



Group Fitness Instructor University Curriculum

Chapter 8: The Prevention and Management of Common Injuries



Learning Objectives

- Upon completion of this chapter, you will be able to:
 - Describe common general musculoskeletal injuries
 - Explain tissue reaction to healing
 - Take steps to manage musculoskeletal injuries
 - Conceptualize the relationship between flexibility and musculoskeletal injuries
 - List important factors associated with injury
 - Identify specific lower-extremity musculoskeletal injuries
 - Identify specific upper-extremity musculoskeletal injuries
 - Implement consistent measures for record keeping after an injury and participant confidentiality

Introduction

- Musculoskeletal injuries are experienced by participants as well as GFIs.
 - GFIs must be able to manage injury risks and provide modifications for participants with injury limitations.
- A primary objective for a GFI is to provide a safe environment for all participants.
- The suggestions given in this chapter are only guidelines for exercise modification.
 - Diagnosis and treatment of musculoskeletal injuries is the domain of an appropriately credentialed healthcare professional.

General Musculoskeletal Injuries

- It is important for GFIs to know about general musculoskeletal injuries so that they can:
 - Prevent their onset
 - Provide modifications during class
 - Properly handle any that may occur during class
- Common injuries include:
 - Sprain
 - Strain
 - Overuse conditions
 - Cartilage damage
 - Bone fractures

General Musculoskeletal Injuries: Sprain

- An acute injury to a ligament caused by sudden trauma to a joint
 - Symptoms include pain, localized swelling, discoloration, loss of motion, loss of use, and joint instability.
- Rated in degrees (1st degree, 2nd degree, and 3rd degree)
- Considerations for group exercise:
 - Avoid exercise that involves the injured joint until symptoms are minimal or no longer present.
 - Gradually reintroduce activity involving the joint.
 - Avoid movement in the end ranges of motion.
 - Monitor the participant for the return of symptoms or an increase in their severity resulting from activity.

General Musculoskeletal Injuries: Strain

- An injury to a muscle usually caused by overexertion
 - Symptoms include pain, loss of motion, and reduced strength.
- Can be acute or develop over time
- Considerations for group exercise:
 - Avoid strenuous or ballistic exercise that involves the injured area until symptoms are minimal or no longer present.
 - Gradually increase the intensity of activity.
 - Incorporate additional gentle stretching before and after exercise.
 - Confine movement to a pain-free range of motion.
 - Monitor the participant for the return of symptoms or an increase in their severity resulting from activity.

General Musculoskeletal Injuries: Overuse Conditions

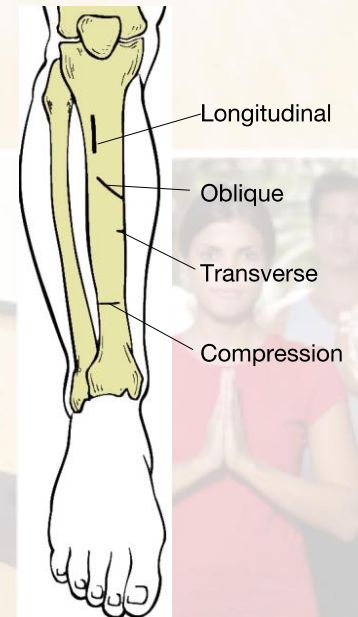
- Inflammatory response to overuse
 - Conditions include tendinitis, bursitis, and fasciitis
 - Symptoms include pain, swelling, and loss of function.
- Considerations for group exercise:
 - Avoid high-repetition activity or heavy loading at the site of inflammation.
 - For lower-extremity inflammation, assess appropriateness of jumping.
 - Use caution when incorporating ballistic activity.
 - Check equipment for proper fit.
 - Allow adequate recovery between sessions.
 - Avoid high repetitions or moderate to heavy loads in strength training.
 - Monitor the participant for the return of symptoms or an increase in their severity resulting from activity.

General Musculoskeletal Injuries: Cartilage Damage

- Damage to joint surfaces protected by cartilage
 - Conditions include menisci damage of the knee and chondromalacia patella
 - Symptoms include inflammation, pain, clicking or popping, and muscle weakness.
- Considerations for group exercise:
 - Avoid high-repetition activity or heavy loading of the lower extremity.
 - Avoid deep squats, cutting, pivoting, twisting of the knee as long as symptoms are present.
 - Closed-chain activities can be progressed from 0–45 degrees to 90 degrees.
 - Open-chain activities can be included at any time.
 - However, knee extensions should be limited to 60–90 degrees.
 - Monitor the participant for the return of symptoms or an increase in their severity resulting from activity.

