

Principles of Anatomy and Physiology
14th Edition
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WILEY

CHAPTER 9
Joints

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Introduction

The purpose of the chapter is to:

1. Introduce the various types of joints in the body
2. Discuss how those joints are classified
3. Learn the types of movements that can be carried out at a joint

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What is a joint?

A joint is a point of contact between:

- Two or more bones
- Cartilage and bone
- Teeth and bone

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Classification of Joints

Joints can be classified

- Structurally
 - Is there a joint cavity?
 - What type of connective tissue is involved?
- Functionally
 - What degree of movement is permitted?

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Classification of Joints

Anatomy Overview:

Joints

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Structural Classification of Joints

Fibrous

- Sutures – dense fibrous CT

Ex. Suture

- Syndesmoses – more dense fibrous CT than a suture

Ex. Gomphosis

- Interosseous membranes – a broad sheet of dense fibrous CT

Ex. Between radius and ulna

Cartilaginous

- Synchondrosis – hyaline cartilage; no movement

Ex. Epiphyseal plate

- Symphysis – fibrocartilage; some movement

Ex. Pubic symphysis

Synovial

- Articular cartilage on ends of long bones and a synovial cavity between articulating bones surrounded by accessory ligaments; freely moveable

Ex. Hip, knee, shoulder, elbow

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Functional Classification of Joints

Synarthroses

- Allow no movement

Ex. Suture, gomphosis

Amphiarthroses

- Allow little movement

Ex. Pubic symphysis, intervertebral discs

Diarthroses

- Freely moveable

Ex. Hip, knee, shoulder, elbow

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Fibrous Joints

Lack a synovial cavity

Articulating bones are held together with dense fibrous connective tissue

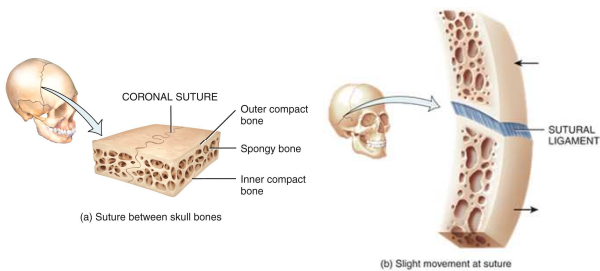
Permit little or no movement

Types:

- Sutures
- Syndesmoses
- Interosseous membranes

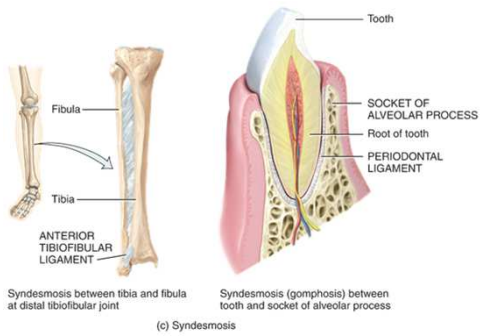
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Examples of Fibrous Joints



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Examples of Fibrous Joints



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Cartilaginous Joints

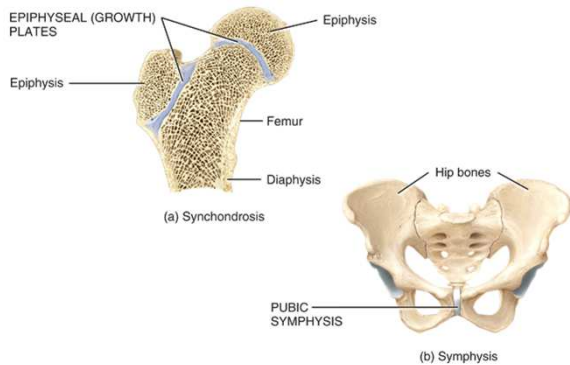
Lack a synovial cavity
Articulating bones are held together with cartilage connective tissue
Permit little or no movement

Types:

- Synchondroses
- Symphyses

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Examples of Cartilaginous Joints



