

## The Muscular System

### Functions of the Muscular System:

- 
- 
- 
- 
- 

### Structures of the Muscular System:

Has over \_\_\_\_\_ muscles, which makes up about \_\_\_\_\_ of the body's weight

#### Muscle Fibers -

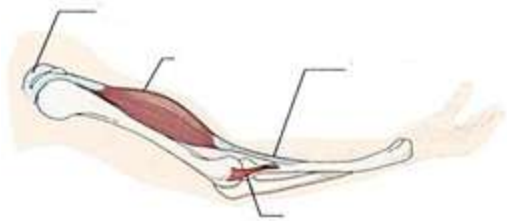
- Muscles are composed of long, slender cells known as \_\_\_\_\_
- Each muscle consists of a group of fibers that are held together by connective tissue and enclosed in a fibrous sheath

#### Fascia -

- 

#### Tendons -

- 



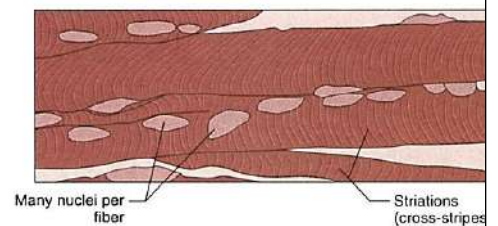
### Types of Muscle Tissue:

Described according to their appearance and function.

#### Skeletal Muscle -

- 
- 
- 
- 

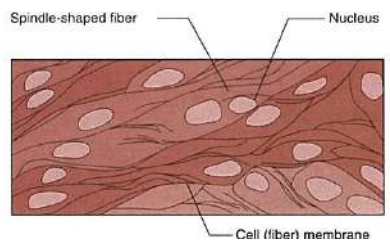
(A) Skeletal muscle



#### Smooth Muscle -

- 
- 
- 
- 

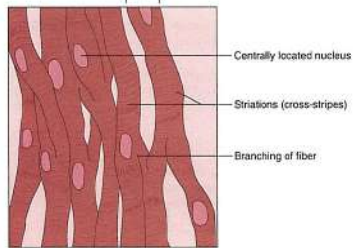
(B) Smooth muscle



## The Muscular System

<ul style="list-style-type: none"> <li>•</li> </ul>	
---	--

### Cardiac Muscle -

<ul style="list-style-type: none"> <li>•</li> <li>•</li> <li>•</li> <li>•</li> </ul>	<p>(C) Cardiac muscle</p>  <p>A fiber</p> <p>Centrally located nucleus</p> <p>Striations (cross-striations)</p> <p>Branching of fiber</p>
--	--

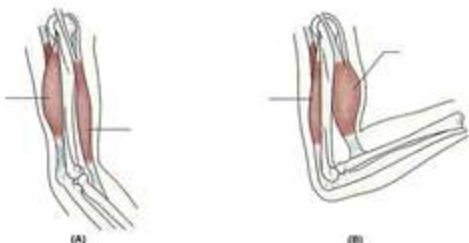
### **Characteristics of Muscles:**

#### Antagonistic Muscle Pairs -

They work in opposition of each other. In an antagonistic pair, one muscle produces movement in one direction, and the other muscle produces movement in the opposite direction.

#### Contraction and Relaxation -

Specialized cells that make up muscles allow them to change shape or length by contracting and relaxing. These contrasting actions make motion possible.

<ul style="list-style-type: none"> <li>• <b>Contraction -</b></li> </ul>	 <p>(A)</p> <p>(B)</p>
<ul style="list-style-type: none"> <li>• <b>Relaxation -</b></li> </ul>	
<ul style="list-style-type: none"> <li>• <b>Muscle Tone - (tonus)</b></li> </ul>	

#### Muscle Innervation -

The stimulation of the muscle by an impulse transmitted by a motor nerve; causes the muscle to contract and will relax when the stimulation stops

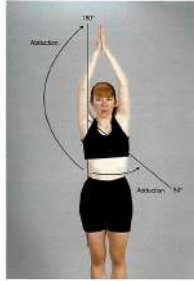
- **Neuromuscular** - pertaining to the relationship between nerve and muscle.
  - If the nerve impulse is interrupted because of injury or pathology of the nervous system, the muscle is paralyzed and cannot contract.