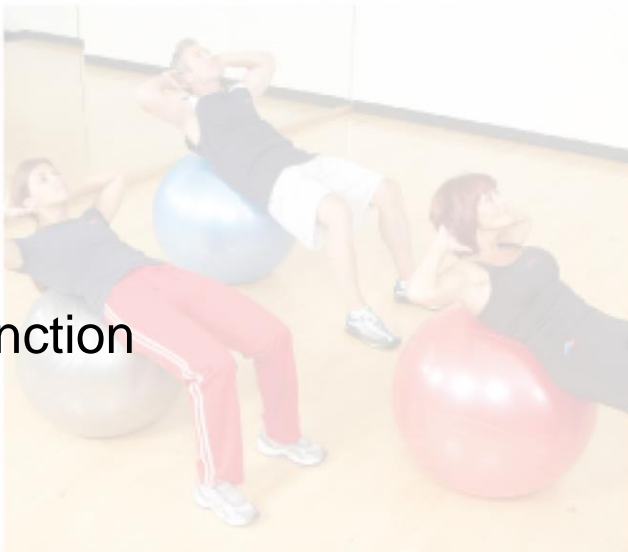
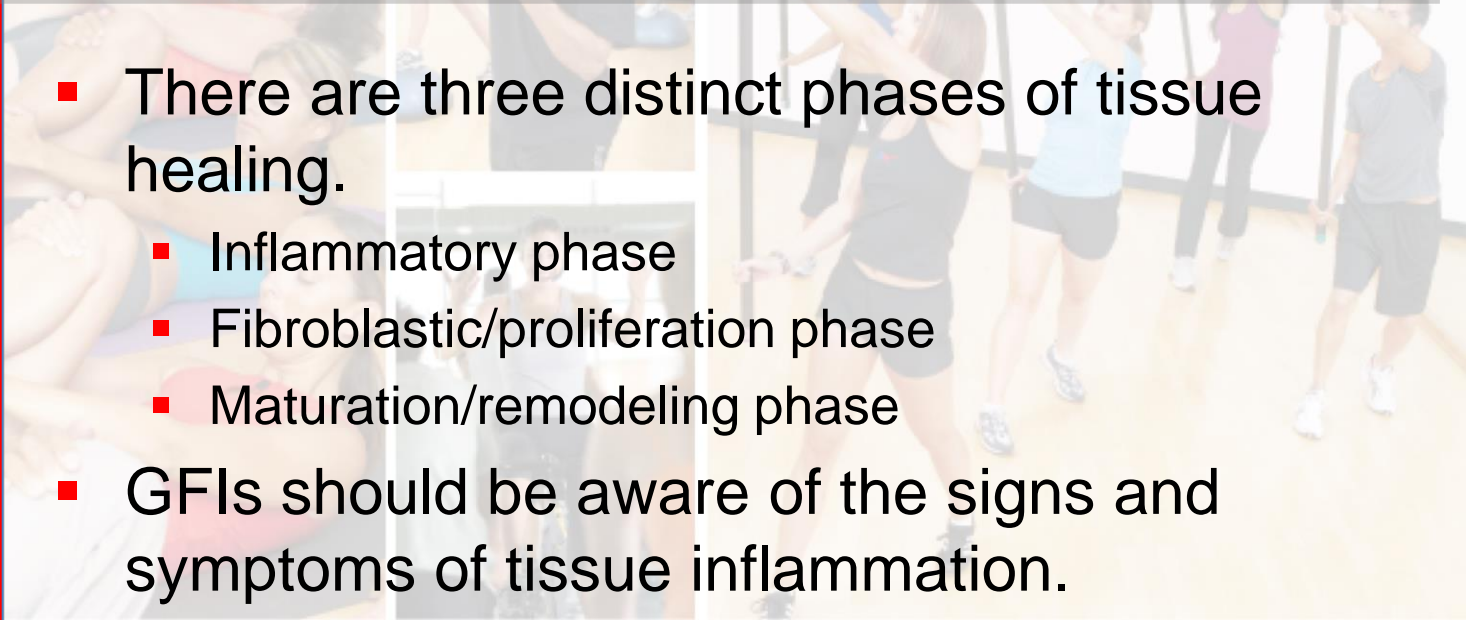
General Musculoskeletal Injuries: Bone Fractures

- Trauma to the bone as a result of a low- or high-impact force
- In group fitness, stress fractures are more common than high-trauma fractures.
 - Symptoms include progressive pain, focal pain, discoloration, pain at rest in some cases, and local swelling.
- Considerations for group exercise:
 - A gradual return to exercise is recommended with low-impact and low-loading activities.
 - Easy balance and functional exercises are appropriate.
 - Monitor the participant for the return of, or an increase in, pain and swelling resulting from activity.



