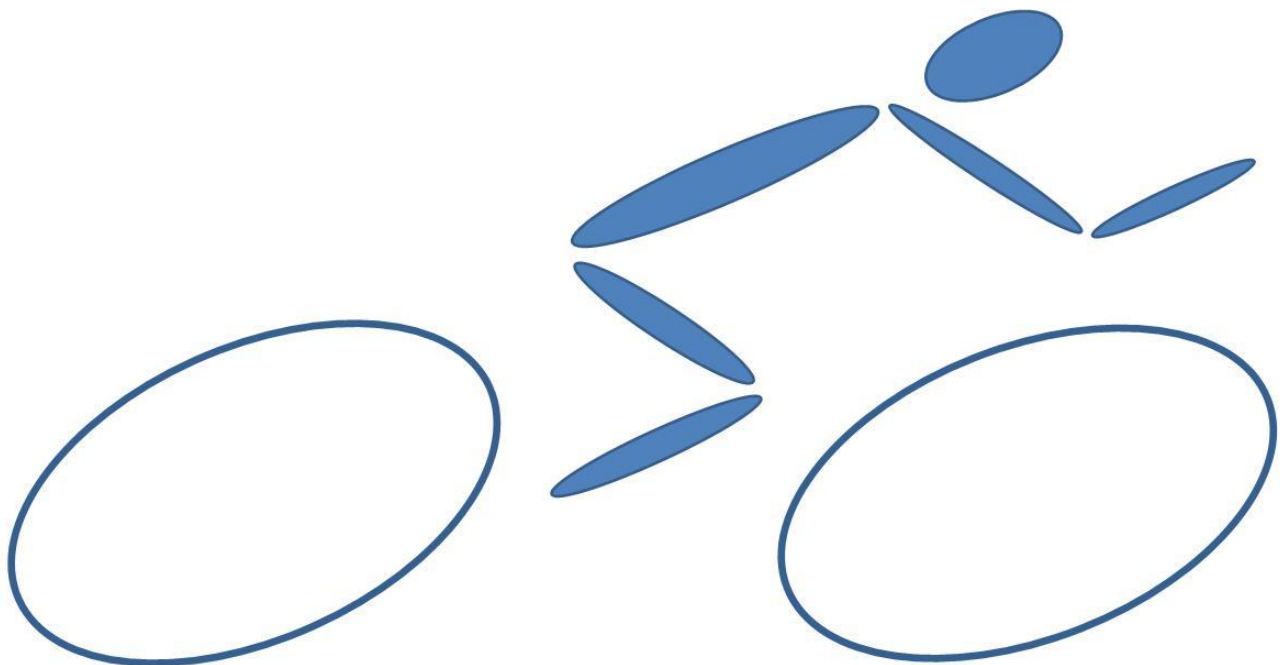


How to Use a Cycling Training Plan



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Disclaimer

This e-book is intended to inform the reader of the basics of a cycling training program. Training methods outlined herein should not be adopted without consultation with your health professional. Use of this information herein is at the sole choice and risk of the reader. The author is neither responsible for, nor liable for any harm or injury resulting from, the use of the information described herein.

About the Author

Coach David Ertl has been riding and racing bikes practically all his life. He began riding at age 5, began competing in 1973, and he continues to compete as a Master's athlete to this day. David became a certified coach with USA Cycling in 2002. In 2004 he became a Certified Personal Trainer with the National Strength and Conditioning Association (NSCA) and in 2007 obtained the highest coaching level offered by USA Cycling, Level 1. David coaches individual cyclists as well as two teams, the Des Moines Cycle Club Race Team and the Iowa Chapter of the JDRF Ride to Cure Diabetes Team. In addition to personal coaching, David also provides online training plans and information, including 15 week and annual training plans for recreational and competitive cyclists and triathletes. Learn more about his background and coaching programs at www.CyclesportCoaching.com.

He has written three books: '101 Cycling Workouts', 'Training For Busy Cyclists', and 'Indoor Training For Cyclists' which are available online at www.CyclesportCoaching.com.

He and his wife, Angie, own the 24/7 X-Press Fitness Center and Pilates Studio in Des Moines, Iowa. He and his family ride and reside in Waukee, Iowa.

