

Muscular System

<p>Course Medical Terminology</p> <p>Unit IV Muscular System</p> <p>Essential Question What medical terms are associated with the muscular system?</p> <p>TEKS 130.203 (c) 1A-F 2A-C 3A-C 4A-B</p> <p>Prior Student Learning Basic understanding of roots, prefixes and suffixes</p> <p>Estimated time 4-7 hours</p>	<p>Rationale Healthcare professionals must have a comprehensive medical vocabulary in order to communicate effectively with other health professionals. They should be able to use terminology of the muscular system to discuss common conditions and diseases.</p> <p>Objectives Upon completion of this lesson, the student will be able to:</p> <ul style="list-style-type: none"> • Define and decipher common terms associated with the muscular system • Identify the basic anatomy of the muscular system • Analyze unfamiliar terms using the knowledge of word roots, suffixes and prefixes gained in the course • Research diseases which involve the muscular system <p>Engage Mr. Smith comes into Dr. Jones' office with complaining that his 4-year-old son, Aaron, is having difficulty walking and running without falling. Noticing that Aaron seems behind in his physical growth Dr. Jones orders several tests to see if there is a serious problem.</p> <p>Key Points</p> <ol style="list-style-type: none"> I. Muscle terms to know <ol style="list-style-type: none"> A. My/o – muscle B. oblique – angled C. Fasci/o – fascia D. -lysis – breakdown E. Ten/o – tendon F. -plegia – paralysis G. Kinesi/o – movement H. rectus – straight I. Ton/o – tone J. transverse – crosswise K. Sphincter – ring-like L. -cele – swelling, hernia, tumor M. -trophy – growth or development N. fibr/o – fiber, connective tissue II. Introduction <ol style="list-style-type: none"> A. Over 600 muscles make up the muscular system B. 45% of the total body weight of an adult C. Made up of bundles of muscle fibers (long slender cells) held together by connective tissue D. When muscle fibers are stimulated by nerves they contract
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(become short and thick,) which causes movement

E. Contraction depends on myofilaments: actin and myosin

F. Properties

1. Excitability – the ability to receive and respond to a stimulus (neurotransmitter, hormone, local change in pH); the response is the generation and transmission of an electrical current (action potential)
 - a. Skeletal muscle responds to stimulus quickly with forceful contraction, and then relaxes promptly
 - b. Visceral muscle responds slowly, maintaining contraction over a longer period of time
 - c. Cardiac muscle is quicker than visceral muscle and contraction is stronger but of a longer duration
2. Contractility – the ability to shorten forcibly
3. Extensibility – the ability to be stretched
4. Elasticity – the ability to resume resting length (of the muscle fiber) after being stretched
5. Automaticity – the ability of a muscle to contract without a nerve supply

G. Functions

1. Movement – locomotion/manipulation, heartbeat, moving substances through hollow organs
2. Posture maintenance
3. Joint Stabilization
4. Heat generation
5. Protection of some internal organs

III. Types of Muscles

A. Cardiac (see the Internal Heart Diagram)

1. Forms walls of heart
2. Contracts to circulate the blood
3. Striated (banded) with lots of mitochondria
4. Involuntary – functions without conscious thought or control (autonomic nervous system control)
5. Efferent nerves control the rate of contraction based on the needs of the body
6. Afferent nerves are concerned with the sensations of pain, spasm, and stretch
7. Contracts at a steady rate, except for brief, rapid bursts

B. Visceral/smooth

1. Found in the internal organs of the body, such as the digestive system, respiratory system, blood vessels, and eyes
2. Walls of hollow, visceral organs
3. No striations = smooth
4. Involuntary – function without conscious thought or control (autonomic nervous system control)
5. Efferent (motor) neurons are less important

