Chapter 16: Musculoskeletal Injuries

ACE Personal Trainer Manual
Third Edition
Introduction

• To help prevent musculoskeletal injuries, focus on the following areas:
  - Strength
  - Flexibility
  - Muscular endurance
  - Balance

• Four (4) tissues of the body are of concern when discussing musculoskeletal injuries:
  - Muscle
  - Tendon
  - Ligament
  - Bone
Introduction

- Muscle tissue is elastic and able to withstand an enormous amount of stress.
- Muscle tissues act as springs for the body by absorbing a tremendous amount of shock.
- They also facilitate movement.
Introduction

• An injury to muscle tissue is called a strain.

• Strains are classified as mild, moderate, or severe (rupture or complete tear).

• These injuries heal with scar tissue, known as collagen tissue, that is not elastic.
Introduction

- Another part of a muscle group that can be injured is the tendon, which connects muscle to bone.

TENDON = MUSCLE > BONE
Introduction

• Ligaments are made up of nonelastic tissue designed to connect bone to bone (around joints).

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\text{LIGAMENT} = \text{BONE} > \text{BONE}
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Introduction

• Bone is the only tissue in the body that, when injured, repairs itself with exactly the same type of tissue.
Tissue Reaction to Injury - Inflammation

• The body’s main transportation system is the circulatory system.

• Signs & symptoms of inflammation include:
  - Increased temperature
  - Redness
  - Swelling
  - Pain
  - Loss of function
Acute Treatment of Musculoskeletal Injuries

- The acronym RICE is the most common method of describing acute treatment for musculoskeletal injuries:
  - R - Rest
  - I - Ice
  - C - Compression
  - E - Elevation
Acute Treatment of Musculoskeletal Injuries

• A client’s flexibility should be compared to that of the average population.

• If the client is hypoflexible (measurements below what is considered normal for flexibility), he/she should be instructed in a solid, well-designed flexibility program.

• Hypoflexible clients are more prone to muscle injuries, strains, & ruptures.
Acute Treatment of Musculoskeletal Injuries

• Clients who are loose-jointed or have joint injuries may not be able to perform all exercises using traditional methods & body positions.

• It is critical that the personal trainer strictly reinforce the importance of proper technique for these clients.

• Correct exercise technique is essential to a safe, effective, and enjoyable exercise experience.
Impingement syndrome is a reduction of space for the supraspinatus muscle and/or the long head of the biceps tendon to pass under the anterior edge of the acromion and coracoacromial ligament; it is attributed to muscle hypertrophy and inflammation caused by microtraumas.

It may be difficult for individuals with impingement syndrome to perform exercises that require the arms to be above the head for extended periods of time.
Acute Treatment of Musculoskeletal Injuries

• Ankle sprains are the most common ankle injury.

• Ankle sprains may be prevented through the proper use of proprioceptive training, proper footwear, and ankle bracing.
Acute Treatment of Musculoskeletal Injuries

• Shin splint syndrome is a term often used to describe any pain in the lower leg.

• Shin splint syndrome may be the result of decreased flexibility of the Achilles tendon and posterior muscles of the calf, decreased strength of the anterior muscles of the lower leg, fallen arches, or flat feet.
Acute Treatment of Musculoskeletal Injuries

- Stress fractures are the result of excessive stress on the bone that causes the outer lining of the bone, the periosteum, to crack.
Acute Treatment of Musculoskeletal Injuries

- Common abnormalities found in the spine include:
  - Scoliosis - abnormal curvature of the thoracic spine
  - Kyphosis - excessive posterior curvature of the upper thoracic spine (hunchback or dowager’s hump)
  - Lordosis - abnormal or excessive curvature of the lower back (swayback)
Acute Treatment of Musculoskeletal Injuries

- Spondylolysis is a stress fracture of the vertebrae of the spine.
Environmental Impact on Injuries

- One of the caveats of human physiology is that the body is constantly in search of balance or homeostasis.

- When an individual loses too much water, one of three conditions related to heat illness (hyperthermia) are likely to occur:
  1. Heat cramps
  2. Heat exhaustion
  3. Heat stroke
Environmental Impact on Injuries

- Heat cramps are usually seen in the dominant, active muscles such as the gastrocnemius and the abdominals.

- A person who is suffering from heat exhaustion may look pale, and have cool, clammy skin and a rapid, weak pulse. They may sweat profusely, yet exhibit a normal body temperature for an active individual.

- The person suffering from heat stroke will most likely have red, hot, and dry skin. Their core body temperature will be elevated, sometimes as high as 105°F. They are usually not sweating because the body is trying to conserve body fluids.
Environmental Impact on Injuries

- Hypothermia is a low core body temperature.

- If a client is exercising in a cold environment, he/she may suffer from hypothermia and/or frostbite.
Record-Keeping for the Personal Trainer

- The use of medical history forms and emergency information forms is essential in case of an emergency or injury.

- These documents are, of course, confidential and should be kept in a secure location and never released without the permission of the client.

- It is also pertinent that the personal trainer keep detailed records of your conversations with, and observations of, those clients who have known injuries or illness while under his/her supervision.