### **Range Of Motion:**

The change in joint position produced by muscle movements

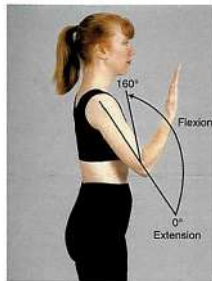
<b>Abduction:</b>	<b>Adduction:</b>
-------------------	-------------------

## The Muscular System



**Flexion:**

**Extension:**



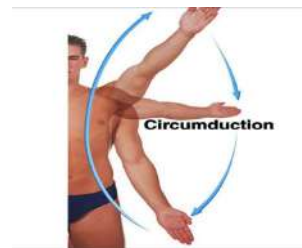
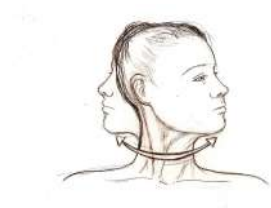
**Elevation:**

**Depression:**



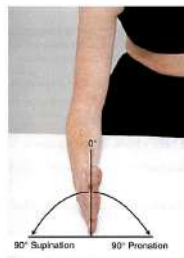
**Rotation:**

**Circumduction:**



**Supination:**

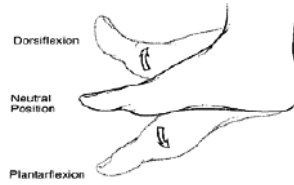
**Pronation:**



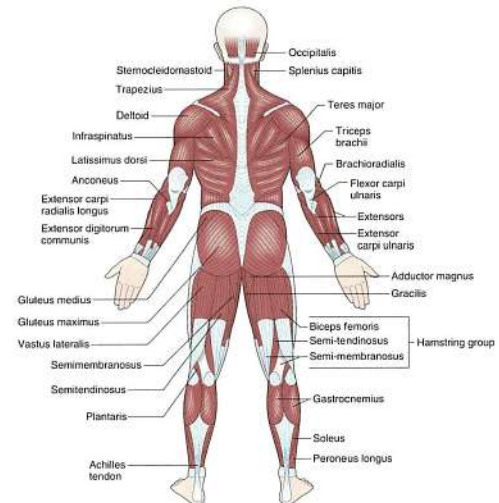
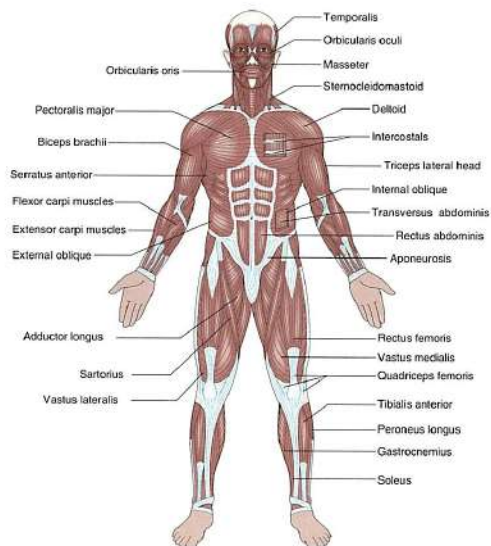
**Dorsiflexion:**

**Plantar Flexion:**

## The Muscular System



### How Muscles Are Named:



### Origin and Insertion -

Muscles named by joining the name of the place of origin to the name of the place of insertion.

#### • Muscle Origin -

#### • Muscle Insertion -

#### • Ex. sternocleidomastoid



### Muscles Named For Their Action -


- 
- Ex. flexor carpi and extensor carpi

### Muscles Named For Their Location -


- 
- Ex. pectoralis major

## The Muscular System

### Muscles Named For Fiber Direction -

•	 <p style="text-align: center;">Rectus abdominis      External oblique      Internal oblique      Transversus abdominis</p>
• Ex. Abdominals - rectus, oblique, transverse, sphincter	

