



ACE Group Fitness Instructor University Curriculum

Chapter 6: Exercise and Special Populations



Learning Objectives

- Upon completion of this chapter, you will be able to:
 - Discuss exercise program variables pertaining to individuals with cardiac diseases
 - Explain exercise considerations unique to individuals with metabolic disorders
 - Discuss exercise program variables for individuals with pulmonary and respiratory disorders
 - Explain exercise considerations and common modifications for individuals with joint and bone disorders
 - Offer exercise program design strategies for children
 - Offer exercise program design strategies for older adults
 - Discuss exercise considerations for individuals with multiple sclerosis

Introduction

- GFIs may frequently encounter participants with special needs and health concerns.
- Many health conditions significantly influence an individual's ability to perform physical activity.
 - Exercise intensity may need to be modified.
 - Specific movements or positions may be contraindicated.
- Guidelines and limitations will generally come from a participant's physician or physical therapist.
 - These must be adhered to by the GFI when instructing classes to individuals with special health concerns.

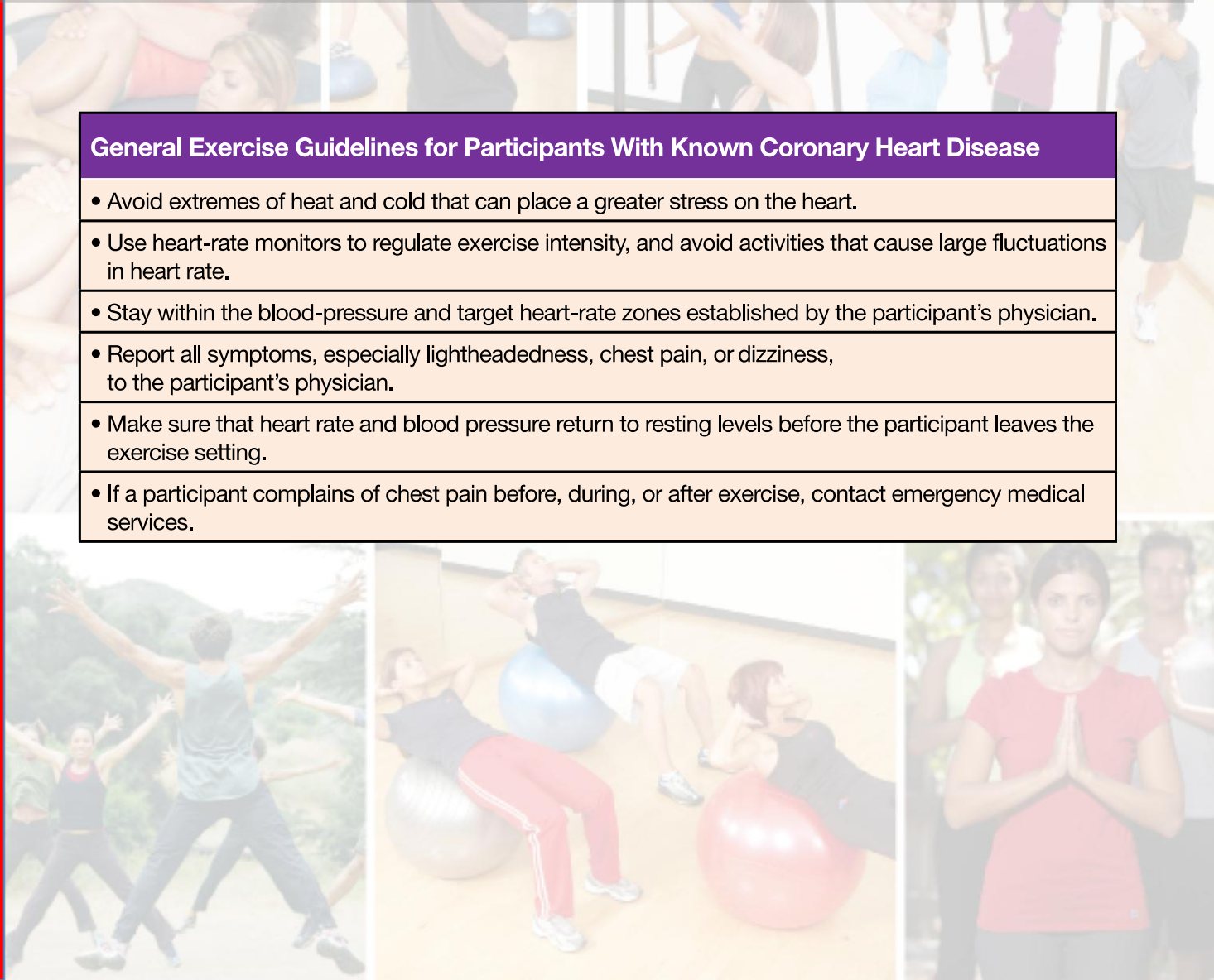
Cardiac Diseases: Coronary Heart Disease