Tissue Reaction to Healing

- There are three distinct phases of tissue healing.
 - Inflammatory phase
 - Fibroblastic/proliferation phase
 - Maturation/remodeling phase
- GFIs should be aware of the signs and symptoms of tissue inflammation.
 - Pain
 - Redness
 - Swelling
 - Warmth
 - Loss of function



Managing Musculoskeletal Injuries

- A GFI must respect scope of practice and refrain from diagnosing any injury.
- Exercise modifications must be provided for participants with pre-existing conditions.
- Acute injury management (PRICE)
 - Protection
 - Rest or restricted activity
 - Ice
 - Compression
 - Elevation



Flexibility and Musculoskeletal Injuries

- When a muscle becomes shortened or inflexible it cannot:
 - Lengthen appropriately
 - Generate adequate force
- This inflexible, weakened state often leads to injury.
- A GFI should be aware of both relative and absolute contraindications to stretching.
 - Any type of contraindication requires further medical evaluation and clearance.

Factors Associated With Injury

- There are many factors that can lead to participant injury.
- Potential injury-causing factors include:
 - Flooring/exercise surface
 - Footwear
 - Equipment
 - Movement execution
 - Class intensity and frequency of participation
- Indicators that can be used to gauge participant limitations:
 - Age
 - Posture
 - New participation

Specific Musculoskeletal Injuries: Lower Extremities

- GFIs should always refer injured participants to their healthcare providers.
- Common lower-extremity injuries:
 - Plantar fasciitis
 - Achilles tendinitis
 - Lateral ankle sprains
 - Shin splints
 - Patellofemoral pain disorders
 - Infrapatellar tendinitis
 - Anterior cruciate ligament tears
 - Greater trochanteric bursitis
 - Iliotibial band syndrome
 - Low-back pain

Specific Musculoskeletal Injuries: Plantar Fasciitis

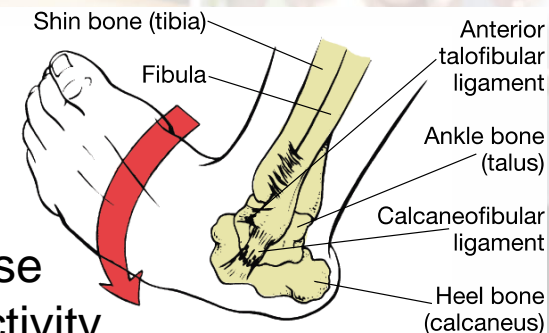
- Microtearing of the fascia at or near its attachment to the calcaneus bone
- Thought to be caused by repetitive overloading of the tissue at its calcaneal attachment
- Considerations for group exercise:
 - Encourage an extended warm-up prior to class.
 - Incorporate additional stretching.
 - Avoid sudden increases in intensity or frequency.
 - Avoid plyometric exercises.
 - Monitor the progression in the increase of the impact of the given activity.
 - Strengthen the muscles of the lower leg and foot.
 - Make sure participants are wearing proper footwear.
 - Monitor the participant for the return of symptoms or an increase in their severity resulting from activity.

Specific Musculoskeletal Injuries: Achilles Tendinitis

- Inflammation of the Achilles tendon
- Can eventually lead to a partial tear or complete tear if not addressed appropriately
- Considerations for group exercise:
 - A gradual, pain-free return to activity is indicated.
 - Avoid overstretching and overexertion of the area.
 - Carefully, progressively load the area with eccentric activity.
 - Facilitate the regaining of calf flexibility to help manage the condition.

