

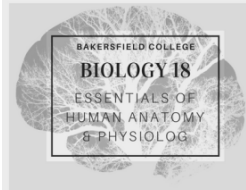


Skeletal System 4
Joints & Movements
Chapter 6



Marieb, 2018. Essentials of Human Anatomy & Physiology (12th Ed.)
ISBN 978-0134395326




Objectives

- Classify joints structurally and functionally.
- Recognize the examples given of fibrous and cartilaginous joints.
- Describe the structural characteristics of all synovial joints.
- Name and provide examples of all 6 movement based types of synovial joint.
- Name and demonstrate with your body common body movements.
- Name and describe common injuries that occur at joints.

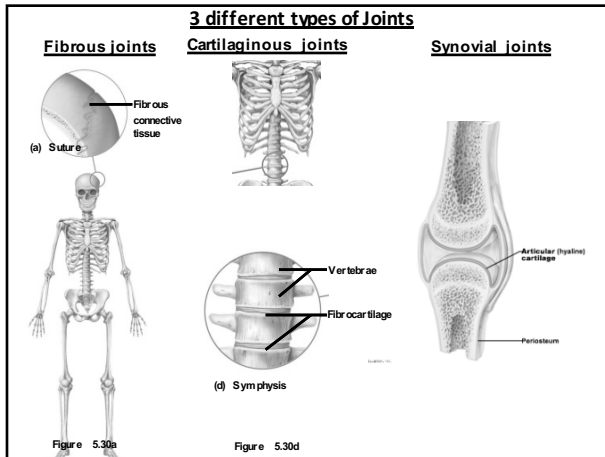
Page 11

Joints

- Also known as “Articulations” of bones
 - Sites where two or more bones meet
- Functions of joints
 - Hold bones together
 - Allow for mobility



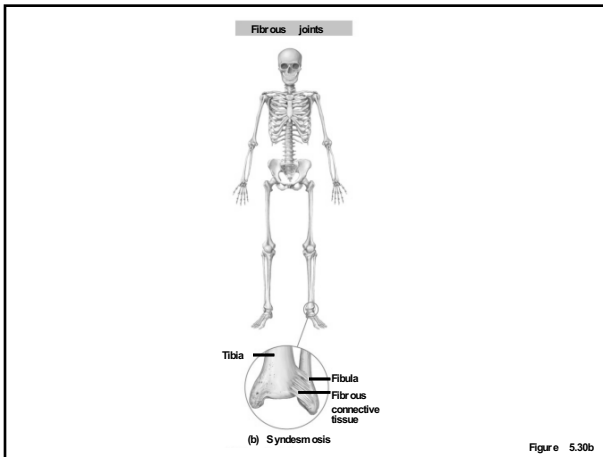
Strayer



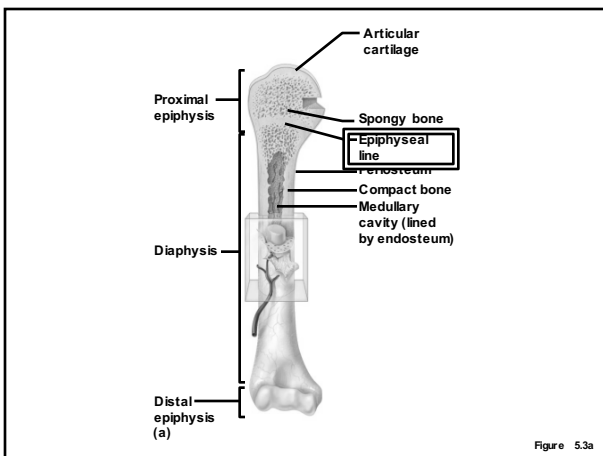
CLASSIFICATION			
STRUCTURE How it's built	FUNCTION (MOVEMENT)	JOINT CAVITY	EXAMPLES
Fibrous	Mostly immovable	None	Sutures •skull Ligament only connections •tibia-fibula
Cartilaginous	Both immovable and slightly movable	None	•temp. epiphyseal plates •intervertebral discs •pubic symphysis
Synovial	Freely movable	Yes!!	
Composed of:	6 types:		
•articular cartilage	1. Plane movt.: glide		•intertarsal •intercarpal
•joint cavity	2. Hinge movt.: one axis		•elbow, ankle •between phalanges
•articular capsule (synovial membrane)	3. Pivot movt.: one axis		•radius •atlas at dens
•synovial fluid	4. Condylar movt.: biaxial		•metacarpophalangeal •wrist
•reinforcing ligaments	5. Saddle movt.: biaxial		•1 st carpometacarpal joint
•nerves & vessels	6. Ball & socket movt.: multiaxial		•hip, shoulder