- Coronary heart disease (CHD) is a multifaceted disorder.
- In the fitness setting, the main goal is to avoid high-intensity exercise.
- Important considerations for participants with CHD:
 - Use ratings of perceived exertion (RPE).
 - Be aware of the association between CHD and stroke.
 - Have participants complete a detailed self-evaluation before each exercise session.
- General exercise guidelines for participants with known CHD are presented on the next slide.

General Exercise Guidelines for Participants With Known CHD

General Exercise Guidelines for Participants With Known Coronary Heart Disease

- Avoid extremes of heat and cold that can place a greater stress on the heart.
- Use heart-rate monitors to regulate exercise intensity, and avoid activities that cause large fluctuations in heart rate.
- Stay within the blood-pressure and target heart-rate zones established by the participant's physician.
- Report all symptoms, especially lightheadedness, chest pain, or dizziness, to the participant's physician.
- Make sure that heart rate and blood pressure return to resting levels before the participant leaves the exercise setting.
- If a participant complains of chest pain before, during, or after exercise, contact emergency medical services.



Cardiac Diseases: Hypertension

- Hypertension is an important risk factor for potential cardiac events.
- Hypertension is classified as blood pressure $\geq 140/90$ mmHg.
- Important considerations for participants with hypertension:
 - Lifestyle recommendations for managing hypertension include exercise and dietary modifications.
 - Blood pressure medication may affect heart rate.
 - Participants should avoid exercise if their resting blood pressure is $>200/110$ mmHg.

Metabolic Disorders: Obesity

- Obesity is the most prevalent health disorder in American Society.
- Obesity is classified as a body mass index (BMI) ≥ 30 kg/m².
- Important considerations for obese participants:
 - Avoid exercise that leads to pain or discomfort.
 - Emphasize low-intensity, high-duration activities.
 - A daily dose of physical activity is recommended.
 - Because arthritis is prevalent, protecting the joints is a main concern.
 - Adjust exercise equipment for comfort.
 - Both aerobic exercise and resistance training are important.

Metabolic Disorders: Diabetes

- Type 1 diabetes
 - Caused by a destruction of pancreatic cells
 - Requires regular administration of insulin
- Type 2 diabetes
 - Caused by insulin resistance combined with defective insulin secretion
 - Treatment includes diet modification, medication, and exercise
- People with both types are encouraged to exercise.
 - Type 1 diabetics receive important health benefits from exercise.
 - Type 2 diabetics receive health benefits plus enhanced glucose control from exercise.

Metabolic Disorders: Diabetes

- Important considerations for participants with diabetes:
 - The proper balance of food and insulin dosage must be understood by the participant.
 - Participants should have specific guidelines from their physicians.
 - Participants should check their blood glucose before and after exercise.
 - The effects of hypoglycemia and hyperglycemia should be understood.
 - Secondary conditions should be considered.
 - Daily exercise is recommended.
 - Avoid exercise late in the evening.
- General exercise guidelines and safety tips for persons with diabetes are presented on the next slide.