6. Afferent nerves are concerned with the sensations of pain, spasm, and stretch
7. Steadies constant contractions, automaticity
- C. Skeletal (see the Anterior/ Posterior Muscle diagram)
 1. 40% of the body
 2. Attaches to and cover the bony skeleton
 3. Longest fibers of all the muscle cells
 4. Striated
 5. Voluntary – a person has control over their actions (central and peripheral nervous system control)
 6. Efferent nerve fibers from the brain and spinal cord send impulses for contraction
 7. Afferent nerve fibers from the muscle send message to CNS to inform brain of the degree of contraction
 8. Contracts rapidly, tires easily; tremendous power, adaptable
 9. Causes body movement
- IV. Methods of Attachment of Skeletal Muscle to Bone
 - A. Tendon
 1. Strong, tough connective tissue cord
 2. Example – the Achilles tendon which attaches the gastrocnemius muscle on the calf of the leg to the heel bone
 - B. Fascia
 1. A tough, sheet-like membrane
 2. Covers and protects tissues
 3. Example – the lumbodorsal fascia which surrounds the deep muscles of the trunk and back
 - C. Aponeurosis – a broad, flat sheet
 - D. Raphe – a seam of fibrous tissue
 - E. Origin and insertion
 1. When muscles attach to bones, one end becomes the origin and one end becomes the insertion
 2. Origin – the end that does not move; usually proximal to insertion
 3. Insertion – the end that moves when muscle contracts
 - F. Direct (fleshy) – the epimysium is fused to the periosteum or perichondrium
 - G. Indirect – more common due to its durability and size
 1. Connective tissue wrappings extend to form tendons; aponeurosis
 2. Anchors muscle to the connective tissue of bone or cartilage, the fascia of other muscles, or the raphe
- V. Gross and Microscopic Anatomy of Skeletal Muscle (see the Basic Muscle Structure Diagram)
 - A. Each muscle is an organ
 - B. There are 100s to 1000s of muscle fibers per muscle
 - C. Connective tissue, blood vessels, and nerve fibers

D. Connective tissue wrappings

1. Endomysium – a fine sheath of areolar connective tissue around each muscle fiber
2. Perimysium – a collagenic sheath around several muscle fibers bundled together (fascicles)
3. Epimysium – a dense, fibrous connective tissue surrounding the entire muscle
4. Deep fascia – a fibrous connective tissue that binds muscles into functional groups and wraps other structures

E. Nerve and blood supply (see the Neuromuscular Junction Diagram)

1. Each muscle fiber has nerve endings to control its activity
2. Each muscle has one artery and one or more veins due to its tremendous energy needs and metabolic waste production
3. Enters the central part of the muscle and branches throughout the connective tissue, including the endomysium for each muscle fiber

F. Arrangement of the fascicles

1. Determines range of motion and power
2. Results in muscles with different shapes and functional capabilities
3. The more fibers “packed” in, the more powerful
4. The more parallel the fibers are to the long axis of the muscle, the more they can shorten
5. Parallel – the fascicles are parallel with the longitudinal axis of the muscle, such as the stylohyoid muscle of the neck
6. Pennate (feather-like) – the fascicles are short in relation to the entire length of the muscle, and the tendons extend almost the entire length of the muscle
7. Convergent – broad origin; the fascicles converge toward a single tendon, i.e. pectoralis major
8. Circular – fascicles in concentric rings, i.e. sphincters – surround external body openings (orbicularis oris, orbicularis oculi)
9. T-tubules – where the sarcolemma penetrates the cell to form a hollow, elongated tube; conducts nerve impulses to the deepest regions of the muscle cell

VI. The Physiology of Skeletal Muscle Contraction

A. Energy sources

1. The Breakdown of adenosine triphosphate (ATP)
2. $\text{ATP} \longleftrightarrow \text{ADP} + \text{PO}_2 + \text{energy}$
3. Energy for resynthesis comes from the breakdown of carbohydrates, i.e. glycogen or glucose, which then results in the formation of pyruvic acid
4. Results depend upon the amount of oxygen available
 - a. During moderate activity with adequate amounts of oxygen – a pyruvic acid is converted to $\text{CO}_2 + \text{H}_2\text{O} +$

