

CHAPTER 9: ARTICULATIONS

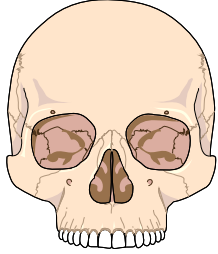
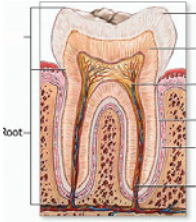
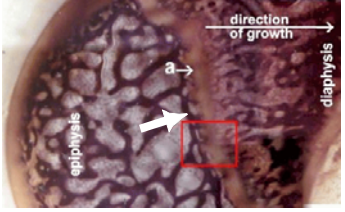
READ: Chapter 9, Pages 258-267 on different types of articulations and their classifications and pages 276-278 on the knee joint and aging.

I. Classification of Joints - Overview

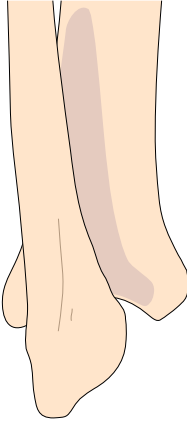
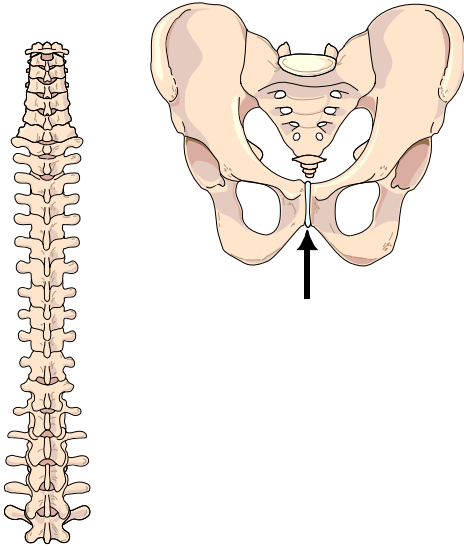
See Tables 9.1 and 9.2 on pages 259-260 for further classification of joints.

II. Functional Classification of Articulations

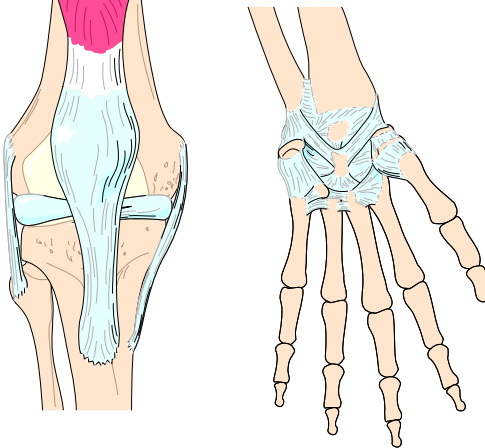
A. Synarthroses -

Type	Structural Category	Description	Example
1) Suture	Fibrous joint	interlocking projections joined by dense connective tissue	between bones of the skull 
2) Gomphosis	Fibrous joint	socket and root (peg-like) fit together; held in place by dense connective tissue (ligaments)	root of tooth in socket 
3) Synchondrosis	Cartilaginous joint	connection formed by cartilage plate	epiphyseal plate (white arrow) 
4) Synostosis	Bony fusion	created by fusion of two bones, no boundary obvious	frontal bone of skull, epiphyseal lines

B. Amphiarthroses -

Type	Structural Category	Description	Example
1) Syndesmosis	Fibrous joint	Ligamentous connection	<p>distal articulation between the tibia and fibula</p> 
2) Symphysis	Cartilaginous joint	connection via a fibro-cartilaginous pad	<p>pubic symphysis, articulation between adjacent vertebral bodies</p> 

C. Diarthrosis -

Type	Structural Category	Description	Example
monoaxial, biaxial, or triaxial	Synovial	complex joint bounded by a joint capsule and containing synovial fluid	<p>elbow, wrist, ankle, shoulder, hip, knee, etc.</p> 

