



CLINICAL EXERCISE SPECIALIST MANUAL

A Fitness Professional's Guide
to Training People with
CHRONIC DISEASE

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**A FITNESS PROFESSIONAL'S GUIDE TO
EXERCISE AND CHRONIC DISEASE**

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CHAPTER 1

CHRONIC DISEASE AND THE BENEFITS OF EXERCISE

By the end of this chapter you will understand:

- Exercise and chronic disease
 - Exercise in the health care continuum
 - Common terms
 - FITT
 - The three stages of prevention
-

Chronic Disease Statistics

Chronic disease is defined as a disease that progresses slowly, lasts for a year or longer, requires ongoing medical care, and interferes with activities of daily living (ADLs), versus *acute* disease that develops and dissipates quickly (Boothe, Roberts, & Laye, 2012). Most chronic diseases are caused by a few risk behaviors such as smoking, poor nutrition, excessive alcohol consumption, and a lack of physical activity. Whereas historically infection was the leading cause of death in the United States, today most people in the United States will die from chronic disease. The following statistics are alarming:

- Chronic diseases account for almost 70% of all deaths in the U.S., and interfere with activities of daily living for about 10% of the U.S. population.
- At least 50%, and maybe as many as 60% of the adult U.S. population has at least one chronic disease.

- 25-40% of the adult U.S. population have two or more chronic diseases.
- Almost 10% of the U.S. population has diabetes.
- Almost 40% of U.S. adults are considered obese.
- The most prevalent chronic disease is cardiovascular disease:
 - Cardiovascular disease is a broad term for any disease of the heart, blood vessels, or circulation.
 - Cardiovascular disease is responsible for almost 18 million deaths annually, or 31% of deaths worldwide.
- Hypertension (HTN) effects over 100 million U.S. adults.
 - HTN is blood pressure (BP) above 140/90mmHg, prehypertension is BP of 120-130/80-89mmHg, and normal BP is 120/80mmHg.
- Type 2 diabetes effects over 30 million adults in the U.S. and is expected to increase to 336 million adults worldwide by 2030.
- In the U.S. 30 million adults suffer from osteoarthritis:
 - It is thought that everyone over the age of 60 has at least one joint effected by osteoarthritis.
 - Rheumatoid arthritis effects just 1% of the adult population.
- *Cancer* is the name given to a group of diseases characterized by uncontrolled cell growth that invade and degrade surrounding fresh tissue.
 - Almost 2 million people in the U.S. are diagnosed with cancer annually, and almost 600,000 will die from it, making it the second leading cause of death.
- The prevalence of asthma has increased over the past few decades to just under 10% of the adult and child U.S. population.
- Physical activity can positively affect over 30 chronic conditions, making it the best deterrent of chronic disease in primary and secondary prevention.
- Only 15-20% of U.S. adults meet the minimum guidelines for physical activity.
- One-third of the world's population does not perform the recommended amount of daily activity, making a sedentary lifestyle one of the biggest public health threats of modern times (American Diabetes Association, 2019; American Heart Association, 2018; Boothe et al., 2012; Centers for Disease Control and Prevention (CDC), 2018; CDC, 2019a; CDC, 2019b; CDC, 2019c; CDC, 2019d; Durstine, Gordon, Wang, & Luo, 2013; Jacobs, 2018; Lobelo, Stoutenberg & Hutber, 2014; Pedersen & Saltin, 2015; Philips & Kennedy, 2012; Spivey, 2015; World Health Organization, 2019).

Common Terms

Before we move on, there are a few terms that are often used interchangeably, and need to be defined (American College of Sports Medicine [ACSM], 2018; Booth et al., 2012; Fahey, Insel, & Roth, 2015).

- *Physical activity* is any bodily movement produced by voluntarily contracting skeletal muscle that results in energy expenditure above a basal level.
- *Exercise* is a repetitive and purposeful, planned, structured physical activity with the objective to improve or maintain one or more components of physical fitness, to include aerobic capacity, muscular strength, muscular endurance, flexibility, or agility.
- *Health* is the overall condition of the body or mind, and the presence or absence of illness or injury. Age, genetics, and family history can determine health, and therefore health may not always be controllable.
- *Wellness* encompasses a number of dimensions of well-being as a descriptor of optimal health. The dimensions are physical, emotional, financial, cultural, spiritual, intellectual, and interpersonal. Wellness is considered controllable based on the elimination of risk factors, diet, activity, and outlook or perception.
- *Physical inactivity* describes individuals who do not get the recommended amount of regular physical activity.
- *Clinical exercise*, *medical exercise*, and *medical fitness* are often used interchangeably, depending on the author of a text or study. We have tried to exclusively use the term *clinical exercise*, but if citing another author's work, we use the term the original author used.

FITT

Current guidelines for physical activity are based on the FITT template (frequency, intensity, time, type). The ACSM (2018) suggests moderate intensity aerobic exercise should be performed at least 5 days per week, and vigorous intensity activity be performed 3 days per week, or a combination of both. Moderate intensity aerobic activity is considered a VO_2 reserve (VO_{2R}) of 40-59%, and vigorous is considered a VO_2R of 60-84%. Bouts of moderate intensity aerobic exercise should last 30-60 minutes with a minimum of 150 minutes per week, and bouts of vigorous intensity aerobic exercise should last 20-60 minutes for at least 75 minutes per week. Aerobic exercise is considered rhythmic exercise using large muscle groups (Garber et al., 2011).

