

# Musculoskeletal System

Bones, Muscles, and Joints Terminology

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# Lecture Objectives

By the end of this lecture, participants will be able to:

- **Understand and use core medical terminology**

Related to the musculoskeletal system

- **Differentiate between structures**

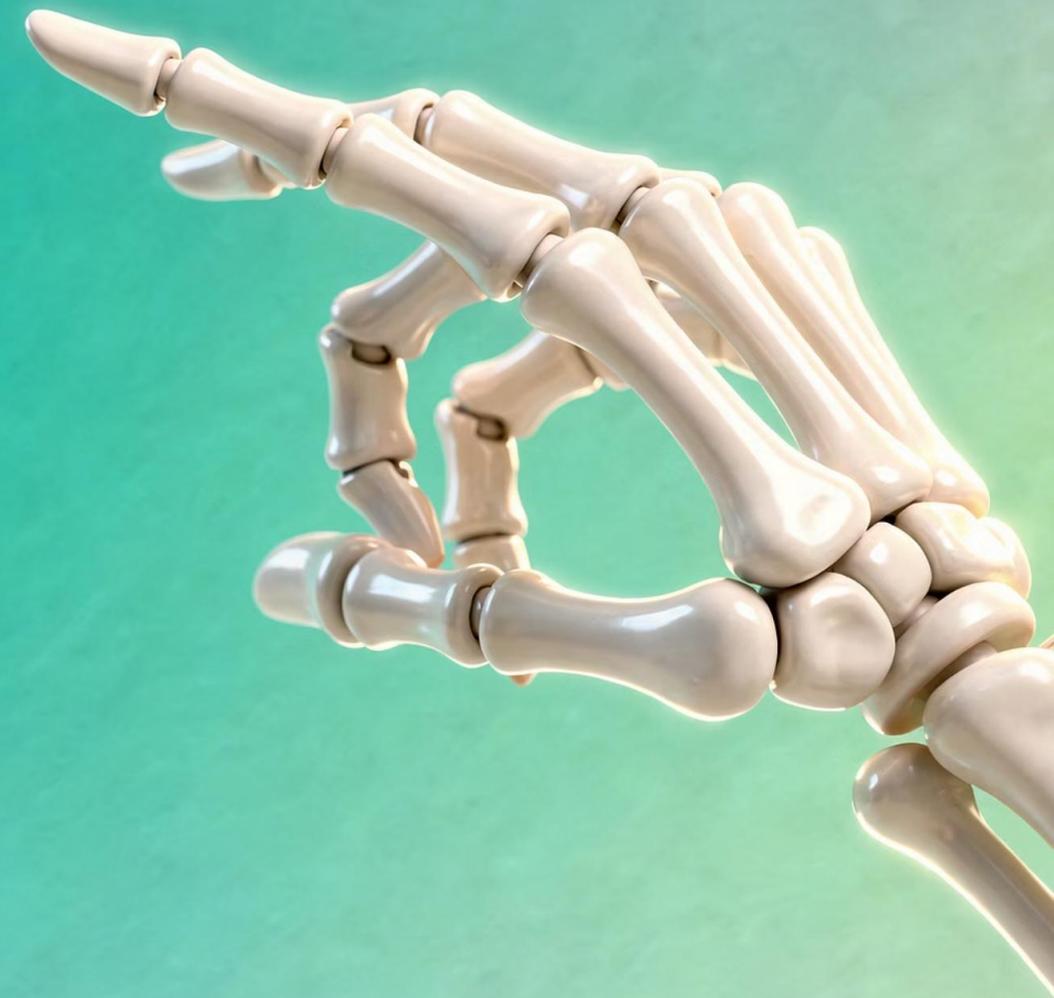
Bone, muscle, and joint structures using correct terms

- **Recognize common disorders**

Skeletal and muscular disorders and their terminology

- **Apply terminology correctly**

In clinical documentation and communication



# Functions of the Musculoskeletal System



**Structural support**



**Protection of vital organs**



**Movement and locomotion  
locomotion**



**Mineral storage**

(calcium, phosphorus)



**Blood cell production**

(hematopoiesis)

# Main Components

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**Bones (Skeletal system)**

03

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**Joints (Articular system)**

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**Muscles (Muscular system)**