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Synovial Joints

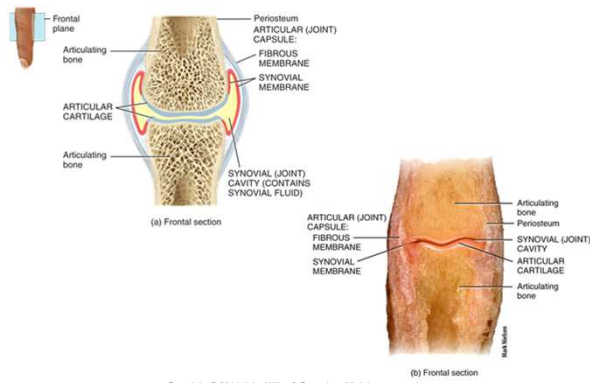
Have a synovial cavity

Articulating bones are covered with articular cartilage, held together by ligaments, contain synovial fluid, have a nerve and blood supply, and are surrounded by an articular capsule

Permit a large range of movement

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Structure of a Synovial Joint



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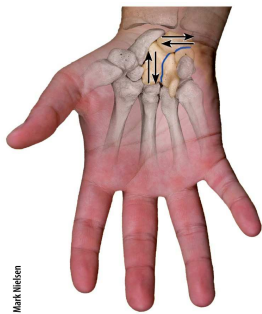
Bursae and Tendon Sheaths

Bursae and tendon sheaths can be found at many synovial joints

- Bursae – sac-like structures filled with synovial fluid that cushion movement of one body part over another
- Tendon sheaths – tube-like bursae that wrap around tendons subject to a great deal of friction

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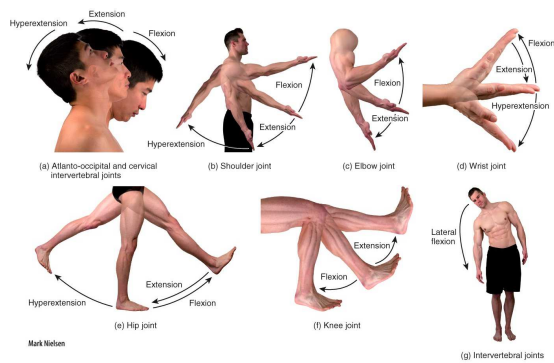
Types of Movement at Synovial Joints



Gliding between carpals (arrows)

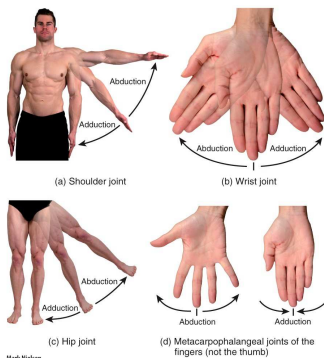
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Types of Movement at Synovial Joints

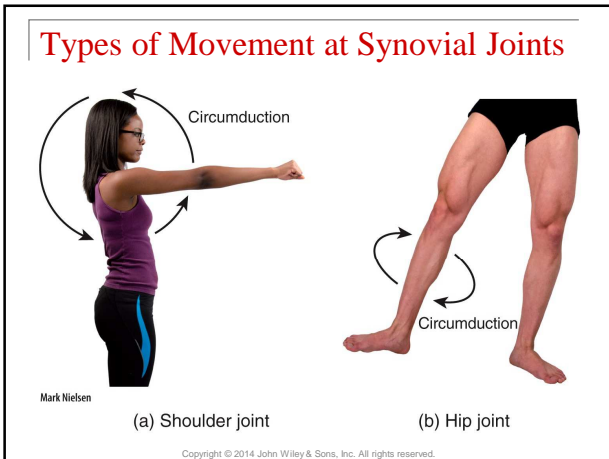


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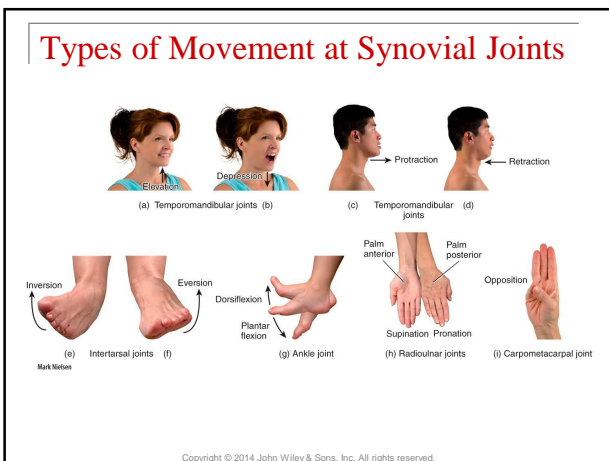
Types of Movement at Synovial Joints



