The Muscular System

Functions of the Muscular System:

1.

2.

3.

4.

5.

Structures of the Muscular System

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

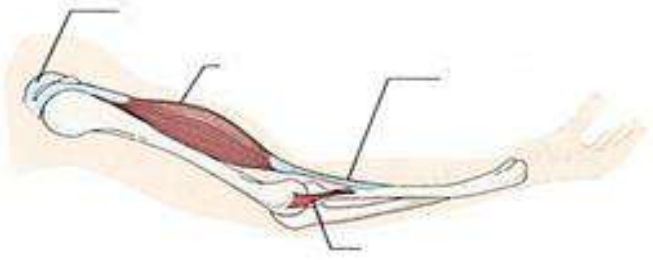
Muscle Fibers

- 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

• Example:	

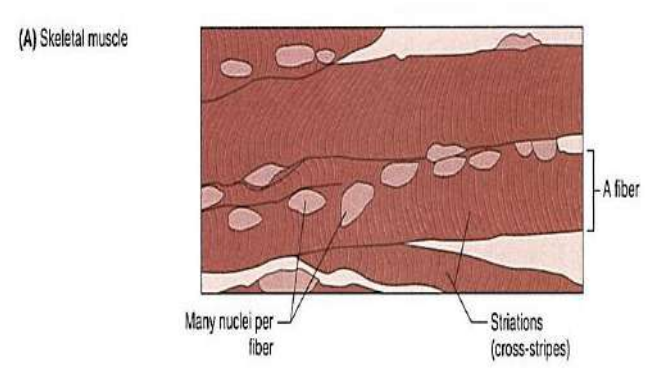
Label the picture

The Muscular System

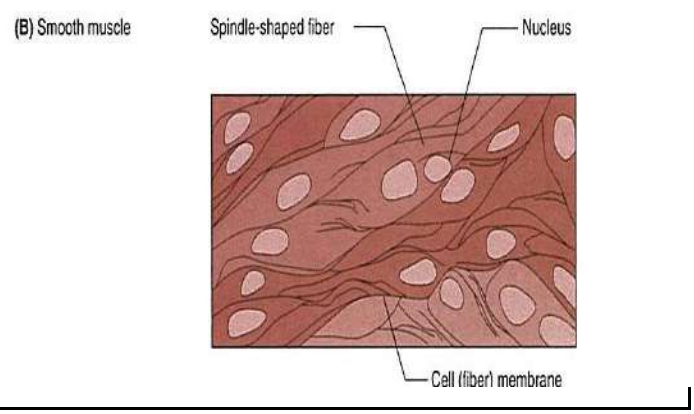
Types of Muscle Tissue

Described according to their appearance and function.

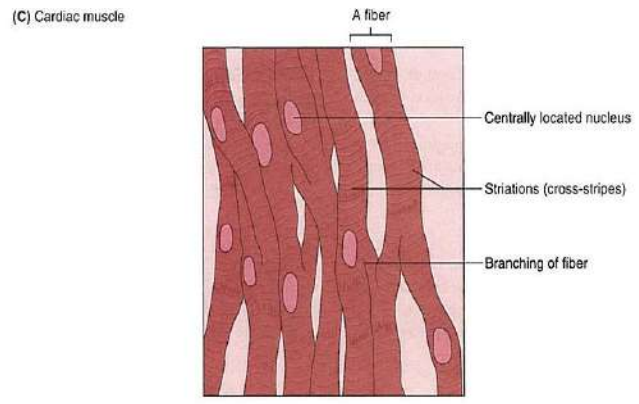
Skeletal Muscle -

1. 2. 3. 4.	

Smooth Muscle -

1. 2. 3. 4. 5.	

Cardiac Muscle -

1. 2. 3. 4. 5.	