04

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**Supporting structures**

ligaments, tendons, cartilage

# Bone Structure Terminology

Term	Definition
Oste/o	Bone
Cortex (Cortical bone)	Dense outer layer of bone
Cancellous (Spongy bone)	Porous inner bone
Periosteum	Fibrous membrane covering bone
Medullary cavity	Central cavity containing bone marrow
Epiphysis	End of long bone
Diaphysis	Shaft of long bone
Metaphysis	Growth plate region

# Major Bones of the Human Body

Skull (Cranium)	Bony structure protecting the brain
Mandible (Jawbone)	Lower jaw bone
Clavicle (Collarbone)	Connects the shoulder blade to the sternum
Scapula (Shoulder blade)	Triangular bone in the upper back
Sternum (Breastbone)	Flat bone in the center of the chest
Ribs	Curved bones forming the rib cage
Humerus (Upper arm)	Long bone of the upper arm
Radius (Forearm - thumb side)	Forearm bone on the thumb side
Ulna (Forearm - pinky side)	Forearm bone on the pinky side
Carpals (Wrist bones)	Eight small bones of the wrist
Metacarpals (Hand bones)	Five long bones of the hand, between carpals and phalanges
Phalanges (Fingers)	Bones of the fingers and toes

# Major Bones of the Human Body (continued)

Bone	Description
Vertebrae (Spine)	Irregular bones forming the spinal column
Pelvis (Hip bones)	Large bone structure at the base of the spine
Femur (Thigh bone)	Longest and strongest bone in the body, in the thigh
Patella (Kneecap)	Small, flat, triangular bone in front of the knee joint
Tibia (Shin bone)	Larger of the two lower leg bones
Fibula (Lower leg)	Smaller of the two lower leg bones
Tarsals (Ankle bones)	Seven bones of the ankle
Metatarsals (Foot bones)	Five long bones of the foot, between tarsals and phalanges

# Bone Cells



## Osteoblast

Bone formation



## Osteocyte

Mature bone cell



## Osteoclast

Bone resorption

# Types of Muscle Tissue

## Skeletal muscle

- Voluntary control
- Striated appearance (due to sarcomeres)
- Multinucleated cells with long, cylindrical fibers
- Primarily attached to bones via tendons
- Responsible for body movement, posture, and heat generation
- Fatigues relatively quickly

## Smooth muscle

- Involuntary control (autonomic nervous system)
- Non-striated (lacks sarcomeres)
- Single, centrally located nucleus with spindle-shaped cells
- Found in the walls of internal organs like the digestive tract, blood vessels, bladder, and airways
- Responsible for slow, sustained contractions that propel substances through tracts or regulate lumen size
- Highly resistant to fatigue