General Guidelines and Safety Tips for Persons With Diabetes

General Guidelines and Safety Tips for Persons With Diabetes

- Regulating blood glucose levels requires optimal timing of exercise periods in relation to meals and insulin dosage.
- Aim to keep blood glucose levels between 100 and 200 mg/dL one to two hours after a meal.
- Exercise can have a significant effect on insulin reduction (American Diabetes Association, 2006). Some experts note that insulin may need to be reduced by 10 to 50% when starting an exercise program (Wallberg-Henriksson, 1992)*
- If blood glucose levels are lower than 100 mg/dL, have the person consume a rapidly absorbing carbohydrate to increase blood glucose.
- If blood glucose is greater than 300 mg/dL before exercise (some doctors may recommend that exercise not be initiated at blood glucose levels greater than 250 mg/dL), make sure that insulin or the oral hypoglycemic agent has been taken. In some circumstances, participants with a high blood glucose level (>300 mg/dL) may lower it to a safe enough level to exercise by drinking water.
- No participant should be allowed to exercise if his or her blood glucose level does not fall to a safe range before exercise.
- Teach participants to check their feet periodically to avoid foot ulcers. If an ulcer is found, have the person consult with his or her physician immediately for proper treatment. Foot ulcers can worsen and cause major problems if left untreated.
- Check blood glucose at the end of the exercise session to make sure that the person does not become hypoglycemic. This could happen very quickly, particularly after high-intensity or long-duration activities or when the person is not accustomed to understanding how the body reacts to exercise.
- Make sure the participant is well hydrated and drinking water frequently during the exercise class. Be especially cautious in hot environments, as blood glucose can be impacted by dehydration, and the sweating response of diabetics may be impaired, limiting their thermoregulatory abilities.

*A change in insulin or oral hypoglycemic medication should only be made on the recommendation of a participant's physician.

Respiratory and Pulmonary Disorders: Asthma

- Asthma is one of a group of conditions that make up chronic obstructive pulmonary disease (COPD).
 - Characterized by restricted airways and difficulty breathing
 - Exercise-induced asthma (EIA)
- Important considerations for participants with asthma:
 - Exercise and asthma medication should be coordinated properly.
 - The use of a peak flow meter is recommended.
 - Light warm-ups, short bouts of exertion, and comfortable exercise intensity are recommended.
 - Participants with EIA should carry inhalers.
 - Avoid exercise in cold air.
 - Participants should be monitored closely for breathing problems after experiencing a cold or flu.
- Steps for managing an asthma attack are presented on the following slide.

Steps for Managing an Asthma Attack

Steps for Managing an Asthma Attack

The time to treat an asthma episode is when the symptoms (e.g., coughing, wheezing, chest tightness, and difficulty breathing) first appear.

Attack-management Steps

- Have the person rest and relax.
- Have the person use medicines (inhaler) prescribed for an attack.
- Have the person drink warm liquids.

Rest and Relax

- At the first sign of breathing difficulties, the person should STOP and rest for at least 10 minutes.
- Make the person feel comfortable and relaxed.

Take Medication

- Make sure the prescribed medicine is available and that the person understands how to correctly take the medicine (inhalers require practice).

Drink Warm Liquid

- Have the person drink slowly.
- Do not allow the person to ingest cold drinks.

Emergency Care

- If you have any doubts about the severity of the attack, get medical help immediately.
- If the person's lips or fingernails are turning blue or if he or she exhibits shallow breathing and is focusing all attention on breathing, get medical help immediately.

Respiratory and Pulmonary Disorders: Bronchitis and Emphysema

- Bronchitis and emphysema cause severe problems related to breathing capacity.
 - Breathlessness and intolerance to exercise are hallmark symptoms.
- Important considerations for participants with bronchitis and emphysema:
 - Interval training may be required for those with low tolerance.
 - Low-variability and low-intensity exercise is appropriate for this population.
 - An adequate warm-up and cool-down are especially important for these participants.
 - Participants should be encouraged to use diaphragmatic breathing.
 - A table describing this technique is presented on the next slide.

Diaphragmatic and Pursed-lip Breathing Techniques

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Diaphragmatic Breathing

- Have the participant lie down on his or her back.
- Have the participant place one hand on the abdomen and one hand on the chest.
- Teach the participant to inspire with maximal outward movement of the abdomen.
- Once the participant is comfortable in the supine position, he or she can perform the technique in sitting and standing positions.

Pursed-lip Breathing

- This can be performed separately or during diaphragmatic-breathing exercises.
- Teach the participant to slowly exhale against a slight resistance created by lightly pursing the lips. The resistance has the potential to increase oxygen saturation.

Joint and Bone Disorders: Arthritis

- Arthritis is a general term for a group of several different conditions.
 - Osteoarthritis
 - Rheumatoid arthritis (RA)
 - Systemic lupus erythematosus (SLE)
- Important considerations for participants with arthritis:
 - Loading of the joints should be minimized and strengthening of the muscles around the joints should be emphasized.
 - Participants will probably have to tolerate some pain with activity.
 - Activities that cause pain to linger longer than two hours after exercise should be avoided.
- Exercise guidelines for persons with arthritis are presented on the next slide.

