

JOINTS

Synarthroses “with/together joint”: **Immoveable.** Best examples are skull sutures and the joint between the tibia and the fibula. Dense fibrous connective tissue holds these joints together tightly.

Amphiarthroses “both joint”: **Slightly moveable.** Best examples are intervertebral joints and the pubic symphysis, both made of fibrocartilage pads.

Synovial “with/together egg”: **very moveable.** Most common joint type.

Synovial joints have several complex features:

articular cartilage: hyaline cartilage prevents crushing of bone ends

articular capsule: dense connective tissue that is continuous with periosteum of bones

joint cavity with synovial fluid: fluid produced by synovial membrane

Viscous egg whitish looking fluid (syn=with/together; ovi = egg); thins as you “warm up” the joint during exercise

Function: reduces friction between articular cartilages. Movement squeezes the fluid out (like a sponge), then the fluid returns.

ligaments: bands of dense connective tissue that connect the bones to each other. Examples: Medial and lateral collateral ligaments of the knee are outside the joint; anterior and posterior cruciate “cross” ligaments are inside the joint cavity of the knee.

Occasionally joints have: meniscus (fibrocartilage pad): found in TMJ, clavicle joints, radioulnar joint, and knee

Bursae and Tendon Sheaths

fibrous sacs lined with synovial membrane (and thus synovial fluid); found where tendons, ligaments, muscles, etc rub together during activity

tendon sheaths are elongated bursae that shelter a tendon from friction where it runs along a bone

Types of movements at joints

Extension/flexion (fingers, wrists, elbows, shoulder, head, trunk, hip, knee, ankle, toes)

Abduction/adduction (hips, arms, fingers)

Pronation/supination (forearm, foot)

Dorsiflexion and plantar flexion (foot)

Rotation and circumflexion (shoulder, hip, head, wrist, ankle)

Types of synovial joints

Plane: allows gliding motions between intercarpal/intertarsal joints (wrist and ankle bones)

Hinge: allows flexion/extension between the humerus and the ulna; and between phalanges

Pivot: allows rotation between the atlas/axis; and between the radius and ulna (for pronation/supination)

Condyloid: a variety of angular motions; wrists, ankles, knees

Saddle: special motions of the thumb

Ball-and-socket: motions in almost all directions at the hip and shoulder

Sprains: ligaments stretched or even torn (if torn, surgery is required)—common in knee, lower back and ankle

Cartilage Injuries: articular cartilage chunks break off—interferes with joint movement/comfort, or a meniscus is torn

Dislocations: bones are moved out of alignment—causes a sprain, as well, since the ligaments will be grossly stretched by the luxation

Rotator cuff tear: **4 important muscles—subscapularis, supraspinatus, infraspinatus and teres minor* all have tendons that encircle joint (rotator cuff) and help stabilize humerus head in glenoid cavity. The supraspinatus is most commonly torn.

Inflammatory and Degenerative Conditions

Bursitis and Tendonitis

- bursitis is when a bursa becomes filled with fluid as a result of inflammation
- tendonitis is very similar, since it is inflammation of tendon sheath, which is essentially an elongated bursa.

Arthritis

- **Osteoarthritis:** articular cartilage is broken down at a faster rate than it can be replaced. Exposed bone experiences greater stress, thus osteoblasts build more bone—these are called bone spurs.
- **Rheumatoid arthritis:** autoimmune disease in which the body’s WBCs attack its own synovial membranes, causing the hyaline cartilage to erode. Over time and repeated attacks, the articular cartilages are replaced with scar tissue and may even ossify! This can lead to bone deformities.
- **Gouty arthritis:** uric acid (byproduct of nucleic acid breakdown) builds up in joints, especially the big toe.