

Chapter 8: Joints

Classification of Joints

- ▶ Objectives
 - ▶ Define Joint or Articulation
 - ▶ Classify Joints by Structure and by Function
 - ▶ Describe the general structure, know the properties of, and provide examples of fibrous, and cartilaginous joints

Classification of Joints

- ▶ Functional Classifications
 - ▶ Based on amount of movement allowed at a joint/articulation
- ▶ Structural Classifications
 - ▶ Based on joint structure and composition/articulation

Functional Classifications of Joints

- ▶ Synarthroses
- ▶ Amphiarthroses
- ▶ Diarthroses



Structural Classifications of Joints

- ▶ Fibrous Joints
- ▶ Cartilaginous Joints
- ▶ Synovial Joints



Structural Classifications of Joints

▶ Fibrous Joints

- ▶ Sutures
- ▶ Syndesmoses
- ▶ Gomphoses



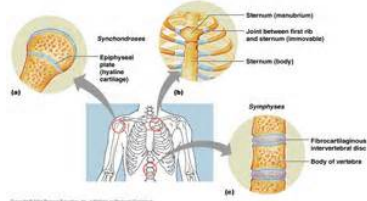
(A) Syndesmosis



Structural Classifications of Joints

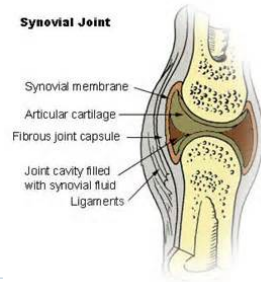
▶ Cartilaginous Joints

- ▶ Synchondroses
- ▶ Symphyses



Structural Classifications of Joints

▶ Synovial Joint



Check Your Understanding

- ▶ What term is a synonym for "joint"?
- ▶ What functional joint class contains the least mobile joints?
- ▶ Of sutures, symphyses, and synchondroses, which are cartilaginous joints?
- ▶ How are joint mobility and stability related?

Synovial Joints

▶ Objectives

- ▶ Describe the structural characteristics of synovial joints.
- ▶ Compare the structures and functions of bursae and tendon sheaths
- ▶ List three natural factors that stabilize synovial joints

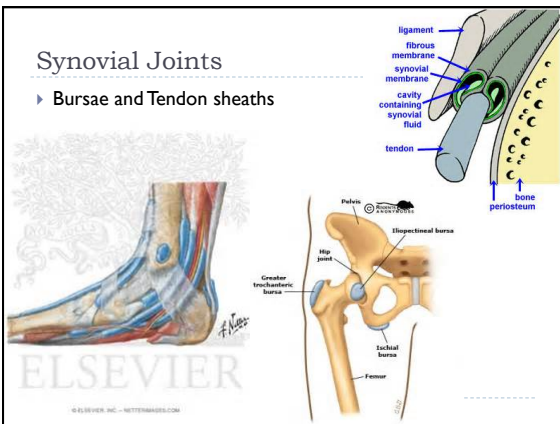
Synovial Joints

▶ General Structure

- ▶ Articular Cartilage
- ▶ Joint (articular) Cavity
- ▶ Articular Capsule
- ▶ Synovial Fluid
- ▶ Reinforcing Ligaments
- ▶ Nerves and blood vessels
- ▶ Fat pads and menisci

Synovial Joints

▶ Bursae and Tendon sheaths



Synovial Joints

- ▶ Factors Influencing the Stability of Synovial Joints
 - ▶ Articular Surfaces
 - ▶ Ligaments
 - ▶ Muscle Tone



Check Your Understanding

- ▶ What are the two layers of the articular capsule?
- ▶ How to bursae and tendon sheaths improve joint function?
- ▶ Generally speaking, what factor is most important in stabilizing synovial joints?
- ▶ What is the importance of weeping lubrication?



Movements Allowed by Synovial Joints

- ▶ Origins vs. Insertions

- ▶ Non-axial movement
- ▶ Uniaxial Movement
- ▶ Biaxial movement
- ▶ Multiaxial movement

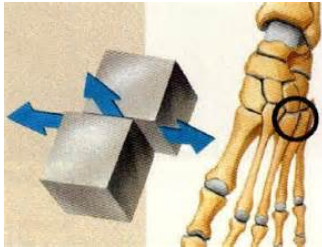
- ▶ Gliding, Angular, and Rotational movements



Movements Allowed by Synovial Joints

▶ **Gliding**

▶ When one flat surface glide over another



Movements Allowed by Synovial Joints

▶ **Angular Movements**

▶ Movements that increase or decrease the angle between two bones

▶ Flexion/Extension

▶ Abduction/Adduction

▶ Horizontal Abd/Add

▶ Circumduction

Movements Allowed by Synovial Joints

▶ **Rotation**

▶ The turning of a bone around its own long axis

▶ Medial or Internal Rotation

▶ Lateral or External Rotation

Movements Allowed by Synovial Joints

- ▶ **Special Movements**
 - ▶ Supination/Pronation
 - ▶ Dorsiflexion/Plantar flexion
 - ▶ Inversion and Eversion
 - ▶ Protraction and Retraction
 - ▶ Elevation and Depression
 - ▶ Opposition



Types of Synovial Joints

- ▶ Plane Joint – Nonaxial
- ▶ Hinge Joint – Uniaxial
- ▶ Pivot joint – Uniaxial
- ▶ Condylar Joint – Biaxial
- ▶ Saddle Joint – Biaxial
- ▶ Ball and Socket Joint - Multiaxial



Check Your Understanding

- ▶ Clayton bends down to pick up a dime... Which movements are occurring at his hips, knees, and ankles?
- ▶ Which of the following joints is uniaxial: Hinge, Condylar, Saddle, Pivot?