D. Structure of a Synovial Joint - example: the knee.

- 1) Joint Cavity
- 2) Articular capsule
 - a) outer fibrous articular capsule
 - b) inner synovial membrane
- 3) Articular cartilage

ACCESSORY STRUCTURES

- 4a) Fat pad
- 4b) accessory cartilage (meniscus)

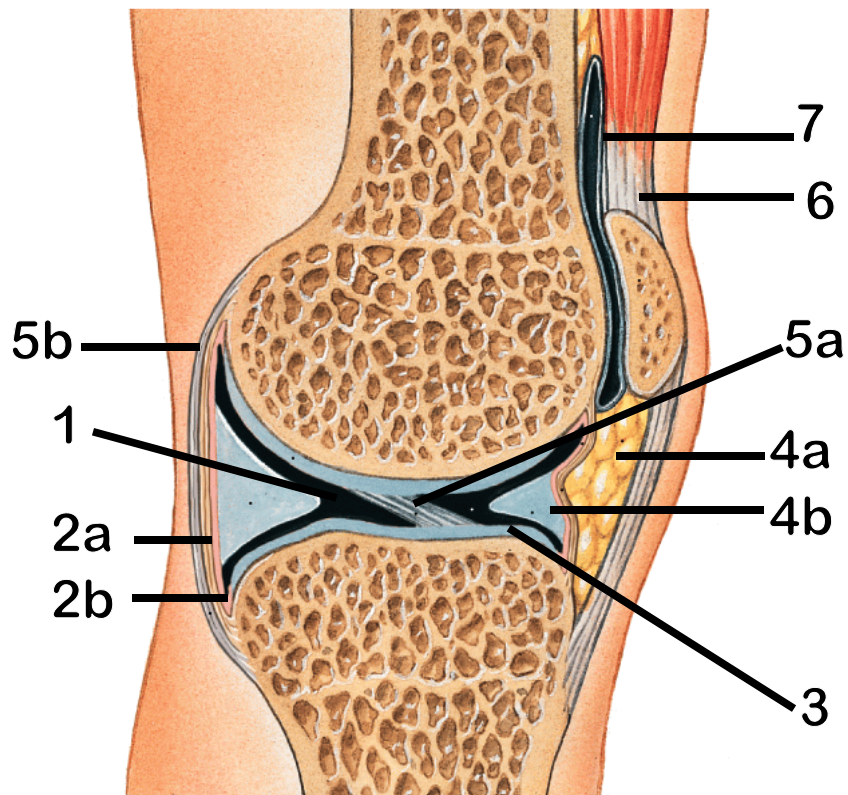
Ligaments:

5a) intracapsular

5b) extracapsular

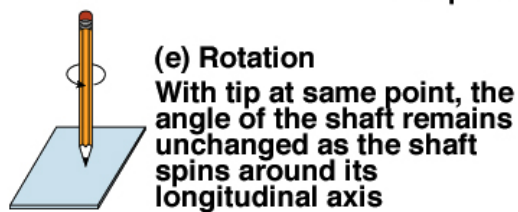
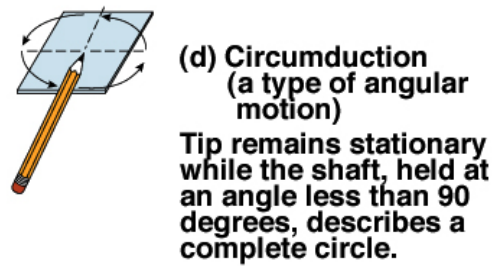
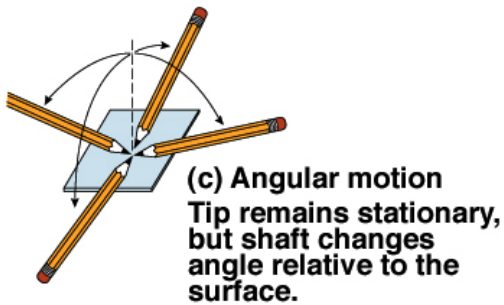
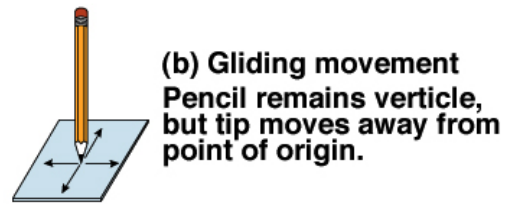
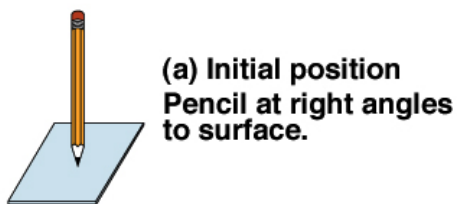
6) tendons