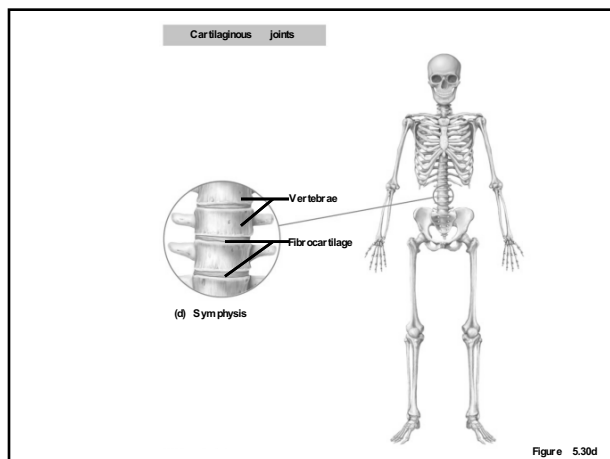
Page 12

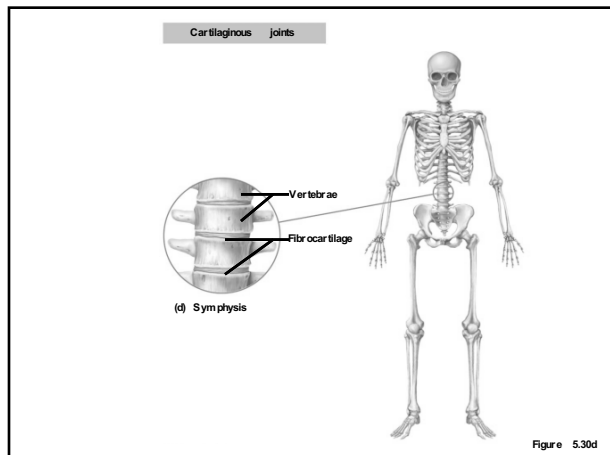
STRUCTURE	FUNCTION (MOVEMENT)	JOINT CAVITY	EXAMPLES
Fibrous	Mostly immovable	None	Skull: Sutures Ligament only connections •tibia-fibula
<p>(e)</p>			

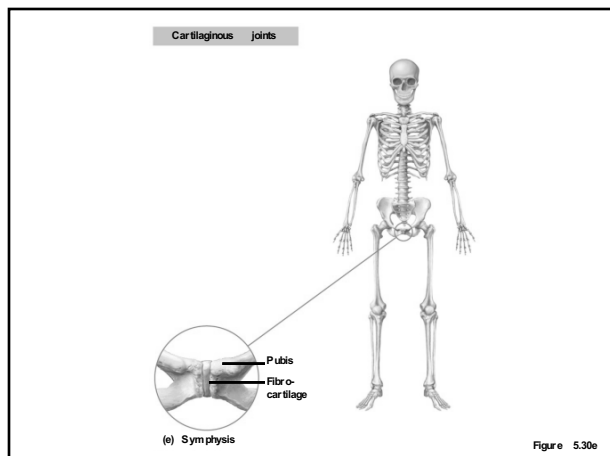


Page 12	STRUCTURE	FUNCTION (MOVEMENT)	JOINT CAVITY	EXAMPLES
	Bones connected by cartilage			
	Cartilaginous	Both immovable and slightly movable	None	<ul style="list-style-type: none"> •temp. epiphyseal plates •intervertebral discs •pubic symphysis
	(b)			
			Common in thoracic area	









STRUCTURE	FUNCTION (MOVEMENT)	JOINT CAVITY	EXAMPLES
<p>Synovial Composed of:</p> <ul style="list-style-type: none"> •articular cartilage •joint cavity •articular capsule -fibrous layer -synovial membrane •synovial fluid •reinforcing ligaments •nerves & vessels 	<p>Freely movable 6 types:</p> <ol style="list-style-type: none"> 1. Plane movt.: glide 2. Hinge movt.: one axis 3. Pivot movt.: one axis <p>Condylar movt.: biaxial Saddle movt.: biaxial Ball-and-socket movt.: multiaxial</p>	<p>Yes!</p> <p>Only one with a Cavity</p>	<ul style="list-style-type: none"> •intertarsal •intercarpal •elbow, ankle •between phalanges •radius •atlas at dens •metacarpophalangeal •wrist •1st carpometacarpal joint •hip, shoulder

Features of Synovial Joints

- Articular cartilage (hyaline cartilage) covers the ends of bones
- Articular capsule encloses joint surfaces and lined with synovial membrane
- Reinforcing ligaments
- Articulating bones are separated by a joint cavity
- Synovial fluid is found in the joint cavity
- Nerves and vessels

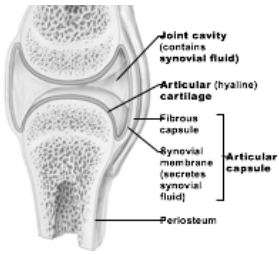
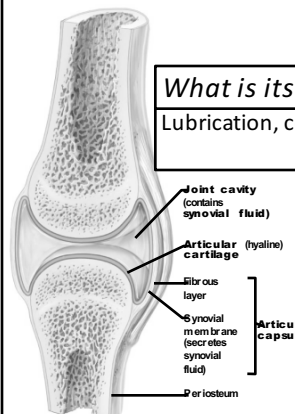


Figure 8.3 General structure of a synovial joint.


Serous fluid.

What is its job?


Lubrication, comes from blood so it carries O₂ and nutrients.

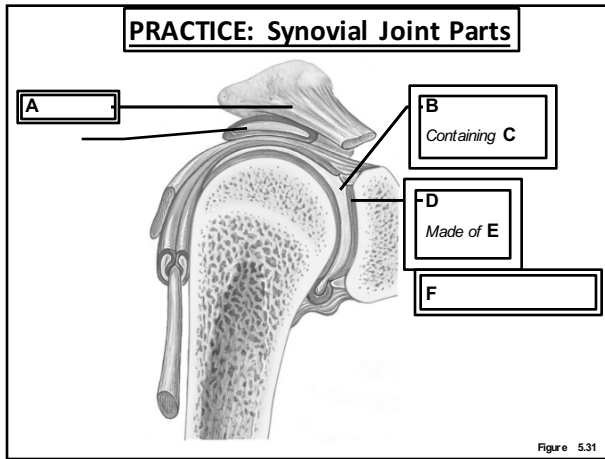


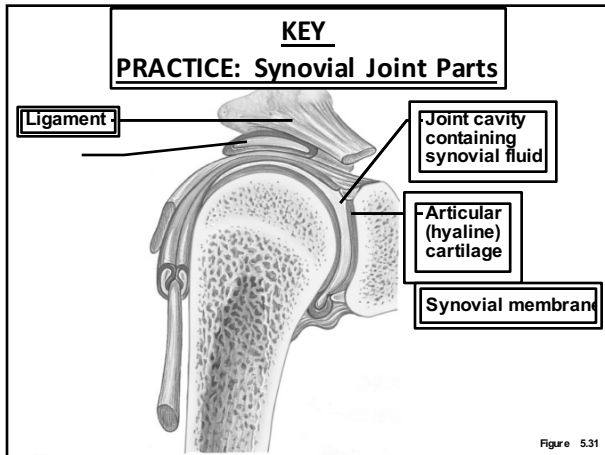
Joint not in use:

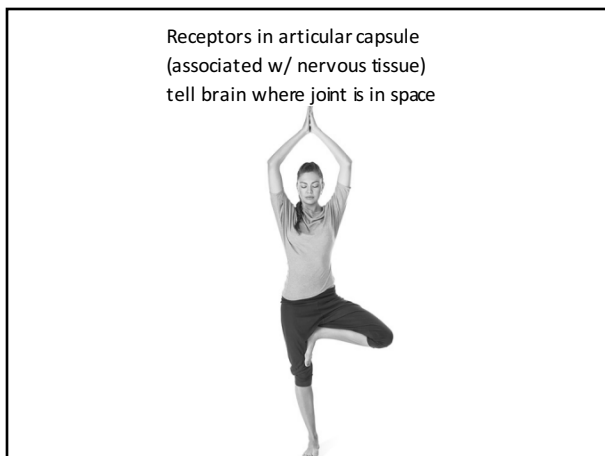


Joint in use:





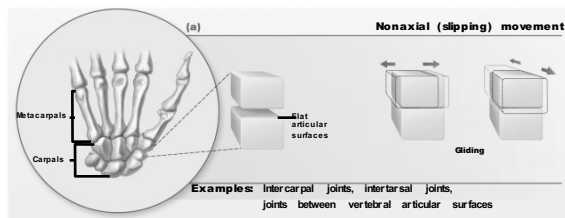




CLASSIFICATION			
STRUCTURE How it's built	FUNCTION (MOVEMENT)	JOINT CAVITY	EXAMPLES
Fibrous	Mostly immovable	None	Sutures •skull Ligament only connections •tibia-tibula
Cartilaginous	Both immovable and slightly movable	None	•temp. epiphyseal plates •intervertebral discs •pubic symphysis
Bones connected by cartilage			
Synovial	Freely movable	Yes!!	
Composed of:	6 types:		
•articular cartilage	1. Plane movt.: glide		•intertarsal •intercarpal
•joint cavity	2. Hinge movt.: one axis		•elbow, ankle •between phalanges
•articular capsule (synovial membrane)	3. Pivot movt.: one axis		•radius •atlas at dens
•synovial fluid	4. Condylar movt.: biaxial		•metacarpophalangeal •wrist
•reinforcing ligament	5. Saddle movt.: biaxial		•1 st carpometacarpal joint
•nerves & vessels	6. Ball & socket movt.: multiaxial		•hip, shoulder

Figure 8.7a The shapes of the joint surfaces define the types of movements that can occur at a synovial joint; they also determine the classification of synovial joints into six structural types.

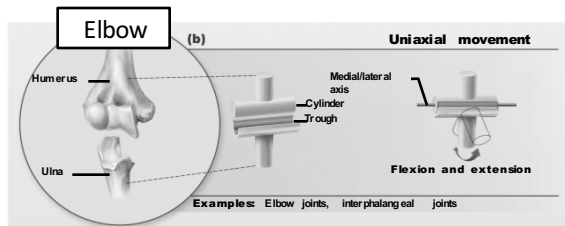
Synovial Joint Type A) Plane joint



© 2014 Pearson Education, Inc.

Figure 8.7b The shapes of the joint surfaces define the types of movements that can occur at a synovial joint; they also determine the classification of synovial joints into six structural types.

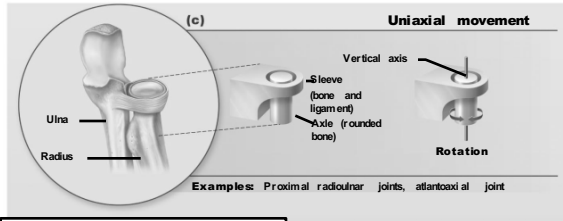
Synovial Joint Type B) Hinge joint



Trochlea to Trochlear notch

Figure 8.7c The shapes of the joint surfaces define the types of movements that can occur at a synovial joint; they also determine the classification of synovial joints into six structural types.

Synovial Joint Type C) Pivot joint

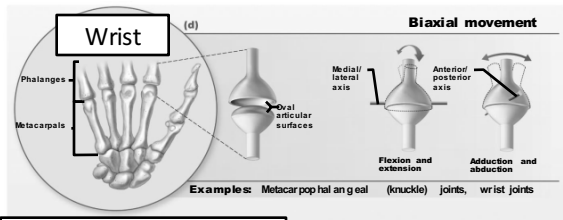


Rotates at the capitulum

© 2014 Pearson Education, Inc.

Figure 8.7d The shapes of the joint surfaces define the types of movements that can occur at a synovial joint; they also determine the classification of synovial joints into six structural types.

Synovial Joint Type D) Condylar joint

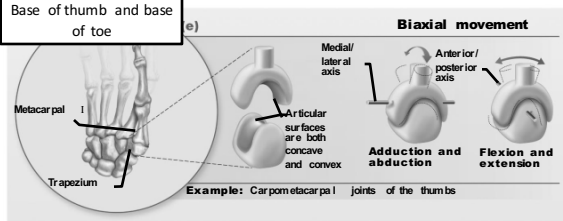


Back and forth and side to side

© 2014 Pearson Education, Inc.

