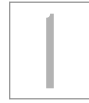


# TRAINING OVERVIEW



## VOLUME AND INTENSITY

Training volume and training intensity have historically been the two main variables in any plan to improve physical fitness. Volume refers to how much you train. Intensity refers to how hard you train.

Manipulating these variables has traditionally been the staple of any endurance program. The training season usually starts with high volume and low intensity. As training progresses, the volume decreases and intensity increases (Figure 1.1).

What if I told you there is a better way?

Only half of our training improves in fitness. The problem is to know which half. Whether that half is volume or intensity remains to be seen, but there is increasing evidence that intensity is the more important half.

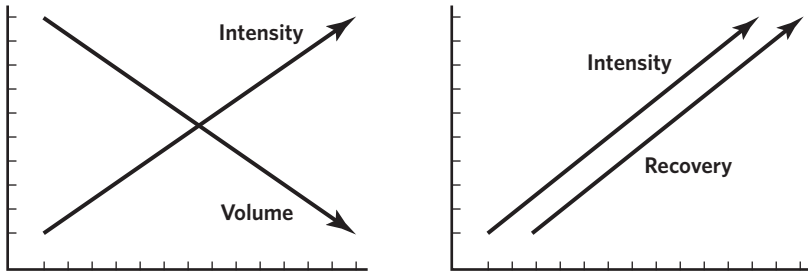
If you increased volume and intensity together, you would surely burn out from physical exhaustion. If you increased only volume, you wouldn't see any significant improvement. If you train by manipulating intensity, you will improve.

Why, then, do we focus so much on volume? Tradition. That’s the way training has always been done. The great racers used to do it. The great riders now do it.

Maybe the people who excel in a sport are the people whose bodies adapt well to traditional training. When I first started racing, I had coaches whose traditional plans developed national and Olympic champions. We did high intensity on Tuesday, Wednesday, and Thursday and then raced on the weekends. The people who improved with this schedule were the people who recovered well. There were only two days off—nonconsecutive days—per week.

**INTENSITY AND RECOVERY**

It’s time to start thinking of training as manipulations not of volume and intensity but of intensity and recovery. Using training principles taken from the exercise-science research, you can maximize your improvements while optimizing your recovery.



**FIGURE 1.1 > The new training model:** We used to think of training as a manipulation of volume and intensity; now we must think of training as a manipulation of intensity and recovery.

If traditional training has worked for you, then you already should have achieved great success in cycling. If you feel you could progress further, you should examine your motives for choosing workouts and building a training plan.

“Because it works for him” is an unproductive way to approach a training plan. Just because a plan works for the other guy doesn’t mean it will work for you.

If you want to excel in cycling, you need to adapt the training to your body. I will show you how intensity and recovery can help you reach your goals.

### How Intensity and Recovery Can Maximize Performance

Many systems in the body are affected by training. The changes that occur in these systems can either help you or hurt you. If you train well, the changes will help. If you don’t, you will not improve and may even regress.

Proper training will improve the function of your muscles and the hormones that help them recover. Changes in the muscles that produce fitness are called the “training effect.” The training effect must occur in all types of muscle fibers for you to improve as an athlete.

**TABLE 1.1** Effect of exercise on the endocrine system

HORMONE	HIGH-INTENSITY TRAINING	LOW-INTENSITY ENDURANCE
Thyroid Hormone	↑	↓
Growth Hormone	↑	↓
Testosterone	↑	↓

If you train well, the recovery hormones (also called anabolic hormones) are maximized, allowing you to train harder the next day (Table 1.1). If you train with too much volume or not enough recovery, your recovery hormones will decrease and you will be unable to train as hard in your next session. You also won’t improve and your performance will suffer.

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## **THE TRAINING EFFECT: CHANGES IN MUSCLES THAT IMPROVE PERFORMANCE**

The power and endurance of the muscles must improve in order to maximize performance. There are three levels of power you need for bicycle racing: endurance, sustained power, and maximum power. Training with intensity improves performance in each area.

### **Endurance**

Endurance has different meanings to different types of athletes. For recreational athletes, endurance might mean being able to go for a long distance at a slow pace. For racing athletes, endurance means being able to hold a lot of power for a long period of time.