Exercise Guidelines for Persons With Asthma

Exercise Guidelines for Persons With Arthritis

- Any exercise that causes pain during exercise, two hours after exercise, or 24 to 48 hours after exercise should be discontinued.
- Find alternative ways to exercise muscles around painful joints. For example, straight-leg exercises are a good way to strengthen the leg muscles around a painful knee.
- Warm-up and cool-down segments are essential components of most exercise programs, but are especially important for persons with arthritis due to joint stiffness.
- Resistance-training activities should be conducted, but exercises that cause pain to a particular joint should be replaced with isometric strength exercises.
- If conducting aquatic exercise, try to maintain a water temperature between 85° and 90° F (29° and 32° C).
- Use smooth, repetitive motions in all activities.
- Keep the exercise intensity level below the discomfort threshold.
- Be aware that acute flare-ups can occur in persons with rheumatoid arthritis. Exercise may not be advisable until the flare-up subsides.
- Participants with osteoarthritis often perform better in the morning, while participants with rheumatoid arthritis may be better off exercising several hours after waking.

Joint and Bone Disorders: Fibromyalgia

- Fibromyalgia is characterized by achy pain, tenderness, and stiffness in the soft tissues.
- Important considerations for participants with fibromyalgia:
 - Symptoms can increase with certain life stressors.
 - Exercise provides many benefits for people with fibromyalgia.
 - Regular exercise is recommended provided there is no increase in symptoms lingering 24 to 48 hours after activity.

Joint and Bone Disorders: Osteoporosis

- Osteoporosis drains bones of mineral content and leaves them at high risk for fracture.
- Important considerations for participants with osteoporosis:
 - Resistance exercises should be approved by the participant's physician.
 - For prevention of osteoporosis, plyometric exercises may be appropriate.
 - Circuit-training and interval-training programs may be better tolerated than traditional strength programs.
 - Water activities are not recommended for improving bone density.
- Safety concerns for exercise and osteoporosis are presented on the next slide.

Safety Concerns When Developing an Exercise Program for Persons With Osteoporosis

Safety Concerns When Developing an Exercise Program for Persons With Osteoporosis

- Always obtain physician consent before developing the exercise program.
- Screen the participant before developing the program. Consult with his or her physician on developing resistance exercises at the site where a fracture may have occurred.
- Avoid jarring or high-load exercises in persons with advanced osteoporosis.
- Avoid back exercises in participants who have localized pain in this region and show signs of kyphosis.
- When performing standing exercises with older participants who have a high risk of injury from a fall or fracture, or who have fallen previously, make sure there is something to hold onto at all times (e.g., ballet barre, parallel bars, or chair).
- Reevaluate the program if there are any signs of pain or fatigue during or after an exercise session in the osteoporosis zones (hip, back, and wrist).



Joint and Bone Disorders: Low-back Pain

- Exercise is a valuable component of treatment and prevention of low-back pain.
- Important considerations for participants with low-back pain:
 - Participants should consult with their physician about chronic low-back pain.
 - Adequate warm-up and cool-down and proper form and alignment are essential during exercise class.
 - Participants should not work through the pain.
 - Proper lifting techniques should be taught to participants.
 - GFIs should consider incorporating specific exercises to improve back health in each class.



