elbow, for example, and the elbow proximal to the hand.
- **Ventral/dorsal:** these terms are slightly different from anterior/posterior as they refer to the front and back of the body in terms of embryological development rather than the anatomical position. For the majority of the body, the anterior surface corresponds to the ventral surface and the posterior surface to the dorsal surface. The lower limb is one exception as it rotates during development such that the ventral parts come to lie posteriorly. The ventral surface of the foot, therefore, is the sole.

The ventral surface of the hand is often referred to as the palmar surface and that of the foot as the plantar surface.

- **Cranial/caudal:** These terms also refer to embryonic development. Cranial refers to the head end of the embryo, and caudal to the tail end.

Planes

Anatomical planes are used to describe sections through the body as if cut all the way through. These planes are essential to understanding cross-sectional imaging:

- **Sagittal:** this plane lies front to back, such that a sagittal section in the midline would divide the body in half through the nose and the back of the head, continuing downwards.
- **Coronal:** this plane lies at right angles to the sagittal plane and is parallel to the anterior and posterior surfaces of the body.
- **Transverse:** this plane lies across the body and is sometimes also referred to as the axial or horizontal plane. A transverse section divides the body across the middle, much like the magician sawing his assistant in half.

Movements

The following anatomical terms are used to describe movement:

- **Flexion:** is usually taken to mean the bending of a joint, such as bending the elbow or knee. Strictly, it refers to the apposition of two ventral surfaces, which is generally taken to mean the same thing.
- **Extension:** is the straightening of a joint or the movement of two ventral surfaces such that they come to lie further apart.
- **Abduction:** is movement of a part of a body away from the midline in the coronal plane. For example, abduction of the arm is lifting the arm out sideways.

In the hand, the midline is considered to be along the middle finger. Thus, abduction of the fingers refers to the motion of spreading them out. In the foot, the axis of abduction is the second toe.

The thumb is a special case. Abduction of the thumb refers to anterior movement away from the palm (see Fig. 1.1). Adduction is the opposite of this movement.

- **Adduction:** is movement towards the middle of the body in the coronal plane.
- **Plantar/dorsiflexion:** are used to describe movement of the foot at the ankle as the use of the terms 'flexion' and 'extension' is confusing. True flexion of the foot is straightening at the ankle, because this leads to two ventral surfaces coming closer together. This is, however, somewhat confusing. For this reason, the term 'plantar/flexion' is used to refer to the action of pointing the toes and dorsiflexion to refer to bending at the ankle such that the toes move towards the face.
- **Rotation:** rotation is movement around the long axis of a bone. For example rotation of the femur at the hip joint will cause the foot to point laterally or medially.
- **Supination/pronation:** are special terms used to refer to rotational movements of the forearm, best thought of when the elbow is flexed to 90 degrees. Supination refers to rotation of the forearm at the elbow laterally, such that the palm faces superiorly. Pronation refers to an inward rotation, such that the dorsal surface of the hand is uppermost.