ACE Personal Trainer Manual, 4th edition

Chapter 14: Exercise and Special Populations

Learning Objectives

- This session, which is based on Chapter 14 of the *ACE Personal Trainer Manual,* 4th ed., describes a variety of client health concerns and provides exercise guidelines for each.
- Guidelines for working with youth, older adults, and pregnant women are also discussed.
- After completing this session, you will have a better understanding of:
  - Select diseases and disorders
  - How the body's response to exercise is affected by each disease, disorder, or stage of life
  - Specific contraindications for exercise associated with each disease, disorder, or stage of life

Introduction

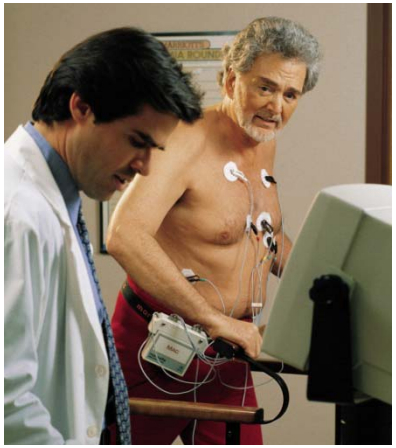
- Personal trainers frequently encounter clients with special needs and health concerns.
- Documentation of client encounters, health status, and progress is especially important.
  - SOAP notes
- In general, clients with chronic conditions should follow a low- to moderate-intensity exercise program that progresses gradually.
- Communication with healthcare professionals is critical when working with special populations.

Cardiovascular Disorders

- Coronary artery disease (CAD)
  - Also called atherosclerotic heart disease
  - A narrowing of the coronary arteries that supply the heart muscle with blood and oxygen
  - Caused by an inflammatory response within the arterial walls resulting from an initial injury and the deposition of plaque and cholesterol
- Manifestations of atherosclerosis include:
  - Angina
  - Heart attack
  - Stroke
  - Intermittent claudication

Exercise and Coronary Artery Disease

- Physical inactivity is a major independent risk factor for CAD.
- Exercise is a critical part of treatment for people with CAD.
- Clients with a history of CAD should be evaluated by their physicians.
- The physician should then provide the personal trainer with basic exercise program parameters.
- It is most appropriate for personal trainers to work with low-risk CAD clients.



Exercise Guidelines for CAD

- Mode
  - Low-intensity endurance exercise gradually progressed to moderate-intensity exercise utilizing interval-type training.
  - Isometric exercises should be avoided.
  - The resistance-training program should utilize one set of 12 to 15 repetitions of eight to 10 exercises.
- Intensity
  - Begin at an intensity of 40 to 50% of HRR or an RPE of 9 to 11 (6 to 20 scale) or at an HR 20 to 30 beats over resting heart rate.
  - Clients who are already exercising may gradually be progressed to an intensity of 60 to 85% of HRR or an RPE of 11 to 14.
- Duration
  - 30 minutes or more of continuous or interval training, plus additional time for warm-up and cool-down activities.
- Frequency
  - Three to five days per week of aerobic training and two days per week of resistance training.

Hypertension

- High blood pressure
  - Having systolic blood pressure (SBP) ≥140 mmHg or diastolic blood pressure (DBP) ≥90 mmHg or taking antihypertensive medication
- Prehypertension
  - Untreated SBP of 120 to 139 mmHg or an untreated DBP of 80 to 89 mmHg
  - Prehypertensive individuals have twice the risk of developing high blood pressure compared to those with normal values.
- Each 20 mmHg rise in SBP or 10 mmHg rise in DBP doubles the risk of developing cardiovascular disease.
- Exercise, weight loss, sodium reduction, and reduced fat and alcohol intake are lifestyle therapies for hypertension.
- Post-exercise hypotension (PEH)

Exercise Guidelines for Hypertension

- Mode
  - Endurance exercise should be the primary exercise mode.
  - Isometric exercise should be avoided.
  - Weight training should feature low resistance and a high number of repetitions, as in a circuit-training program.
  - Mind-body exercise is appropriate
- Intensity
  - An RPE of 9 to 13 (6 to 20 scale) is the preferred exercise intensity.
  - When using heart rate, the target should be set at the lower end of the heart-rate range (40 to 65%).
- Duration
  - Gradual warm-up and cool-down periods lasting longer than five minutes
  - Exercise duration up to 40 to 60 minutes per session
- Frequency
  - Four to seven days per week

Stroke

- Ischemic stroke
  - Occurs when the blood supply to the brain is cut off
- Hemorrhagic stroke
  - Occurs when a blood vessel in the brain bursts
- Warning signs of a stroke:
  - Sudden numbness or weakness of the face, arms, or legs
  - Sudden confusion or trouble speaking or understanding others
  - Sudden trouble seeing in one or both eyes
  - Sudden walking problems, dizziness, or loss of balance and coordination
  - Sudden severe headache with no known cause
- Transient ischemic attacks (TIA)
- Exercise can increase functional capacity and improve CVD risk factors in stroke patients.
- Exercise has been shown to improve fibrinolytic activity.

