

Introduction

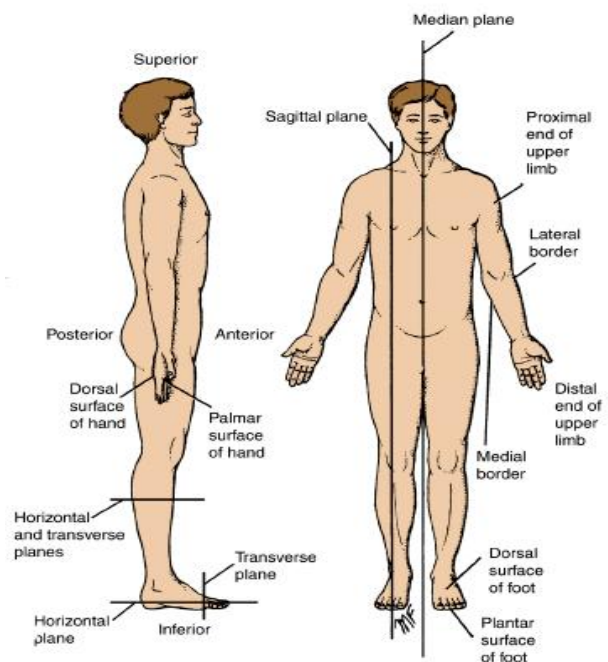
- **Anatomy** is the science of the structure and function of the body.
- **Clinical Anatomy** is the study of the anatomy with relation to the practice of medicine and other health sciences.

Anatomic Terminology:

Understanding the terms used for describing the structures in different regions of the body is essential for describing the composition of the body, also the accurate use of anatomic terms by medical personnel enables them to communicate with their colleagues.

- **Anatomical position**

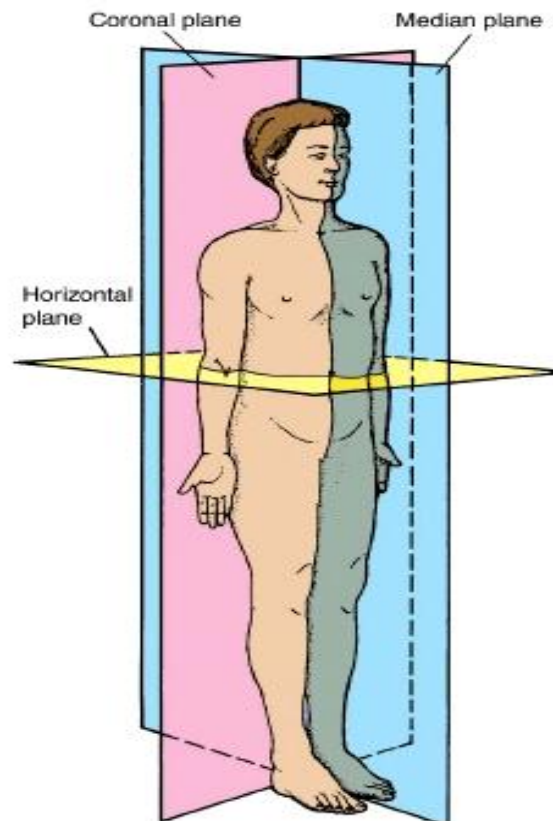
All descriptions of the human body are based on a posture termed the **anatomical position**. In this, a person is standing erect and facing forward, the upper limbs are by the sides, the palms of the hands are directed forward, the lower limbs are together, the soles of the feet are on the ground, and the toes are pointing forward.



