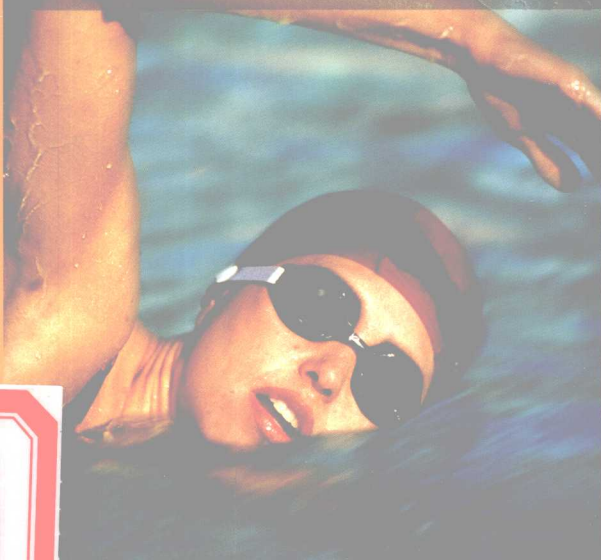


Interval Training for Fitness



Joseph T. Nitti & Kimberlie Nitti



F i t n e s s T r a i n e r s

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Important Note

The material in this book is intended to provide a review of information regarding fitness training. Every effort has been made to provide accurate and dependable information, and the contents of this book have been compiled through professional research and in consultation with medical professionals. However, always consult your doctor before undertaking a new exercise regime or doing any of the exercises – or following the suggestions – contained in this book.

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Foreword

Carl Lewis

As a world-class athlete and Olympic champion, I've found that people around the world are curious to peek inside the head of an elite athlete and find an answer to one particular question: what's the secret?

The truth is, there isn't one.

I didn't win those medals because I trained at altitude, or had to run back and forth to school as a child, or took any performance-enhancing drugs or supplements. There are only three things that make a great athlete: good genes, a strong work ethic, and an intelligent, well-crafted training programme.

It's been said, 'To become an Olympic athlete, choose your parents well.' There may come a day when genetic engineering is perfected, but for now we all have to work with what we're born with. What you *can* control is how hard you are willing to work for your physical goals.

It isn't easy, pushing your body to higher heights, faster times, greater distances. There have been many, many days when I felt too tired or too sore to work out or just plain didn't feel like doing it. But I did it anyway. That's what you do if you want to win gold at the Games or attain a personal best in a sport or just make your body fitter and stronger than ever before. Working hard and, even more importantly, working *smart* – this is truly the stuff of champions.

Not everyone can be an elite athlete. But knowing how to train like one, that's a whole different story. *Interval Training for Fitness* is the next best thing to having your very own coach. The techniques found in this book aren't new or revolutionary, as interval training has been used for decades by the world's greatest athletes. What is special about this book is that it presents interval training as a complete programme for athletes of *all* abilities. *Interval Training for Fitness* can teach you how to train like a world-class athlete – the rest is up to you. If you can dream great dreams and have the dedication, courage, and determination to make them come true, you can be one of the few to reach your full physical potential. Who knows how far you'll go? Set your goals high – then go out and attain them. That's what being an athlete is all about.



Carl Lewis has won more Olympic gold medals than any American in history. He has been ranked number one in the world in the 100 metres, 200 metres, and long jump multiple times. He is considered by many to be one of the greatest athletes of all time.

P r e f a c e

It's not the years, it's the mileage.

– Indiana Jones

Despite the overwhelming hype and promise of the fitness boom, most people never meet their fitness and weight loss goals. The complaints are all too common: 'I run 15 miles a week but I haven't lost any more weight.' Or, 'How can I still be out of shape when I work out on the stair climber 30 minutes every day?'

Why is this?

It's because most people do no more than mildly exert themselves at the same comfortable, steady pace each time they work out. It may work for a while, but as millions of frustrated exercisers have discovered, it doesn't work for long. The unfortunate thing is that most people have never been taught how to improve.

