CHAPTER 8
JOINTS
2. CHAPTER 8 – JOINTS

Joints or articulations site where bones meet

Function: skeletal movement, hold skeleton.

Together & protection

Movement vs. Strength: less joint movement means greater joint strength.

I. Classification: by structure & function

   A. Function classification

      1. Synarthrosis: immoveable joint
      2. Amphiarthrosis: slightly moveable
      3. Diarthrosis: freely movable
3. **B. Structure** Classification – fibrous, Cartilagenous & synovial*

1. fibrous: No joint cavity, bones held tightly together w/ fibrous CT and very little movement
   a. sutures: (seams) interlocking jagged Edges (jig saw puzzle)
   b. Syndesmososes: connected by ligaments
      - If short little movement – ie: distal tibia Fibula;
      - if long more movement – ie: ulna/radius

   fig 8.1; page. 249 & fig. 7.27 pg. 230
Short fibrous tissue – Little movement
5. fig 8.1; page. 249 & fig. 7.27 pg. 230 fibrous Syndesmosis long attachment – more movement
6.

c. Gomphosis: cone like peg fitting into a socket fibrous

1. Teeth - mandible & maxilla
2. held in w/ held in w/ periodontal ligament

fig. 8.1 c; pg. 249
7.  **fig. 8.1 c; pg. 249 fibrous**

<table>
<thead>
<tr>
<th>(a) Suture</th>
<th>(b) Syndesmosis</th>
<th>(c) Gomphosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Joint held together with very short, interconnecting fibers, and bone edges interlock. Found only in the skull.</td>
<td>Joint held together by a ligament. Fibrous tissue can vary in length, but is longer than in sutures.</td>
<td>“Peg in socket” fibrous joint. Periodontal ligament holds tooth in socket.</td>
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</tbody>
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8. 2. Cartilaginous: No joint cavity, articulating bones are held tightly together by cartilage with little or no movement.
   a. Synchondrosis: where **hyaline cartilage** connects the bone.
      i. ie: growth plate/epiphyseal plate (temporary)
      ii. ie: True ribs connected to the sternum

   b. Symphysis: broad flat disc of **fibrocartilage** connects articulating bones.
      i. ie: vertebral disc
      ii. ie: disc between left/right pubic bones
      Fig 8.2 a&b; pg. 250

   iii. Menisci of knee  Fig 8.8 a,b&e pg 262
(a) **Synchondroses**

Bones united by hyaline cartilage

- Epiphyseal plate (temporary hyaline cartilage joint)
- Joint between first rib and sternum (immovable)
- Sternum (manubrium)

(b) **Symphyses**

Bones united by fibrocartilage

- Body of vertebra
- Fibrocartilaginous intervertebral disc
- Hyaline cartilage
- Pubic symphysis

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10. C. SYNOVIAL JOINTS!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!!

- Have a fluid filled cavity
- Six characteristics for synovial joints
  1. Articular hyaline cartilage – *cushions for compression and friction free articulations*
  2. Synovial cavity - filled w/ synovial fluid
  3. Joint capsule – double layer
    - a. external layer – tough, irregular CT
    - continuous w/ bone periosteum
    - b. Inner layer – synovial membrane makes synovial fluid
11. 4. Synovial fluid – fills the cavity
   a. like egg whites – very slippery
   b. soaks into articular cartilage & then back out
   when under pressure taller am

5. Reinforcing (accessory) ligaments – 3 types
   a. capsular/intrinsic: thickened part of capsule
   b. extra capsular: distinct, separate & outside of
      the capsule
   c. Intracapsular: inside capsule but separate
      from capsule wall

6. Nerves & blood vessels
   a. pain receptors
   b. proprioceptive: monitor position & stretch
13. Bursa: Flattened bags of synovial fluid to separate & cushion ligaments, muscles, tendons, bones or skin reducing friction

- Tendon sheaths: tube-like bursae that surround tendons
  - a. Separate tendons when crowded
  - b. Trigger finger
(a) Frontal section through the right shoulder joint

(b) Enlargement of (a), showing how a bursa eliminates friction where a ligament (or other structure) would rub against a bone
15. Movements Allowed by Synovial Joints