Selected Synovial Joints

- ▶ Understand the structure and function of the knee, shoulder, hip, elbow, and TMJ joints

Knee "Joint"

- ▶ Patellofemoral Joint
- ▶ Tibiofemoral Joint
- ▶ Proximal Tibiofibular Joint

- ▶ Medial/Lateral Menisci

- ▶ Extracapsular Ligaments

- ▶ MCL/LCL

- ▶ Intracapsular Ligaments

- ▶ ACL/PCL



Shoulder "Joint"

- ▶ Glenohumeral Joint

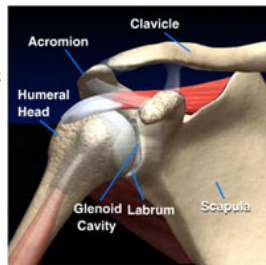
- ▶ Glenoid fossa/humeral head

- ▶ Acromioclavicular Joint

- ▶ Clavicular facet/Acromial facet

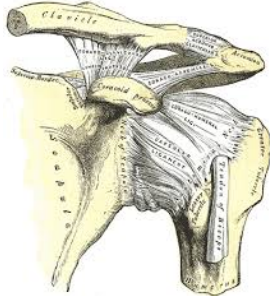
- ▶ Sternoclavicular Joint

- ▶ Sternal facet/clavicular notch



Glenohumeral Joint

- ▶ **Articulating surfaces**
 - ▶ Glenoid Cavity and Humeral Head
- ▶ **Ligamentous Support**
 - ▶ 3 Glenohumeral Ligaments
 - ▶ Coracohumeral ligament
- ▶ **Musculotendinous Support**
 - ▶ Rotator Cuff
 - ▶ Long Head of Biceps
- ▶ **Other Structures**
 - ▶ Glenoid Labrum
 - ▶ Thin and loose joint capsule



Elbow "Joint"

- ▶ **Ulnohumeral joint**
 - ▶ Trochlear notch
 - ▶ Trochlea
- ▶ **Radiohumeral joint**
 - ▶ Fovea
 - ▶ Capitulum



Ulnohumeral Joint

- ▶ **Articulating surfaces**
- ▶ **Ligamentous Support**
 - ▶ Ulnar collateral ligament
 - ▶ Radial Collateral Ligament
- ▶ **Musculotendinous support**
 - ▶ CET and CFT
 - ▶ Brachialis, biceps, triceps
- ▶ **Other Structures**
 - ▶ Thin and loose articular capsule



Hip (Coxal) Joint

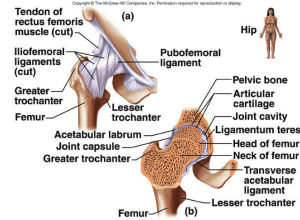
▶ Also called the Femoroacetabular joint

▶ **Articulating Surfaces**
 ▶ Acetabulum, Femoral Head

▶ **Ligamentous Support**
 ▶ Extracapsular: Iliofemoral, pubofemoral, ischiofemoral ligaments
 ▶ Intracapsular: Ligamentum Teres (capitis) AKA ligament of the head of the femur

▶ **Musculotendinous Support**
 ▶ Musculature of the hip and thigh

▶ **Other Structures**
 ▶ Thick, strong articular capsule that is reinforced by ligaments
 ▶ Acetabular labrum (slightly smaller diameter than femoral head)



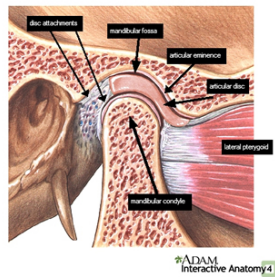
Temporomandibular Joint "TMJ"

▶ **Articulating surfaces**
 ▶ Mandibular Condyle, Mandibular Fossa, Articular Tubercle

▶ **Ligamentous Support**
 ▶ Lateral Ligament

▶ **Musculotendinous Support**
 ▶ Masseter
 ▶ Temporalis
 ▶ Pterygoid muscles

▶ **Other Structures**
 ▶ Articular Disc (divides synovial cavity into superior and inferior compartments)



Check Yourself

- ▶ Which of the previous joints is purely uniaxial?
- ▶ Which joint is the most easily dislocated?
- ▶ Which of the previous joints are multiaxial?
- ▶ Which is more mobile and therefore less stable... the glenohumeral joint, or the femoroacetabular joint?

Homeostatic Imbalances of Joints

▶ Common Joint Injuries

- ▶ Cartilage Tears
- ▶ Sprains
- ▶ Dislocations and Subluxations



Homeostatic Imbalances of Joints

▶ Inflammatory and Degenerative Conditions

- ▶ Bursitis and Tendonitis
- ▶ Osteoarthritis
- ▶ Rheumatoid Arthritis
- ▶ Gouty Arthritis



Check your understanding

- ▶ What does arthritis mean?
- ▶ How would you guess by looking at someone with arthritis whether they have OA or RA?