Figure 8.7e The shapes of the joint surfaces define the types of movements that can occur at a synovial joint; they also determine the classification of synovial joints into six structural types.

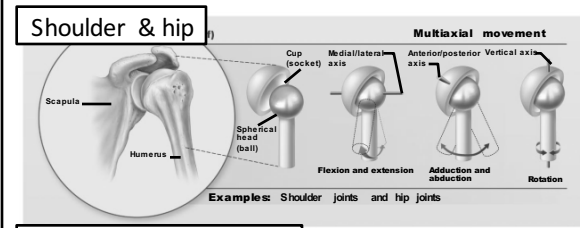
Synovial Joint Type E) Saddle joint



© 2014 Pearson Education, Inc.

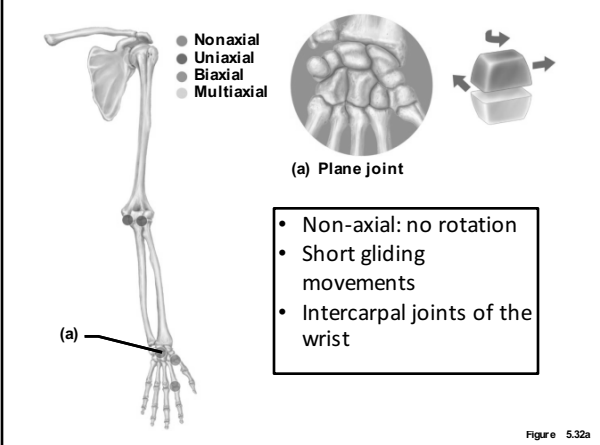
Figure 8.7f The shapes of the joint surfaces define the types of movements that can occur at a synovial joint; they also determine the classification of synovial joints into six structural types.

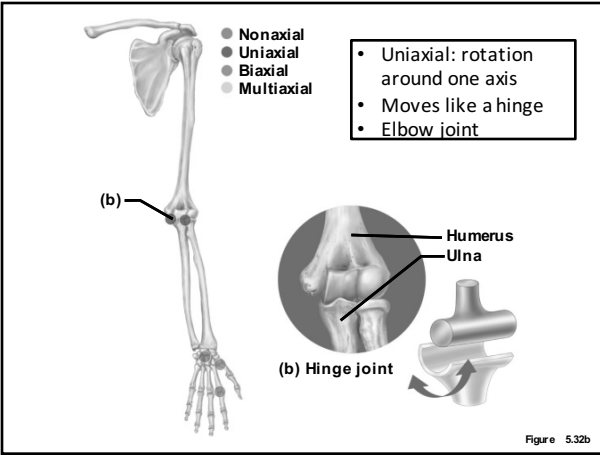
Synovial Joint Type F) Ball &-socket joint

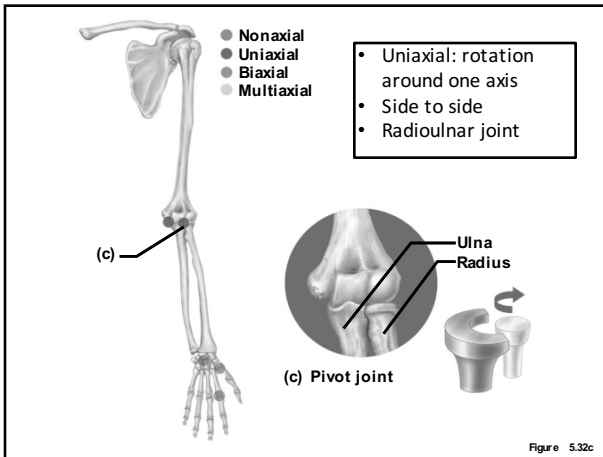


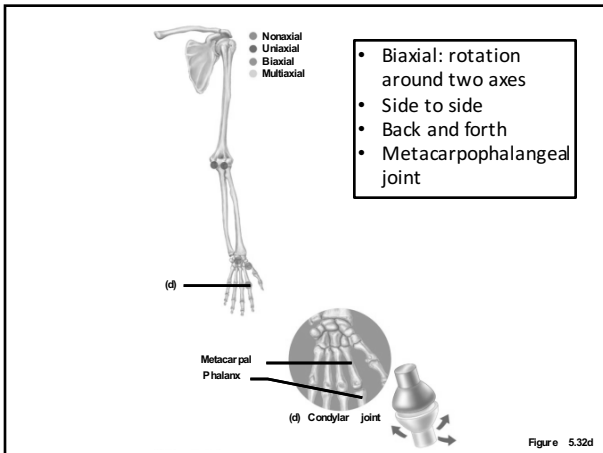
Look for a round HEAD on a bone

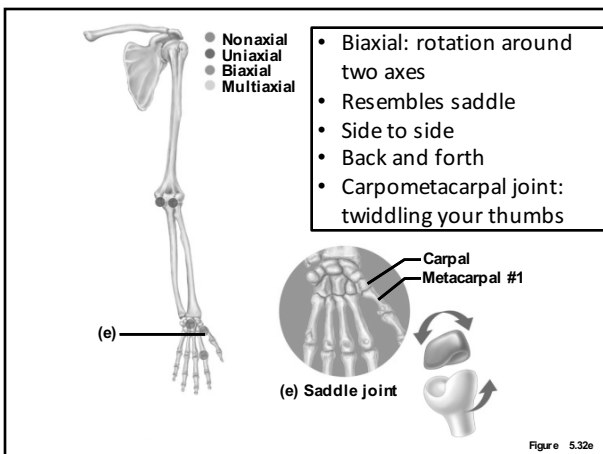
© 2014 Pearson Education, Inc.