Exercise Guidelines for Stroke

- Mode
  - Walking, stationary and recumbent bicycling, upper-extremity ergometers, and water exercise
  - Significant loss of limb function may require that activities are adapted
  - Balance exercises, light resistance training, and cognitive challenges should also be included when possible.
- Intensity
  - Light to moderate
- Duration
  - Begin with short bouts of activity—three to five minutes—and gradually build to 30 minutes over time.
- Frequency
  - Five days per week
  - Clients may need to begin with three days and gradually progress to five.

Peripheral Vascular Disease

- Peripheral vascular disease (PVD) is caused by atherosclerotic lesions in one or more peripheral arterial and/or venous blood vessels.
- Peripheral artery occlusive disease (PAOD)
- Peripheral vascular occlusive disease (PVOD)
- A subjective rating of pain can be made with the four-point scale presented here.
- Regular exercise improves ambulation distances in individuals with PVD.

Subjective Grading Scale for Peripheral Vascular Disease

Grade I — Definite discomfort or pain, but only of initial or modest levels

Grade II — Moderate discomfort or pain from which the client's attention can be diverted, by conversation, for example

Grade III — Intense pain (short of Grade IV) from which the client's attention cannot be diverted

Grade IV — Excruciating and unbearable pain

Exercise Guidelines for PVD

- Mode
  - Non-impact endurance exercise may allow for longer-duration and higher-intensity exercise.
  - Weightbearing activities can be incorporated as tolerated.
- Intensity
  - Moderate intensity for aerobic exercise
  - Weightbearing activities should be carried out to the point of moderate to intense pain (Grade II to Grade III).
  - As functional capacity improves, gradually increase intensity.
- Duration
  - Longer and more gradual warm-up and cool-down periods (longer than 10 minutes)
  - Gradually increase duration to 30 to 60 minutes.
- Frequency
  - Daily exercise is recommended initially, then reduce to four to five days a week.

Dyslipidemia

- Correlates of CVD
  - Elevated levels of total cholesterol and LDL cholesterol
  - Suboptimal levels of HDL cholesterol
  - Elevated levels of triglycerides
- Cholesterol travels through the body attached to a lipoprotein.
  - Low-density lipoprotein (LDL)
  - Very low-density lipoprotein (VLDL)
  - High-density lipoprotein (HDL)
  - Non-HDL cholesterol (non-HDL)
- Treatment generally encompasses diet, exercise, and medications.
- Exercise and diet are particularly effective at increasing low HDL levels.

Exercise Guidelines for Dyslipidemia

- Mode
  - Aerobic activities are appropriate unless contraindicated by other health conditions.
  - Resistance training twice a week using light to moderate weights at 10 to 12 repetitions may provide additional benefit.
- Intensity
  - Begin at a low to moderate intensity with a focus on duration.
  - Some clients may be able to progress to short bouts of vigorous-intensity exercise.
- Duration
  - Begin at 15 minutes and build to 30 to 60 minutes per day.
  - The goal is to exercise for a total of 150 to 200 minutes each week.
- Frequency
  - Five days per week

Diabetes

- Hyperglycemia
- Type 1 diabetes
  - Body's immune system destroys pancreatic beta cells that are responsible for producing insulin
  - Regular insulin delivered by injections or a pump to regulate blood glucose levels is required
  - 5 to 10% of all adult diagnosed cases of diabetes
- Type 2 diabetes
  - Initially presents as insulin resistance
  - As the demand for insulin rises, the pancreas gradually loses its ability to produce it
  - Accounts for 90 to 95% of all diagnosed cases
  - Approximately 75% of people with type 2 diabetes are obese or have a history of obesity
- Gestational diabetes
  - Occurs during approximately 7% of all pregnancies
  - Women who have experienced gestational diabetes have a 40 to 60% chance of developing diabetes over the subsequent five to 10 years.

Diabetes Control

- The primary treatment goal is twofold:
  - Normalize glucose metabolism
  - Prevent diabetes-associated complications and disease progression
- Proper management of diabetes requires a team approach:
  - Physicians
  - Diabetes educators
  - Dietitians
  - Exercise specialists
  - The diabetic person’s self-management skills

Benefits of Exercise for Diabetes

- Type 1 diabetes
  - Improved functional capacity, reduced risk for CAD, and improved insulin-receptor sensitivity
- Type 2 diabetes
  - Prevention of CAD, stroke, peripheral vascular disease, and other diabetes-related complications
  - The combination of weight loss and exercise can positively affect lipid levels, thereby lowering a type 2 diabetic's risk for heart disease.