- energy
 - b. During strenuous activity with not enough oxygen – pyruvic acid is converted to lactic acid = oxygen debt = cramps
 - c. Oxygen debt – an extra amount of O_2 that must be taken in by the body for restorative processes; the difference between the amount of O_2 needed for totally aerobic respiration during muscle activity and the amount that is actually used
- B. Contractility
- 1. Involves protein filaments – the actin and myosin located in the sarcoplasm
 - 2. Chemical changes
 - a. Nerve impulse alters the sarcolemma
 - b. Sodium enters the cell and causes the release of calcium from the sarcoplasmic reticulum
 - c. Calcium combines with troponin on the actin to cause contraction
 - d. Relaxation of the muscle requires energy to transport calcium back into the sarcoplasmic reticulum
 - 3. Electrical changes
 - a. Clinical significance – diagnostics, i.e. EKG, EEG, EMG
 - b. All or none law – each muscle cell, when stimulated, gives a total response or does not contract at all
 - c. Strength depends on the number of muscle cells stimulated and the condition of the muscle
- C. Force of contractions
- 1. The number of muscle fibers contracting
 - 2. The relative size of the muscle (regular exercise increases strength by causing muscle cells to hypertrophy)
 - 3. Series-elastic elements – the muscle must be attached to movable structures and the connective tissues must be pulled taut (stretch and recoil); transfer tension to the load
 - 4. Degree of muscle stretch – a severely stretched muscle cannot develop tension
- D. Muscle tone
- 1. Steady partial contraction is present at all times
 - 2. State of tension when awake
 - 3. State of readiness to act; enables muscles for immediate response
 - 4. Does not produce an active movement
 - 5. Keeps muscles firm and healthy
 - 6. Stabilizes the joints
 - 7. Maintains posture
 - 8. Loss of muscle tone
 - a. Can occur in severe illnesses such as paralysis and

- palsy
- b. When muscles are not used for a long period of time – atrophy, waste away (degeneration and loss of mass)
- c. Complete immobilization of muscle (complete bed rest or loss of neural stimulation or in a cast) – strength decreases 5% per day; paralysis = atrophy to $\frac{1}{4}$ the initial size; the muscle tissue is replaced by fibrous connective tissue – muscle rehabilitation is impossible; delay with electrical stimulation
- d. Lack of use can result in contracture (permanent contraction of the muscle due to spasm or paralysis)
 - i. Severe tightening of a flexor muscle
 - ii. Results in bending of a joint
 - iii. When no ATP is available, the state of continuous contraction results because crossbridges are unable to detach
 - iv. Foot drop = common
 - v. Fingers, wrists, and knees, as well as other joints, can be affected
- 9. Rigor mortis – the muscle shortens, becoming rigid due to a decrease in ATP
- 10. Muscle fatigue
 - a. The muscle is unable to contract
 - b. Tension drops to zero
 - c. Inability to generate enough ATP to power the contractile process
 - d. A relative deficit of ATP, **not** a total absence
 - e. An excessive accumulation of lactic acid and ionic imbalances
- 11. Spasm – a sudden, involuntary contraction of a muscle
- 12. Clonic – a spasm alternating with relaxation
- 13. Tonic – sustained
- 14. Tetanus – a smooth, sustained contraction
- 15. Tetany – the result of low calcium
 - a. increases the excitability of neurons
 - b. loss of sensation, muscles twitching, convulsions
 - c. if untreated – spasms of the larynx, respiratory paralysis, and death
- E. Sliding Filament Theory
 - 1. The individual sarcomeres shorten, the myofibrils shorten, and the whole cell shortens
 - 2. The thin filaments slide past the thick filaments so that actin and myosin overlap
 - 3. The muscle fibers are activated by the nervous system, crossbridges attach to the active (myosin binding) sites on actin, pulling the thin filaments toward the center of the

sarcomere (multiple attachments and detachments); this requires calcium

4. Crossbridge attachment, power stroke, crossbridge detachment, “cocking” of the myosin head
5. A single power stroke of all crossbridges in the muscle results in the shortening of only 1% (most muscles shorten 30%-35%); therefore, multiple attach-detach sequences are needed
6. Actin – myosin is irreversibly crosslinked due to a calcium influx into the cell
7. Rigor mortis – illustrates that crossbridge detachment is ATP-driven; the muscles begin to stiffen 3-4 hours after death; peak rigidity at 12 hours; the stiffness dissipates over the next 48-60 hours