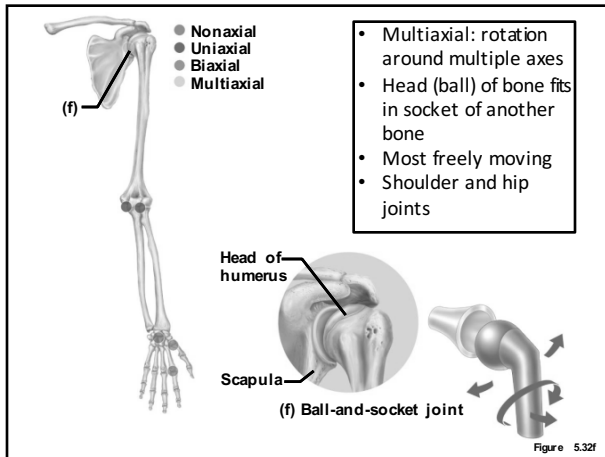


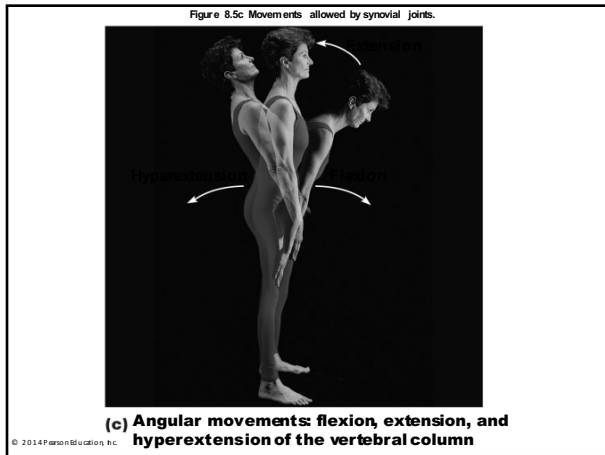


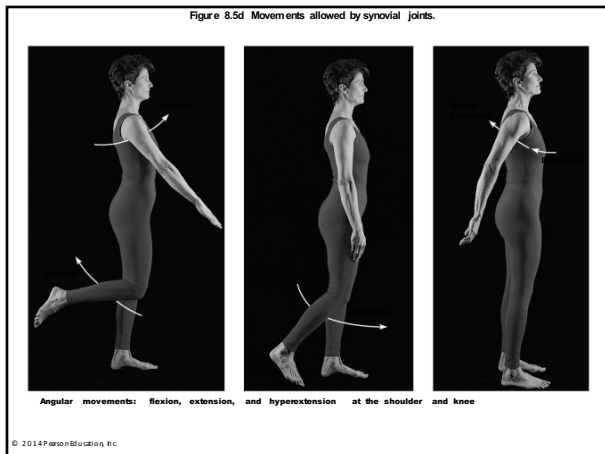


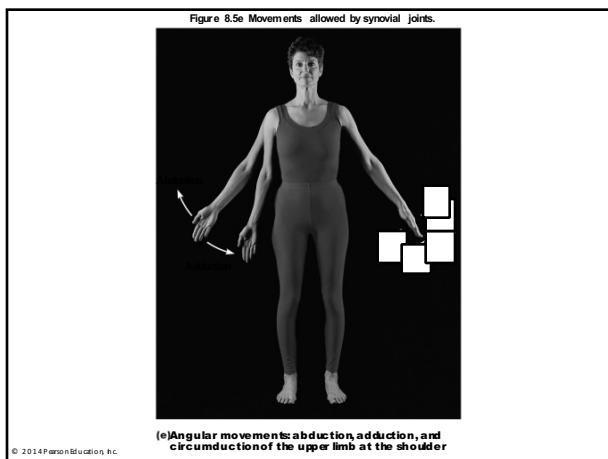


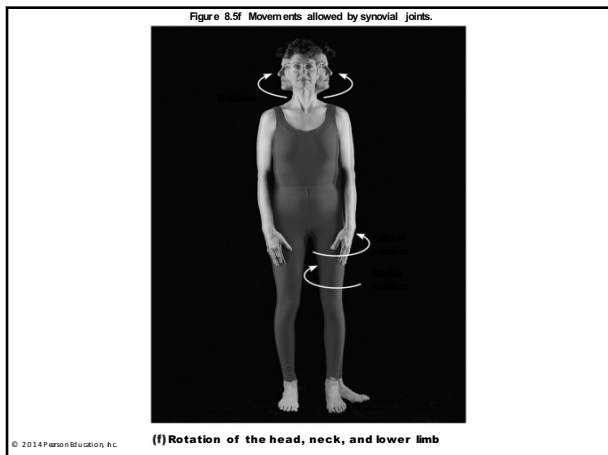


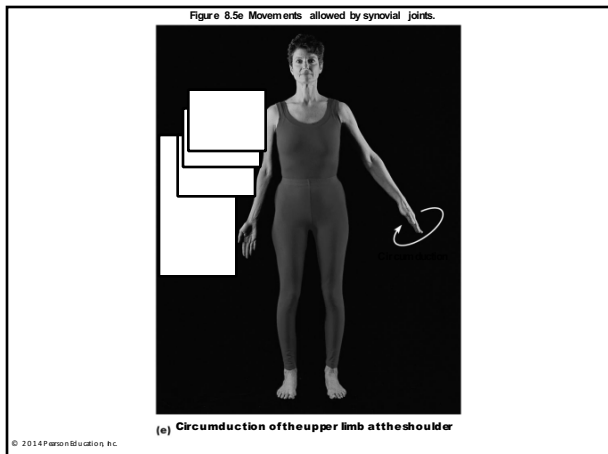


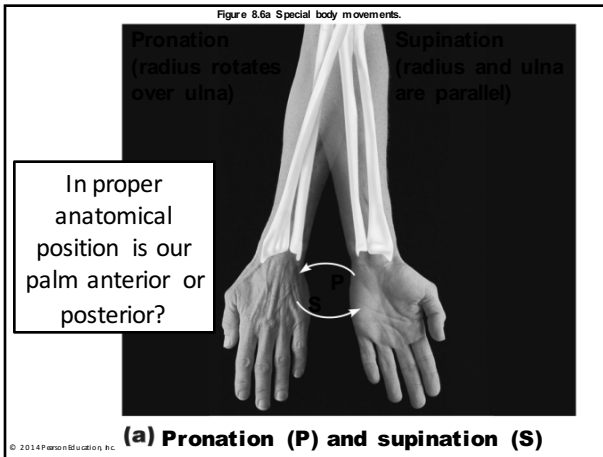


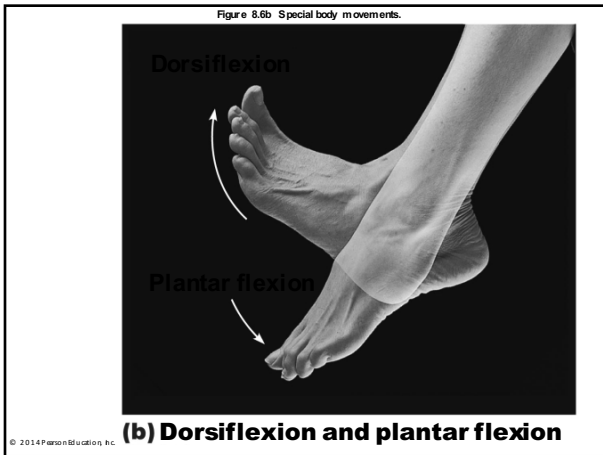


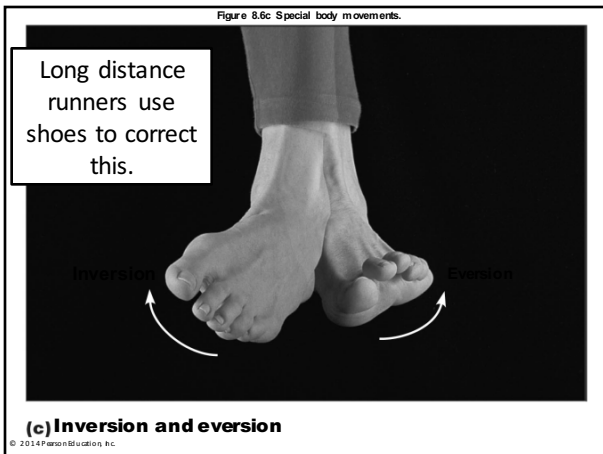


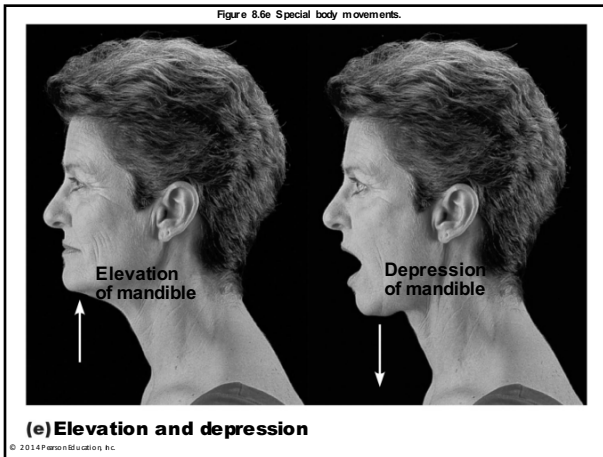


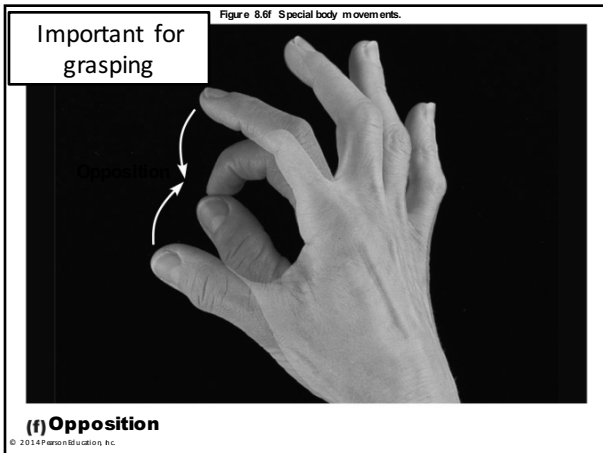












Page 13

Specialized Structures

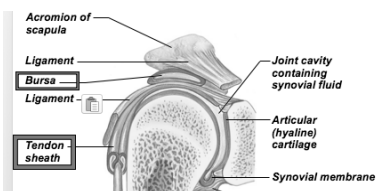
- Meniscus: fibrocartilage dividing joint space
 - Functions:
 - Prevents side-to-side rocking of femur on tibia
 - Absorbs shock transmitted to knee joint

Femur (Thighbone)
Patella
Meniscus
Tibia (Shinbone)

Page 13

Specialized Structures

- Bursa: bag of synovial fluid outside of joint cavity
 - Function: decreases friction between adjacent structures joint cavity
 - Condition: bursitis
 - inflammation of a bursa usually caused by a blow or friction