What is clearly needed is an exercise routine that:

- is scientifically and clinically proven to build muscle, burn fat, and improve the body's cardiovascular system
- can be adapted for use with different aerobic activities, such as running, walking, cycling, or swimming or for workouts using fixed exercise machines (such as stair climbers, stationary bicycles, treadmills, cross-country ski machines, or elliptical trainers)
- doesn't require any special or expensive equipment
- can be done alone or with others
- is designed so you can progress at your own pace
- can be used by anyone in reasonable health with a basic foundation of fitness
- offers a variety of workouts to keep things interesting
- provides a clear measure of physical improvement
- gives maximum results in minimal time

These very elements form the basis of the I.T. programme, a practical, easy-to-understand, scientifically and clinically proven fitness plan based on the training methods used by the fittest, leanest people on earth: elite athletes.

I.T. stands for 'interval training', a technique originally developed in the 1930s. Until then, athletic training for endurance events was a bit haphazard,

and many athletes who found their way to the top of the awards podium were victorious simply because they had the good fortune to have superior genetics. You either had it from birth or you didn't – the ability to go faster wasn't considered attainable by any other means.

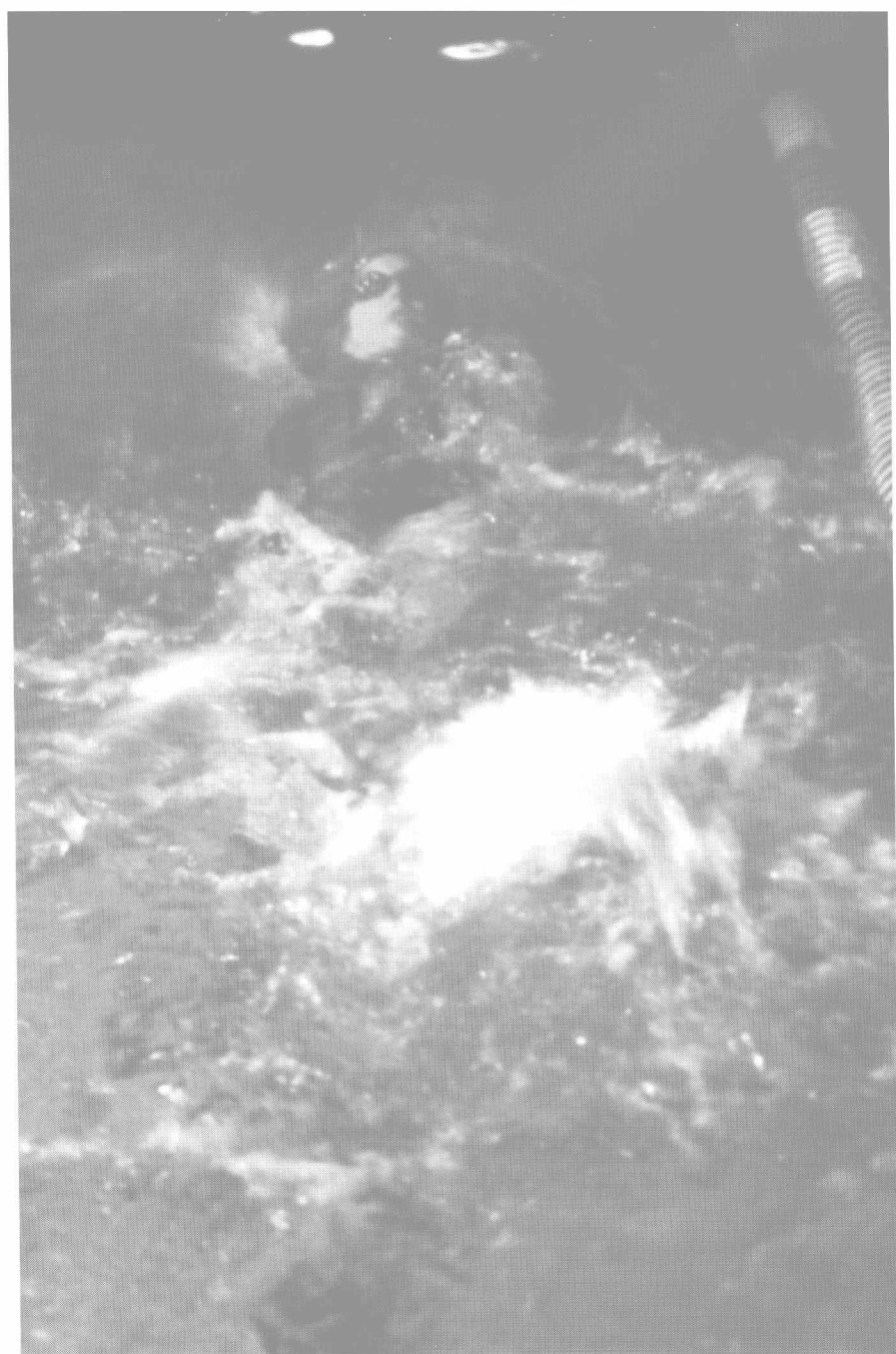
Fortunately, two German track coaches dared to think differently. As exercise physiologists, they had a theory that if a runner practised doing brief segments of his regular workouts at a faster 'race pace', he could later string together all those fast segments in actual competition to achieve a better overall time.