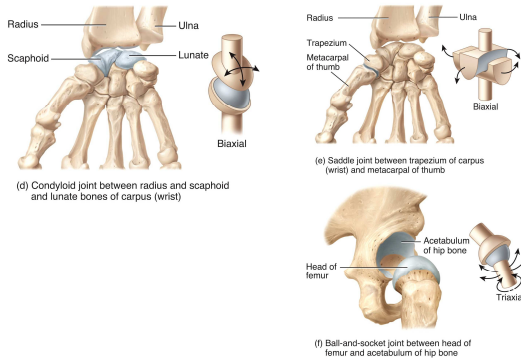
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Types of Movement at Synovial Joints



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Factors Affecting Contact and Range of Motion at Synovial Joints

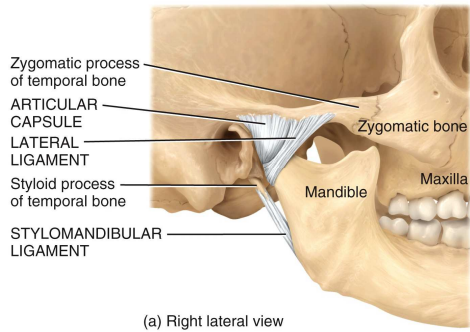
- Structure and shape of the articulating bones
- Strength and tautness of the joint ligaments
- Arrangement and tension of the muscles
- Contact of soft parts
- Hormones
- Disuse

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Selected Joints of the Body

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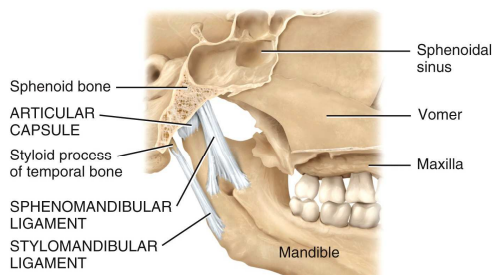
Temporomandibular Joint



(a) Right lateral view

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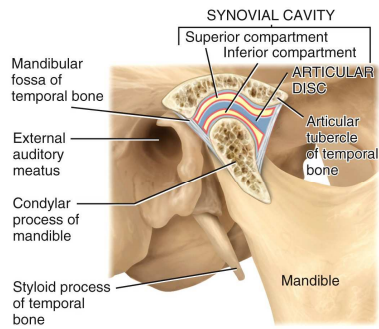
Temporomandibular Joint



(b) Left medial view

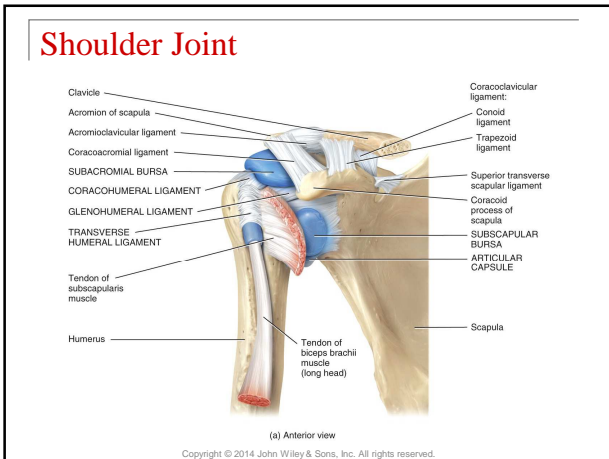
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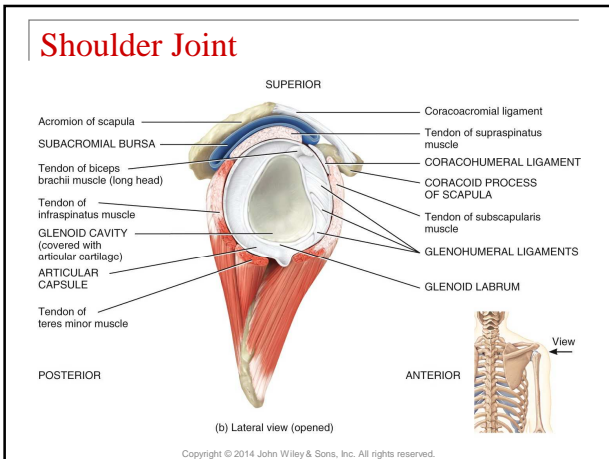
Temporomandibular Joint