F. All or none response

1. Once the muscle fiber has been stimulated to contract, it will contract to its fullest extent
2. Each muscle is served by at least one motor nerve, which contains hundreds of neuromuscular junctions within each single muscle fiber
3. A motor neuron and all the muscle fibers that it supplies are called a motor unit
4. When a motor neuron fires, all the muscle fibers that it innervates respond by contracting
5. There are an average 150 muscle fibers per motor unit
6. There are four to several hundred muscle fibers per motor unit for fine motor control, i.e. controlling finger and eye movements

G. Neuromuscular junction

1. The motor neurons stimulate muscle fibers
2. The axons divide and end at each of the single muscle fibers, forming the neuromuscular junction
3. Synaptic cleft – calcium and acetylcholine (neurotransmitter) fill the cleft, attach to the receptors, and stimulate the muscle fiber to contract (ACh is broken down immediately)
4. Curare (used for intubation anesthesia) and organophosphate poisons bind to the receptor sites and block ACh attachment

VII. Interactions of Skeletal Muscles

A. Muscles do not act independently

B. Prime Mover/Agonist

1. Provides the major force for producing a specific movement
2. Initiates movement
3. Example – biceps brachii—elbow flexion

C. Antagonist

1. Opposes or reverses a particular movement
2. Example – triceps brachii—elbow extension

D. Synergist

1. Aid the agonists by promotion of the same movement, or by reducing undesirable or unnecessary movements
2. Example – muscles which help make a fist without bending the wrist

E. Fixator

1. Synergists which immobilize a bone or a muscle origin
2. Example – muscles to stabilize the scapula

VIII. Actions or Movements of Skeletal Muscles

- A. Goniometry – the measurement of joint movement
- B. Adduction – moving a body part toward the midline
- C. Abduction – moving a body part away from the midline
- D. Flexion – decreasing the angle of a joint
- E. Extension – increasing the angle of a joint
- F. Hyperextension – increases the angle beyond the anatomical position
- G. Circumduction – the distal end of an extremity inscribes a circle while the shaft inscribes a cone
- H. Rotation – revolving a body part about the longitudinal axis
 1. Internal – move toward the midline, or medially
 2. External – move away from the midline, or laterally
- I. Supination – turn the palm upward; “what’s up?”
- J. Pronation – turn the palm downward
- K. Inversion – turn the plantar surface away from the midline
- L. Plantar flexion (extension) – move the sole of the foot downward, as in standing on the toes
- M. Dorsiflexion – move the sole of the foot upward

IX. Muscle Nomenclature

- A. Location, i.e. external oblique, pectoralis
- B. Origin and insertion, i.e. brachioradialis, occipitofrontal
- C. Number of heads, i.e. biceps, triceps
- D. Function, i.e. ulnar flexor (flexes the wrist), buccinator (the cheek muscle used to blow a trumpet)
- E. Size, i.e. vastus medialis
- F. Shape, i.e. deltoid
- G. Orientation of the muscle fiber bundles, i.e. rectus abdominus (the straight muscle of the abdomen), orbicularis oris (the circular muscle around the mouth)
- H. Adjectives to describe muscles
 1. bi, tri, quadri – 2, 3, 4
 2. Externus – exterior
 3. Gracilis – slender
 4. Latissimus – wide
 5. Longissimus – long
 6. Longus – long
 7. Medius – intermediate
 8. Orbicularis – around

9. Quadratus – square
10. Rectus – straight
11. Rhomboideus – diamond shaped
12. Scalenes – irregular triangle
13. Teres – round
14. Transverse – crosswise
15. Vastus – great

Activity

- I. Make flash cards of muscular terms and practice putting the terms together with prefixes and suffixes to make new terms.
- II. Complete Worksheet over the Muscular system
- III. Complete the Medical Terminology Worksheet
- IV. Review media terms with the students using review games such as the “Fly Swatter Game” or the “Flash Card Drill” (see the Medical Terminology Activity Lesson Plan - http://texashste.com/documents/curriculum/principles/medical_terminology_activities.pdf)
- V. Research and report on diseases and disorders from the Muscular system.