It worked. Varying the degree of effort used within a single workout (fast 'repetitions' followed by slower recovery 'intervals') produced spectacular results. World records began to improve dramatically and athletes all over the world scrambled to adopt the revolutionary interval training method for themselves. One such individual was British medical student Roger Bannister. In 1954, after using the principles of I.T. in his daily one hour training regime, he went on to be the first in the world to run a mile in under 4 minutes. This set an exciting new benchmark for athletic achievement – and human potential.

Today, every top endurance runner, cyclist and swimmer aiming for peak performance uses some form of interval training. That's a good enough recommendation for us. But what if you're not an elite athlete? No problem. The same physiologic principles apply to almost everyone, from weekend enthusiasts to national-class marathon runners. It's not necessary to be in stellar shape to benefit from interval training. Just the opposite, in fact: the I.T. programme is designed to help you attain superior fitness.

Until now, there's never been a single, authoritative source that presented the basic training principles of elite athletes in a way that could be adapted by others interested in better health and fitness. But after Joseph qualified for the '92 Olympic Trials, so many people began to ask for advice about their own training that we started writing down our notes, and the I.T. programme slowly began to take shape. Those who were motivated enough to follow the programme described in this book went on to achieve – and sometimes even surpass – their health and fitness goals. We were motivated to publish the I.T. programme because it worked for them, and we're confident it can work for you, too.

Joseph and Kimberlie Nitti



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I.T. basics: the science behind the fitness

Over the years, various fitness ‘gurus’ have had a major influence on the British public, offering a fitness programme designed to improve health, build muscle, and burn calories. Each one of these exercise entrepreneurs became a household name to thousands of faithful fans. But, oddly enough, the person who probably had the most influence on fitness might very well be someone you’ve never even heard of.

Dr Kenneth Cooper launched one of the biggest fitness revolutions in history with his book *Aerobics*, published in the late 1960s. Cooper’s book popularised the notion that moderate aerobic exercise (strictly defined as exercise done ‘with oxygen’) performed three to four times a week for 20 minutes was all it took to improve health and fitness. Aerobics became hugely popular and inspired the jogging craze of the 1970s and the ‘power walking’ fad that followed. People were understandably enthused about an exercise plan that required little more than lacing up a pair of trainers, wasn’t too physically taxing, didn’t take all day and even packed a bit of an endorphin kick. It sounded like the discovery of the Holy Grail of physical fitness, and, to some degree, it was. Aerobic devotees enjoy fairly decent returns for their rather minimal efforts, becoming fitter, managing their weight better and enjoying healthier lives.