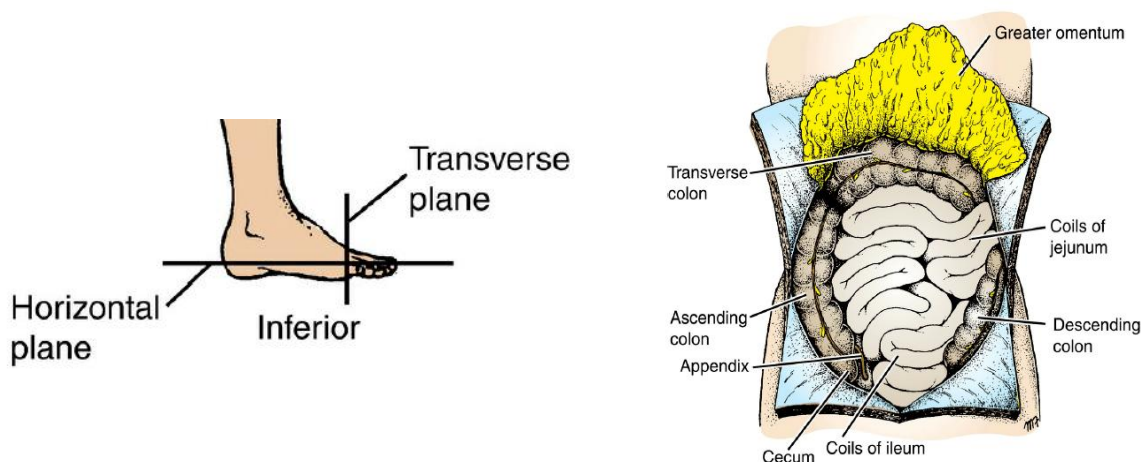
- **Geometric planes**

There are four geometric planes, three of which are at right angles to the others, are applied to the body in the anatomical position.

- The **Median plane** is a vertical plane passing through the center of the body, dividing it into equal right and left halves.
- The **Sagittal plane** is any plane parallel to the median plane that divides the body into unequal right and left portions.
- The **coronal (frontal) plane** is a vertical plane situated at a right angle to the median plane. The coronal plane divides the body into anterior (front) and posterior (back) portions.
- The **horizontal plane** lies at right angles to both the median and the coronal planes. A horizontal plane divides the body into upper and lower parts.



A **transverse plane** lies perpendicular to the long axis of a given structure and divides that structure in a cross-sectional orientation. The terms “transverse plane” and “horizontal plane” are not necessarily equivalent. Consider the difference between horizontal and transverse planes in the leg versus the foot and in the abdomen versus the gut tube.



- **Anterior (ventral) and Posterior (dorsal)**

Are used to indicate the front and back of the body, respectively

In describing the hand, the terms **palmar** and **dorsal** surfaces are used in place of anterior and posterior, respectively.

In describing the foot, the term **plantar** surface refers to the sole of the foot and **dorsal** surface indicates the upper (top) surface.

- **Medial and Lateral**

A structure situated nearer to the median plane of the body than another is said to be **medial** to the other. Similarly, a structure that lies farther away from the median plane than another is said to be **lateral** to the other (e.g., in the head, the eyes are lateral to the nose, and the nose is medial to the eyes).

- **Superficial and Deep**

The terms denote positions relative to the surface of the body or a given structure. Superficial is closer to the surface, whereas deep is farther away from the surface (e.g., the skin is superficial to the ribs, but the heart is deep to the ribs).

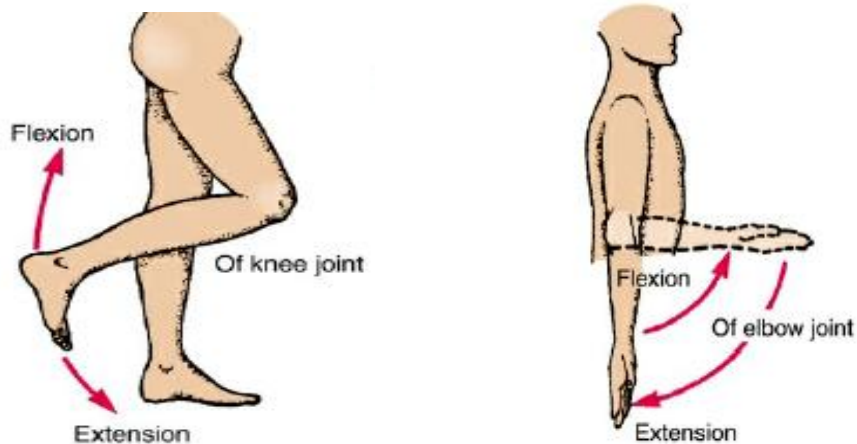
- **Ipsilateral and contralateral**

Are terms referring to positions relative to a reference side of the body. Ipsilateral is on the same side as the reference point, and contralateral is on the opposite side from the reference point (e.g., the right eye is ipsilateral to the right ear; however, the right eye is contralateral to the left ear).

