1.05 Understand the functions and disorders of the muscular system
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- What are the characteristics of muscles?
- What are the functions of the muscular system?
- What are common disorders of the muscular system?
- How are muscular disorders treated?
- How does the muscular system relate to the body’s support and movement?
Characteristics of Muscles

Contractibility

Excitability

Extensibility

Elasticity

1.05 Understand the functions and disorders of the muscular system
Characteristics of Muscles

Contractibility- When a muscle shortens or contracts

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Characteristics of Muscles

Contractibility

Myoneural stimulation

+ contraction of muscle proteins

= movement and heat
Characteristics of Muscles

Contractibility

Neurotransmitter at site of muscle stimulus.

The sodium-potassium pump of the membrane of a muscle cell.

The purpose of this slide is to illustrate the complexity of the process of movement.

1.05 Understand the functions and disorders of the muscular system
Characteristics of Muscles

Excitability

1.05 Understand the functions and disorders of the muscular system
• Excitability: the ability to respond to certain stimuli by producing electric signals called impulses.
Characteristics of Muscles

Extensibility - The muscles' ability to be stretched.

1.05 Understand the functions and disorders of the muscular system
Characteristics of Muscles

Elasticity - the muscles' ability to return to its original length when relaxing.

1.05 Understand the functions and disorders of the muscular system
Characteristics of Muscles

- Contractibility
- Excitability
- Extensibility
- Elasticity

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Muscle Tone

Discuss muscle tone.

• Atrophy:

  \[ a- \text{__________} \text{-troph}y \text{__________} \]
  Muscles wasting

• Hypertrophy:

  \[ hyper- \text{__________} \text{-troph}y \text{__________} \]
  Muscles increase in diameter( become stronger)
John just got a cast off his leg. His calf muscle on the affected leg is 1” smaller in diameter than his other calf muscle.

• What happened?

• How do you explain this to him?
Muscle Tone
Exercise & Training

What are the advantages of exercise?
• Control weight
• Combat health conditions
• Improve mood

Are there any disadvantages of exercise?

1.05 Understand the functions and disorders of the muscular system
Muscle Fatigue

Discuss muscle fatigue:

– What causes muscle fatigue?
  • From accumulation of lactic acids in the muscles

– How does the body correct muscle fatigue?
  • Rest, taking in of oxygen through respirations

– Is muscle fatigue dangerous? Why / why not?

– Discuss aerobic and anaerobic exercise.
  • Give examples of each.
    – Weight lifting
    – Long distance running or cycling
    – Read page 219 muscular fuel
Functions of the Muscular System

What are the functions of the muscular system?

1.05 Understand the functions and disorders of the muscular system
Movement: Skeletal Muscle

- Receptors in muscles provide the brain with information about body position and movement.

- The brain controls the contraction of skeletal muscle.
Movement

Discuss the mechanism of skeletal muscle movement to include:

- Point of origin
- Point of insertion

Identify the:

- Prime mover – movement in a single direction
- Antagonist - movement in the opposite direction
- Synergists - steady the movement.

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Movement: Digestive System

The nervous system regulates the speed at which food moves through the digestive tract.

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Movement: Circulatory System
Heartbeat

The nervous system and hormones regulate the speed at which the heart beats.

1.05 Understand the functions and disorders of the muscular system
Posture

• How does the muscular system effect posture?
Body Heat

What is the body’s response to cold? Why?

How is this response helpful?

How does the body respond to exercise? Why?
Myopathy

Myo-
-pathy

1.05 Understand the functions and disorders of the muscular system
Fibromyalgia - Chronic pain lasting 3 or more months in specific muscle points.

Discuss the pictures and how they relate to fibromyalgia.

**Cause** - Unknown

**Symptoms** - Muscle pain, fatigue, headache, numbness or tingling, joint pain

**Diagnosis** - by symptoms

**Treatment** - Pain relief, proper sleep, exercise, relaxation and stretching techniques, medication.

**Prognosis**

1.05 Understand the functions and disorders of the muscular system
Hernia- Occurs when an organ protrudes through a weak muscle.

Discuss hernias.

Causes- Weak muscles

Locations- Inguinal, abdominal, hiatal

Symptoms- visual bulging, pain, discomfort

Diagnosis- Patient history, physical examination

Treatment- surgery

Prevention

1.05 Understand the functions and disorders of the muscular system
Muscle Spasms  
(Involuntary hypertonicity)

Discuss muscle spasms.

Causes- muscle overuse.
Locations- any muscle
Symptoms- pain
Diagnosis- pt. history and physical
Treatment- rest from specific task, passive stretching, dietary electrolyte replacement
Prognosis

1.05 Understand the functions and disorders of the muscular system
Muscular Dystrophy - A group of diseases in which the muscle cells deteriorate.

• Discuss the picture and how it relates to muscular dystrophy.

Cause - Most common type: genetic

Symptoms - Muscle weakness,

Diagnosis - Physical exam, genetic tests, muscle biopsy

Treatment - Physical therapy, respiratory therapy, orthopedic appliances, drug therapy

Prognosis - Depends on the progression of the disease.
Myasthenia Gravis - Occurs when the connection between the nerves and muscle is lost.

Discuss the picture and how it relates to myasthenia gravis.

**Cause** - autoimmune attack

**Symptoms** - muscle weakness, often starting with facial or eye muscles

**Diagnosis** - Blood tests, electromylogram (EMG)

**Treatment** - Rest, cholinesterase inhibitors, removal of the thymus gland

**Prognosis** - Symptoms may go into remission, but most people need to be on medication indefinitely.
Strain

• What happened here?
• What symptoms is this man having? Why?
• How will he treat them? — RICE- (rest, ice, compression, elevation), Pain relievers, physical therapy, surgery.
• What is his prognosis?
Tendonitis

Discuss the pictures and how they relate to tendonitis.

**Cause** - Chronic overuse or disease

**Symptoms** - pain, stiffness, weakness

**Diagnosis** - examination, xray, patient history

**Treatment** - anti-inflammatory drugs, ultrasound, lasers, shock waves

**Prognosis**
Tetanus - an infectious disease characterized by continuous spasms of the voluntary muscles.

Discuss the picture and how it relates to tetanus.

**Cause** - bacterial infection

**Symptoms** - Progressive muscle spasm, paralysis, stiffness and pain, especially in the jaw.

**Diagnosis** - physical exam, lab test, history of a wound

**Treatment** - wound hygiene, tetanus anti-toxin, sedation, pain management

**Prognosis** - can be fatal if not treated early.

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