Assessment

Successful completion of the activities

Materials

Muscular System worksheet
Medical term worksheet

Accommodations for Learning Differences

For reinforcement, the students will color and label a diagram of the muscles of the body.

For enrichment the students will research and report on a neuromuscular disease.

National and State Education Standards

National Healthcare Foundation Standards and Accountability Criteria
Health care workers will know the various methods of giving and obtaining information. They will communicate effectively, both orally and in writing.

TEKS

- 130.203 (c)(1)(A) identify abbreviations, acronyms, and symbols;
- 130.203 (c)(1)(B) identify the basic structure of medical words;
- 130.203 (c)(1)(C) practice word-building skills;
- 130.203 (c)(1)(D) research the origins of eponyms;
- 130.203 (c)(1)(E) recall directional terms and anatomical planes related to body structure;

130.203 (c)(1)(F) define and accurately spell occupationally specific terms such as those relating to the body systems, surgical and diagnostic procedures, diseases, and treatments.

130.203 (c)(2)(A) demonstrate appropriate verbal and written strategies such as correct pronunciation of medical terms and spelling in a variety of health science scenarios;

130.203 (c)(2)(B) employ increasingly precise language to communicate;

130.203 (c)(2)(C) translate technical material related to the health science industry.

130.203 (c)(3)(A) examine medical and dental dictionaries and multimedia resources;

130.203 (c)(3)(B) integrate resources to interpret technical materials;

130.203 (c)(3)(C) investigate electronic media such as the Internet with appropriate supervision.

130.203 (c)(4)(A) distinguish medical abbreviations used throughout the health science industry; and

130.203 (c)(4)(B) translate medical abbreviations in simulated technical material such as physician progress notes, radiological reports, and laboratory reports.

College and Career Readiness Standards

English/language art

B.1 Identify new words and concepts acquired through study of their relationships to other words and concepts.

B2. Apply knowledge of roots and affixes to infer the meanings of new words.

B3. Use reference guides to confirm the meanings of new words or concepts.

Cross- Disciplinary standards-Foundational Skills

A2. Use a variety of strategies to understand the meanings of new words

Muscular System Worksheet

Name _____ Period _____

1. Muscle tissue has five properties. What are they? Define them.

- a. _____
- b. _____
- c. _____
- d. _____
- e. _____

2. List the four basic functions of the muscular system.

- a. _____
- b. _____
- c. _____
- d. _____

3. Three types of muscle tissue are found in the human body. What are they? Where is each type found?

- a. _____
- b. _____
- c. _____

4. Define Tendon.

5. Define Fascia.

6. Identify the following:

- a. Muscle fatigue _____

- b. Spasm _____

- c. Clonic _____

- d. Tonic _____

- e. Tetanus _____

- f. Tetany _____

7. Choose the type of muscle tissue that fits each descriptive phrase.

C = Cardiac Muscle

S = Smooth Muscle

SK = Skeletal

- _____ a. Forms the bulk of the wall of the heart
- _____ b. Has intercalated discs
- _____ c. Involuntary, nonstriated
- _____ d. Involuntary, striated
- _____ e. Located in walls of hollow internal surfaces such as the blood vessels
- _____ f. Exhibits autorhythmicity
- _____ g. Requires a constant supply of oxygen so the mitochondria are larger and more numerous
- _____ h. Is slower to contract than the other two tissue types
- _____ i. Does not have sarcomeres

8. Describe the "sliding filament theory."

9. Define these terms:

- a. Origin _____
- b. Insertion _____

10. Define the roles of the prime mover (agonist), antagonist, synergist, and fixator in producing body movements.

- a. Prime Mover _____
- b. Antagonist _____
- c. Synergist _____
- d. Fixator _____

11. What would happen if the flexors of your forearm were functional, but the antagonistic extensors weren't?

12. What action would occur if both the flexors and extensors contracted simultaneously?

13. What is the location of the pectoralis major, deltoid, and latissimus dorsi muscles?
All three of these muscles are (superficial / deep). They are all directly involved with movement of the (shoulder girdle / humerus / radius/ ulna).