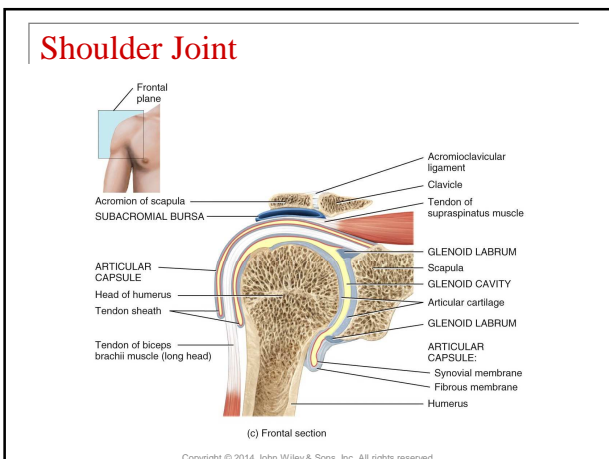


(c) Sagittal section viewed from right

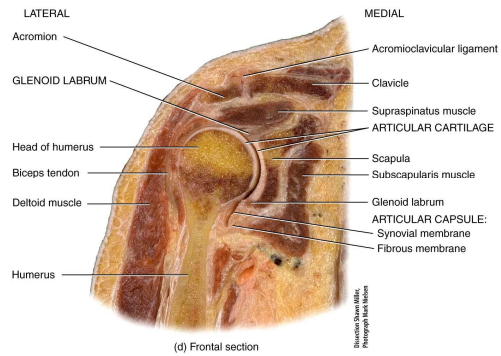
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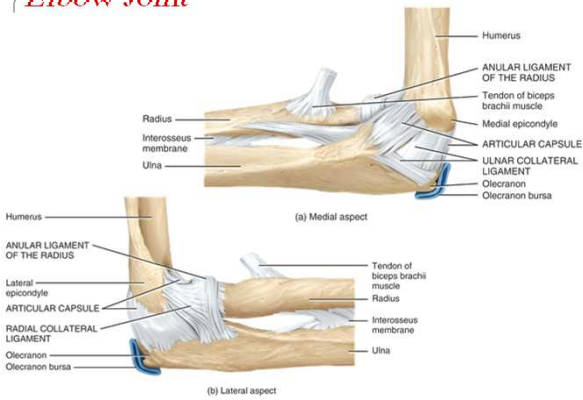


Shoulder Joint



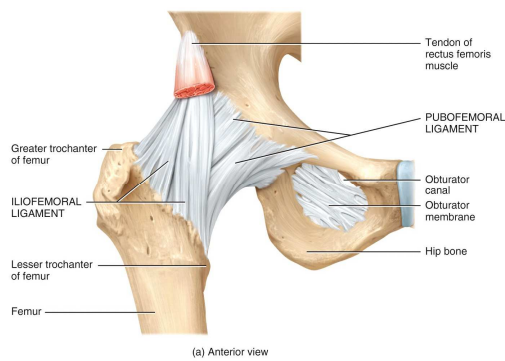
(d) Frontal section
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Elbow Joint