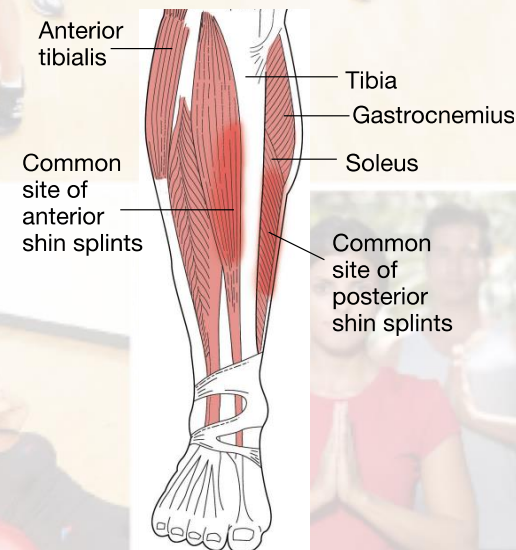
Specific Musculoskeletal Injuries: Lateral Ankle Sprain

- Occurs when the foot is inverted forcefully during weightbearing activity
- Considerations for group exercise:
 - Limit motion to a pain-free range and intensity.
 - Resume activity only when released by a physician or all symptoms are gone.
 - Avoid cutting, jumping, and lateral movements (especially on carpet or uneven surfaces) until full strength and proprioception have returned.
 - Encourage non-impact exercise.
 - Load closed-chain activity according to the tolerance of the joint.
 - Make sure participants are wearing appropriate footwear.
 - Monitor the participant for the return of symptoms or an increase in their severity resulting from activity.



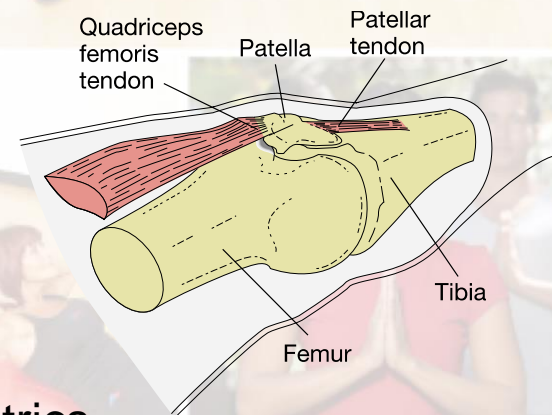
Specific Musculoskeletal Injuries: Shin Splints

- Also known as tibial stress syndrome
- The exact pathology is not known.
 - It is theorized that shin splints are a microtearing of the attachment of the muscles of the lower leg on the tibia.
- Considerations for group exercise:
 - Avoid repetitive impact on hard surfaces.
 - Avoid drastically changing the amount of impact in a class setting.
 - Use shock-absorbing surfaces.
 - Encourage additional stretching.
 - Incorporate additional warm-up time before class.
 - Make sure participants are wearing appropriate footwear.
 - Carefully monitor indoor cyclists who take weightbearing/ impact classes.
 - Monitor the participant for the return of symptoms or an increase in their severity resulting from activity.



Specific Musculoskeletal Injuries: Patellofemoral Pain Disorders (PFPD)

- May involve the patella, the femoral condyles, the quadriceps muscles, and/ or patellar tendon
- Numerous conditions include chondromalacia, patellar tendinitis, anterior knee pain, and patellofemoral malalignment
- The majority of PFPD are considered overuse syndromes.
- Considerations for group exercise:
 - Avoid full squats and excessive knee flexion.
 - Strengthen within a range of 8–20 repetitions.
 - Encourage additional stretching of the lower-extremity.
 - With indoor cycling, elevate the seat as high as possible.
 - Avoid repeated jumping or plyometrics.
 - Monitor the participant for the return of symptoms or an increase in their severity resulting from activity.

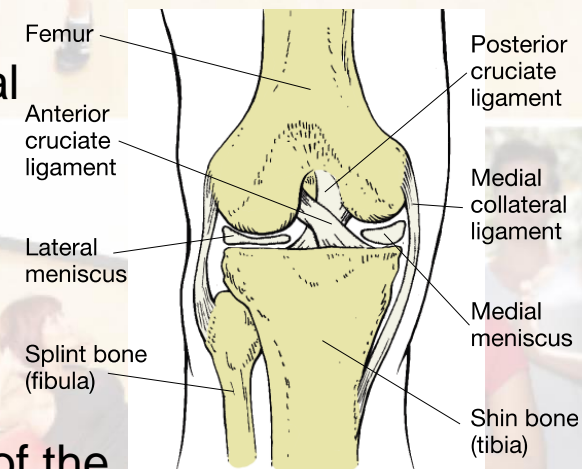


Specific Musculoskeletal Injuries: Infrapatellar Tendinitis

- Also called “jumper’s knee”
- An overuse syndrome characterized by inflammation of the patellar tendon at the insertion into the distal part of the patella and the proximal tibia
- Considerations for group exercise:
 - Restore proper flexibility and strength in the lower extremity.
 - Encourage stretching/self–myofascial release of the area.
 - Functional movement exercise should be encouraged.
 - Initially, avoid high-impact exercise and return to loading slowly.