In fact, aerobics has become such a part of the cultural lexicon that today the very word calls to mind images of lycra-clad bodies sweating to the beat of loud music in packed exercise studios. But the aerobics movement also includes the many dedicated fitness buffs who run, walk, cycle, swim and use fixed exercise machines. This massive group of well-intentioned, health-oriented individuals probably includes you, the reader of this book.

So the question is, with all this exercising going on why aren’t there more people out there in better shape?

Two words: Plateau effect.

The plateau effect

The ‘plateau effect’ is a rather disheartening levelling off of fitness as measured by such things as exercise tolerance, weight control, and athletic performance. Anyone who works out consistently has probably experienced this dreaded plateau to some degree. You’re exercising as much as ever, but instead of improving, you’re unable to budge those last few kilos or advance to a tougher level of step class or swim a mile any faster than you could swim it months ago.

Why is this?

It's because your exercise programme is too limited.

The bottom line is that purely aerobic exercise can only take the body so far, even if you had a whole day, every day, to devote to working out. Relying solely on moderately paced, moderately difficult exercise, as most people do, will never, ever give you anything more substantial than (yawn) moderate results. You'll definitely be in better shape than a beer-swilling, channel-surfing couch potato, of course, but you won't ever be considered very fit. Unfortunately, most people have never been taught to exercise any other way.

Does aerobic exercise work? Of course. But interval training works better.

Interval training (I.T.) makes the most of the limited amount of time most of us have available for exercise. Instead of squandering this time on comfort zone exercise, the I.T. programme devotes a couple sessions a week to more challenging workouts. These workouts use brief bursts of higher-intensity activity to generate powerful physiologic processes, which result in decreased body fat and increased fitness and strength. I.T. helps you get the most out of the time you have and ultimately rewards you with better results.

I.T. v aerobic exercise

There is no question that interval training is superior to purely aerobic exercise. This has been proven both in the stadium and in the laboratory. Basically, I.T. delivers remarkable results by using the body's natural ability to adapt to physical stress. The I.T. programme is based primarily on several scientifically proven mechanisms.

I.T. increases human growth hormone

One way the body deals with the stress of higher intensity exercise is by secreting hormones, such as Human Growth Hormone (HGH). This naturally occurring anabolic (or 'building') hormone stimulates muscle growth by encouraging the creation of protein. HGH also makes fats more available as fuel for the body by increasing their presence in the bloodstream. Simply put, HGH builds muscle and burns fat, which is exactly what most people are looking to get out of their workout programme. Several experts have even touted HGH as the secret to slowing the ageing process and enjoying a longer, fuller life. It's not too surprising that some Olympic-calibre athletes have been banned for cheating with illegal injections of HGH.

Fortunately, you can steer clear of needles and get the same performance-enhancing benefits by doing interval training, which increases HGH. Blood levels of HGH have been shown to rise significantly during and immediately after interval training. This is substantially different from purely aerobic exercise, in which HGH levels remain the same both during and after a workout. No matter what level of fitness you're at or what type of exercise you do, I.T. boosts HGH production like no other legal substance. I.T. also releases other useful hormones such as corticotropin, cortisol and catecholamines, all of which help to mobilise fats as a source of energy.

The power 'A's: ATP, Aerobic and Anaerobic

The words 'cellular metabolism' may trigger haunting memories of high school biology class, with all those charts of Krebs's Cycles and other scary stuff that you promptly forgot after final exams. For anyone serious about athletics, however, a simple explanation of how the power 'A's generate energy within exercising muscles might be interesting.

For starters, you need to know that ATP stands for **adenosine triphosphate**, and an ATP molecule is the basic unit of cellular energy. Say you're walking down a street. In order to move, ATP needs to be broken down in the muscles to provide the required energy. But there are only a few seconds worth of ATP available in your cells, so more has to be made, pronto – otherwise you'll stop moving. The primary energy provider, **aerobic metabolism**, kicks in. Aerobic means 'with oxygen', and aerobic metabolism combines oxygen with carbohydrates, fats, and proteins to create ATP. Aerobic metabolism is pretty darn efficient, in that it can produce a whopping 38 ATP by combining a single molecule of glucose (a form of carbohydrate) with oxygen. Since there's an abundance of oxygen available when you're walking at an easy pace, you can keep creating enough ATP to plod along for quite some time.