7) bursae

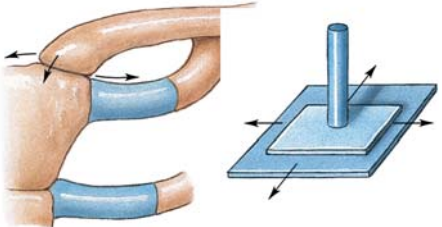
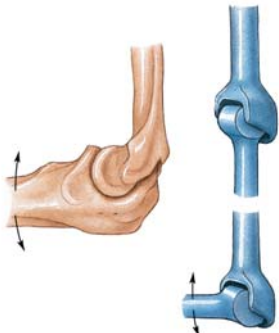
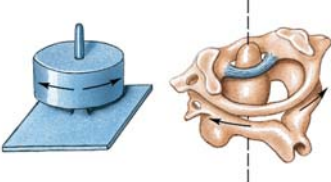


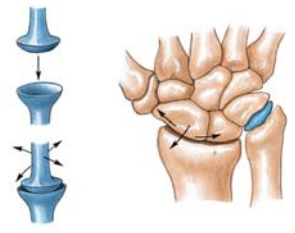
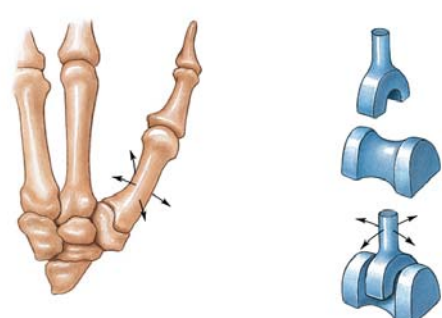
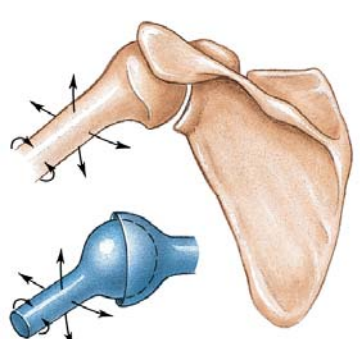
E. Types of Motion Permitted by Synovial Joints

- 1)
- 2)
- 3)