Precautions for Working With Diabetic Clients

- A personal trainer who chooses to work with a diabetic client should:
  - Be aware of potential complications associated with exercise
  - Know how to appropriately respond should such complications occur
- The table presented on the following slide covers preventive measures.

Exercise Precautions for Clients With Diabetes

Exercise Precautions for Clients With Diabetes
• Metabolic control before exercise ✓ Avoid exercise if fasting glucose levels are ≥250 mg/dL and ketosis is present or if blood glucose levels are >300 mg/dL and no ketosis is present. ✓ Ingest additional carbohydrate if glucose levels are <100 mg/dL.
• Blood glucose monitoring before and after exercise ✓ Identify when changes in insulin or food intake are necessary. ✓ Be aware of the glycemic response to different exercise conditions.
• Food intake ✓ Consume additional carbohydrate as needed to avoid hypoglycemia. ✓ Carbohydrate-based foods should be readily available during exercise.
• Avoid injecting insulin into the primary muscle groups that will be used during exercise, because it will be absorbed more quickly, potentially resulting in hypoglycemia.
• Avoid exercise during periods of peak insulin activity.
• Exercise at the same time each day with a regular pattern of diet, medication, and duration/intensity.
• Exercise with a partner and wear a medical identification tag.
• Proper hydration is extremely important. Drink water before, during, and following exercise to prevent dehydration. Be especially cautious on hot days, as blood glucose can be impacted by dehydration.
• Focus on careful foot hygiene and proper footwear. Cotton socks and correctly fitting athletic shoes are important. Regularly check feet for sores, blisters, irritation, cuts, and other injuries.
• Do not ignore pain. Discontinue exercise that results in unexpected pain.

Exercise Guidelines for Diabetes

- Mode
  - General aerobic endurance exercises are appropriate.
  - Utilize gradual warm-up and cool-down periods.
  - Twice-a-week resistance training is appropriate and beneficial, using eight to 10 exercises at eight to 12 repetitions.
  - Clients should monitor blood glucose before and after exercise.
- Intensity
  - Clients should train at a moderate intensity, such as an RPE of 11 to 14 (6 to 20 scale) for type 1 diabetes and 11 to 16 for type 2 diabetes.
- Duration
  - Clients with type 1 diabetes should gradually work up to 30 minutes or more per session.
  - 40 to 60 minutes is recommended for individuals with type 2 diabetes.
- Frequency
  - Five to six days per week
  - Some clients may need to start out with several shorter daily sessions.

Metabolic Syndrome

- The metabolic syndrome (MetS) is a cluster of conditions that puts a person at an increased risk for developing heart disease, type 2 diabetes, and stroke.
- MetS be identified as the presence of three or more of the following components:
  - Elevated waist circumference
    - Men ≥40 inches (102 cm)
    - Women ≥35 inches (88 cm)
  - Elevated triglycerides: ≥150 mg/dL
  - Reduced HDL cholesterol
    - Men <40 mg/dL
    - Women <50 mg/dL
  - Elevated blood pressure: ≥130/85 mmHg
  - Elevated fasting blood glucose: ≥100 mg/dL

Exercise Guidelines for MetS

- Mode
  - Begin with low-impact activities
  - Consider non-weightbearing activities for obese clients and those with musculoskeletal challenges
  - Twice-a-week resistance training is appropriate and beneficial, using eight to 10 exercises at eight to 12 repetitions.
  - Encourage a physically active lifestyle
- Intensity
  - RPE of fairly light to somewhat hard (11 to 13 on the 6 to 20 scale) or 30 to 75% of VO_2 reserve
  - Begin at a low intensity and gradually progress as conditioning improves and weight loss occurs.
- Duration
  - Total weekly accumulation of 200 to 300 minutes using a gradual progression
  - Intermittent short exercise bouts (10 to 15 minutes) accumulated throughout the day may be appropriate
- Frequency
  - Three to five days per week, preferably daily

Asthma

- Asthma is a chronic inflammatory disorder characterized by:
  - Shortness of breath
  - Wheezing
  - Coughing
  - Chest tightness
- The inflammatory response is typically set off by environmental triggers.
- Approximately 80% of people with asthma experience asthma attacks during and/or after physical activity [exercise-induced asthma (EIA)].
- Most people with controlled asthma will benefit from regular exercise and can follow exercise guidelines for the general population.
- A client with asthma should be cleared by his or her physician prior to beginning an exercise program.