Specific Musculoskeletal Injuries: Anterior Cruciate Ligament (ACL) Tear and Reconstruction

- Commonly caused by rapid deceleration or by a direct blow to the knee that causes the knee to hyperextend
- Instability of the knee is a concern with this injury.
- Considerations for group exercise:
 - Do not allow participation until the participant has medical clearance.
 - Closely adhere to limitations provided by healthcare providers.
 - Avoid high-impact, multidirectional ballistic movements.
 - Watch for difficulty with balance and movement execution.
 - Encourage aquatic or cycling exercise.
 - Incorporate additional stretching of the lower extremity before and after class.
 - Monitor the participant for the return of symptoms or an increase in their severity resulting from activity.



Specific Musculoskeletal Injuries: Greater Trochanteric Bursitis

- Characterized by painful inflammation of the greater trochanteric bursa
- Considerations for group exercise:
 - Focus on regaining flexibility and strength.
 - Stretch the IT band complex, hamstrings, and quadriceps.
 - Strengthen the gluteals and deep hip rotator muscles.
 - Encourage proper walking and running gait mechanics.
 - Avoid side-lying positions.
 - Be aware the high-loading activities may not be tolerated.
 - Encourage aquatic exercise.

Specific Musculoskeletal Injuries: Iliotibial Band Syndrome (ITBS)

- A repetitive overuse condition that occurs when the distal portion of the iliotibial band rubs against the lateral femoral epicondyle
- Considerations for group exercise:
 - Regain flexibility and strength in the hip and lateral thigh.
 - Introduce higher-loading activities slowly.
 - Lunges and squats should be limited to 45 degrees of knee flexion initially, and then progress to 90 degrees and beyond.
 - Encourage aquatic exercise.