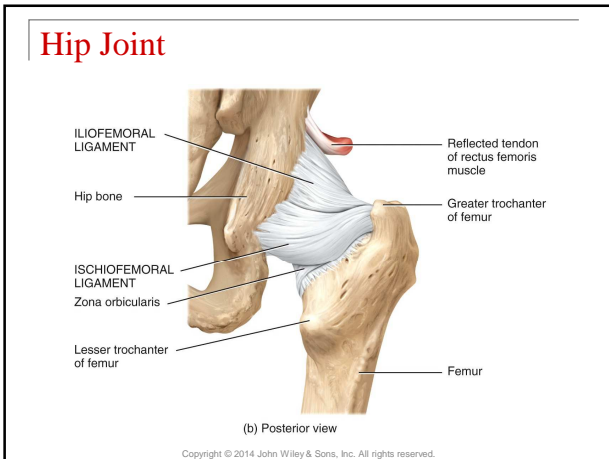


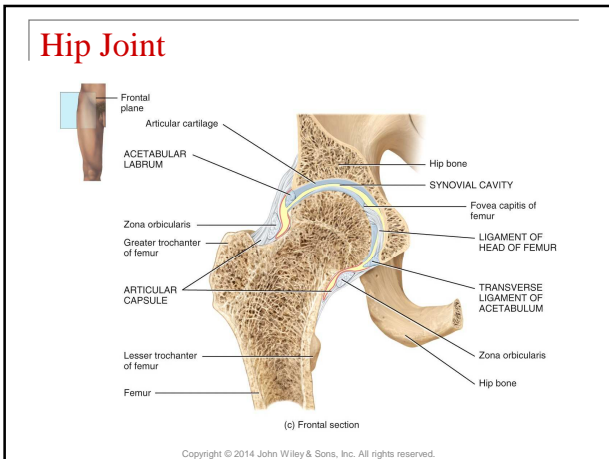
(a) Medial aspect
(b) Lateral aspect
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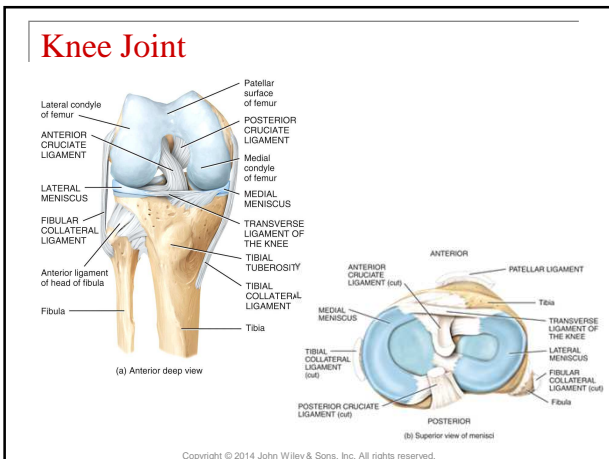
Hip Joint



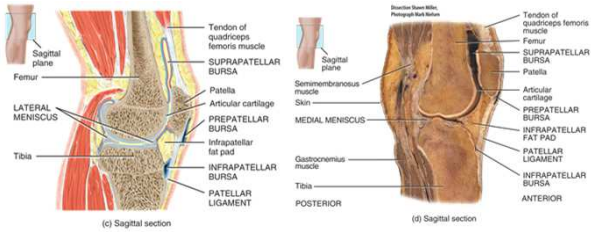
(a) Anterior view
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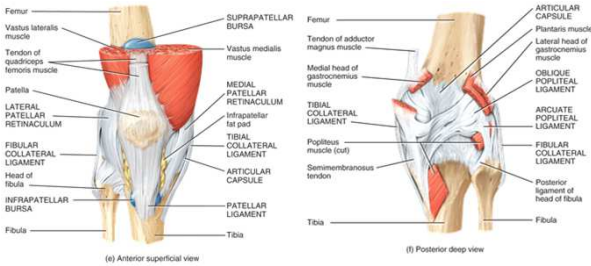


Knee Joint



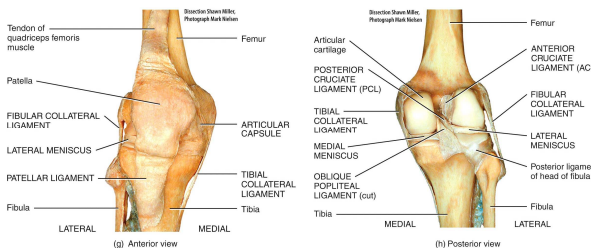
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Knee Joint



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Knee Joint



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Aging and Joints

As we age, our joints experience:

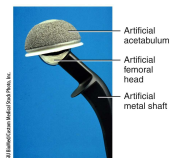
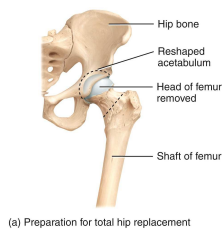
- Decreased production of synovial fluid
- Thinning of articular cartilage
- Loss of ligament length and flexibility

Arthroplasty

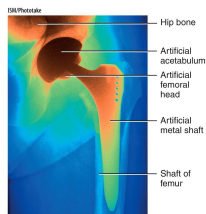
- Joint replacement surgery can be performed to counter some of the effects of aging

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Arthroplasty



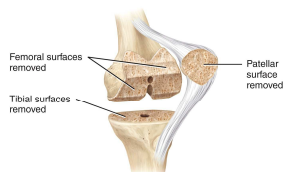
(b) Components of an artificial hip joint prior to implantation



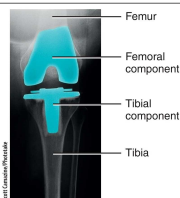
(c) Radiograph of an artificial hip joint

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Arthroplasty



(e) Components of artificial knee joint prior to implantation (left) and implanted (right)



(f) Radiograph of total knee replacement

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End of Chapter 9

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