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Forward

This booklet was written to assist you in using a structured training plan provided to you by a coach, specifically through www.CyclesportCoaching.com so as to get the maximum benefit from the plan. It covers the basics of an annual training plan with the cycles involved, and the rationale for these cycles. It briefly discussed the major physiological systems a training plan works. Most of the content discusses the weekly training plans and the workouts included within the weekly plan. This booklet will discuss how to determine your training zone, whether based on Relative Perceived Exertion, Heart Rate, or Power. It also gives some guidelines on when it's permissible to modify your weekly plan when work, illness or social issues interfere with the plan, and how to modify it. In addition, it gives guidelines on how to increase or decrease the volume from what the plan states, should that be desired. I will also discuss how to peak and taper for an important ride.

Don't just ride your bike, Train! -- David Ertl



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How to Use a Cycling Training Plan

A. Training Plans and Sessions

Training plans need to be developed to stress the various physiological systems required by the cyclist to bring about the desired training responses. They are typically created around the annual cycle. **Periodization** is the segmentation of a period of time (the training year) into smaller periods of time (months), and each of these is broken down into weekly plans. The overall training plan should be based on the year-long plan, called a **Macrocycle**. This macrocycle is divided into shorter periods of training called **Mesocycles**, lasting from 4 to 12 weeks in duration. There are one or more **Microcycles** within a mesocycle, each typically a week in duration. Within each microcycle are a series of **Training Sessions**. Each training session has a specific purpose to stress or recover one or more physiological systems. **Macrocycle:** Typically a 12 month period covering the training and competition season.

Mesocycle	Strength	Endurance	Aerobic	Anaerobic	Speed
Foundation					
Base					
Build					
Peak					
Race					
Transition					

Mesocycles:

Transition = the rest and recovery phase after a season or racing period

Foundation = begin conditioning for the upcoming season, develop off-season strength

Base = the aerobic endurance phase – getting your body used to long hours in the saddle

Build = increased aerobic and anaerobic capacity through intensive workouts

Peak = specific workouts to prepare for events, includes a taper period

Race = the event or series of closely occurring events for which you are focusing

The Build-Peak-Race mesocycles will be repeated 2-3 times per macrocycle.

The various physiological systems are trained at varying times during the macrocycle. The following is a rough guide to when each of these systems are trained.

Examples of Mesocycles through one macrocycle:

Transition Phase: October through early November

Cross-train – run, mountain bike, hike, play basketball, swim, start weight training program. Continue to train the aerobic and strength systems, but in a non-structured, fun way. Give your mind as well as your body a break.

Foundation Phase: November through December

Prepare the body for the heavy training load coming in the Base phase. Begin more intense weight training sessions, become more specific in cycling workouts rather than cross-training.

Base Phase: December through February

Begin building an endurance base. Continue to train the muscular and aerobic systems. This phase trains the aerobic and muscular systems to take on the stresses of the Build and Race phases. Also work on strength endurance.

Build Phase: March through April (repeated again one or two times during season)

Begin doing intensive training (intervals, hills, sprints, time trials). This is the most intense phase with the most physiological systems being trained. Overload is the intent here so built-in rest periods are essential.

Peak Phase: Two weeks prior to key race periods.

A two week period prior to the Priority A races during the season. There may be 2 or 3 peak periods in a given macrocycle (year). This period reduces volume of training while continuing to maintain intensity: strength, speed, and power. This period ends with a few days of taper before the big event(s).

Race Phase: 2-3 peak races targeted for the year

The race phase is typically a week, no more than two, where you are aiming for peak performance and which your entire season is focused. There may be 2 or 3 such race peaks in a given macrocycle (year).

Mid-season Transition: Week following Race Phase

Up to one week of recovery rides following a peak race period in mid-season. The purpose here is to recover and rejuvenate both mentally and physically following an intense build, peak, and race period. The last transition phase of the season is longer and becomes the 'off-season'.

Microcycles are short (one week) periods of training within a mesocycle.
Examples of microcycles with training sessions:

Summer:

Monday: Recovery day – spin for 45 min
Tuesday: 6 all-out sprints in zone 5
Wednesday: Endurance – zones 2-3 for 2.5 hours
Thursday: Hill intervals
Friday: Recovery – day off bike
Saturday: 1 hour race prep with some spin-ups
Sunday: 40 mile road race

Winter:

Monday: Recovery day – spin for 30 min
Tuesday: 45 minute spin class
Wednesday: Upper body weight workout with 30 minute spin
Thursday: Leg weight workout with spinning in between sets
Friday: Day off
Saturday: Two 15-minute LT intervals on stationary trainer with 10 minute recovery in between
Sunday: 1.5 hour mountain bike ride

Training sessions are individual training workouts. There may be one or more training sessions per day. These are typically focused on one primary physiological system but also impact the other systems. Below is a set of workouts and the systems they emphasize.