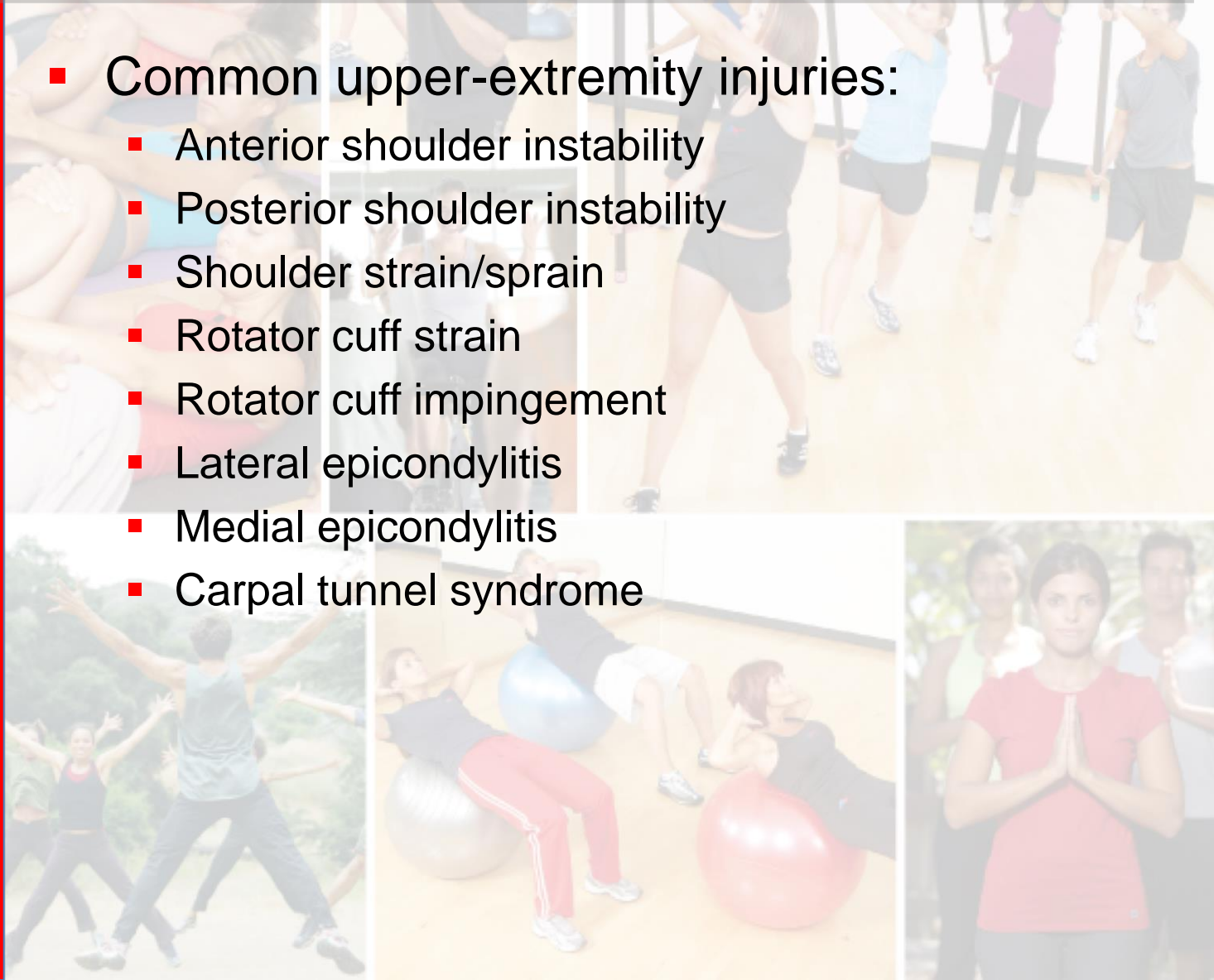


Specific Musculoskeletal Injuries: Low-back Pain

- A symptom that can be caused by a number of underlying conditions, including genetic abnormalities, muscle strains, sprains, disc herniations, and bony abnormalities
- Considerations for group exercise:
 - Avoid any motion that causes an increase in pain.
 - Always engage abdominal muscles for protection of the lumbar spine during motion.
 - Emphasize the maintenance of good posture.
 - Encourage stretching of the trunk and lower extremities to maintain full ROM.

Specific Musculoskeletal Injuries: Upper Extremities

- Common upper-extremity injuries:
 - Anterior shoulder instability
 - Posterior shoulder instability
 - Shoulder strain/sprain
 - Rotator cuff strain
 - Rotator cuff impingement
 - Lateral epicondylitis
 - Medial epicondylitis
 - Carpal tunnel syndrome



Specific Musculoskeletal Injuries: Anterior Shoulder Instability

- Weakness in the anterior wall musculature and/or stretching of the anterior capsule and ligaments that allows the humeral head to sublunate or dislocate anteriorly
- Can be caused acutely by a fall or blow to the shoulder
- Considerations for group exercise:
 - Limit motion to avoid humeral abduction with external rotation or horizontal extension.
 - Be cautious with external rotation movements.
 - Avoid behind-the-neck movements and full-range or wide-grip chest presses.
 - Stretch the posterior cuff.
 - Avoid stretching the anterior shoulder.
 - Monitor the participant for the return of symptoms or an increase in their severity resulting from activity.

Specific Musculoskeletal Injuries: Posterior Shoulder Instability

- Subluxations or dislocations (rare) of the posterior shoulder
- The mechanism of injury is usually a fall on an outstretched hand in a position of shoulder flexion, adduction, and internal rotation.
- Considerations for group exercise:
 - Avoid positions of flexion, internal rotation, and horizontal adduction.
 - Strengthen posterior shoulder musculature.
 - Rowing is a good exercise for this condition.
 - Push-ups and bench presses are contraindicated.
 - Avoid stretching of the posterior shoulder.
 - Monitor the participant for the return of symptoms or an increase in their severity resulting from activity.

Specific Musculoskeletal Injuries: Shoulder Strain/Sprain

- Occurs when the soft-tissue structures (e.g., bursa and rotator cuff tendons) get abnormally stretched or compressed
- Considerations for group exercise:
 - Avoid overhead, across-the-body, and behind-the-back movements.
 - Educate participants on avoiding aggravating activities and improving posture and body positioning.
 - Strengthen the scapular stabilizers and rotator cuff muscles.
 - Stretch the major muscles around the shoulders.
 - Teach overhead-activity modifications.

