Articulation (Joint): *Arthro & Artic* = Joint

**Articulation:**

⇒ AKA;

✓ All bones EXCEPT ONE:

**2 Types of “Bone-Bone” Interaction**

1. 
2. 

⇒ Bones separated by:

   a.
   b.
   c.

**Structural Joint design determines:**

1. Degree of Joint Motion:

   ✯

   a. Type of Joint Motion

      ✯ ie: Rotation, flexion, gliding

   b. Degree of Joint Stability

⇒ *Anatomical Relationship*:

   ✯ Joint *stability* and *mobility* are:

**Joint Classification (2 Types):**

1. Structural: “How is the joint built?”

   • Defined by:

2. Functional: “How does the joint move?”

   • Defined by:

**Structural Classifications**

a. **Bony Fusion:**

   • Space between bones:

      ⇒ *Complete:*

   • Degree of motion:

      ⇒

b. **Fibrous Joint:**

   • Space between bones:
• Degree of motion:

\[ \Rightarrow \]

c. **Cartilaginous Joint**:

• Space between bones:

• Degree of motion:

\[ \Rightarrow \]

d. **Synovial Joint**:

• Space between bones:

✓

• Bones held together w/ bands of dense regular CT:

\[ \Rightarrow \]

• Degree of motion:

\[ \Rightarrow \]

2. **Functional Classification**: "How much movement does the joint allow?"

a. **Synarthrosis**: syn = “together” ; arthr = “joint”

• Mobility:

• Structural Classification:

1.

2.

3.

b. **Amphiarthrosis**: amphi = “both sides”

• Mobility:

• Structural Classification:

1.

2.

c. **Diarthrosis**: dia = “through”

• Mobility:

• Structural Classification:

  a. ONLY -

  Joints Motion:
1. Linear Motion:
   - Clavicle & sternum

2. Angular Motion:
   - Changes in:
     a. Flexion / Extension: Sagittal Plane
       - Flexion:
       - Extension:
       - Hyperextension:
     b. Abduction/ADDuction: Frontal Plane
       - Abduction:
       - ADDuction:
     c. Circumduction: Combination: /

3. Rotation: Spin (Pivot) along longitudinal axis
   a. Medial Rotation:
   b. Lateral Rotation:

Additional Specialized Movements:
1. Elevation & Depression:
   -

2. Protraction & Retraction:
   -

3. Inversion & Eversion: “Used for feet”
   - Inversion:
   - Eversion:

4. Pronation & Supination:
   - Body Position:
     - Prone: Functional surface face down
     - Supine: Functional surface face up
a. **Pronation & Supination**: Forearm  
   ⇒ Pronation:
   ⇒ Supination:

b. **Pronation & Supination**: Foot  
   ⇒ Pronation:
   ⇒ Supination:

5. **Dorsiflexion & Plantar Flexion**: Foot  
   • Dorsiflexion:
   • Plantar Flexion:

**Classification of Synovial Joints**:

1. **Plane (Gliding) Joint**:
   • Movement:
     ✯ Sternum & Clavicle; Tarsals, Ribs & Vertebrae, Carpals

2. **Hinge Joint**: “Joint opens and closes”  
   • Movement:
     ✯ Elbow & Knee

3. **Pivot Joint**:
   • Movement:
     ✯ Axis & Atlas; Radius & Ulna

4. **Ellipsoidal (Condyloid) Joint**:
   • Articulating surface:
   • Movement:
     ➤
     ➤
     ➤
     ➤
     ✯ Wrist: Radius & Carpals: Phalanges & Metacarpals

5. **Saddle Joint**:
   • Articulating surface:
• Movement:
  1.
  2.
  3.

* Metacarpal & Carpal I (Pollex)

6. Ball & Socket Joint:

• Articulating surface:

• Movement:
  1.
  2.
  3.

* Shoulder & Hip

Study Questions:
1. What are the main structural differences between the axial and appendicular skeleton? From your understanding of this difference, into which of these two classifications do the following bones belong: a. thigh bone (Femur), b. antibrachial bone (Ulna), c. thoracic bones (ribs), d. coxal bone, e. cranial bones
2. What is the innate problem with having bones be the structural component and protective tissue of our bodies? How do joints solve this problem?
3. What is the relationship between a joint’s stability and a joint’s mobility? Use examples of bones that you know to help explain your answer.
4. What are the four classifications of structural joints? Provide an example of each.
5. What are the three functional classifications of joints? Provide an example of each.
6. All synovial joints are what kind of functional joint. The joint between your clavicle and your sternum is a synovial joint. Without dissecting your chest, how can you show this to be true?
7. The pubic symphysis is a cartilaginous joint between your coxal bones. It is described as amphiarthrotic. What does this mean about this joint’s movements.
8. The tarsal bones on the foot are short cube shaped bones. These bones can slide back and forth across one another, What synovial joint classification do these bones belong?
9. The ability of the head to “nod yes” results form movements of the Occipital condyles on the first vertebrae. What kind of motion is produced at this joint and what is this type of joint called.
10. The ability of the head to “nod NO” results from movements of the first vertebrae across the second vertebrae. What is this rotational motion called and what type of joint is represented?
11. What particular motion being produced in the following activities: Doing jumping jacks; standing up on your tip toes (like a ballerina); kicking a ball (at the leg –knee and at the hip); looking straight up in the air; moving your forearm from an anterior to a posterior position; bending forward to touch your toes; bringing your fingers together; bending your wrist backwards.
12. What is the difference between rotation and circumduction?
13. Where does pronation and supination occur? Describe the difference between pronation and supination at the different locations. When the body is in a prone position are they facing upward or downward?
14. What is the difference between extension and hyperextension? Is hyperextension a motion which involves tissue damage – explain? What is the difference between adduction and abduction?