14. Write the names of the muscles that fit these descriptions.

- a. Covers most of the posterior of the humerus. _____
- b. The largest muscle of the chest region; used to throw a ball in the air (flex the humerus) and to adduct the arm. _____
- c. Bows and rotates head from side to side. _____
- d. Controls action at the elbow for a movement such as the downstroke in hammering a nail. _____
- e. Flexes the forearm. _____
- f. Hyperextends the humerus, as in doing the "crawl" swimming stroke.

- g. Moves the shoulders by raising them and pulling them back; helps hold the head erect
- h. Abducts the arm _____

Muscular System Worksheet – Answer Key

1.
 - a. Contractility – the ability of muscle tissue to shorten and produce force
 - b. Extensibility – the ability of muscle tissue to be stretched with very little application of force from the opposing muscle group
 - c. Elasticity – the ability of muscle tissue to return to its normal resting length from its extended position without additional energy requirements
 - d. Excitability – the ability of muscle tissue to receive and respond to stimuli (electrical)
 - e. Automaticity – the ability of muscle to contract without a nerve supply
2. Motion, maintenance of posture, heat production, stabilization of joints, protection
3.
 - a. Skeletal muscle tissue – attached to the bones and moves parts of the skeleton. It is striated and voluntary
 - b. Cardiac muscle tissue – forms the bulk of the heart wall. It is striated and involuntary
 - c. Smooth (Visceral) muscle tissue – located in the walls of hollow internal structures such as blood vessels, the stomach, and the intestines. It is non-striated and involuntary
4. Tendon – muscular connective tissue in a cord-like formation
5. Fascia – a tough, sheet-like membrane that covers and protects
6.
 - a. Muscle fatigue – a muscle unable to contract, with the inability to produce ATP
 - b. Spasm – a sudden, involuntary contraction of a muscle
 - c. Clonic – an alternating spasm and relaxation
 - d. Tonic – sustained
 - e. Tetanus – a smooth sustained contraction
 - f. Tetany – the result of low calcium, which increases the excitability of neurons
7.

a. cardiac	f. smooth
b. cardiac	g. cardiac
c. smooth	h. smooth
d. cardiac	i. smooth
e. smooth	
8. The sliding filament theory states that the weakest stimulus from a neuron that can initiate a contraction is the threshold stimulus. Once a threshold stimulus is applied, individual muscle fibers of a motor unit will contract to their fullest extent or will not contract at all. Individual muscle fibers do not partly contract.
9.
 - a. The attachment of a muscle tendon or aponeurosis to a stationary bone
 - b. The attachment of a muscle tendon or aponeurosis to a movable bone

10. Prime mover – a muscle that causes a desired action
Antagonist – the muscle which has an opposite effect as that of the prime mover
Synergist – a muscle which serves to steady a movement, preventing unwanted movements; helps the prime mover be more efficient
Fixator – a muscle which stabilizes the origin of the prime mover
11. Your arm would flex, but would be unable to relax and extend
12. No action would occur – there would be no movement at the elbow joint
13. superficial, shoulder girdle
14. a. Triceps brachii
b. Pectoralis major
c. Sternocleidomastoid
d. Triceps brachii
e. Biceps brachii
f. Latissimus dorsi
g. Trapezius
h. Deltoid

Muscular System Medical Terminology

Write the meaning of each term in the spaces provided below.