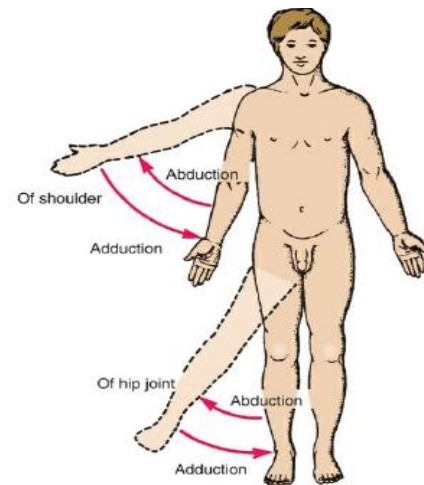
Terms Related to Movement

- **Flexion** is the movement in which a joint angle is decreased (closed) during motion occurring in a sagittal plane.

Extension is the opposite movement in which the joint angle is increased (opened; straightened) in a sagittal plane (e.g., flexion of the elbow approximates the anterior surface of the forearm to the anterior surface of the arm; extension of the elbow is the reverse motion).



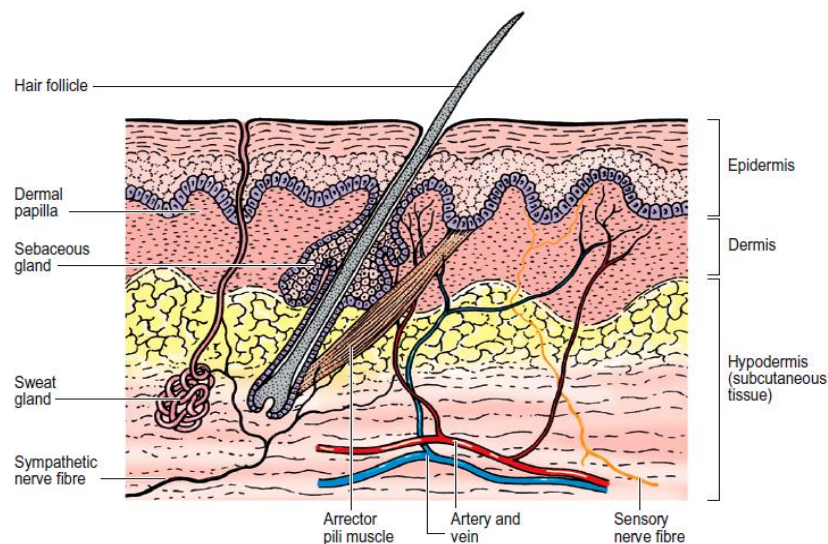
- **Abduction** is movement away from the midline of the body in the coronal plane.
- Adduction** is movement toward the midline of the body in the coronal plane.



BASIC ANATOMY

✓ The Skin

The skin is divided into two parts: the superficial part, the **epidermis**, and the deep part, the **dermis**. The epidermis is a stratified squamous epithelium. On the palms of the hands and the soles of the feet, the epidermis is extremely thick to withstand the wear and tear that occurs in these regions. In other areas of the body, such as on the eyelid, it is very thin. The dermis is composed of dense connective tissue containing many blood vessels, lymphatic vessels, and nerves. It shows considerable variation in thickness in different parts of the body, tending to be thinner in women than in men.



The appendages of the skin are **the nails, hair follicles, sebaceous glands, and sweat glands.**

A band of smooth muscle, the **arrector pili**, connects the undersurface of the hair follicle to the superficial part of the dermis. The muscle is innervated by sympathetic nerve fibers, and its contraction causes the hair to move into a more vertical position; it also compresses the sebaceous gland and causes it to extrude some of its secretion. The pull of the muscle also causes dimpling of the skin surface, so-called **gooseflesh** (or “goose pimples”).

Sebaceous glands secrete **sebum (oil)** onto the **shafts of the hairs**. They are situated on the undersurface of the follicles within the dermis. Sebum is an oily material that helps preserve the flexibility of the hair.

✓ Cartilage

Cartilage is a connective tissue that has firmness and resilience. The covering of the cartilage is by a fibrous membrane called the **perichondrium**.

There are three types of cartilages: hyaline cartilage, fibro cartilage and elastic cartilage.

Hyaline cartilage has a great resistance to wear and covers the articular surfaces of nearly all synovial joints.

It plays an important part in the growth in length of long bones (epiphyseal plates - which are growth centers- are composed of hyaline cartilage).

