

ENDURANCE TRAINING

Advanced Concepts

Volume 1

NFPT 

Training Methodologies for
Improving Aerobic
Functions and Outcomes.



Endurance Training Manual

A complete guide to aerobic and endurance sports training

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Recommended Reading – NFPT Personal Trainer Manual, as well as the Nutrition & Resistance Training Specialty Manuals for the best possible holistic education experience!

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Preface & Introduction

Welcome to one of the most unique and valuable approaches to learning advanced education in the area of endurance training as it relates to health, fitness, and sports. Be prepared for an “inside out” approach to the study of endurance training. Unlike most study & reference manuals teaching to this subject, this manual is based around the exact same independent research that has earned the National Federation of Professional Trainers (NFPT) its esteemed position as an industry leader having credentialed thousands of certified fitness professionals. For the purpose of comprehension NFPT research has been translated and presented such that complicated relative body function and scientific terminology as they relate to endurance training topics are better understood.

This manual is meant to complement your existing knowledge and add to it with advanced endurance training approaches.

The test for this course requires you to understand the endurance training concepts presented while also possessing experience in the fundamental application of these methodologies. Knowledge, Skills and Abilities (KSAs) on these topics are measured by assessment on the Endurance Training test. This assessment may also require you to call upon your existing KSAs in some areas of application of aerobic exercise.

All of these individual chapters focus around diverse scenarios teaching to the direct interaction that exists between the functions of anatomy & biology, and the application of activity all along the entire energy continuum. Education on how the body functions, adapts to, and provides energy for activity is paramount for having a full and well rounded Endurance Trainer education.

We hope that you will find the educational approach in this manual to be unique and enlightening as NFPT methodologies are discussed and the scientific reasoning behind the research is presented. Learn how NFPT research findings impact issues ranging from weight maintenance to advanced endurance sports performance.

General Health and Other Considerations

General Exercise and the Aerobic Prescription

After spending countless hours in the gym lifting weights and doing aerobics, how will you know when you're physically fit? Many of your clients will tell you they just want to get fit. Therefore, it is important to know just what constitutes a general state of physical fitness.

Being physically fit means, "having the energy and strength to perform daily activities vigorously and alertly, with energy left over to enjoy leisure activities or to meet emergency demands." Your heart, lungs, and muscles should be strong. Your weight and body fat should be within a desirable range. For women, fat should not exceed 25% of their body weight. For men, fat should not exceed 18% of their body weight.

To determine a level of physical fitness, break up your fitness prescription into 3 measurable parts: Endurance, Strength and Flexibility. For our purposes we will be discussing the endurance phase of this general fitness prescription. Endurance is defined as “the ability to keep moving for long periods of time.” There are 2 categories of endurance, Cardiorespiratory and Muscular.

Cardiorespiratory Endurance

Cardiorespiratory Endurance is the prolonged ability of your heart and lungs to supply muscles with nutrients and oxygen. Aerobic exercise like biking, jogging, and swimming enhance cardiorespiratory endurance, and performance can be measured for speed, duration and distance.

Building endurance promotes higher energy levels. Aerobic exercise also burns calories and fat to keep your weight under control. A fit cardiorespiratory system lowers the risk of death from heart attacks, strokes, and pulmonary disease.

Developing the Aerobic Phase

The following principles should be applied when developing the aerobic phase of a general fitness exercise prescription to enhance cardiorespiratory fitness:

1. **Type of Activity.** The activity must use large muscle groups and must be maintained for a period of time.
2. **Intensity.** The average conditioning intensity for healthy adults is 60-70% of their *functional capacity*, referred to as *maximum heart rate*. Monitoring a target heart rate training zone during exercise is a good way to measure intensity.
3. **Duration.** The duration of the exercise will depend on the intensity of the exercise. Usually activities of

lower intensity, such as walking, can last longer than a high intensity exercise like running. Aerobic fitness can also be accomplished by alternating high and low-level activities as in walking between brief periods of jogging for 15 to 60 minutes of continuous or discontinuous aerobic activity.

4. **Frequency of Conditioning.** The aerobic activity must be performed from 3 to 5 days a week.
5. **Rate of Progression.** In the first 6-8 weeks of exercise, significant conditioning effects will occur. The fitness professional will have to adjust the intensity and duration of the activity if progress is to continue.

Progression and the Aerobic Phase

There are 3 stages of progression in the aerobic or endurance phase of the exercise prescription:

1. **The Initial Conditioning Stage.** During the first 4 to 6 weeks, low-level activities of 10-15 minutes, at 60-70% of maximum heart rate, are recommended for the average healthy individual. You should also include some stretching and light calisthenics, such as abdominal work.
2. **The Improvement Conditioning Stage.** Initially, there is a slight increase in exercise intensity. Thereafter, duration of the activity is increased every 2 to 3 weeks. Older and significantly de-conditioned individuals may take longer to adapt to increases in conditioning intensity and duration.
3. **The Maintenance Conditioning Stage.** Usually after 6 months of aerobic training, the average individual has achieved their goal of general fitness and just wants to maintain. Aerobic Maintenance Conditioning can be accomplished in as few as three 30 minute workouts a week, training at 60-70% of maximum heart rate.

Muscular Endurance

The second type of endurance one must develop to be physically fit is Muscular Endurance. Muscular Endurance is defined as the ability of your muscles to perform contractions for long periods of time. The number of curl ups one can perform, for example, is a measure of abdominal endurance.

Improving Muscular Endurance

Generally, the performance of high repetition resistance exercises enhances the endurance of the muscles involved. The muscular endurance phase of a general fitness exercise prescription may include the performance of a circuit routine consisting of multiple exercises targeting all of the major muscle groups and involving the largest amount of muscle tissue possible.

Post-Workout Stretching

After a high repetition muscle endurance workout, it is most important to stretch the just previously trained muscles. Post-workout stretching is performed for the purpose of possibly improving between workout recovery through increased relaxation and resulting enhanced blood flow. This improved collateral circulation will provide for greater waste removal, as well as healing nutrient provision.

What Exercise is Best

High rep resistance training is quite possibly the healthiest form of exercise you can prescribe to your clients with general fitness goals. While aerobic workouts alone can lead to loss of valuable body tissue and heavy resistance exercise

alone can result in poor cardiorespiratory efficiency, high rep resistance training is the compromise that should be prescribed where general fitness is concerned. This type of exercise possesses all of the favorable attributes of aerobics and heavy training. With the performance of resistance exercise for general fitness there is less risk of tissue loss as there is with aerobics when aerobics are performed alone in the overall fitness program. The inclusion of high repetition resistance exercise along with aerobics will increase resting metabolism. Overtraining aerobically in the absence of resistance exercise may result in lean weight loss. While varying the rest periods between sets of high repetitions, a favorable yet not optimal aerobic effect can be achieved. If cardiorespiratory enhancement is to be achieved however, resistance-based cardio effects can not replace steady-state aerobic exercise.

High rep resistance exercise will allow a client more flexibility in dietary control of fat deposits. This is due to the fact that recovering muscle tissue will require a greater amount of ingested calories. This will leave fewer surplus calories for fat deposit. Also, as explained elsewhere, during recovery from energy exhaustive resistance training, fats are used for ATP production during glucose uptake, conversion, and storage in the individual muscle cells. This accounts for a great deal of fat loss.

A twist not yet discussed relative to high rep resistance exercise has recently become evident. The cardiovascular system subjected continuously to this type of training tends to adapt by increasing and extending capillaries and improved circulation.

While blood flow is being interrupted during a long-term continuous contraction there is a back pressure of fluid in the vessels. When relaxation finally