Bicycle riding and racing demands a wide range of physiological capabilities, from being able to ride at given pace for hours and then finish strong, to be able to climb short and long hills, to accelerating anaerobically in a race or away from a chasing dog!

B. Physiological Systems

Cycling requires three major **physiological systems** to perform well in all aspects of the sport. These are the **Energy, Cardiovascular** and **Muscular** systems.

Types of physiological systems:

- I. Energy Systems
- II. Cardiovascular System
- III. Muscular System

I. Types of Energy Systems:

There are three major energy systems used in cycling:

- Creatine-Phosphate (10-15 second efforts)
- Anaerobic (30 seconds to two minutes)
- Aerobic (long efforts 3 min to hours)

II. Cardiovascular System:

The cardiovascular system is involved in circulating blood, which carries essential nutrients and oxygen to the working muscles. The type of metabolic response one experiences is described by the percentage of capacity at which someone is exercising. This has traditionally been described as a percentage of maximum heart rate (MHR), or percentage of the anaerobic threshold (AT) at which one is exercising. For the training plans I am creating and using, I will be using percentage of AT, not percentage of MHR. The main reason for this is because it's difficult and risky to test one's maximum heart rate, whereas it is possible to estimate your AT quite accurately and safely. It's also possible to train just by the feeling of the effort. The Rating of Perceived Exertion (RPE) is a method of judging your effort based on feel.

Rating of Perceived Exertion (RPE): RPE is useful to judge your effort when you don't have a heart rate monitor or power meter. Even if you do have these gadgets, it's still useful to understand how your body feels at these different intensities. RPE has traditionally used a 6-20 scale, but I am using the modified 1-10 scale as it is easier to remember. It is a subjective measure but once you get experience with it, you can quickly tell your RPE value. Here is the description of RPE:

- 0 = No effort (coasting)
- 1 = Very light (Zone 1)
- 2 = Light
- 3 = Moderate (Zone 2)
- 4 =
- 5 = Somewhat hard (Zone 3)
- 6 =
- 7 = Hard effort (Zone 4)
- 8 =
- 9 = Very Hard (Zone 5)
- 10 = Maximal exertion (Zone 6)

Lactate Threshold (LT) or Anaerobic Threshold (AT): The heart rate at which you begin to accumulate lactic acid in your muscles – where anaerobic energy production surpasses aerobic. It is the rate at which the effort is no longer sustainable for long periods of time. This generally occurs at 85-92% of MHR. See the chapter "How to Estimate your AT" to determine your heart rate zones.

Training Zones:

Training zones are used in these training plans to prescribe the intensity of the workouts. These are typically based on levels of effort and are listed according to RPE or percentage of your Anaerobic Threshold (AT) or Threshold Power (TP). There are several versions of zones available, here's the zones I use:

Heart Rate Zones:

- Zone 1** = Recovery (<71% of AT) – uses the aerobic system
- Zone 2** = Endurance (72-81% of AT) – uses the aerobic system
- Zone 3** = Tempo Pace (82-91% of AT) – uses mainly aerobic system
- Zone 4** = Threshold Pace (92-102% of AT) – uses mainly aerobic system with some anaerobic system
- Zone 5** = Anaerobic Pace (103-110% of AT) – covers zone where aerobic converts to the anaerobic system.
- Zone 6** = Maximum aerobic capacity (Too short to record HR) – anaerobic and CP systems

Power Zones:

- Zone 1** = Recovery (<55% of TP) – uses the aerobic system
- Zone 2** = Endurance (56-75% of TP) – uses the aerobic system
- Zone 3** = Tempo Pace (76-90% of TP) – uses mainly aerobic system
- Zone 4** = Threshold Pace (91-105% of TP) – uses mainly aerobic system with some anaerobic system
- Zone 5** = Anaerobic Pace(106-120% of TP) – covers zone where aerobic converts to the anaerobic system.
- Zone 6** = Maximum capacity (V02 Max) (>120% of TP) – anaerobic and CP systems

III. Muscular Systems:

Strength = ability to exert a force to overcome resistance

Endurance = ability to pedal over a prolonged time

Speed = ability to pedal quickly

Power = Work / Time; ability to exert sustained force for a period of time

Improvement of the combination of these four muscular systems will contribute to success in cycling.