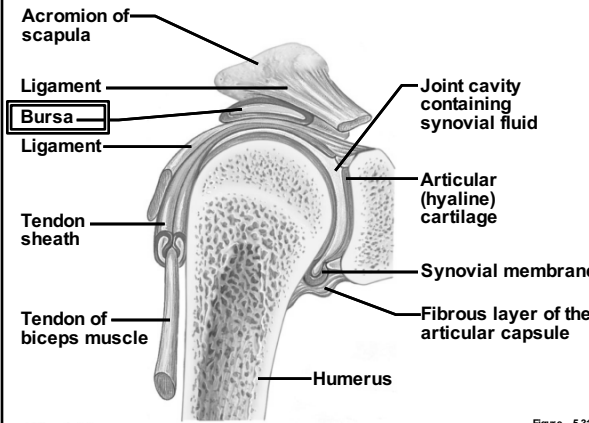
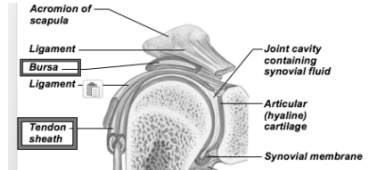
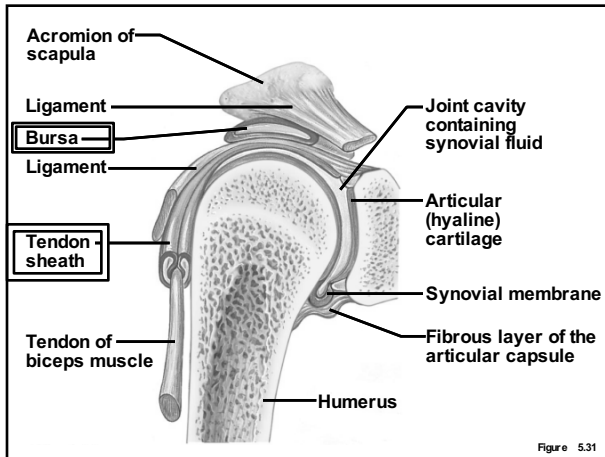


Figure 5.31

Specialized Structures

- Tendon sheath: elongated bursa around a tendon
 - Function: decreases friction around a tendon
 - Condition: tendonitis
 - inflammation of tendon sheaths

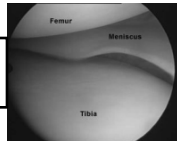


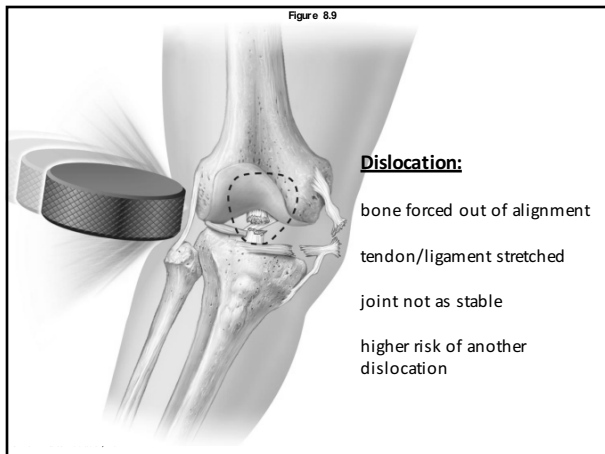


Joint Injuries

- Sprains: ligaments and tendons of joint are damaged by excessive stretching
- Dislocations: bones of a joint are forced out of their normal positions
- Cartilage Injuries
 - Torn meniscus
 - Arthroscopy
 - “arthro”: relating joints
 - “scopy”: viewing

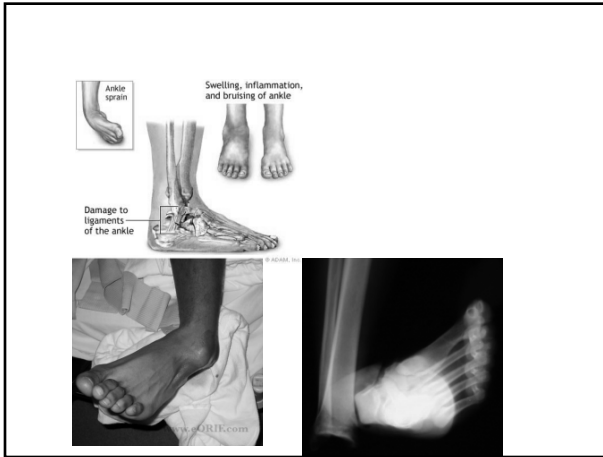
Popping noise





Dislocation:

- bone forced out of alignment
- tendon/ligament stretched
- joint not as stable
- higher risk of another dislocation



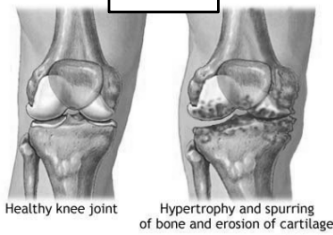
Other Medical Conditions (homeostatic imbalances)

- Arthritis—inflammatory or degenerative diseases of joints
 - Over 100 different types
 - The most widespread crippling disease in the United States
 - Initial symptoms: pain, stiffness, swelling of the joint