Now say you start jogging. The faster pace requires more energy, which means there's less oxygen available for use. You start breathing harder, trying to get more oxygen into your lungs, and your heart rate speeds up to deliver that oxygen to working muscle cells. The oxygen then moves to the cell 'powerhouses' (mitochondria), to crank out enough ATP to meet the muscles' energy needs. This is considered an aerobic workout, exercise that is done at an intensity that can be adequately fuelled with oxygen.

Pick up the pace to a sprint. Now you are generating maximum ATP using oxygen (i.e. aerobically), but it just isn't enough to maintain the higher speed. Here's where the anaerobic system kicks in. **Anaerobic metabolism** converts carbohydrates and some fats into ATP without using any oxygen whatsoever and provides enough energy to keep you sprinting for a short time. But there's a cost. For one thing, the anaerobic system is extremely inefficient—it can only generate a measly two (two!) ATP from a molecule of glucose. It also produces lactic acid, a nasty substance that causes your legs to burn after a short burst of sprinting. Eventually, the acidity shuts down muscle cell activity, causing your muscles to fail and forcing you to slow down. This allows the lactic acid to disperse and recovery to occur as oxygen levels catch up again to meet the body's energy needs. For all its limitations, the anaerobic system is the primary way to create energy in larger muscle fibres during very high-intensity activity, such as interval training.

I.T. burns calories

I.T. gets you exercising at higher intensities for brief chunks of time. This extra effort takes more energy than the plodding pace of aerobic exercise because it taps larger, less efficient muscle fibres that aren't frequently used. And, using more energy means you're burning more calories.

Even better news: I.T. revs up your metabolism. After intense exercise, the body needs extra calories as it works to repair muscles, replenish energy stores and restore the body to its normal state again. Since this can take from several hours to a full day, you'll keep on burning calories long after the workout is over. That doesn't happen with purely aerobic exercise. Over the course of the I.T. programme, resting metabolism increases along with lean muscle mass, because muscle needs additional calories to fuel its everyday metabolic functions. All this calorie burning and muscle building ultimately results in a leaner, fitter body. You can't beat that.

I.T. taps larger muscle fibres

Interval training requires both small and large muscle fibres. Smaller muscle fibres are better at utilising oxygen and are employed mostly for aerobic exercise, while larger fibres generate more power and are used mainly for more strenuous anaerobic (meaning 'without oxygen') exercise. Since the larger fibres cannot use oxygen efficiently, they tend to fatigue quickly – which explains why you can only sprint so far, so fast, before you're exhausted and gasping desperately for air. Doing only moderate aerobic workouts all the time means that larger muscle fibres are more or less ignored, and they'll eventually shrink and weaken from lack of exercise. Use it or lose it, in other words. Interval training, on the other hand, uses both small and large muscle fibres. Making use of these larger fibres makes them more efficient and results in stronger muscles that are better able to handle heavy-duty exercise.

I.T. means greater fitness in less time

There's no question that aerobic exercise done regularly improves the body's cardiovascular system. But sooner or later there comes the dreaded fitness plateau, when improvement seems to grind to a halt. The I.T. programme is scientifically proven to break through this sort of barrier and provide you with greater fitness in less time. Studies of aerobically trained runners show that after a few months of interval training they are able to pump more blood and deliver more oxygen to their muscles, generating more energy than ever before. The I.T. programme also incorporates extra-long sessions of aerobic exercise – known as 'XL workouts' – which help the body generate energy in other ways. Here's how: during aerobic exercise, oxygen travels from the lungs via the blood to working muscles, where it's passed along from blood capillaries to muscle mitochondria (cell 'powerhouses' that use oxygen to convert food into energy). XL workouts help beef up capillary density and the number and size of mitochondria, so more oxygen can be used by the muscles, which results in more efficient

energy production. Basically, having more energy to power a workout results in greater fitness for you, because you can exercise at higher intensities for longer periods of time.