C. How to estimate your AT or TP:

AT and TP is the maximum sustainable pace you can maintain during a time trial effort that lasts about an hour. However, it's possible to estimate this heart rate or power from a shorter 20 min time trial effort. Find a road that is relatively level and free of traffic and intersections. You may need to find a road that's about 5 miles and do an 'out and back' course to get your 20 min test done. Alternately, you can do this on an indoor trainer. In some ways this gives you a more repeatable result as you don't have the weather and traffic variables. Warm up thoroughly, then begin the 20 minute time trial. Ride as hard as you can at a pace you can maintain for the full 20 minutes. There is a fine line between going out too fast and not pushing yourself hard enough. You may need to do a few of these before you figure out your sustainable pace. Record your heart rate and/or power toward the end of the 20 min. Do not accelerate or sprint at the end. What we are after is your sustainable heart rate or power. If you have a computer that allows you, take the average heart rate or power for the last 5 minutes of the effort.

The pace you can maintain for 20 min is slightly faster than the pace you can maintain for an hour. So take your heart rate or power from this 20 minute test and multiply by 0.95 to arrive at your sustainable pace, which is your estimated Anaerobic Threshold (AT) or Threshold Power (PT). Use this value to estimate your own zones as described in Section B.II above or using the table below.

These power threshold zones are very similar to those advocated by Allen and Coggan in their book, 'Training and Racing with a Power Meter'.

Use this chart below to identify your zones based on your own AT and TP values obtained from your test:

Heart Rate Training Zones

	Recovery	Endurance	Tempo	Threshold	Anaerobic	Max Effort
A.T. Heart Rate (Beat/Min)	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6
130	<94	94-107	108-120	121-134	135-143	>143
135	<97	97-111	112-124	125-139	140-149	>149
140	<101	101-115	116-129	130-144	145-154	>154
145	<104	104-119	120-133	134-149	150-160	>160
150	<108	108-123	124-138	139-155	156-165	>165
155	<112	112-127	128-143	144-160	161-171	>171
160	<115	115-131	132-147	148-165	166-176	>176
165	<119	119-135	136-152	153-170	171-182	>182
170	<122	122-139	140-156	157-175	176-187	>187
175	<126	127-144	145-161	162-180	181-193	>193
180	<130	130-148	149-166	167-185	186-198	>198
185	<133	133-152	153-170	171-191	192-204	>204
190	<137	137-156	157-175	176-196	197-209	>209
195	<140	140-160	161-179	180-201	202-215	>215

Power Training Zones

	Recovery	Endurance	Tempo	Threshold	Anaerobic	Max Effort
Threshold Power (Watts)	Zone 1	Zone 2	Zone 3	Zone 4	Zone 5	Zone 6
200	<110	110-150	151-182	183-212	213-240	>240
210	<116	116-158	159-191	192-223	224-252	>252
220	<121	121-165	166-200	201-233	234-264	>264
230	<127	127-173	174-209	210-244	245-276	>276
240	<132	132-180	181-218	219-254	255-288	>288
250	<138	138-188	189-228	229-265	266-300	>300
260	<143	143-195	196-237	238-276	277-312	>312
270	<149	149-203	204-246	247-286	287-324	>324
280	<154	154-210	211-255	256-297	298-336	>336
290	<160	160-218	219-264	265-307	308-348	>348
300	<165	165-225	226-273	274-318	319-360	>360
310	<171	171-233	234-282	283-329	330-372	>372
320	<176	176-240	241-291	292-339	340-384	>384
330	<182	182-248	249-300	301-350	351-396	>396

D. Determining an appropriate training volume

How do you know how much you should be training? Is more always better? How much is too little? A rule of thumb is that you can get very close to your potential on 10 hours of training, or perhaps even less. There is a diminishing return on the training effect once you get past about five hours per week. Each increment of improvement gets increasingly difficult to attain. If you want to be close to your potential without doubling your training time, then shoot for 7-10 hours per week.