Osteoarthritis

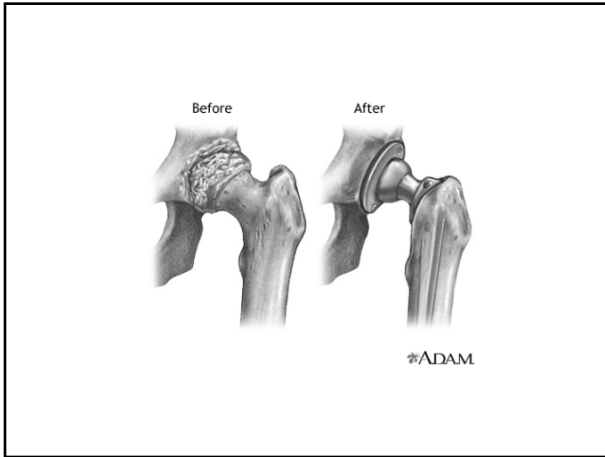
Old

- “Wear-and-tear arthritis”
- articular cartilage breaks down as we age and ossifies
- “bone spurs” in joint




Treatment:

Pain meds



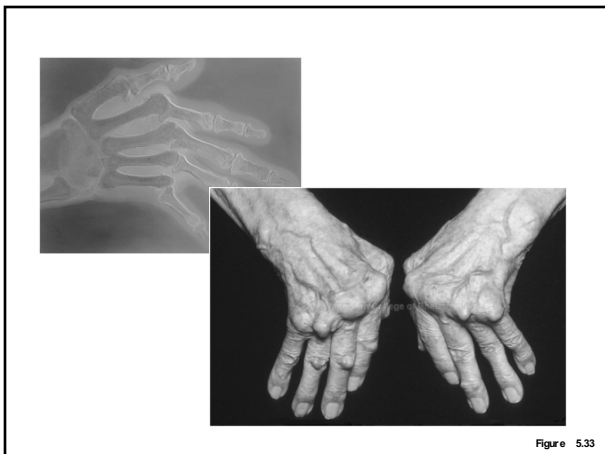
Rheumatoid arthritis (RA) Young/
Old

- Autoimmune
- synovial joint starts to produce abnormal fluid
- triggers immune response



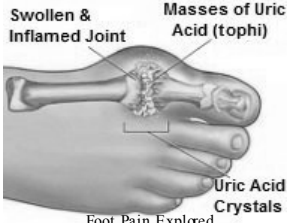
- WBC's secrete abnormal protein in joint
- protein accumulates and causes ossification

Treatment:
Pain meds



Gouty arthritis (gout) More in males

- Build-up of uric acid
- Uric acid byproduct from breakdown of nucleic acids
- cause: excess nucleic acid in diet (diets high in red meat)



Swollen & Inflamed Joint
Masses of Uric Acid (tophi)
Uric Acid Crystals

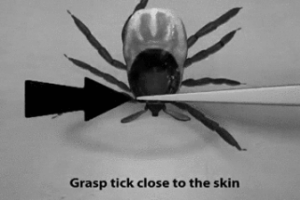
Treatment:

- Alter diet
- Pain meds

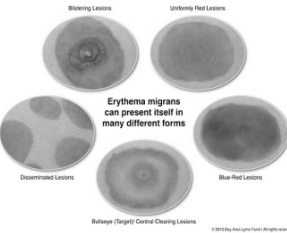
Foot Pain Exploded

Lyme disease Bacterial

- Bacterial infection (often from ticks)
- Bacteria can damage joint



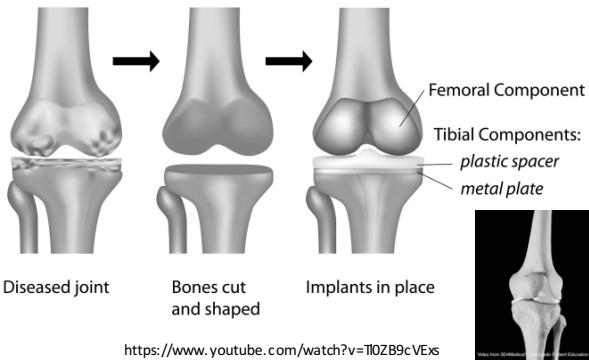
Grasp tick close to the skin



Erythema migrans can present itself in many different forms

Town of Sandwich

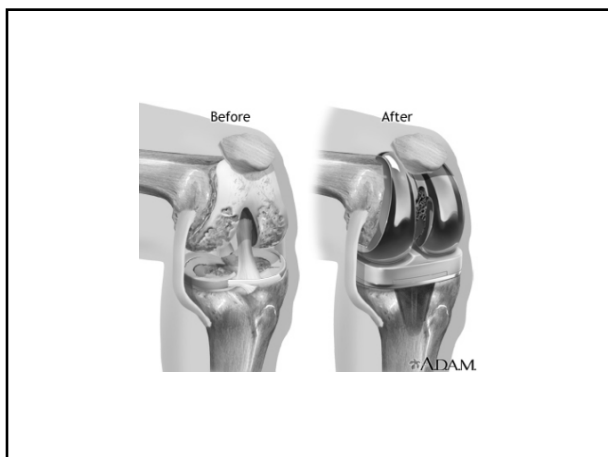
Joint Replacement



Diseased joint Bones cut and shaped Implants in place

Femoral Component
Tibial Components:
plastic spacer
metal plate

<https://www.youtube.com/watch?v=Tl0ZB9cVEs>



Helpful Review Tools

- PRACTICE: Synovial Joint Parts (PDF, KEY)
- PRACTICE: Synovial Joint Types (PDF, KEY)
- QUIZ: Movement Quiz on Canvas
- VOCABULARY: Movement
- PRACTICE: Movements (PDF, KEY)

The image contains two video thumbnails. The left thumbnail is titled 'Joints: Crash Cours...' and features a play button icon and the word 'BONES' in large letters. The right thumbnail is titled 'Joint Movements S...' and features a play button icon and a diagram of a hand and foot.