Endurance is not a function of how many base miles (long, low-intensity riding early in the training season) you have logged but rather is a function of the size of your muscle fibers, how well you are able to supply them with energy, and how efficiently they use energy.

Muscle-fiber growth, energy delivery, and energy use do not happen with traditional base miles. In fact, base miles can even cause the endurance fibers to shrink. The new training paradigm suggests that along with appropriate interval training and weight training, you need to train the energy-storage and manufacturing systems in the muscles.

The training effect is achieved with a combination of intensity and recovery. During recovery, nutritional manipulations that are timed with workouts will train the body to store energy and use it more efficiently. Although what you eat during training and racing is important, what you eat after training and racing is more important. Well-planned recovery after well-planned workouts will keep you going longer and stronger.

### **Sustained Power**

Whether climbing a hill or attacking your opponents, you need to have sustained power. This comes from muscle fibers that are powerful but that lack the long-distance ability of the muscle fibers primarily responsible for endurance. Like the endurance sections of muscle, the sustained-power muscle fibers are also trainable for use in energy storage and production. A combination of work and recovery through effort, rest, and nutrition will take you to the next level.

### **Maximum Power**

The third component of the successful endurance athlete is the ability to employ maximum power over a brief period. This happens during sprinting, jumping away from your competitors, and climbing short hills. Because these fibers rely upon different energy sources, they are not as trainable as the other components with nutritional manipulations; rather, you must train at specific intensity to develop them.

## **THE COMPLETE PICTURE: BEYOND THE BIKE**

### **Flexibility**

The complete athlete possesses many physical characteristics. Power is important, but the body also must function well. Strength, endurance, and power are important but cannot be optimal without flexibility.

Increasing flexibility of your muscles and tendons is often overlooked during training; however, stretching exercises can lead to faster position on the bicycle and decreased risk of overuse injury.

As a complete athlete, you become dynamic. A perfect pedal stroke, bike fit, or position will change as you train, not only throughout the season but for specific events as well.

## **Strength**

The distinction between strength and endurance athletes becomes blurred in high-intensity training, because it produces changes in the muscles similar to changes that occur with weight training. Weight training, combined with brief workouts to increase the training effect will not only make you stonger, but will strengthen muscle tendons and provide better recovery as well.

## **Nutrition**

Nutrition will not help you if you are not training well, but poor nutritional habits can be detrimental to your training progress. Learning what to eat and when to eat it will take you a long way toward improved fitness. Several types of meals are important to athletes to improve recovery and efficient energy use:

### ***3-to-1 carbohydrate and protein***

The ratio of 3 grams of carbohydrate to 1 gram of protein is the key to ensuring adequate recovery. Your body needs protein to build and repair muscles and carbohydrate to fuel those muscles. The amount of carbohydrate is calculated based upon your weight. Carbohydrates are most effective for recovery when eaten immediately after training and then again at one hour after training.

### ***High carbohydrate***

High-carbohydrate meals are great for packing the muscles with stored glycogen as part of a carbo-load workout.

### ***Low carbohydrate***

If muscles are deprived of carbohydrate for three days during a recovery period, they will crave carbohydrate and will be more able to store carbohydrates when you reintroduce them into your diet. Focusing on a low-carbohydrate diet during the rest days that follow hard training can enhance the effect of training.

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**High fat**

Following a high-fat diet for five days will teach the muscles to use fat as an energy source. Since fat contains twice the calories of carbohydrate, it is a useful fuel source for low-intensity exercise, sparing the carbohydrate for higher intensities.

- SUMMARY**
- Traditional training involves a progression from high volume to high intensity.
  - High-volume training can decrease recovery and strength.
  - Know when to decrease your volume and replace it with intensity.
  - Intensity is the most efficient way to increase the training effect.
  - Intensity helps develop endurance, sustained power, and maximum power.
  - Recovery from intensity is the key to improvement.
  - Combining proper diet with exercise will increase recovery.
  - Flexibility, resistance training, and nutrition are all important for maximizing performance.

If you are looking for a training plan that will help to develop you as an athlete or if you are seeking to augment your existing training plan, the next few chapters will help get you there.