### Muscles Named For Number of Divisions -

•	
• Ex. Bicep, Tricep, Quadriceps Femoris	

### Muscles Named For Their Size -

- 
- Ex. gluteus maximus

### Muscles Named For Their Shape -

- 
- Ex. deltoid muscle looks like an inverted triangle or the Greek letter delta

## Pathology Of The Muscular System:

### Fibers, Fascia, and Tendons -

- **Fascitis/Fasciitis** -
- **Tenalgia or Tenodynia** -
- **Tendinitis/Tendonitis** -
- **Overuse Tendinitis** -

### Muscles -

- **Adhesion** - a band of fibrous tissue that hold structures together abnormally; may occur in muscles or in organs
- **Muscle Atrophy** - the weakness and wasting away of muscle tissue. caused by pathology or by disuse
- **Myalgia** -
- **Myolysis** - degeneration of muscle tissue
- **Myositis** -
- **Polymyositis** - chronic progressive disease affecting the skeletal muscle that is characterized by muscle weakness and atrophy
- **Myomalacia** -
- **Myorrhexis** -
- **Myosclerosis** -

### Hernias -

- **Hernia** - the protrusion of a part r structure through the tissues normally containing it
- **myocele** -

## The Muscular System

### Muscle Tone -

- **Atonic** -
- **Dystonia** -
- **Hypertonia** -
  
- **Hypotonia** -
  
- **Myotonia** -

### Voluntary Muscle Movement -

- **Ataxia** -
- **Dystaxia** - (partial ataxia)
- **Contracture** -
- **Intermittent claudication** -
  
- **Spasm** - (cramp) sudden violent, involuntary contraction of a muscle or a group of muscle
- **Spasmodic Torticollis** - (wryneck)

### Muscle Function -

- **Bradykinesia** -
- **Dyskinesia** -
- **Hyperkinesia** - (hyperactivity) abnormally increased motor function or activity
- **Hypokinesia** -
- **Tardive dyskinesia** - late appearance of dyskinesia as a side effect of long-term treatment with certain antipsychotic drugs.

### Myoclonus -

- **Myoclonus** -
- **Nocturnal myoclonus** - jerking of the limbs that may occur normally as a person is falling asleep
- **Singultus** - ( ) myoclonus of the diaphragm that causes the characteristic hiccup sound with each spasm

### Myasthenia Gravis -

- **Myasthenia** - muscle weakness from any cause
- **Myasthenia Gravis (MG)** - chronic \_\_\_\_\_ disease in which there is an abnormality in the neuromuscular function causing episodes of muscle weakness; most frequently affects the muscles that control eye movement, eyelids, chewing, swallowing, coughing, and facial expression

### Muscular Dystrophy -

- group of inherited muscular disorders that cause muscle weakness without affecting the nervous system
- **Duchenne's MD - (DMD)** \_\_\_\_\_; appears from 2 -6 years of age and progresses slowly; survival is rare beyond late 20s
- **Becker's MD (BMD)** - \_\_\_\_\_. The progression is slower with survival well into middle to late adulthood

### Fibromyalgia Syndrome -

- **(FMS)**
  
- **Tender Points** - abnormal localized areas of soreness, are important diagnostic indicators of FMS

### Repetitive Stress Disorder -

- have symptoms caused by repetitive motions that involve muscles, tendons, nerves and joints
- **Ergonomics** -

## The Muscular System

- **Overuse Injuries** - minor tissue injuries that have not been given time to heal
- **Myofascial Damage** - can be caused by overworking the muscles, results in tenderness and swelling of the muscles and their surrounding tissue
- **Rotator Cuff Injuries** -
  - Rotator Cuff Tendinitis -
  - Impingement Syndrome - occurs when the tendons become inflamed and get caught in the narrow space between the bones of the shoulder joint
  - Calcium Deposit -
  - Torn Tendon - result of nontreated injury or chronic overuse
- **Carpal Tunnel Syndrome** -
  - 
  - occurs when the tendons passing through the carpal tunnel are chronically inflamed and swollen;
  - Swelling causes compression on the median nerve as it passes through the carpal tunnel.
- **Cervical Radiculopathy** -
  - 
  - pressure may be caused by muscle spasm due to repetitive motions or by compression of cervical vertebral disks
- **Epicondylitis** - inflammation of the tissues surrounding the elbow
  - Lateral -
  - Medial -
- **Plantar Fasciitis** - inflammation of the plantar fascia causing foot or heel pain when walking or running. Heel Spur is a thickening on the surface of the calcaneus bone that causes severe pain standing