Fibrocartilage is found in the discs within joints (e.g., the temporomandibular joint (TMJ), sternoclavicular joint and intervertebral disc).

Elastic cartilage is found in the auricle of the ear, the cartilages of the nose, and the epiglottis.

✓ Joints

A site where two or more bones come together, whether or not movement occurs between them, is termed a **joint**.

Joint Classification

The three main types of joints are based on the tissues that lie in the **joint space** between the bones: **fibrous joints, cartilage joints, and synovial joints**

❖ Fibrous Joints

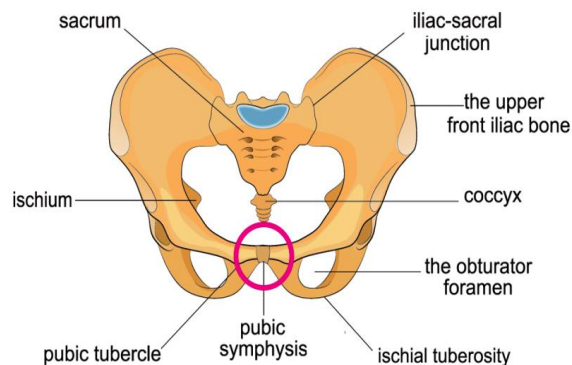
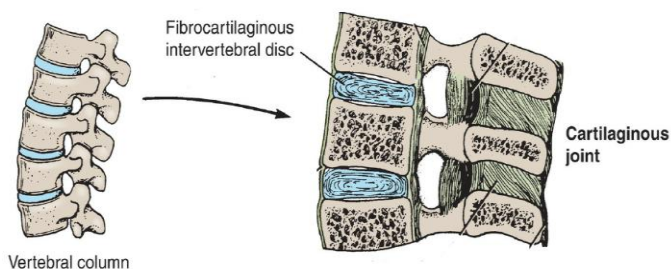
In fibrous joints, the fibrous tissue fills the joint space. Thus, very little movement is possible at these joints. The sutures of the vault of the skull are examples of fibrous joints.

❖ Cartilage Joints

In cartilage joints, the space between the articulating bony surfaces is filled with a cartilaginous pad. The two types of cartilage joints are synchondroses and symphyses.

A **synchondrosis** is a cartilaginous joint in which the articulating bones are united by hyaline cartilage which ossifies later in growth. The sphenoid occipital synchondrosis is an example of this type of joint. No movement occurs in synchondroses.

A **symphysis** is a cartilage joint in which the bones are united primarily by a fibrocartilage. Symphyses are located along the midline of the body (like the intervertebral joints and pubic symphysis). A small amount of movement is possible in symphyses.

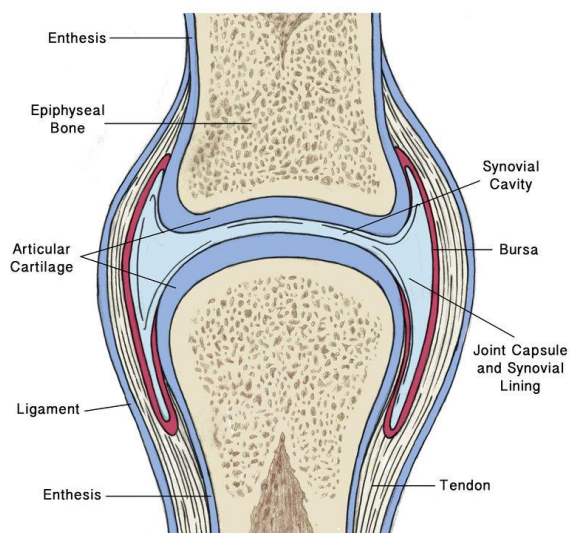


❖ Synovial Joints

In synovial joints, the articular surfaces of the bones are covered by a thin layer of hyaline cartilage and are separated by a fluid (synovial fluid), which permits a great degree of movement.

The typical synovial joint

- Is lined by **synovial membrane** which produces viscous synovial fluid that lubricates the articular surfaces,
- Have **hyaline cartilage** between the articulating surfaces
- Surrounded tough fibrous **capsule**
- Supported by **ligaments**.