## Cardiac muscle

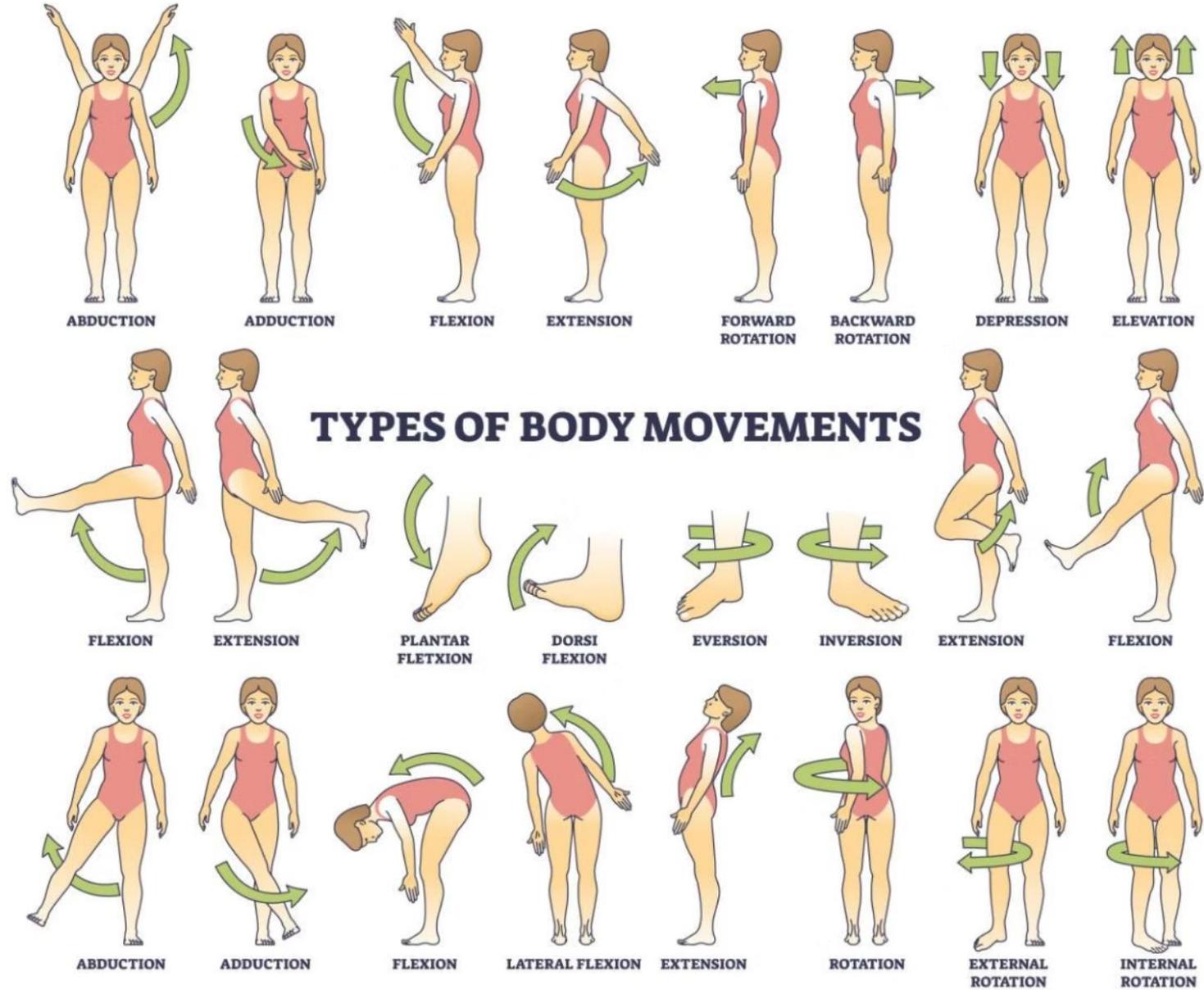
- Involuntary control
- Striated appearance
- One or two nuclei per cell, with branched fibers
- Unique to the heart wall
- Contains intercalated discs for rapid electrical communication between cells
- Generates and conducts its own electrical impulses (autorhythmic)
- Pumps blood throughout the body with continuous, rhythmic contractions

# Muscle Structure Terms

Term	Meaning
My/o	Muscle
Fascia	Connective tissue sheath
Tendon	Muscle-to-bone connection
Origin	Fixed muscle attachment
Insertion	Movable muscle attachment
Sarcomere	Functional unit of muscle

# Muscle Actions Terminology

Term	Definition
Flexion	Decreasing joint angle
Extension	Increasing joint angle
Abduction	Movement away from midline
Adduction	Movement toward midline
Rotation	Circular movement
Supination	Palm upward
Pronation	Palm downward



# Types of Joints



## Fibrous

Skull sutures



## Cartilaginous

Intervertebral discs



## Synovial

Knee, Shoulder

# Synovial Joint Components

Term	Description
Articular cartilage	Reduces friction
Synovial fluid	Lubrication
Joint capsule	Stability
Ligament	Bone-to-bone connection

# Synovial Joint Movements



## Hinge

(e.g., knee, elbow)



## Ball-and-socket

(e.g., hip, shoulder)



## Pivot

(e.g., atlantoaxial joint)



## Saddle

(e.g., thumb carpometacarpal joint)

# Bone Disorders

Term	Definition
Osteoporosis	Reduced bone density
Osteomalacia	Softening of bone (Vit D deficiency)
Osteomyelitis	Bone infection
Fracture	Break in bone
Scoliosis	Lateral spine curvature

# Muscular Disorders Terminology

## Muscle Disorders

Term	Definition
Myalgia	Muscle pain
Myositis	Muscle inflammation
Muscular dystrophy	Genetic muscle weakness
Atrophy	Muscle wasting
Spasm	Involuntary contraction

# Tendon & Ligament Disorders

Term	Definition
Tendinitis	Tendon inflammation
Tenosynovitis	Tendon sheath inflammation
Sprain	Ligament injury
Strain	Muscle/tendon injury