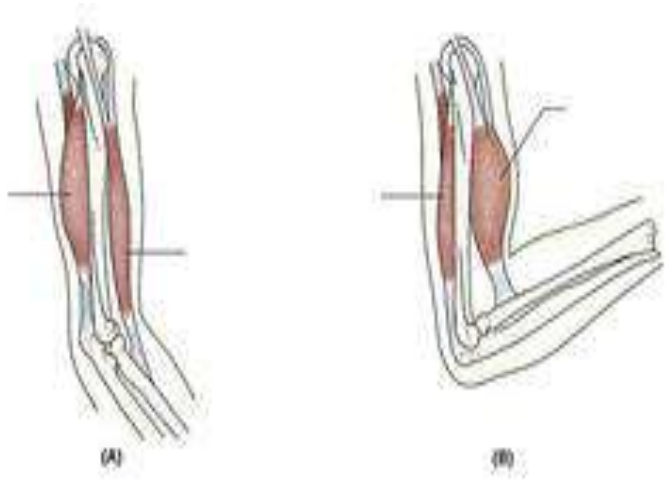
The Muscular System

_____: the study of muscular activity and the resulting movement of body parts

Characteristics of Muscles

_____ 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.

● **Contraction** – ●	
● **Relaxation** – ●	
● **Muscle Tone** - (tonus)	

Label pictures

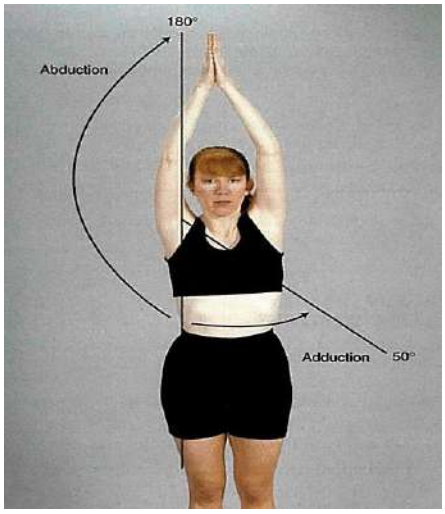
Muscle Innervation
The stimulation of the muscle by an impulse transmitted by a motor nerve; causes the muscle to contract and will relax when the stimulation stops

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

The Muscular System

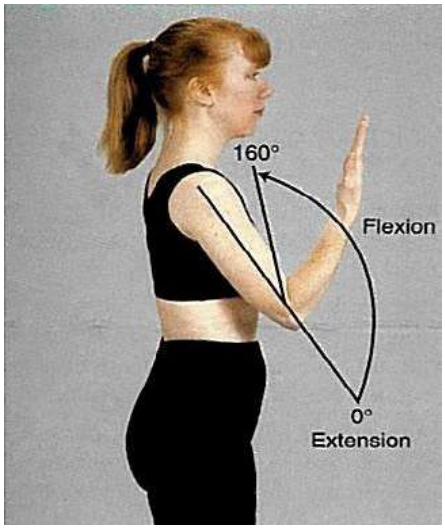
Range Of Motion

-



Abduction:

Adduction:

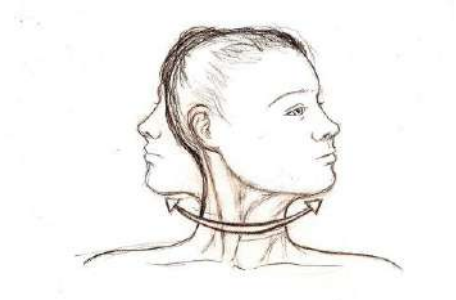


Flexion:

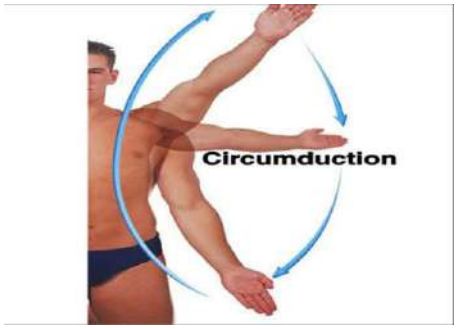
Extension:

Elevation:

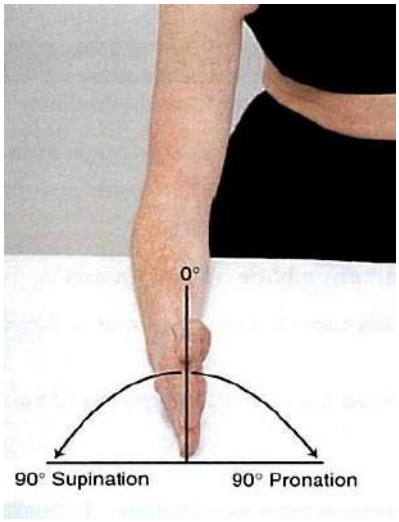
Depression:



Rotation:

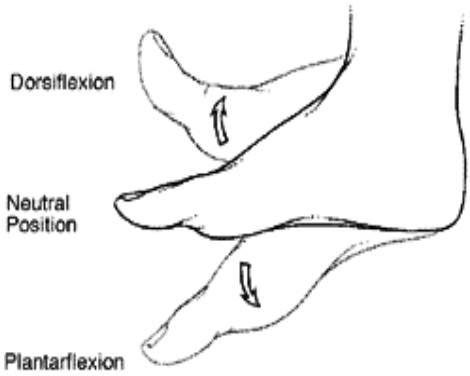


Circumduction:



Supination:

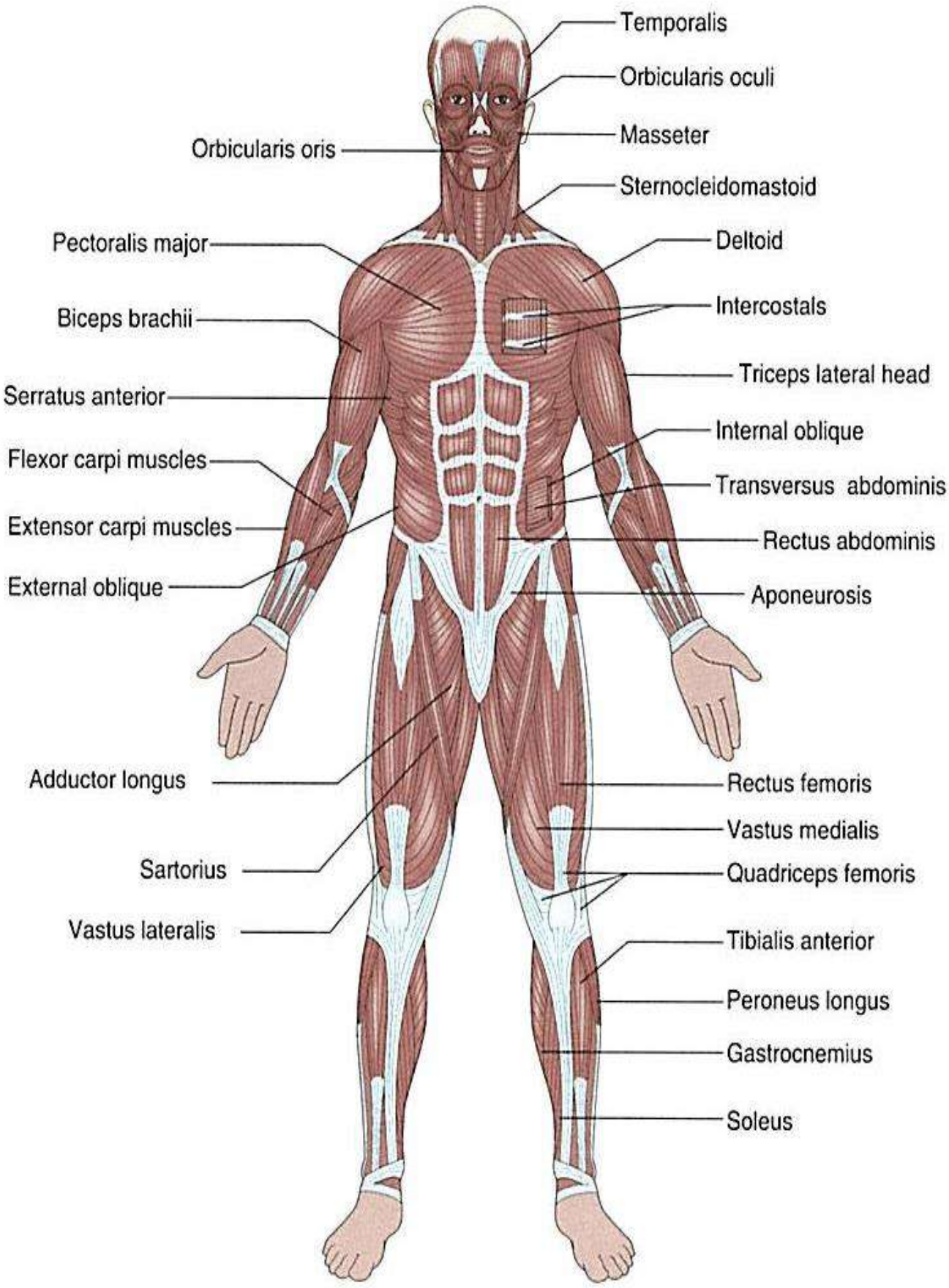
Pronation:



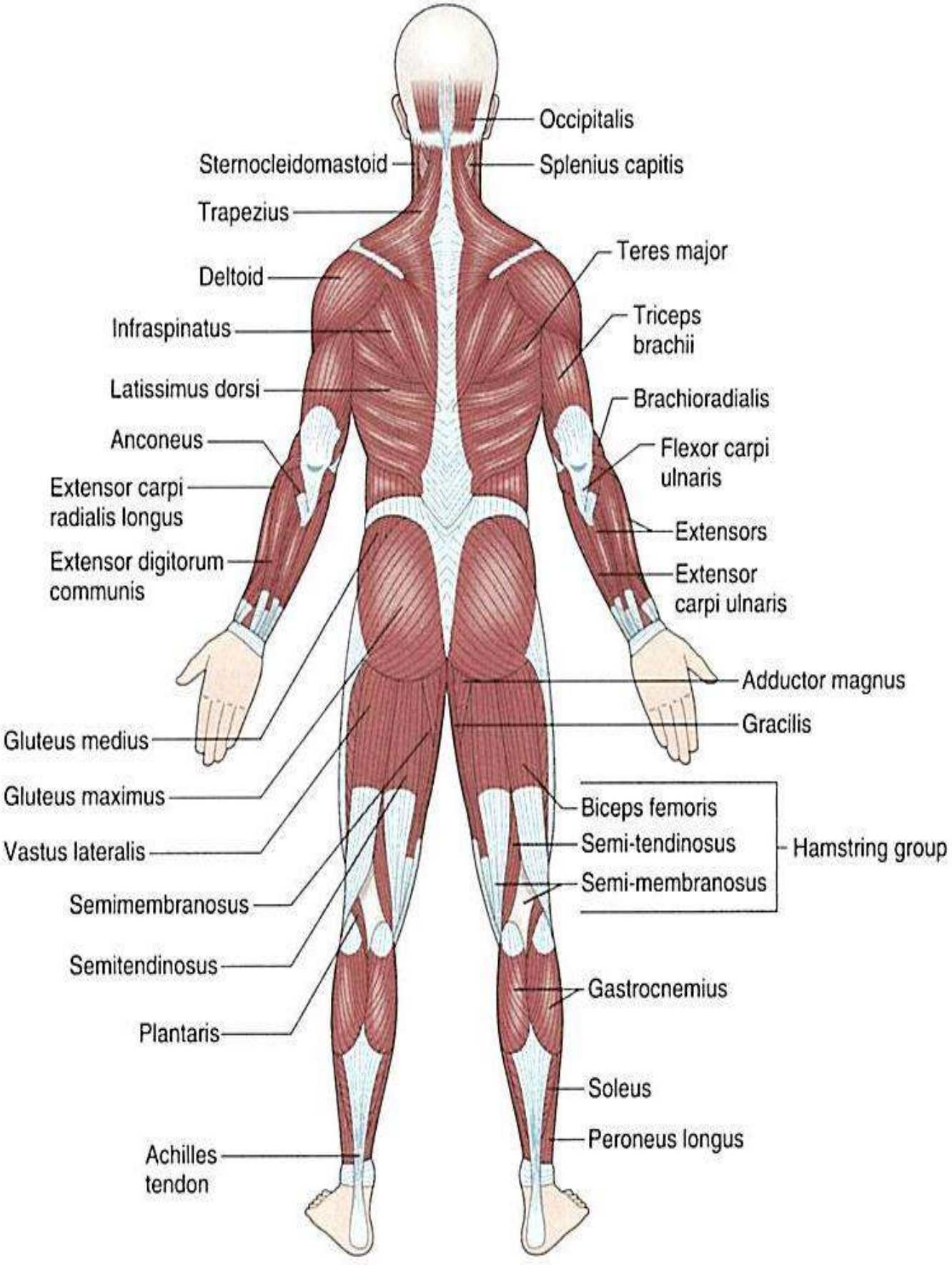
Dorsiflexion:

Plantar Flexion:

The Muscular System



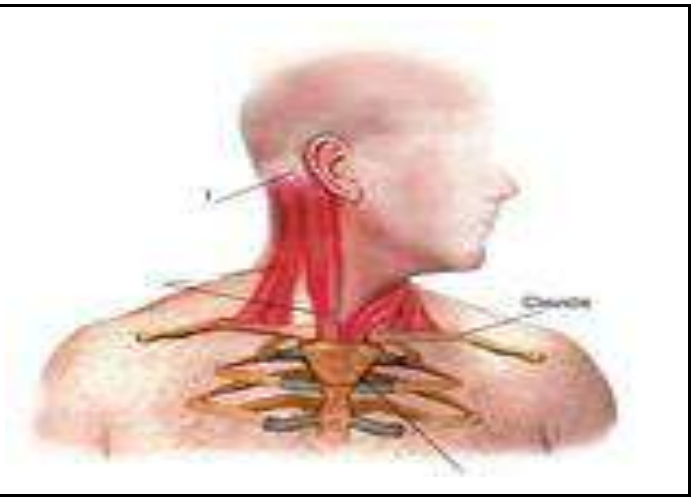
The Muscular System



The Muscular System

How Muscles are Named

<u>Origin and Insertion</u> -
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	

<u>Muscles Named For Their Action</u>

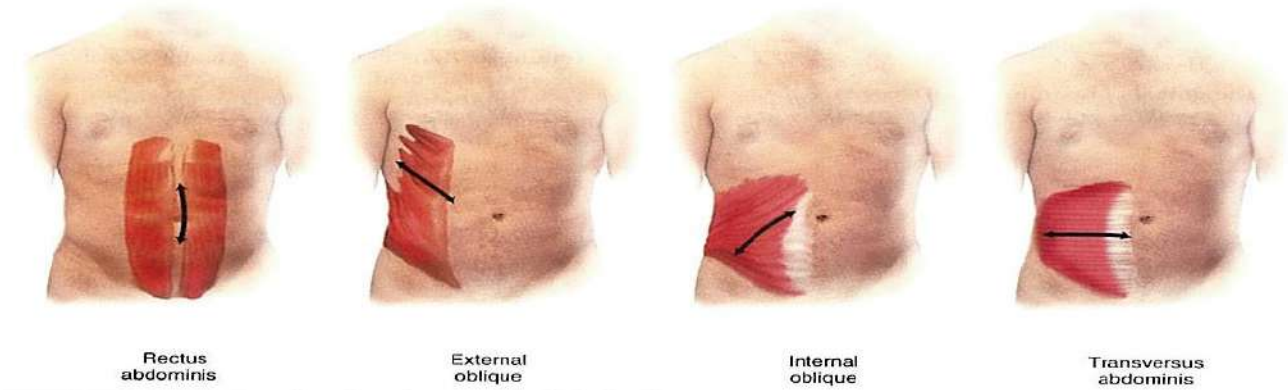
-
- Ex. flexor carpi and extensor carpi

<u>Muscles Named For Their Location</u>

-
- Ex. pectoralis major

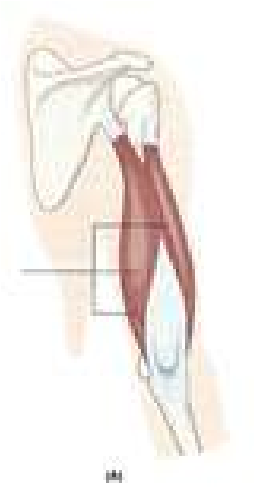
<u>Muscles Named For Fiber Direction</u>

•	• Ex. Abdominals - rectus, oblique, transverse, sphincter



The Muscular System

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 –** inflammation of tendons caused by excessive or unusual use of a joint

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** -

Muscle Tone

- **Atonic** -
- **Dystonia –** condition of abnormal muscle tone
- **Hypertonia** -
- **Hypotonia** -
- **Myotonia** - delayed relaxation of a muscle after a strong contraction

The Muscular System

Voluntary Muscle Movement

- **Ataxia** –
- **Dystaxia - (partial ataxia)**
- **Contracture** – abnormal shortening of muscle tissues, making muscle resistant to stretching
- **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

The Muscular System

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

Paralysis **-paresis =**

-plegia =

- **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

Paralysis continued

- **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

Electroneuromyography - (aka:_____**)**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) -

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

The Muscular System

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
- _____ **(ROM)** - one form of PT; goal is to increase strength, flexibility and mobility
- **Activities of Daily Living (_____)** - minimum goal of therapy is to restore the individual to the level of self-help
    - personal hygiene, dressing, grooming, eating, and toileting

Fascia

- **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** -

The Muscular System

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