Some synovial joints have Fibro cartilage (disc) instead of hyaline cartilage, that's why these joints are known as atypical synovial joints as the tempromandibular joint (TMJ)

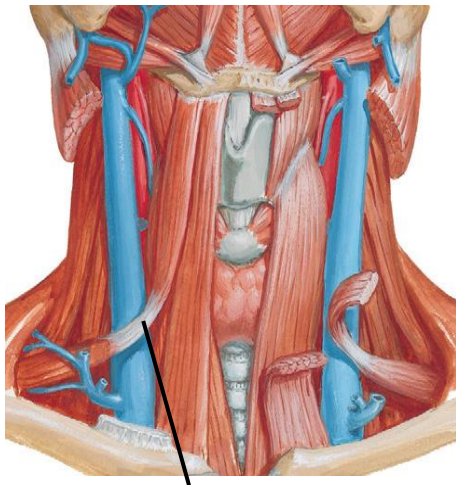
✓ Ligaments

A ligament is a band of fibrous connective tissue that typically binds the bones at joints. The two types of ligaments are fibrous and elastic.

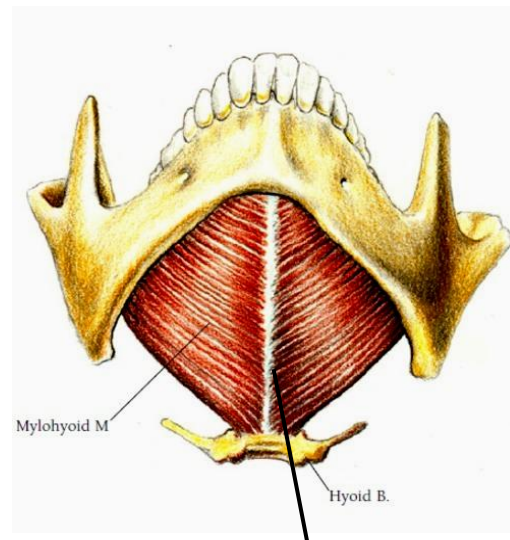
✓ Tendons

They are bands of fibrous tissue that connect muscle to bone or to other muscles.

- **intermediate tendon:** connect between the two bellies of the muscle
- **Aponeurosis:** thin, strong sheet as the aponeurosis of the scalp.
- **Raphe,** is an interdigitation of the tendinous ends of fibers of flat muscles as Mylohyoid raphe (the muscle which form the floor of the mouth)



Intermediate tendon between omohyoid bellies



Mylohyoid raphe

✓ Muscle

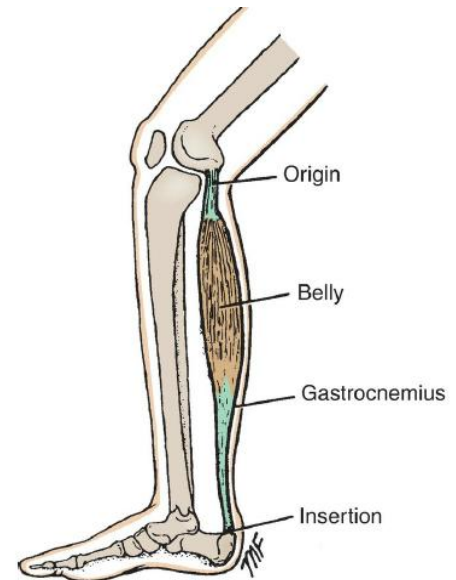
The three types of muscle are skeletal, smooth, and cardiac.

▪ Skeletal Muscle

Skeletal muscles generally act to produce the movements of the skeleton; they are voluntary muscles and are made up of **striated muscle fibers**.

A skeletal muscle has two or more attachments. The more proximal, less mobile attachment is referred to as the **origin**. The more distal, more mobile attachment is the **insertion**. When a muscle contracts, the insertion is drawn proximally toward the origin.

The fleshy part of the muscle is referred to as its **belly**. Individual muscles are named according to their shape, number of heads or bellies, attachments, or actions



▪ Smooth Muscle

They are non striated muscles, form the walls of most viscera. They are non voluntary muscles that controlled by the autonomic nervous system.

▪ Cardiac Muscle

Cardiac muscle consists of striated muscle. It forms the myocardium of the heart. Its fibers have the property of spontaneous and rhythmic contraction. The myocardium is controlled by autonomic nervous system.

This is the End of the Lecture – Good Luck