Every muscle is attached to, 2 or more, bones w/a joint in between

- **Origin** is the attached bone that doesn’t move
- **Insertion** is the bone that does move

Movement occurs when muscles contract bringing the insertion towards the origin

Movements are described in directional terms relative to the plane they move in
16. I. Angular movements

A. Flexion: bending movement that decreases the angle.

B. Extension: reverse of flexion; increases the angle

Usually in the sagittal plane- anterior/posterior
(b) Angular movements: flexion, extension, and hyperextension of the neck
(c) Angular movements: flexion, extension, and hyperextension of the vertebral column
(d) Angular movements: flexion and extension at the shoulder and knee
20. C. Abduction: Moving away from midline
D. Adduction: Moving towards midline

Figure 8.5 e
(e) Angular movements: abduction, adduction, and circumduction of the upper limb at the shoulder

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22. E. Circumduction: distal end moves in a circular pattern w/ proximal end is motionless.

figure 8.5 e  pg. 257
(e) Angular movements: abduction, adduction, and circumduction of the upper limb at the shoulder
24 F. Rotation: Moving a bone along it’s own long axis.
1. Hip & shoulder rotation – medial & lateral
   - Rotation
25. Fig. 8.5 f page 257

(f) Rotation of the head, neck, and lower limb
26. II. Gliding movements
   A. When “flatish” surfaces slide back & forth or side to side.
      1. Wrist: Ulnar & Radial deviation
      2. Ankles: Inversion & Eversion
      3. vertebral column
27. Figures 8.5 a & 8.6 c

(a) Gliding movements at the wrist

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(c) Inversion and eversion
29. III. Special Movements -

A. Pronation/Supination: movements of radius around the ulna – “don’t spill your soup”
30. Fig. 8.6 a pg. 258

Pronation (radius rotates over ulna)  Supination (radius and ulna are parallel)

(a) Pronation (P) and supination (S)
31. B. Dorsiflexion & plantar flexion: up & down movements foot @ ankle
(b) Dorsiflexion and plantar flexion
33. C. Protraction & Retraction: Anterior & posterior . . movement along transverse plane – mandible
Protrusion of mandible

Retraction of mandible

(d) Protrusion and retraction
35. D. Elevation & Depression: Lifting a body part superiorly & inferiorly

1. Mandible & shoulders
(e) Elevation and depression

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37. E. Opposition: Touch tip of thumb to tip of any finger
(f) Opposition
(e) Anterior view of flexed knee, showing the cruciate ligaments (articular capsule removed, and quadriceps tendon cut and reflected distally)
(a) Sagittal section through the right knee joint
Lateral

Hockey puck

Medial

Patella (outline)

Tibial collateral ligament (torn)

Medial meniscus (torn)

Anterior cruciate ligament (torn)

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Fig. 8.7 a; pg. 260 plane joints/gliding joints

Plane joint (intercarpal joint)
Fig. 8.7 b; pg. 260 hinge joint

b Hinge joint (elbow joint)
Fig. 8.7 c; pg. 260  pivot joint

**c** Pivot joint (proximal radioulnar joint)
45 Fig. 8.7 d; pg. 260 condyloid – oval “process” & oval “fossa” – “ball & socket”

d Condyloid joint (metacarpophalangeal joint)
Fig. 8.7e pg. 260 – Saddle joint – concave & convex surface

Saddle joint (carpometacarpal joint of thumb)
Ball-and-socket joint (shoulder joint)

Labrum
Fig. 8.10d; pg. 265 labrum, fibrocartilage lip – shoulder & hip ball & socket

Acromion
Coracoid process
Articular capsule
Glenoid cavity
Glenoid labrum
Tendon of long head of biceps brachii muscle
Glenohumeral ligaments
Tendon of the subscapularis muscle
Scapula

Posterior
Anterior
(d) Lateral view of socket of right shoulder joint, humerus removed

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Write test letter and number behind your name on scantron.

Lay scantron horizontal between the first two pages of the test booklet when finished.

You must sign roster & write down test number when you leave.

No cell phones etc, thank you and don’t cheat.