With all this going for the I.T. programme, why wait? If you're anything like most people, you're looking for results, yesterday. Let's get started!



2

Before you start: building the foundation

The I.T. programme can benefit almost any healthy person, from beginning exercisers to world-class endurance athletes. In fact, most athletes you see participating in the Olympics or other major events use some form of interval training in their own workout programmes. That's not bad company to be in.

But even these paragons of fitness didn't start off doing I.T. from Day 1. They first had to develop a foundation of aerobic fitness that allowed them to physically and psychologically manage the higher intensity levels that interval training demands.

A consistent programme of aerobic exercise, even at a low level of effort, results in several encouraging changes:

- a more efficient heart and circulatory system
- improved oxygen delivery and utilisation by the muscles
- stronger muscles, tendons, ligaments and bones
- improved body composition (less fat and more muscle)
- better self-image and overall sense of well-being

Doing nothing but aerobic exercise may be enough for people who aren't out to become superfit. But for more motivated exercisers, aerobic training is mainly a springboard to the I.T. programme and its proven formula to control weight and attain maximum fitness.

Before starting the I.T. programme, you must be able to complete 30 minutes of continuous exercise at least three times a week for 4 consecutive weeks.

This continuous exercise can be any aerobic activity (such as walking, running, cycling, or using a stair climber) done at any intensity level, provided it lasts for 30 minutes. Already at this level of conditioning? You're probably ready to start doing I.T. If you don't have the recommended foundation yet, follow the aerobic base programme described later in this chapter. You'll be ready to step up to the I.T. programme in just 8 weeks. In either case, read the medical precautions section below before moving on to your first workout session.

Medical precautions

From blisters to stress fractures to heart attacks, there's always a possibility of some pain or injury with physical exertion. It may be necessary to get a green light from your doctor to ensure your body is up to the rigours of a new, strenuous exercise programme. The American College of Sports Medicine (ACSM) has two useful pre-exercise evaluations we've adapted here. They can help determine if you might be at risk for coronary artery disease or a disease of the cardiovascular and pulmonary systems.

Don't be overly concerned if you do need to see a doctor – a thorough medical history and physical exam may be all that's needed to get a thumbs-

Coronary artery disease risk factors

Family history: Heart attack, heart bypass surgery, or sudden death (due to cardiac arrest) before 55 years of age in father, brother or son, or before 65 years of age in mother, sister or daughter

Cigarette smoking: Current cigarette smoker or those who quit within the previous 6 months

High blood pressure: Systolic blood pressure (upper number) of greater than or equal to 140 mm Hg; or diastolic (lower number) blood pressure of greater than or equal to 90 mm Hg, confirmed by measurements on at least two separate occasions; or taking anti-hypertensive (high blood pressure) medication

High cholesterol: Total serum cholesterol of greater than 200 mg; or high-density lipoprotein cholesterol (HDL, or 'good' cholesterol) of less than 35 mg; or on lipid-lowering medication. If low-density lipoprotein cholesterol (LDL, or 'bad' cholesterol) measurement is available, use more than 130 mg as measure rather than total cholesterol of more than 200 mg

Impaired fasting glucose: Fasting blood glucose (test taken after 6 hours without food) of greater than or equal to 110 mg confirmed by measurements on at least two separate occasions

Obesity: Body Mass Index of greater than or equal to 30 kg/m squared (measured by taking your weight in kilograms and dividing it by your height in metres) or waist girth of more than approximately 40 inches

Sedentary lifestyle: Persons not participating in a regular exercise programme or meeting the minimal physical activity recommendations of 30 minutes or more of moderate physical activity on most days of the week.

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