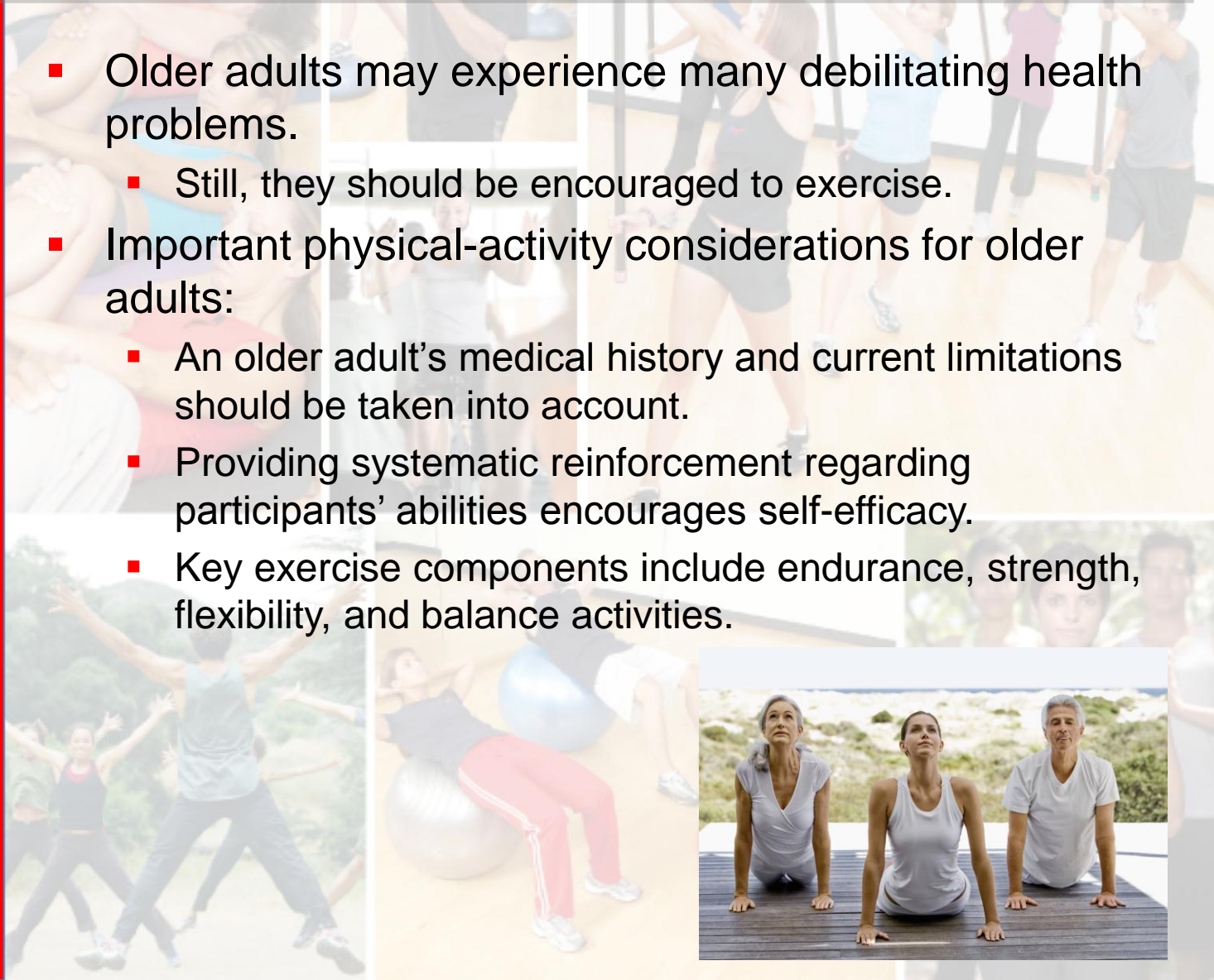
Human Development and Aging: Children

- A large proportion of American children are inactive, unfit, and increasingly overweight.
- Important physical-activity considerations for youth:
 - Promoting physical activity within families, physical education programs, and community programs are keys to success.
 - Youth should participate in at least 60 minutes or more of daily physical activity.
 - Exercise should be interesting and fun.
 - There are several physiological differences between youth and adults.



Human Development and Aging: Older Adults

- Older adults may experience many debilitating health problems.
 - Still, they should be encouraged to exercise.
- Important physical-activity considerations for older adults:
 - An older adult's medical history and current limitations should be taken into account.
 - Providing systematic reinforcement regarding participants' abilities encourages self-efficacy.
 - Key exercise components include endurance, strength, flexibility, and balance activities.



Autoimmune Diseases: Multiple Sclerosis

- Multiple sclerosis (MS) is a variable progressive neuromuscular disorder.
 - Often characterized by exacerbations and remissions
- Important considerations for participants with MS:
 - Exercise should be part of a daily regimen.
 - Balance is often impaired.
 - Spasticity is often an issue.
 - Extra time should be allowed to complete each exercise movement.
 - Warm environments can cause premature fatigue.
 - The bladder should be voided before and after exercise.

Summary

- This chapter covered:
 - Exercise program variables pertaining to individuals with cardiac diseases
 - Exercise considerations unique to individuals with metabolic disorders
 - Exercise program variables for individuals with pulmonary and respiratory disorders
 - Exercise considerations and common modifications for individuals with joint and bone disorders
 - Exercise program design strategies for children
 - Exercise program design strategies for older adults
 - Exercise considerations for individuals with MS