### Sports Injuries -

- **Sprain** - injury to a joint
- **Strain** - injury to the body of the muscle or attachment of the tendon
- **Shin Splint** - pain caused by the muscle tearing away from the tibia
- **Hamstring Injury** - may be a strain or tear of the posterior femoral muscle
- **Achilles Tendinitis** - a painful inflammation of the Achilles tendon caused by excessive stress being placed on the tendon

### Paralysis -

- **Myoparesis** -
- **Hemiparesis** -
- **Paralysis** - loss of sensation and voluntary muscle movements through disease or injury to its nerve supply
- **Spinal Cord Injury (SCI)** - often causes paralysis because nerve impulses cannot be carried below the level of the injury
- **Paraplegia** - \_\_\_\_\_;  
Paraplegic is someone affected with paraplegia; involves a SCI below the cervical vertebrae
- **Quadriplegia** - \_\_\_\_\_;  
SCI involving the cervical vertebrae; if the injury is above C5 it also affects respiration
- **Hemiplegia** - total paralysis of one side of the body; usually associated with a stroke or brain damage
- **Cardioplegia** - paralysis of the muscles of the heart

### **Diagnostic Procedures Of The Muscular System:**

#### **Deep Tendon Reflex (DTR)** - tested with a reflex hammer used to strike the tendon;

- No response or abnormal response may indicate a disruption of the nerve supply to the involved muscle

#### **Electromyography (EMG)** - records the strength of muscle contraction as the result of electrical stimulation

- This test may be helpful in determining the cause of pain, numbness, tingling, or weakness in the muscle or nerves

## The Muscular System

**Electroneuromyography - (Nerve conduction studies)** a procedure for testing and recording neuromuscular activity by electric stimulation of the nerve trunk that carries fibers to and from the muscle

**Range of Motion Testing (ROM)** - a diagnostic Procedure to evaluate joint mobility and muscle strength

### Treatment Procedures Of The Muscular System:

#### Medications -

- **Anti-inflammatory** - act as an analgesic and relieves inflammation
- **Antispasmodic (anticholinergic drug)** acts to control spasmodic activity of the smooth muscles
- **Atropine** - antispasmodic that may be administered preoperatively to relax smooth muscles
- **Muscle Relaxant** - acts on the central nervous system to relax muscle tone and relieve spasms

#### Physical Therapy -

- **PT** - treatment to prevent disability or to restore functioning through the use of exercise, heat, massage, and other methods to improve circulation, flexibility, and muscle strength
- **Range of Motion Exercises (ROM)** - one form of PT; goal is to increase strength, flexibility and mobility
- **Activities of Daily Living (ADL)** - minimum goal of therapy is to restore the individual to the level of self-help
  - personal hygiene, dressing, grooming, eating, and toileting

#### Fasica -

- **Fasciotomy** -
- **Fascioplasty** -

#### Tendons -

- **Carpal Tunnel Release** - surgical enlargement of the carpal tunnel or cutting the carpal ligament to relieve nerve pressure
- **Tenectomy** -
- **Tenodesis** -
- **Tenolysis** - to free a tendon from adhesions
- **Tenonectomy** -
- **Tenotomy (tendotomy)** - surgical division of a tendon for relief of a deformity caused by the abnormal shortening of a muscle such as strabismus (cross eyes)
- **Tenoplasty (tendoplasty)** -
- **Tenorrhaphy** - suturing of a divided tendon

#### Muscles -

- **Myectomy** -
- **Myoplasty** -
- **Myorrhaphy** -

### Careers:

Orthopedic Surgeon Rheumatologist Neurologist Sports Medicine Physical Therapist (PT) Physical Therapy Assistant (PTA)	Massage Therapist Athletic Trainer (AT) Kinesiotherapist Occupational Therapist (OT) Occupational Therapist assistant
---	---