Prefixes, Suffixes, and Root Words

a	
ab	
ad	
-algia	
ambul	
-asthenia	
bi	
blephar/o	
brady	
-cardia	
cardi/o	
-duction	
dys	
electr/o	
end/o	
epi	
fasci/o	
fibr/o	
-gram	
hemi	
hyper	
-ic	
-itis	
-ium	
kinesi/o	
-kinesia	
lei/o	
metr/i	
my/o	
-ology	
-oma	
para	
peri	
-phagia	
-phasia	
-plasty	
-plegia	

quad	
-rrhexis	
sarc/o	
-spasm	
tachy	
ten/o	
tend/o	
tendin/o	
tetan	
ton/o	
tri	
-trophy	

Medical Terms

abduction	
adduction	
ambulate	
aphasia	
atrophy	
blepharospasm	
bradycardia	
bradykinesia	
dysphagia	
dysphasia	
dystrophy	
electromyogram	
endomysium	
epimysium	
fascia	
fibromyalgia	
hemiplegia	
hypertrophy	
kinesiology	
leiomyoma	
myalgia	
myasthenia	
myocardium	
myoma	
myometrium	
myorrhesis	
paraplegia	

perimysium	
phrenic	
quadriplegia	
sarcolemma	
tachycardia	
tendinitis	
tendinoplasty	
tetanus	

Medical Abbreviations

amb	
CNS	
GI	
HR	
IM	
K	
kg	
lb	
MI	
Na	
P	
PK	
RICE	

KEY - Muscular System Medical Terminology

Prefixes, Suffixes, and Root Words

a	without, absence of
ab	from, away from
ad	to, toward
-algia	pain
ambul	walking
-asthenia	weakness, lack of strength
bi	two
blephar/o	eyelids
brady	slow
-cardia	heart
cardi/o	heart
-duction	movement
dys	bad, painful, difficult
electr/o	electricity
end/o	within, inside
epi	on, upon
fasci/o	fascia, fibrous bands
fibr/o	fiber
-gram	recorded picture
hemi	half
hyper	above
-ic	pertaining to
-itis	inflammation of
-ium	pertaining to (not on the words list)
kinesi/o	movement
-kinesia	movement
lei/o	smooth
metr/i	uterine tissue
my/o	muscle
-ology	study of
-oma	tumor
para	beyond (when used with plegia refers to two limbs)
peri	around
-phagia	eating, swallowing
-phasia	speaking
-plasty	surgical repair
-plegia	paralysis
quad	four

-rrhexis	rupture
sarc/o	flesh, muscle
-spasm	sudden, involuntary muscular contraction
tachy	rapid, swift
ten/o	tendon
tend/o	tendon
tendin/o	tendon
tetan	stiff
ton/o	tension, pressure
tri	three
-trophy	development

Medical Terms

abduction	movement away from (the midline)
adduction	movement towards (the midline)
ambulate	to walk
aphasia	without speech
atrophy	without development
blepharospasm	involuntary contraction of the eyelid
bradycardia	slow heart
bradykinesia	slow movement
dysphagia	difficulty swallowing or eating
dysphasia	difficulty speaking or talking
dystrophy	bad development (refers to the disorders when muscle development ceases or slows beyond normal)
electromyogram	recording of the electrical activity of the muscles
endomysium	pertaining to within the muscles
epimysium	pertaining to on or upon the muscles
fascia	fascia or fibrous bands
fibromyalgia	pain in the muscle fibers
hemiplegia	half paralyzed (which usually refers to the left side or the right side of the body being paralyzed)
hypertrophy	overdevelopment
kinesiology	study of movement or motion
leiomyoma	tumors of the smooth muscle
myalgia	muscle pain
myasthenia	muscle weakness
myocardium	referring to the heart muscle
myoma	tumor of the muscles
myometrium	muscular uterine tissue
myorrhesis	rupture of the muscles

paraplegia	beyond paralysis (refers to the paralysis of two limbs, usually the legs)
perimysium	pertaining to around the muscles
phrenic	pertaining to the diaphragm
quadriplegia	paralysis of four (referring to the paralysis of all four limbs)
sarcolemma	muscle (flesh) membrane
tachycardia	rapid heart
tendinitis	inflammation of the tendon
tendinoplasty	surgical repair of the tendon
tetanus	condition of stiffness (refers to constant muscle contractions)

Medical Abbreviations

amb	ambulate
CNS	central nervous system
GI	gastrointestinal
HR	heart rate
IM	intramuscular
K	potassium
kg	kilogram
lb	pound
MI	myocardial infarction
Na	sodium
P	pulse
PK	pain killer
RICE	rest, ice, compression, and elevation