

## Joint study guide

### Types of joints:

#### **By Structure:**

**SYNOVIAL:** Bones separated by joint cavity lubricated by synovial fluid, enclosed in fibrous capsule

Structure: 1. Ligament, 2. Joint capsule- Fibrous capsule of Dense Regular Connective Tissue & Synovial membrane sheet of various types of connective tissue secreting synovial fluid, 3. Articular (hyaline) Cartilage, 4. Joint cavity-containing synovial fluid, 5. Periosteum covering the outermost areas of the bones comprising the joint

Examples: shoulder, elbow, carpal joints, hip, knee, tarsal joints, Interphalangeal joints, joints between processes of cervical to lumbar vertebrae

Mobility: **DIARTHROSES**- shoulder, elbow, carpal joints, hip, knee, tarsal joints, Interphalangeal joints  
**AMPHIARTHROSES**- joints between processes of cervical to lumbar vertebrae

**FIBROUS:** Bones held together by collagenous fibers extending from matrix of 1 bone into matrix of next w/no joint cavity

Examples: Skull sutures, teeth in sockets, distal radioulnar joints, tibiofibular joints

Mobility: **AMPHIARTHROSES**- distal radioulnar joints, tibiofibular joints **SYNTHROSES**- skull sutures, teeth in sockets

**CARTILAGINOUS:** Bones held together by cartilage with no joint cavity

Examples: epiphyseal plates of long bones, costosternal joints, public symphysis, intervertebral discs

Mobility: **AMPHIARTHROSES**- intervertebral discs, costosternal joints for ribs 2-7, pubic symphysis  
**SYNTHROSES**- epiphyseal plates of long bones, 1<sup>st</sup> costosternal joint, mental symphysis

#### **By Function:**

**DIARTHROSES**-Freely movable- Only **Synovial Joints**

**AMPHIARTHROSES**- Slightly movable joints- Can be **Synovial Joints, Fibrous Joints, or Cartilaginous Joints**

**SYNTHROSES**- Joints with little or no movement- Can be **Fibrous Joints or Cartilaginous Joints**

### **Types of Diarthroses joints:**

**Ball-and-socket joint:** Consists of a bone with a globular or slightly egg-shaped head that articulates with the cup-shaped cavity of another bone. Such a joint allows a wider range of motion than does any other kind, permitting movements in all planes, as well as rotational movement around a central axis. **Hip and shoulder, humeroscapular**

**Condylloid joint:** The ovoid condyle of one bone fits into the elliptical cavity of another bone, as in the joints between the metacarpals (bones of the palm) and phalanges (bones of the fingers and toes). This type of joint permits a variety of movements in different planes; rotational movement, however, is not possible. **Metacarpophalangeal**

**Gliding joints:** The articulating surfaces are nearly flat or slightly curved. These joints allow sliding or back-and-forth motion & twisting movements. Most of the joints within the wrist & ankle, as well as those between the articular processes of adjacent vertebrae, belong to this group. The sacroiliac joints & the joints formed by ribs 2 through 7 connecting with the sternum are also gliding joints. **Intercarpal**

**Hinge joint:** The convex surface of one bone fits into the concave surface of another, as in the elbow and the joints of the phalanges. Such a joint resembles the hinge of a door in that it permits movement in one plane only. **Humeroulnar**

**Pivot Joint:** The cylindrical surface of one bone rotates within a ring formed of bone and fibrous tissue of a ligament. Movement at such a joint is limited to rotation around a central axis. The joint between the proximal ends of the radius and the ulna, where the head of the radius rotates in a ring formed by the radial notch of the ulna and a ligament (annular ligament), is of this type. Similarly, a pivot joint functions in the neck as the head turns from side to side. In this case, the ring formed by a ligament (transverse ligament) and the anterior arch of the atlas rotates around the dens of the axis. **Radioulnar**

**Saddle joint:** Forms between bones whose articulating surfaces have both concave and convex regions. The surface of one bone fits the complementary surface of the other. This physical relationship permits a variety of movements, mainly in two planes, as in the case of the joint between the carpal (trapezium) and the metacarpal of the thumb.