Precautions/Recommendations for Asthma and Exercise

- Clients with asthma should have rescue medication with them at all times and be instructed on how to use it.
- Clients should drink plenty of fluids before, during, and after exercise.
- Clients should avoid asthma triggers during exercise.
- Asthmatic clients should utilize gradual and prolonged warm-up and cool-down periods.
- Peak exercise intensity should be determined by the client's state of conditioning and asthma severity.
- Reduce intensity and terminate the exercise session should symptoms worsen.
- If an asthma attack is not relieved by medication, activate the emergency medical system.
- People with asthma often respond best to exercise in mid-to-late morning.

Exercise Guidelines for Asthma

- Mode
  - Walking, cycling, ergometer use, and swimming
  - For some clients, upper-body exercises may not be appropriate because of the higher ventilation demands
- Intensity
  - Low- to moderate-intensity dynamic exercise
  - Begin easy and gradually increase intensity during the session
- Duration
  - Gradually progress total exercise time to 30 minutes or more
  - Encourage longer, more gradual warm-up and cool-down periods (10 minutes or more)
- Frequency
  - Three to five days per week
  - Some clients may benefit from intermittent exercise (two or three 10-minute sessions, or interval training).

Cancer

- Cancer is a group of diseases in which abnormal cells divide without control.
- Cancer rates may dramatically increase over the next decade due to:
  - The aging population
  - Continued population growth
  - Rapidly improving detection technology
- Metastasis
- Malignant versus benign cells
- Physical activity can help protect active people from acquiring some cancers
- The goal of exercise in the treatment of cancer is to:
  - Maintain and improve cardiovascular conditioning
  - Prevent musculoskeletal deterioration
  - Reduce symptoms such as nausea and fatigue
  - Improve the client's mental health outlook and overall quality of life

Precautions for Exercise and Cancer

- Clients who are anemic should not exercise without physician clearance.
- Clients with neutropenia should consider avoiding public gyms.
- Clients who have experienced frequent vomiting and/or diarrhea should check with their physicians before resuming exercise.
- Swollen ankles, unexplained weight gain, and/or shortness of breath at rest or with limited exertion should be reported to the client's physician.
- Clients with thrombocytopenia and those taking blood thinners should avoid activities that raise the risk of falls and physical contact.
- Cancer clients that have a catheter should avoid aquatic exercise.
- People should not exercise within two hours of chemotherapy or radiation therapy.

Exercise Guidelines for Cancer

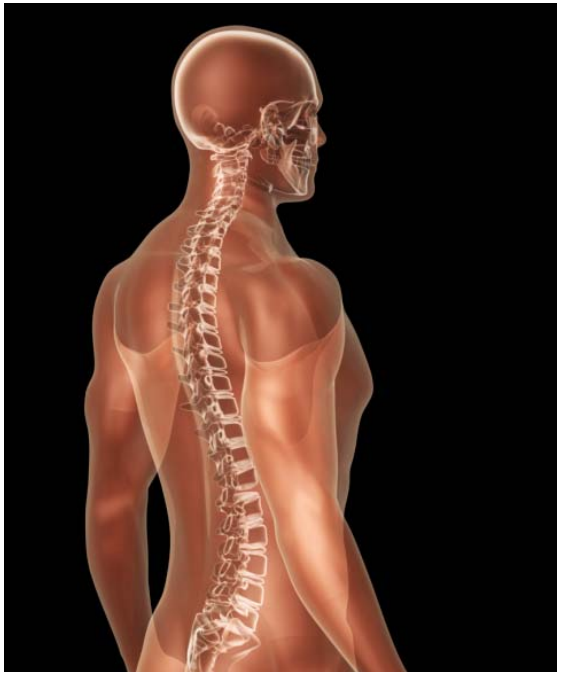
- Mode
  - Weightbearing exercise is appropriate
  - Low-impact or non-weightbearing aerobic activities are secondary options.
- Intensity
  - Light- to moderate-intensity exercise (RPE of 9 to 13 on the 6 to 20 scale)
  - Clients in remission and with good conditioning may be able to increase their exercise intensity levels.
  - Focus more on duration and consistency than intensity.
- Duration
  - Low-functioning clients may begin with multiple short bouts of activity.
  - Progress to 10-minute intermittent bouts and gradually build to 30 to 40 minutes of accumulated exercise
- Frequency
  - A cardiovascular, flexibility, and balance program can be performed on a daily basis.
  - Strength training can be performed two to three times a week, with at least a full 24 hours of rest between sessions.

Osteoporosis

- Osteoporosis is characterized by low bone mass and disrupted microarchitecture.
  - Defined as a bone mineral density (BMD) that is 2.5 standard deviations (s.d.) or more below the mean for young adults
  - Results in structural weakness and increased risk for fracture
- Osteopenia
  - BMD between 1.0 and 2.5 s.d. below the mean
- Bone remodeling
  - Formation versus resorption
- The goals of treatment are to retain bone mineral and decrease the risk of falls and fractures.
  - Exercise is an important part of the prevention and treatment plan for osteoporosis.