F. Structural Types of Synovial Joints (and movements permitted)

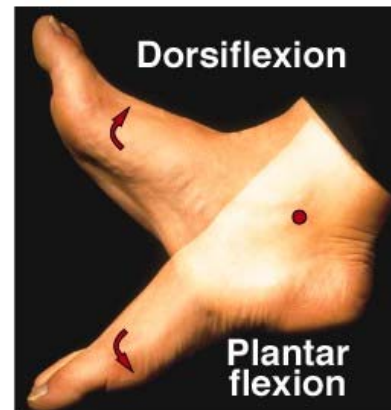
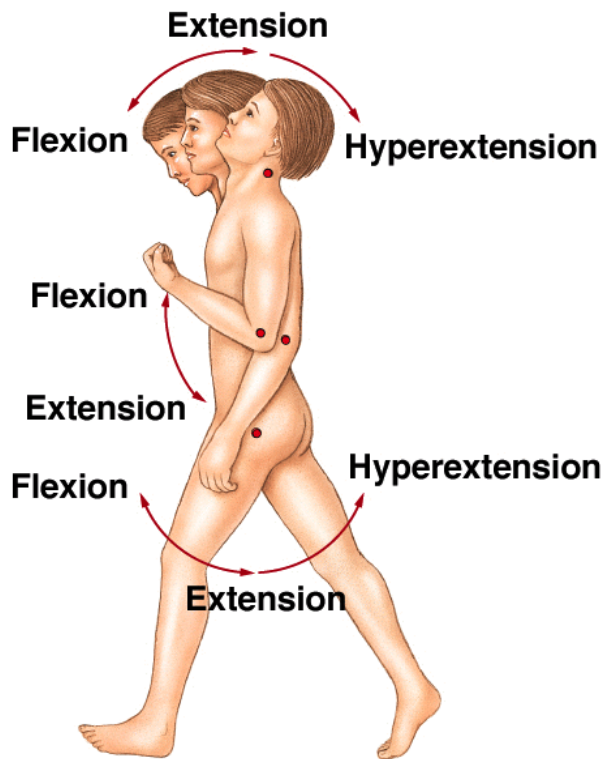
Type	Description	Movement	Examples
<p>1) Gliding (planar)</p>	<p>articulating surfaces are flat to slightly curved</p>	<p>surfaces slide over each other with a limited range of movement; nonaxial or multiaxial</p>	<p>clavicle, carpal bones, between ribs 2-7 and sternum, between articular facets of the vertebrae</p> 
<p>2) Hinge</p>	<p>C-shaped surface of one bone fits with a pulley-shaped surface of another bone, forms a hinge</p>	<p>angular movement in one direction like opening and closing of a door; monaxial</p>	<p>knee, elbow (trochlea of humerus + trochlear notch of ulna), ankle, interphalangeal joints</p> 
<p>3) Pivot</p>	<p>a ring of bone or disc-shaped depression fits with a process on another bone</p>	<p>rotation, monoaxial</p>	<p>atlas and axis, head of radius and proximal shaft of ulna</p> 

<p>4) Ellipsiodal (condlyoid)</p>	<p>an oval condyle of one bone fits in a depression of another bone</p>	<p>angular movement in two planes (circumduction may occur but no rotation); biaxial</p>	<p>radius with proximal carpals, phalanges with metacarpals, phalanges with metatarsals</p> 
<p>5) Saddle (sellaris)</p>	<p>resembles a saddle with complex concave and convex surfaces</p>	<p>angular movement in two planes (circumduction may occur but no rotation); biaxial</p>	<p>carpometacarpal joint at base of thumbs (twiddling).</p> 
<p>6) Ball-and-Socket</p>	<p>ball-shaped head of one bone fits into a cup-shaped socket of another bone</p>	<p>all combinations of angular, rotational, and circumduction movements; triaxial</p>	<p>Shoulder and hip</p> 

