# Chapter 7: The Muscular System

## I. INTRODUCTION

A. The muscular system allows for _____.
   1. External motion of the arms and legs
   2. Internal motion including the movement of the digestive system, the _____ system, and the respiratory system

B. Different types of muscles allow for both external and _____ movement.

## II. OVERVIEW

A. Muscle is a general term for all contractile tissue.
   1. Contraction—muscle tissue becomes _____ and thick because of a nerve impulse.
   2. _____ occurs when impulse ends
   3. Alternating contraction and _____ causes _____.

B. Muscle tissue is constructed of bundles of these fibers, approximately the thickness of human hair.

## III. TYPES OF MUSCLES

A. **Skeletal Muscle**
   1. Attached to _____; provide movement for the body
   2. Tendons—fibrous tissues that attach skeletal muscles to _____
   3. Striated-look striped
   4. _____—movement is controlled by conscious thought
   5. Contraction and relaxation
      a. Contraction—_____ of muscle
      b. All movement is a result of contraction of primary movers and _____ of opposing muscles.
   6. Types of movements

| | Movement | Description |
|---|---|---|
| a | | Circular movement that occurs around an axis |
| b | | Movement away from the midline |
| c | | Movement toward |
| d | | Increasing the angle between two bones connected at a joint |
| e | | Decreasing the angle between two bones |

   7. Movement at the cellular level

| | Cellular Movement | Fill in the Blanks |
|---|---|---|
| a | Muscle _____ | i. Each muscle cell is an elongated fiber.<br>ii. Several muscle fibers can be bundled together to form a specific muscle segment. |

| | | |
|---|---|---|
| b | Sarcomeres | i. Sarcomeres are the functional contractile units of each fiber.<br>ii. Each sarcomere has two types of threadlike structures called thick and thin myofilaments.<br>iii. _____ myofilaments are made up of the protein myosin.<br>iv. _____ myofilaments are made up of the protein actin. |
| c | Muscle Contraction | i. Acetylcholine, a _____, is released from the nervous system.<br>ii. This causes contraction by causing myosin heads to bind to actin filaments (crossbridge formation).<br>iii. Energy is needed for contraction and relaxation.<br>a. _____ (adenosine triphosphate) |
| d | Muscular Fuel | i. Oxygen and _____to make ATP<br>ii. _____ stored in muscle can be converted to glucose.<br>iii. Fat can be stored for energy.<br>iv. Muscle blood supply and color.<br>a. Higher demand muscles also have a greater blood supply to carry much-needed oxygen.<br>b. The greater blood supply gives them a darker color. |
| e | Muscles and Body Temperature | i. Muscles produce _____.<br>ii. Producing heat is important in maintaining body temperature.<br>iii. Shivering |
| f | Rigor Mortis | i. When a body dies, all the stored _____ is unable to be pumped back out of the muscles.<br>ii. Excess calcium remains in the muscles throughout the body and causes muscle fibers to shorten and _____ the whole body.<br>iii. Shortage of ATP also contributes. |

B. **<u>Smooth Muscle</u>**

1. Also called visceral _____
2. Found in hollow organs (except heart) and tubes, such as blood vessels
3. Involuntary muscles; slower than skeletal muscles
4. Action
    a. _____ the diameter of a blood vessel is called vasodilation.
    b. _____ the diameter of a blood vessel is called vasoconstriction.
    c. Sphincters—close and open tubes

C. **Cardiac Muscle**
    1. Found in the wall of the _____
    2. Involuntary
    3. Fibers are shorter and receive a richer supply of blood than any other muscle in the body.
    4. Intercalated disks—link fibers; causing one fiber to contract and then pull the next one into a contraction, creating a domino effect
    5. Cardiac muscles do not _____ themselves, leading to scarring.

## IV. MUSCLE TONE

A. Tonus (muscle tone)—partial contraction of a muscle with resistance to stretching
B. _____—increased muscle size
C. _____—muscle wasting from disuse

## V. COMMON MUSCULAR SYSTEM DISORDERS

A. Myalgia: pain or tenderness in a muscle
B. Fibromyalgia: mainly affects _____ under 40 but is not fully understood; symptoms include aches, pains, and muscle stiffness with specific tender points; cause is unknown but is linked with chronic fatigue syndrome.
C. Paralysis: partial or total loss of function in _____ muscles; can be either flaccid or rigid paralysis
D. Spasm or cramp: involuntary sudden and violent contraction of a muscle for a prolonged period of time
E. Sprains: tears or breaks in _____
F. Strains: actual tears in _____ or tendons
G. Shin splints: inflammatory condition of the extensor muscles and surrounding tissues of the lower leg; often found in _____
H. Hernia: tear in the muscle wall through which an _____ of the body protrudes
I. Tendinitis: inflammation of _____
J. Electromyography: a diagnostic test in which a muscle or group of muscles are stimulated with an electrical impulse, causing contraction, allowing the strength of the contraction to be measured
K. Neuromuscular disorders
    1. Myasthenia gravis
        a. Gradually increasing profound _____ weakness
        b. Drooping eyelid frequently the first symptom
    2. Muscular dystrophy
        a. Inherited muscular diseases
        b. Muscle fibers _____
        c. Progressive muscular weakness occurs
    3. Guillain-Barré syndrome
        a. Disorder of the _____ nervous system that causes flaccid paralysis and the loss of reflexes
        b. Ascends from the feet and progressing to the head
        c. Paralysis peaks in 10 to 14 days and then subsides gradually

4. Tetanus
    a. Creates rigid paralysis, and any minor stimulus causes muscles to go into a major spasm
    b. Caused by toxins produced by a _____ found in the ground and can be spread by any type of puncture, not just a rusty nail
5. Botox
    a. Botulism is a potentially deadly disease resulting from _____ poisoning with the *Clostridium botulinum* bacteria.
    b. Science can utilize botulinum toxins for medical and cosmetic treatment.
    c. Small amounts of botulinus toxin are injected into facial muscles to stop previously untreatable facial twitching by paralyzing the muscles.
    d. Toxin also is used to treat wrinkles without surgery; known as _____ injections.

Test Your Knowledge 7-1 Page 147

Multiple Choice:

**1**. **2.** **3**. **4**.

Test Your Knowledge 7-2 Page 151

List the Correct Body Movement:

1. --
2. --
3. --
4. --
5. --

Test Your Knowledge 7-3 Page 155

Fill in the Blanks

1. --
2. --
3. --
4. --
5. --

Test Your Knowledge 7-4 Page 158

Fill in the Blanks

1. --
2. --
3. --
4. --
5. --
6. --

Review Questions:

Multiple Choice:

**1**. **2.** **3**. **4**. **5**. **6**. **7.**

Fill in the Blanks

1. --
2. --
3. --
4. --
5. --
6. --

Short Answer

1. --