Contraindications for Exercise and Osteoporosis

- To prevent further injury and falls, some clients (e.g., those with spinal and other fractures) may need to avoid:
  - Spinal flexion, crunches, and rowing machines
  - Jumping and high-impact aerobics
  - Trampolines and step aerobics
  - Abducting or adducting the legs against resistance
  - Pulling on the neck with hands behind the head



Exercise Guidelines for Osteoporosis

- Mode
  - Weightbearing exercises and resistance training
  - Exclude any jarring, high-impact activities such as running.
  - Activities that promote balance and coordination should also be included.
- Intensity
  - Weightbearing activities are best performed at high intensities that promote high strain and stimulate bone adaptation.
  - Strength-training activities should be of higher intensity (8 RM).
- Duration
  - Duration of loading activities can be short (five to 10 minutes)
  - For cardiovascular exercise, clients with osteoporosis can follow the age-appropriate guidelines for the general public.
- Frequency
  - Multiple bouts of bone-loading exercises
  - Provide for adequate rest between exercise bouts
  - For cardiovascular exercise, clients can follow the age-appropriate guidelines for the general public.

Arthritis

- Arthritis is a chronic condition characterized by inflammation and associated joint pain.
  - Osteoarthritis
  - Rheumatoid arthritis
- Prevalence
  - Higher in women, and obese and overweight individuals
  - Higher in physically inactive people
  - Increases with age in both genders
- Individuals with arthritis can be classified into four categories of functional capacity.

American College of Rheumatology Revised Criteria for Classification of Functional Status in Rheumatoid Arthritis	
Class I	Completely able to perform usual activities of daily living (self-care, vocational, and avocational)
Class II	Able to perform usual self-care and vocational activities, but limited in avocational activities
Class III	Able to perform usual self-care activities, but limited in vocational and avocational activities
Class IV	Limited in ability to perform usual self-care, vocational, and avocational activities

Note: Usual self-care activities include dressing, feeding, bathing, grooming, and toileting. Avocational activities (recreational and/or leisure) and vocational (work, school, homemaking) activities are patient-desired and age- and sex-specific.

Hochberg, M.C. et al. (1992). The American College of Rheumatology 1991 revised criteria for the classification of global functioning status in rheumatoid arthritis. *Arthritis and Rheumatism,* 35, 5, 498–502.

Arthritis and Exercise

- Consistent exercise benefits clients with arthritis by:
  - Improving cardiovascular fitness, muscular strength and endurance, and joint mobility
  - Improving daily function and enhancing quality of life
- Precautions
  - Clients with hip and/or knee arthritis should avoid jarring exercises.
  - All joints should be moved through their full range of motion at least once a day to maintain mobility.
  - Emphasize proper body alignment and proper exercise technique at all times.
  - Special precautions must be taken when working with clients who have undergone a hip replacement.
  - Individuals with rheumatoid arthritis should not exercise during periods of inflammation.
  - Clients with arthritis may be more limited by joint pain than by cardiovascular function.

Exercise Guidelines for Individuals With a Hip Replacement
• Lift knee no higher than hip level or 90˚ flexion
• Toes straight ahead, no “pigeon” or “duck” toes
• No adduction past midline
• Need leg/hip abduction and lateral movements and strengthening

Exercise Guidelines for Arthritis

- Mode
  - Non-weightbearing or non-impact activities
  - For warm-water exercise, temperature should be in the 83 to 88˚ F range (28 to 31˚ C)
  - Daily recreational activities should also be encouraged.
- Intensity
  - Emphasize low-intensity, low-impact dynamic exercise
  - Intensity should be based on comfort level before, during, and after exercise.
  - Generally, 9 to 15 RPE range (6 to 20 scale)
- Duration
  - Prolonged and gradual warm-up and cool-down periods (greater than 10 minutes)
  - Begin initial exercise sessions at 10 to 15 minutes and gradually progress to 30 minutes.
  - Some individuals may require intermittent exercise with shorter durations.
- Frequency
  - Three to five days per week

Fibromyalgia

- Fibromyalgia is a syndrome characterized by long-lasting widespread pain and tenderness at specific points on the body.
- Diagnosis is based on generalized symptoms such as pain, fatigue, and sleep disturbances.
- Criteria for diagnosis is based on pain on palpation of 11 of 18 tender point sites (as listed in the table on the following slide).
- Exercise is beneficial, easing symptoms and preventing the development of other chronic conditions.
- Clients with fibromyalgia are typically deconditioned and tend to shy away from exercise.