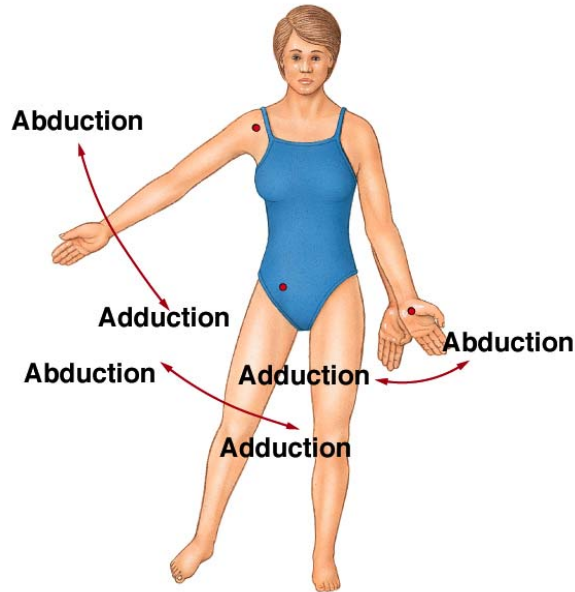
G. Classification of Body Motion

1) Angular Movement

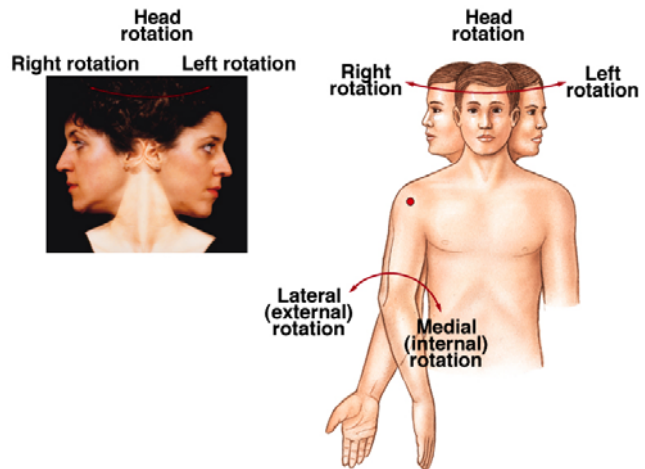
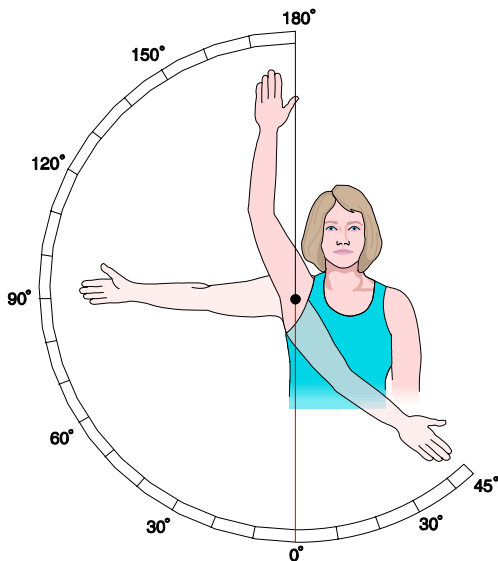
- a) Flexion - decreases the angle between articulating bones in the anterior/posterior plane
- b) Extension - increase the angle between articulating bones in the anterior/posterior plane
- c) Hyperextension - continuation of extension beyond anatomical position.



- d) Abduction - movement away from the midline
- e) Adduction - movement toward the midline

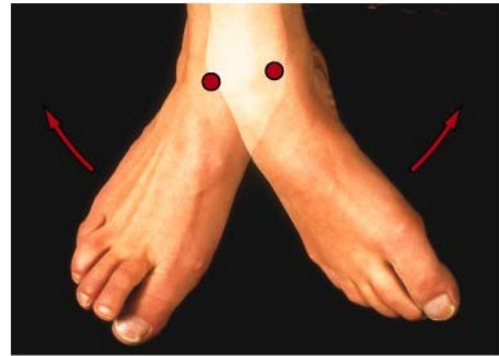


- f) Circumduction - proximal end pivots while the distal end moves in a circle
- g) Rotation - movement of a bone around a long axis



2) Special Movements

- a) inversion - moving sole inward (medially)
- eversion - moving sole outward (laterally)



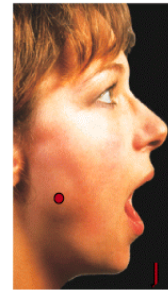
Eversion **Inversion**

- b) protraction - moving mandible forward
- retraction - moving mandible backward

- c) elevation - superior movement of jaw or shoulders
- depression - inferior movement of jaw or shoulders