**Carpometacarpal**

## Types of Joint Movements:

**Flexion:** Bending parts at a joint so that the angle between them decreases and the parts come closer together (bending the lower limb at the knee).

**Extension:** Straightening parts at a joint so that the angle between them increases and the parts move farther apart (straightening the lower limb at the knee).

**Hyperextension:** Excess extension of the parts at a joint, beyond the anatomical position (bending the head back beyond the upright position).

**Lateral excursion:** Temporomandibular joint moves laterally

**Medial excursion:** Temporomandibular joint moves medially

**Opposition:** Movement of thumb to forefinger

**Reposition:** Thumb and forefinger move back to anatomical position

**Dorsiflexion:** Bending the foot at the ankle toward the shin (bending the foot upward).

**Plantar flexion:** Bending the foot at the ankle toward the sole (bending the foot downward).

**Abduction:** Moving a part away from the midline (lifting the upper limb horizontally to form a right angle with the side of the body).

**Adduction:** Moving a part toward the midline (returning the upper limb from the horizontal position to the side of the body).

**Rotation:** Moving a part around an axis (twisting the head from side to side). Medial rotation involves movement toward the midline, whereas lateral rotation involves movement in the opposite direction.

**Circumduction:** Moving a part so that its end follows a circular path (moving the finger in a circular motion without moving the hand).

**Supination:** Turning the hand so the palm is upward or facing anteriorly (in anatomical position).

**Pronation:** Turning the hand so the palm is downward or facing posteriorly (in anatomical position).

**Eversion:** Turning the foot so the sole faces laterally.

**Inversion:** Turning the foot so the sole faces medially.

**Protraction:** Moving a part forward (thrusting the chin forward).

**Retraction:** Moving a part backward (pulling the chin backward).

**Elevation:** Raising a part (shrugging the shoulders).

**Depression:** Lowering a part (drooping the shoulders).

## Major Joints of Body:

Joint	Type of joint	Type of movement
Shoulder	Ball-and-socket	Flexion, extension, adduction, abduction, rotation, circumduction
Elbow	Hinge	Flexion, extension
Temporomandibular retraction	Hinge and gliding joint	Lateral & medial excursion, elevation, depression, protraction, retraction
Proximal radioulnar	Pivot	Rotation
Wrist	Condylloid	Flexion, extension, adduction, abduction, circumduction
Carpometacarpal 1	Saddle	Flexion, extension, adduction, abduction
Carpometacarpal 2-5	Condylloid	Flexion, extension, adduction, abduction
Metacarpophalangeal	Condylloid	Flexion, extension, adduction, abduction
Interphalangeal Hinge		Flexion, extension
Hip	Ball-and-socket	Flexion, extension, adduction, abduction, rotation, circumduction

Tibiofemoral (knee)	Modified hinge	Flexion, extension, slight rotation when flexed
Ankle	Hinge	Dorsiflexion, plantar flexion, flexion, slight circumduction
Metatarsophalangeal	Condyloid	Flexion, extension, adduction, abduction

## Meniscus:

Crescent-shaped (C-shaped) fibrocartilaginous structure that cushions the knee and partly divides a joint cavity in the knee, acromioclavicular, sternoclavicular, and temporomandibular joints.

Meniscus in knee keeps weight across the knee, and are subject to **Longitudinal, Radial or Oblique tears** that can come from twisting or turning rapidly with knee bent and foot is on the ground. The tears can be **minor, moderate or severe**, primarily diagnosed by check of tenderness, range of motion, stability of knee, X-rays & MRI. Treatments can include rest and ice, physical therapy or surgical repair.

*Courtesy of Linda Ladden, Fall 2011*