Diagnostic Criteria for Fibromyalgia

American College of Rheumatology Diagnostic Criteria for Fibromyalgia
History of Widespread Pain
Pain is considered widespread when all of the following are present: • Pain in the left side of the body • Pain in the right side of the body • Pain above the waist • Pain below the waist
In addition, axial skeletal pain (in the cervical spine or anterior chest, or thoracic spine or low back) must be present. "Low-back" pain is considered lower-segment pain.
Pain on digital palpation in 11 of 18 tender-point sites: 1. Occiput: bilateral, at the suboccipital muscle insertions 2. Low cervical: bilateral, at the anterior aspects of the intertransverse spaces at C5-C7 3. Trapezius: bilateral, at the midpoint of the upper border 4. Supraspinatous: bilateral, at origins, above the scapular spine and near the medial border 5. Second rib: bilateral, at the second costochondral junctions, just lateral to the junctions on upper surfaces 6. Lateral epicondyle: bilateral, 2 cm (0.8 inches) distal to the epicondyles 7. Gluteal: bilateral, in upper, outer quadrants of the buttocks in the anterior fold of the muscle 8. Greater trochanter: bilateral, posterior to the trochanteric prominence 9. Knee: bilateral, at the medial fat pad proximal to the joint line

Wolfe, F. et al. (1990). The American College of Rheumatology 1990 Criteria for the Classification of Fibromyalgia: A report for the multicenter criteria committee. *Arthritis Rheumatology,* 33, 160–172.

Exercise Guidelines for Fibromyalgia

- Mode
  - Walking, low-impact activities, and swimming
  - Include light stretching as part of the daily routine, along with resistance exercise activities
- Intensity
  - Low to moderate intensity—RPE of 9 to 13 (6 to 20 scale)
- Duration
  - Gradually progress to a goal of 150 minutes or more per week of aerobic activity.
  - May need to begin with frequent short-duration sessions (10 minutes) and gradually build over time
- Frequency
  - Three to five days per week

Chronic Fatigue Syndrome

- Chronic fatigue syndrome (CFS) is characterized by incapacitating fatigue lasting at least six months.
- Diagnosis can be challenging, as many of the signs and symptoms of CFS also occur with other diseases and health conditions (as listed in the table on the following slide).
- The treatment regimen may include:
  - Moderating daily activity
  - Gradually progressing exercise
  - Cognitive behavior therapy
  - Treatment of depression
  - Treatment of existing pain
  - Treatment of allergy-like symptoms
- Most people with CFS cannot tolerate traditional exercise routines.
  - Moderate- to vigorous-intensity activities can cause an exacerbation in fatigue and other symptoms associated with CFS.

Chronic Fatigue Syndrome Criteria

Chronic Fatigue Syndrome Criteria

- Unexplained, persistent fatigue that is not due to ongoing exertion, is not substantially relieved by rest, is of new onset (not lifelong), and results in a significant reduction in previous levels of activity

AND

- Four or more of the following symptoms present for six months or more:
  - ✓ Impaired memory or concentration
  - ✓ Post-exertional malaise (extreme, prolonged exhaustion and exacerbation of symptoms following physical or mental exertion)
  - ✓ Unrefreshing sleep
  - ✓ Muscle pain
  - ✓ Multijoint pain without swelling or redness
  - ✓ Headaches of a new type or severity
  - ✓ Sore throat that is frequent or recurring
  - ✓ Tender cervical or axillary lymph nodes

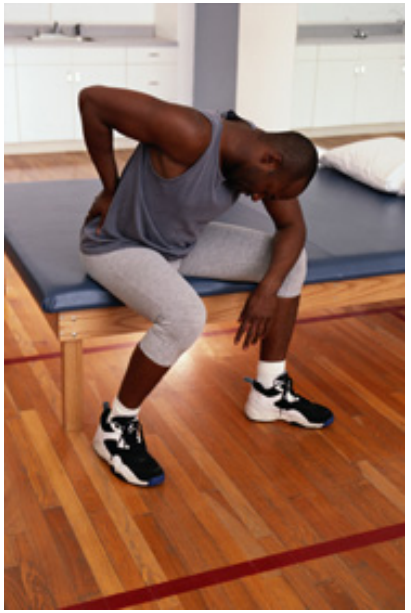
Sources: Griffith, J.P. & F.A. Zarruof (2008). A systematic review of chronic fatigue syndrome: Don't assume it's depression. Primary Care Companion. *Journal of Clinical Psychiatry*, 10, 2, 120–128; Centers for Disease Control and Prevention (2006a). *Toolkit for Healthcare Professionals: Chronic Fatigue Syndrome*. www.cdc.gov/cfs

Exercise Guidelines for CFS

- Mode
  - Activities of daily living and walking or low-impact activities
  - Light stretching and light resistance training
- Intensity
  - Low-intensity exercise
  - Develop a “regular” pattern of activity that does not result in post-activity malaise
- Duration
  - Begin with multiple two- to five-minute exercise periods followed by six- to 15-minute rest breaks (i.e., 1:3 ratio).
  - Gradually build to 30 minutes of total activity
- Frequency
  - Three to five days per week

Low-back Pain

- Chronic back pain is pain that persists for more than three months.
- A number of lifestyle-related factors are associated with low-back pain (LBP):
  - Physical inactivity
  - Being overweight or obese
  - Poor posture and sleeping position
  - Stress
  - Smoking
- Exercise is one of the cornerstones of both the prevention and treatment of LBP.