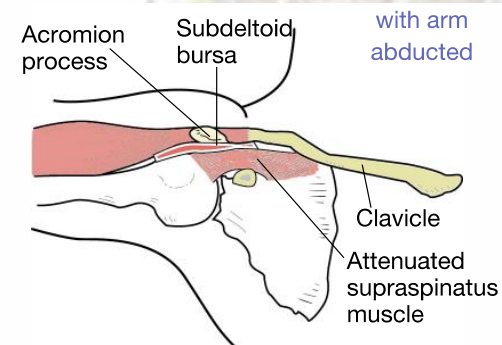


Specific Musculoskeletal Injuries: Rotator Cuff Strain

- The overstretching, overexertion, or overuse of the musculotendinous unit of one or more of the rotator cuff muscles
- Considerations for group exercise:
 - Avoid loading the shoulder in excess of the tolerance of the rotator cuff.
 - Watch for complaints of pain and altered mechanics.
 - Avoid fatiguing the rotator cuff muscles with isolated exercise prior to executing movements that require their activity for stabilization.
 - Monitor the participant for the return of symptoms or an increase in their severity resulting from activity.

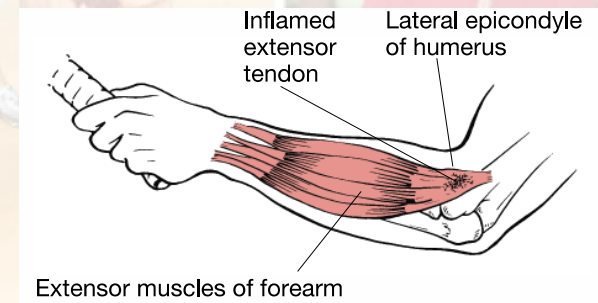
Specific Musculoskeletal Injuries: Rotator Cuff Impingement

- A common overuse syndrome of the shoulder in athletes who participate in overhead sports or individuals who perform repetitive overhead work
- Characterized as a pinching of the rotator cuff tendon under the coracoacromial arch when the arm is abducted
- Considerations for group exercise:
 - Encourage additional stretching of the rotator cuff.
 - Discourage stretching of the anterior shoulder.
 - Avoid active abduction and overhead arm movements unless pain-free.
 - Minimize repetition of arm abduction or overhead motion.
 - Avoid behind-the-neck movements.
 - Monitor the participant for the return of symptoms or an increase in their severity resulting from activity.



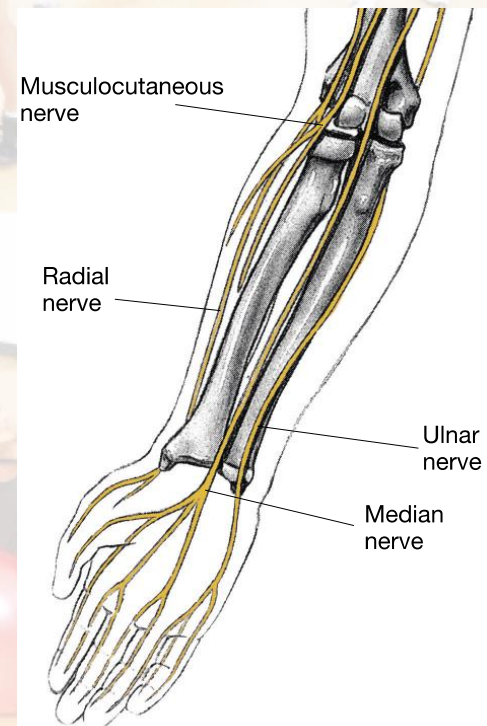
Specific Musculoskeletal Injuries: Lateral and Medial Epicondylitis

- Lateral epicondylitis (“tennis elbow”)
 - An overuse injury affecting the musculotendinous junction of the wrist extensor muscles at the lateral epicondyle of the humerus
- Medial epicondylitis (“golfer’s elbow”)
 - An overuse injury affecting the musculotendinous junction of the wrist flexor muscle at the medial epicondyle of the humerus
- Considerations for group exercise:
 - Encourage stretching for all wrist motions.
 - Stretch wrist flexors/extensors before all activities that involve the wrist.
 - Use lighter loads during repetitive motion.
 - Avoid high-repetition wrist exercises.
 - Avoid holding hand positions for prolonged durations during cycling classes.
 - Monitor the participant for the return of symptoms or an increase in their severity resulting from activity.



