

#### 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

# What is a joint?

A joint is a point of contact between:

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

#### **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?

#### **Classification of Joints**

#### Anatomy Overview:

Joints

You must be connected to the Internet and in Slideshow Mode to run this animation.



#### **Functional Classification of Joints**

Amphiarthroses

intervertebral discs

- Synarthroses Allow no ٠
- movement Ex. Suture,
- gomphosis
- Allow little Freely moveable movement Ex. Pubic symphysis,
  - Ex. Hip, knee, shoulder, elbow

Diarthroses

#### **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







# Cartilaginous Joints

Lack a synovial cavity

Articulating bones are held together with cartilage connective tissue

Permit little or no movement

Types:

- Synchondroses
- Symphyses





# 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



#### 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 movemnet of one body part over another
- Tendon sheaths tube-like bursae that wrap around tendons subject to a great deal of friction

























# Types of Movement at Synovial Joints

MOVEMENT	DESCRIPTION	MOVEMENT	DESCRIPTION
Sliding	Movement of relatively flat bone surfaces buck-and-forth and side-to-side over one another; little change in angle between bones.	Rotation	Movement of bone around longitudinal axis; in limbs: may be medial (toward midline) or lateral (away from midline).
Angular	Increase or decrease in angle between bones.	Special	Occurs at specific joints.
Flexion	Decrease in angle between articulating bones, usually in sagittal plane.	Elevation	Superior movement of body part.
		Depression	Inferior movement of body part.
Lateral flexion	Movement of trunk in frontal plane.	Protraction	Anterior movement of body part in transverse plane.
Extension	Increase in angle between articulating bones,	Retraction	Posterior movement of body part in transverse plane.
	usually in sagittal plane.	Inversion	Medial movement of sole.
Hyperextension	Extension beyond anatomical position.	Eversion	Lateral movement of sole.
Abduction	Movement of bone away from midline, usually in frontal plane.	Dorsiflexion	Bending foot in direction of dorsum (superior surface).
Adduction	Movement of bone toward midline, usually in frontal plane.	Plantar flexion	Bending foot in direction of plantar surface (sole).
		Supination	Movement of forearm that turns palm anteriorly.
Circumduction	Flexion, abduction, extension, adduction, and rotation in succession (or in the opposite order); distal end of body part moves in circle.	Pronation	Movement of forearm that turns palm posteriorly.
		Opposition	Movement of thumb across palm to touch fingertips on same hand.

#### oyright © 2014 John Wiley & Sons, Inc. All rights reserved.

# Types of Synovial Joints

STRUCTURAL CLASSIFICATION	DESCRIPTION	FUNCTIONAL CLASSIFICATION	EXAMPLE
SYNOVIAL Characterize and Bursae.	ed by Synovial Cavity, Articular Cartilage, an	d Articular (Joint) Capsule; May Conta	in Accessory Ligaments, Articular Discs,
Plane	Articulated surfaces flat or slightly curved.	Many biaxial diarthroses (freely movable): back-and-forth and side- to-side movements. Some triaxial diarthroses: back-and-forth, side-to- side, rotation.	Intercarpal, intertarsal, sternocostal (between sternum and second to seventh pairs of ribs), and vertebrocostal joints.
Hinge	Convex surface fits into concave surface.	Uniaxial diarthrosis: flexion-extension.	Knee (modified hinge), elbow, ankle, and interphalangeal joints.
Pivot	Rounded or pointed surface fits into ring formed partly by bone and partly by ligament.	Uniaxial diarthrosis: rotation.	Atlanto-axial and radioulnar joints.
Condyloid	Oval-shaped projection fits into oval- shaped depression.	Biaxial diarthrosis: flexion-extension, abduction-adduction.	Radiocarpal and metacarpophalangeal joints.
Saddle	Articular surface of one bone is saddle-shaped; articular surface of other bone "sits" in saddle.	Biaxial diarthrosis: flexion-extension, abduction-adduction.	Carpometacarpal joint between trapezium and metacarpal of thumb.
Ball-and-socket	Ball-like surface fits into cuplike depression.	Triaxial diarthrosis: flexion-extension, abduction-adduction, rotation.	Shoulder and hip joints.











# 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

riaht © 2014 John Wiley & Sons. Inc. All riah

Contact of soft parts

Hormones

Disuse

**Selected Joints of the Body** 



Temporomandibular Joint

(b) Left medial view

Sphenoid bone ARTICULAR – CAPSULE

Styloid process of temporal bone

SPHENOMANDIBULAR LIGAMENT STYLOMANDIBULAR ~ LIGAMENT Sphenoidal sinus

Vomer

Maxilla

Mandible























































# 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









# End of Chapter 9

#### Copyright 2014 John Wiley & Sons, Inc.

All rights reserved. Reproduction or translation of this work beyond that permitted in section 117 of the 1976 United States Copyright Act without express permission of the copyright owner is unlawful. Request for further information should be addressed to the Permission Department, John Wiley & Sons, Inc. The purchaser may make back-up copies for his/her own use only and not for distribution or resale. The Publisher assumes no responsibility for errors, omissions, or damages caused by the use of these programs or from the use of the information herein.

16