Contraindications for Clients With LBP

- Clients with LBP should avoid:
  - Unsupported forward flexion
  - Twisting at the waist with turned feet, especially when carrying a load
  - Lifting both legs simultaneously when in a prone or supine position
  - Rapid movements, such as twisting, forward flexion, or hyperextension
- Clients should *not* be encouraged to “work through the pain.”

Recommendations for Exercise for LBP

- Clients with LBP should consult with a physician and get specific recommendations for exercise.
- Always maintain neutral pelvic alignment and an erect torso during any exercise movements.
- Avoid head-forward positions in which the chin is tilted up.
- When leaning forward or lifting or lowering an object, always bend the knees.
- Avoid hyperextending the spine in an unsupported position.
- Low-back exercises have the most beneficial effect when performed daily.
- Diurnal variation stresses are highest in the intervertebral discs following bed rest and diminish over the subsequent few hours.
- Strength gains should not be overemphasized at the expense of endurance.
- There is no such thing as an ideal set of exercises for all individuals.
- Increased function and pain reduction may not occur for three months.

Exercise Guidelines for LBP

- Mode
  - Walking, stationary biking, and swimming
  - Core strengthening exercises, light resistance training, and stretching may also be included
- Intensity
  - Light to moderate intensity is recommended initially.
  - As conditioning improves and symptoms dissipate, progress to moderate to vigorous activity.
- Frequency
  - Three to five days per week
  - Specific back health exercises may be performed daily.

Weight Management

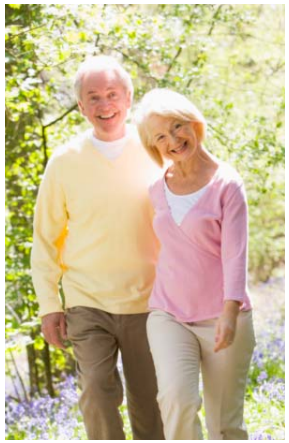
- Obesity is defined as an excessive amount of adipose tissue in relation to lean body mass.
- Lifestyle habits and cultural changes contribute to weight gain and obesity, including:
  - Overeating through increased caloric intake
  - The proliferation of microwaveable and ready-to-eat high-fat foods
  - Less in-home cooking and eating out and on-the-go more often
  - Marketing that entices people to choose foods that are higher in calories and fat
  - Low levels of physical activity
  - Excessive amounts of time spent doing sedentary activities
- Overweight or obese clients seeking weight loss should accumulate more than 150 minutes of moderate-intensity exercise each week.

Exercise Guidelines for Weight Management

- Mode
  - Walking, cycling, group exercise classes, aquatic exercise, and resistance training
- Intensity
  - Low to moderate
  - Be aware of signs that the client is working too hard and modify intensity as required
- Duration
  - Accumulate 150 to 200 or more minutes each week
- Frequency
  - Five to six days per week
  - Initially, two to three days per week may be all that is tolerated

Exercise and Older Adults

- Regular physical activity is essential for older adults who wish to maintain independence and quality of life.
- The following areas are affected by aging and should be considered when programming for this population:
  - Cardiovascular system
  - Musculoskeletal system
  - Sensory systems
  - Mental health



- At least twice each week, older adults should perform muscle-strengthening and flexibility activities.
- Older adults at risk for falling should perform exercises that maintain or improve balance.

Exercise Guidelines for Older Adults

- Mode
  - Endurance exercise should be the primary exercise mode
  - Weight training that features low resistance and high repetitions (at least initially) and include exercises that maintain or improve balance
  - Active lifestyle and participation in recreational activities
- Intensity
  - Range from low to moderate (RPE of 11 to 13 on the 6 to 20 scale), with relatively few individuals performing vigorous exercise
- Duration
  - Longer and more gradual warm-up and cool-down periods
  - Gradually increase exercise duration to 30 to 60 minutes per session
- Frequency
  - At least five days each week
  - Daily exercise of shorter duration may be appropriate initially

Exercise and Youth

- Regular physical activity in children and adolescents is essential to promote health and fitness.
- The primary exercise activities for youth are aerobic conditioning, muscle strengthening, and bone strengthening.
- The following guidelines help decrease the risk of injury from exercise training in youth:
  - Obtain medical clearance or instructions regarding physical needs.
  - Children should be properly supervised and use proper exercise technique at all times.
  - Do not allow children to exercise unless the weight-training facility is safe for them.
  - Never have children perform single maximal lifts.
  - Teach children how to breathe properly during exercise movements.
  - Never allow children to use any equipment that is broken or damaged, or that they do not fit on properly.
  - Children should rest for approximately one to two minutes between each exercise.
  - Children should have scheduled rest days between each training day.
  - Tell children that they need to communicate when they feel tired or fatigued, or when they have been injured.