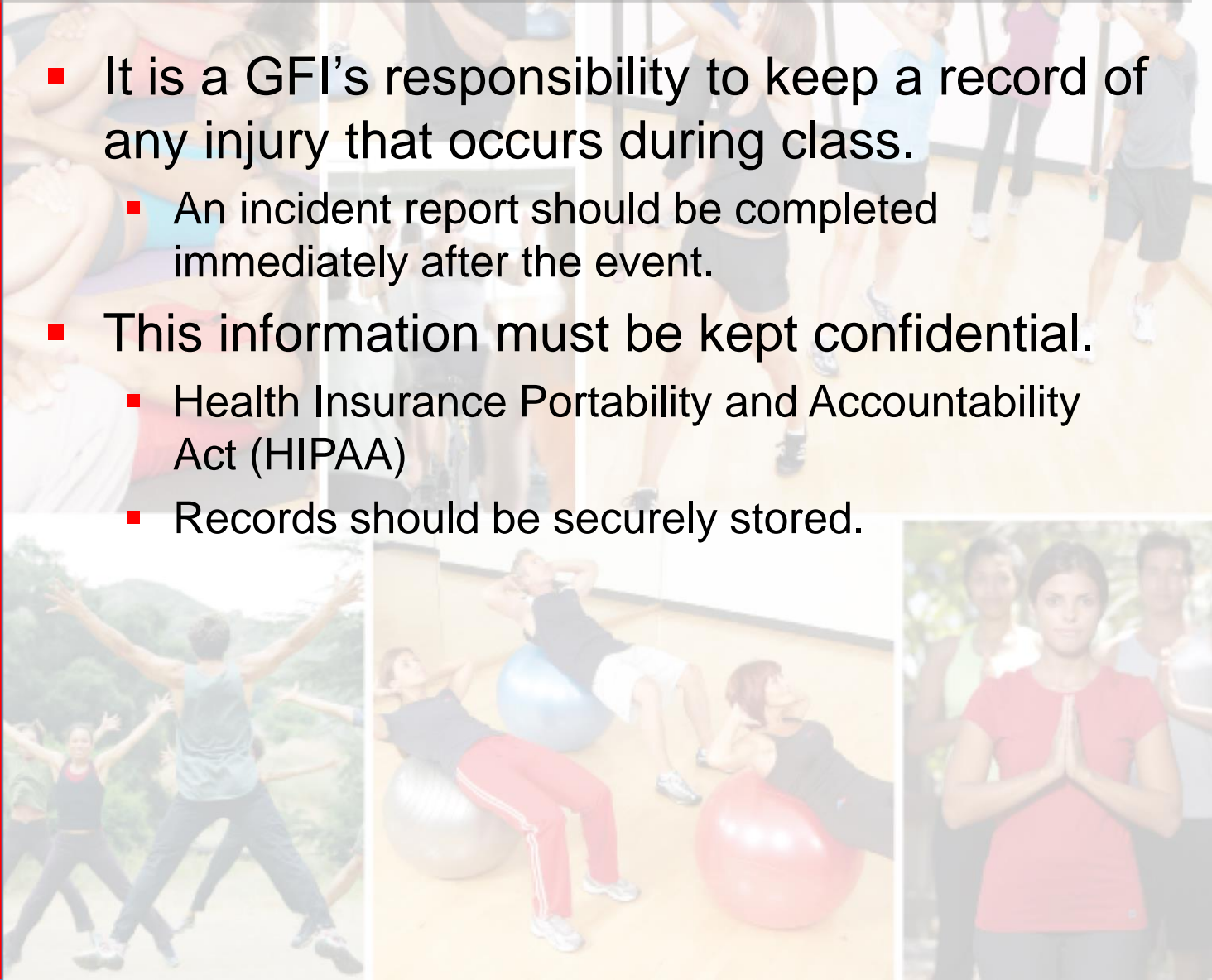
Specific Musculoskeletal Injuries: Carpal Tunnel Syndrome

- The most frequently occurring compression syndrome of the wrist
- Repetitive wrist and finger flexion that results in a narrowing of the carpal tunnel due to inflammation
 - Eventually compresses the median nerve
- Considerations for group exercise:
 - Participants may be prescribed wrist splints.
 - Provide education on avoiding aggravating activities and improving posture and body positioning.
 - Emphasize regaining strength and flexion.



Record Keeping and Confidentiality

- It is a GFI's responsibility to keep a record of any injury that occurs during class.
 - An incident report should be completed immediately after the event.
- This information must be kept confidential.
 - Health Insurance Portability and Accountability Act (HIPAA)
 - Records should be securely stored.



Summary

- This chapter covered:
 - General musculoskeletal injuries
 - Tissue reaction to healing
 - Management of musculoskeletal injuries
 - Flexibility and musculoskeletal injuries
 - Factors associated with injury
 - Specific lower-extremity musculoskeletal injuries
 - Specific upper-extremity musculoskeletal injuries
 - Record keeping and participant confidentiality