Retraction **Protraction**

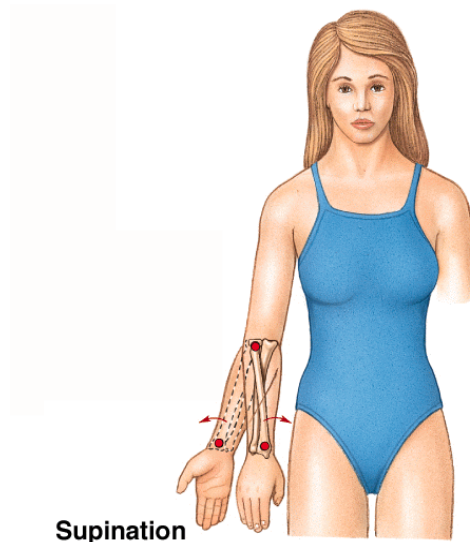


Depression



Elevation

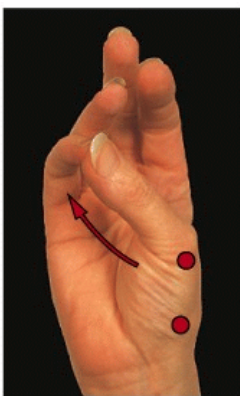
- d) supination - moving forearm to turn palm anteriorly
- pronation - moving forearm to turn palm posteriorly



Supination

Pronation

- e) opposition - movement of thumb toward the palm of the hand

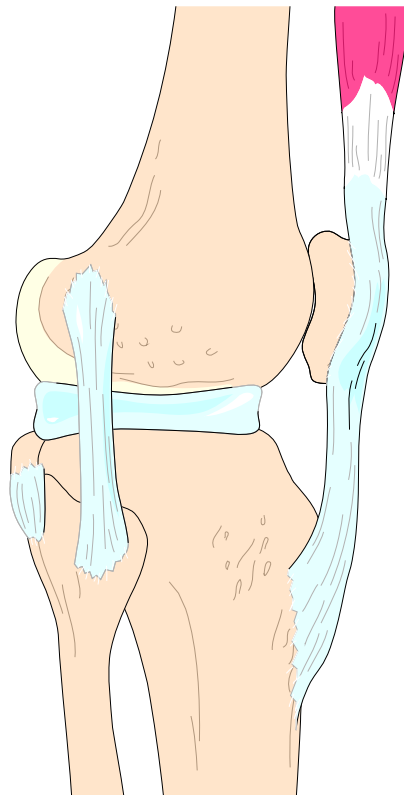


Opposition

ASSIGNMENTS

LECTURE GUIDE

- 1) Define articulation. Describe the functional and structural categories of joint classification.
- 2) What type of tissue(s) are found in immovable joints? Give some examples of immovable joints. How are slightly moveable joints different from immovable and freely moveable joints?
- 3) Label the ligaments, articular cartilage, meniscus, patella, tendons of the synovial joint below. Draw and label the outer articular capsule, inner synovial membrane, fat pad(s), and bursae on the figure below.



- 4) Demonstrate each of the six types of structural synovial joints using your body. Repeat this in the lab using the skeleton.
- 5) What are the three basic types movement at synovial joints? What are the subtypes of angular movement?
- 6) Give examples of nonaxial, monaxial, biaxial, triaxial movements at joints.

- 7) Demonstrate the following types of movements using your body. Repeat these in the lab using the skeleton. Flexion, extension, hyperextension, abduction, adduction, dorsiflexion, plantar flexion, circumduction, rotation, supination, pronation, opposition, retraction, protraction, depression, and elevation.
- 8) Where does synovial fluid come from? (Be specific) What is the function of this fluid? What types of ligaments are found in a synovial joint? What is the function of each type ligament in a synovial joint?

Feel free to visit with me for answers to the Lecture Guide questions.

TEXTBOOK CHAPTER 9 (pages 28-282)

Level 1 Reviewing Facts and Terms: 1-7, 9-15, 18

Level 2 Reviewing Concepts: 21, 23, 27

Answers to the above questions are located in the back of the text book.

STUDY GUIDE Chapter 9 (pages 153-170)

(L1) Multiple Choice: 1-15, 17-18

Completion: 24-26, 28-32

Matching: 39-46

Drawing/Illustration: Figures 9-1, 9-3, 9-4

(L2) Concepts Map 1

Multiple Choice: 28-32, 36, 38

Completion: 47-49

Short Essay: 57-63

(L3) Critical Thinking: 2, 4

Answers to Study Guide Questions are located on pages 615-618 of the Study Guide.