Resistance training should be performed 2-3 non-consecutive days per week. Starting intensity should be 40-50% of the maximum weight an individual can lift for one repetition (1RM), and progress to 60-80% for intermediate exercisers, and >80% for experienced exercisers. Although there are no time guidelines for resistance training, chosen exercises should target each major muscle group. Two-four sets are recommended, with 8-12 repetitions in each set for most adults, 10-15 repetitions for deconditioned adults, and 15-20 repetitions to improve muscular endurance (Garber et al., 2013).

Neuromuscular training should be performed 2-3 days per week with each bout lasting 20-30 minutes. Intensity guidelines for neuromuscular training have not been established, but exercises that challenge motor skills and proprioception should be performed.

Flexibility exercises should be done 2-3 days per week, but performing them more often increases the benefits. Each stretch should be taken to a point of tightness or slight discomfort, with static stretches

held for 20-30 seconds, keeping in mind holding each stretch for longer offers increased benefits. Active, passive, dynamic, and proprioceptive neuromuscular facilitation (PNF) stretching are considered effective modalities. Table 1.1 details FITT protocols for apparently healthy adults.

Table 1.1

FITT guidelines

Mode	Frequency	Intensity	Time	Type
Cardiorespiratory Exercise/Aerobic	≥ 5 days/week of moderate intensity or ≥ 3 days/week of vigorous intensity	Moderate or vigorous	30-60 min/day of moderate (150 min/week) 20-60 min/day of vigorous (75 min/week)	Continuous, rhythmic, includes all major muscle groups
Older or deconditioned individuals		Light to moderate	bouts of <10 min can be beneficial	
Resistance Exercise	Each major muscle group 2-3 days/week	60%–70% of the 1RM (moderate to hard intensity) for novice to intermediate exercisers $\geq 80\%$ of the 1RM (hard to very hard intensity) for experienced strength trainers <50% of the 1RM for muscular endurance	8–12 reps to improve strength 15–20 reps to improve muscular endurance 2-4 sets	Resistance exercises involving each major muscle group, targeting larger groups first
Older or deconditioned individuals		Light intensity; 40-50% 1RM	10–15 reps for strength 15-20 reps for muscular endurance A single set can be effective	
Posture Restoration	1-2x/day	Small overload in controlled positions	Hold isometric contractions for 5-10 seconds Dynamic contractions: 1-2 sets, 12-20 reps	30-45 minutes 1-3 months

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Flexibility	≥ 2-3 days/week	Stretch to the point of feeling tightness or slight discomfort	Static stretching hold for 10-30 sec. or up to 60 sec. for older individuals For PNF stretching, a 3- to 6-sec contraction at 20%–75% maximum voluntary contraction followed by a 10-30 sec. assisted stretch	Static flexibility, Dynamic flexibility PNF
Older or deconditioned individuals			Static stretching hold for up to 60 sec.	
Posture Restoration	10 min bouts 1-2x/day	Static-to the point of tension Dynamic-controlled to the point of resistance	Static—2-4 reps; 30-60 seconds Dynamic—1-2 sets, 5-10 reps	30-45 min 1-3 months
Neuromuscular exercise training The effectiveness of neuromuscular exercise training in younger and middle-aged persons has not been Established	≥2-3 days/week	N/A	≥20-30 min/bout	Exercise that challenges motor skills, coordination, and proprioception such as Yoga or Tai Chi

Garber et al, 2011

Booth et al. (2012) suggest physical inactivity is activity at a level less than what is required for optimal health and is considered a cause of chronic disease and premature death. The deleterious effects of inactivity are progressive and compounding, resulting in a worse state of disease and/or dysfunction. Cardiovascular disease, muscular atrophy, hypertension, lipid disorders, diabetes, and osteoporosis will all deteriorate with prolonged periods of inactivity (Jacobs, 2018). In other words: use it or lose it.

Clinical Exercise in the Healthcare Continuum

The current model of healthcare in the U.S. is based on treatment rather than prevention (Ali & Katz, 2015). Treatment is given for a disease or injury that has been diagnosed; prevention is taking measures to avoid or improve a probable or possible disease or injury (Booth et al., 2012). Prevention is categorized as primary, secondary, or tertiary. The goal of primary prevention is to keep a condition from developing and includes immunizations, targeted types of exercise, wellness programs, and education. Secondary prevention interrupts the progression of disease to slow down or reverse the progression. Examples are treatment for hypertension, asthma, and some cancer treatments. The goal of tertiary prevention is to manage and treat symptomatic disease to reduce the severity, restore function, and reduce disease related complications, and includes treatment for late stage cancer, coronary heart disease, and rehabilitation (Booth et al., 2012; Katz & Ali, 2009; Spivey, 2015). The best deterrent of chronic disease is physical activity for primary and secondary prevention; therefore, the main goal of clinical exercise in the healthcare continuum is to prevent the onset of chronic disease (Durstine, et al., 2013).

The role of a clinical exercise specialist (CXS) is to work with a client's team of other healthcare providers. Building a medical network indicates a fitness professional's main goal is the wellbeing of a client. The team of providers may include a nutritionist or RD, a rehabilitation specialist or physical therapist, or an alternative healthcare provider such as a massage therapist or chiropractor. A client's referring physician may be a cardiologist, oncologist, or orthopedist; regardless, the physician is the center of the client's healthcare team and should be provided regular updates as to the client's progress (Mikeska, 2015; Spivey, 2015).

Discussion and application

1. Define chronic illness and provide an overview of how your fitness practice will benefit clients with one or more chronic illness. If possible, provide an example of how you have already done this.
2. Explain the three levels of prevention and provide examples of each one. How would you explain this to a client?

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