Heat-related Precautions for Exercise in Youth

- Reduce the intensity of exercise when it is very hot, humid, or sunny.
- Cancel activity or move indoors to an air conditioned environment during periods of very hot and especially humid conditions.
- Maintain hydration
- To prevent hyponatremia, replace both lost water and salt.
- Encourage frequent breaks/rest periods in the shade, and have children drink fluids during these breaks.
- Encourage lightweight, light-colored, loose-fitting clothing, as well as the use of sunscreen.

Exercise Guidelines for Youth

- Mode
  - Sustained activities that use large muscle groups
  - Recreational sports
  - Muscle-strengthening and bone-strengthening exercise
- Intensity
  - Start with low-intensity activity and gradually progress
  - As conditioning progresses, include moderate- and vigorous-intensity activity.
- Duration
  - Accumulate 60 minutes or more of daily physical activity.
- Frequency
  - Youth should be encouraged to exercise daily.
  - Activities should include a variety of play and recreational activities.

Pre- and Postnatal Exercise

- Exercise during pregnancy and the postpartum period:
  - Reduces the risk of preeclampsia
  - Treats or prevents gestational diabetes
  - Helps manage or alleviate pregnancy-related musculoskeletal issues
  - Positively affects mood and mental health
  - Is safe and does not harm offspring health or development
- Pregnant women with the following health conditions should not exercise:
  - Risk factors for pre-term labor
  - Vaginal bleeding
  - Premature rupture of membranes

Exercise Recommendations for Pregnancy

- Do not begin a vigorous exercise program shortly before or during pregnancy.
- Women who have been previously active may continue their exercise programs, as tolerated.
- Women who have not previously been active may need to begin slowly and perform intermittent exercise.
- Gradually reduce the volume of exercise during the second and third trimesters.
- Use the RPE scale rather than heart rate to monitor exercise intensity.
- Avoid prolonged exercise in the supine position after the first trimester.
- Avoid long periods of standing and instead keep moving or sit and rest.
- Exercise should be avoided when the temperature and/or humidity is high.
- Body temperature should not exceed 100° F (38° C).
- Focus on proper fluid intake.
- Utilize extended warm-up and cool-down periods and incorporate some stretching.
- Wear supportive shoes and undergarments.
- Eat a small snack prior to exercise.

Contraindicated Activities for Pregnant Exercisers

- Activities that require extensive jumping, hopping, skipping, bouncing, or running
- Deep knee bends, full sit-ups, double-leg raises, and straight-leg toe touches
- Contact sports such as softball, football, basketball, and volleyball
- Bouncing while stretching
- Activities where falling is likely

Exercise Guidelines for Pregnancy

- Mode
  - Aerobic and strength-conditioning exercises
  - Avoid jumping and jarring activities and contact sports
- Intensity
  - Light- to moderate-intensity (9 to 13 on the 6 to 20 scale)
- Duration
  - Begin with 15 minutes of continuous exercise and gradually build to 30-minute sessions.
  - Women who are already exercising may be able to start at 30 to 40 minutes.
- Frequency
  - Three to five days per week

Postnatal Exercise Guidelines

- After delivery, women should adhere to the following general guidelines:
  - Obtain physician clearance and guidelines prior to resuming or starting an exercise program.
  - Begin slowly, and gradually increase duration and then intensity.
  - Start with walking several times per week.
  - Avoid excessive fatigue and dehydration.
  - Wear a supportive bra.
  - Stop the exercise session if unusual pain is experienced.
  - Stop the exercise session and seek medical evaluation if bright red vaginal bleeding occurs that is heavier than a normal menstrual period.
  - Drink plenty of water and eat appropriately.

Summary

- The likelihood of working with one or more “special population” clients is high.
- The personal trainer must be careful not to step beyond the defined scope of practice when working with special populations.
- This session covered:
  - Cardiovascular disorders
  - Metabolic disorders
  - Musculoskeletal disorders
  - Asthma
  - Chronic fatigue syndrome
  - Weight management
  - Older adults and exercise
  - Youth and exercise
  - Pre- and postnatal exercise