Increasing training volume over and above the Training Plan: Should you do more than the plan says to if you have the time and energy? You can do more, but there are some caveats. First, don't increase mileage by riding more than prescribed on recovery days. These days are sacred and you should only do the recommended amount of riding on those days. Rather, increase time for your harder days, starting with your endurance and tempo rides, then increase the length of your threshold and interval workouts but be careful with the intervals and don't increase too much too quickly. If you find you are always increasing your training above and beyond the plan, you may be at a point where you would benefit from personal coaching. If you can put in 15 hours a week or more and recover, you have a lot of potential but it takes more care in designing a heavy duty program.

Decreasing training volume lower than the Training Plan: If you don't have time or energy to train as much or as hard as the plan suggests, it is perfectly acceptable to reduce the training volume. Keep in mind your fitness results may not be as great, but make the most of the time and energy you have. You need to keep in mind that work, family and other activities take time and emotional energy. Sometimes emotional energy is more limiting than physical energy or time. You will be better off riding less as long as you maintain your intensity according to the plan. If you need to decrease volume, the first place to start is by reducing the length of your endurance and tempo rides. Next, decrease the duration of your threshold workouts and lastly decrease the length of anaerobic intervals. It is better to follow the plan and reduce the length of the workouts than it is to skip workouts altogether. For example, if the plan calls for 10 hours in a week, you can drop it to five hours but try to do each workout but reduce the length of them. Even if you have to reduce your endurance rides drastically, you should still try to do your intense interval work. This will maintain and possibly increase your fitness. Training is composed of Frequency, Intensity and Time (FIT). First decrease the Time, then Frequency, and lastly the Intensity. You may only have three hours to train in a given week, but if you do your two intense workouts, you won't lose much if any fitness. Over the long term, you will lose endurance if you continually reduce workload below five hours per week.

D. Modifying your training plan

Obviously you won't be able to follow any training plan to the letter unless you don't have anything else to do and the weather is perfect! There are all sorts of issues you need to work around to get your training in, such as family and social commitments, work which rarely cares about you training, illness and any other interruption. Also, since you are a cyclist there are events you are probably training for, be it a Century ride, a Tour, or competitions. This section will discuss how to modify your plan accordingly.

When and how to move training sessions around: There are some workouts that are allowable to move around and others that are not. Keep in mind that recovery days are very important for improvement – remember: training tears you down, recovery is what makes you come back stronger. So if you miss a recovery workout, no big deal because not exercising does provide a recovery day, but active recovery is usually preferred over doing nothing unless you are absolutely fatigued. If you miss an intense workout, you may move that to the next day. Just make sure that you don't have more than two back to back hard workouts planned. For example, if you have a hard workout planned for Tuesday and Thursday and you miss Tuesday's, you can move it to Wednesday and do a hard ride both Wednesday and Thursday. However, if you have two hard workouts planned (e.g. Saturday and Sunday), don't move Thursday's hard workout to Friday because that will give you three hard workouts in a row and you will compromise your ability to put in a good effort by Sunday. It's better to miss a hard workout than jam them up all together. Missing one workout a week will barely affect your fitness and may even do you good by giving you a few days off to fully recover. I never worried too much if I had a business trip for 3-4 days. I tried to do something to stay active but considered travel a chance to take a few days easy and catch up on recovery. As I said in section C, if something has to give, let it be the endurance rides first. So if you can only ride one day (Sunday) on a weekend and you have an interval day planned Saturday and an endurance day planned Sunday, you may choose to do your Saturday's interval workout on Sunday in place of the endurance ride. It's okay to make one such change per week, but don't get carried away. Structured training plans are put together systematically to work certain systems in a certain order to allow you to work very hard on hard days and easy on recovery days. If you take each week's plan and then mix it up, you won't be getting the best workout intensity or recovery.

How to modify your plan for important events: As you approach significant cycling events such as a century, triathlon, tour or race, you will need to alter your training. The longer or harder the event, the longer you should taper. For a one day event, it's okay to continue training according to plan through Tuesday but then start taking it easy Wed-Fri if the event is on the weekend. If it's a race on the weekend and you want to maintain your edge going into the event, you can still do a few (1-3) hard but short intervals on Thursday – enough to keep your metabolism up but not enough to tire your legs out.

Suggested Reading

The Cyclists Training Bible. 1996. Joel Friel. VeloPress. Boulder, CO

Bicycle Road Racing. 1985. Edward Borysewicz. VeloPress. Brattleboro, VT

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