Base Miles Basics

Base miles are the physical foundation—whether for racing, training, touring, or just general fitness—that help you reach your physical potential. A simple analogy, which you may have seen before in cycling training literature, is the training pyramid. Think of your training as building a fitness pyramid.

Using the pyramid analogy, base miles are your foundation. This foundation of the pyramid must be solid, well-planned out, and, most importantly, large. The larger the base of the pyramid, the higher your potential to build greater fitness.

Your base—i.e., aerobic endurance, strength, and neuromuscular training—must be large enough to support the apex you wish to achieve—i.e., your peak cycling condition. By riding at aerobic endurance pace, building leg strength, and honing neuromuscular fitness, you will achieve a solid base.

This handout begins with a general overview of periodization planning for the training year. Planning will allow you to schedule the proper volume and timing of base training. Following the periodization overview, this handout will cover the specifics of enacting a base training mesocycle.

Periodization Planning

To promote long-term training and performance improvements, a cyclist should include variations in specificity, intensity, and volume in planned periods or cycles within an overall program. This is *periodization*. The concept of periodization was proposed in the 1960s by Russian physiologist Leo Matveyev. Tudor O. Bompa brought periodization to the fore across many disciplines. Bompa theorized that "structuring training phases [lead] to the highest level of speed, strength, and endurance" and "the division of the annual plan [ensured] an optimal performance for the main competition."

A periodized plan breaks the season from larger into smaller compartments called macrocycles, mesocycles, and microcycles, respectively. Each cycle, or period, builds upon the past cycle to provide ample and constructive development of physical elements.

MACROCYCLES, MESOCYCLES, MICROCYCLES

When planning a training program it is best to think in cycles of varying sizes. Your largest cycle is the *macrocycle*, which is one-year, one season in length, or longer. It is possible to stack macrocycles for multi-year plans or even five-year plans. Within the macrocycle are *mesocycles*, which are weeks to months in length. Within the mesocycles are *microcycles*, which are weeks to days in length. From microcycles, you develop your daily workouts.

Each cycle will have specific workout modalities, which should be progressive, either in volume, intensity, or frequency, or usually all 3. For example, the base mesocycle will have workouts of building aerobic endurance miles, in tandem with honing neuromuscular fitness and improving strength. These workouts will be greater in volume or frequency as the mesocycle progresses.

MESOCYCLES OF PHYSICAL FITNESS

No matter the sport, breaking training into 4 to 5 mesocycles provides an efficient framework for the necessary training modalities. The cycling mesocycles are *base*, *development*, *taper*, *race*, and *transition*. Physical training in *base* focuses aerobic endurance, strength, and neuromuscular fitness elements, and prepares the body for the rigors of harder more intense efforts. Physical training in *development* focuses on improving further neuromuscular efficiency, strength, and introduces development of lactate threshold, anaerobic threshold, leg speed, and power. Physical training in *taper* allows the athlete to reduce volume, while fine tuning specific elements of fitness necessary for success in specific events. Physical training in *race* focuses solely on intensity with reduced training volume, and possibly frequency, to maintain elements developed in other mesocycles and keep the athlete fresh for racing. *Transition* is a period of recuperation, both physically and mentally, in order to tackle another season of training.

This handout briefly touches on the transition mesocycle , prior to explaining the base mesocycle.

PERIODIZATION FOR CYCLISTS

Pick a race event goal and count back 4 to 6 months. From the 4 to 6 month starting point, you will be able to lay out your training macrocycle starting with a transition mesocycle. A sound method is to select 2 high-priority events or string of events separated by a few months during the racing season and develop 2 race-shape peaks for a racing season. The closer you get to the peak, the more importance you can place on best performances in races—preferably independent of results. In-between peaks, use low-priority races as training or learning experiences. These low priority races serve the important benefit of building "race shape". In many cases only racing itself can prepare you for the intensity and speed of competition.

The longer your racing season, the larger base necessary. For example, a 2-peak race season—meaning 2 periods of peak racing fitness for 2 target events or string of events—running from March to September usually means a 2- to 3-month base mesocycle. A racing season of a few months may only need a 1-month base. Review the table below to see how many weeks or months of base you might want to incorporate into a macrocycle relative to your racing goals.

EXAMPLE MACROCYCLES	
One-Peak Season	
Base	Jan
Development	Feb/Mar/Apr
Taper	Apr
Race	May/Jun
Alternate One-Peak Season	
Base	Mar
Development	Apr/May/Jun
Taper	Jun
Race	Jul/Aug
Two-Peak Season	
Base	Nov/Dec
Development	Jan/Feb/Mar
Taper	Mar
Race	Apr/May
Development	Jun/Jul
Taper	Jul
Race	Aug
Alternate Two-Peak Season	
Base	Nov/Dec/Jan
Development	Feb/Mar/Apr
Taper	Apr
Race	May
Development	Jun/Jul/Aug
Taper	Aug
Race	Sep/Oct

TRANSITION MESOCYCLE

When your season ends, it is important to take a complete break from the bicycle. The body needs to recuperate physically and mentally, in order to perform another macrocycle. This may be a challenging concept, both mentally and physically, for the bicycle racer. The excitement of finding form at the end of the season, the pleasure of riding with comrades on a daily and weekly basis, the rush of adrenaline and endorphins from heavy exercise, all entice the training cyclist not to want to put the bike away for a couple of weeks. This can be a shortsighted viewpoint. When periodizing, think long term to the next macrocycle or season.

Continuing to ride straight through to the next season will only cause you to hit the "wall" or feel overtrained at some point in the future. You would not want to be overtrained before your next season's biggest goal. Once you complete your last race of the season—and it is recommended that you actually pick a last race or event and stick to it, even if you feel like you could race or train more—put the bike down and steer clear of cycling for at least 1 week, if not 2 weeks. Yes, your fitness will drop slightly, but the long-term recovery will far outweigh the short-term drop in fitness.

After a week has passed, start cross-training at very low intensity. Cross-training can include any sport or physical activity, which keeps you fit and which you enjoy. Common cross-training activities include swimming, soccer, basketball, hiking, walking, running, and weight training. Cross training can continue through base and development, but as the race season approaches (i.e., taper), it should decrease in volume and intensity.

After two weeks, it's time to pick up the bicycle again, at perhaps half the volume (i.e., hours or miles) and at recovery intensity [i.e., <70% Maximum Heart Rate (Max HR) or <50% 20-minute sustained power (SP)]. This is a good time of year to set up group "coffee rides," whereby you pick a destination that is within an hour or so, and take a long break before riding back. Mix these easy rides in with your cross-training in preparation for the base mesocycle.

BASE MESOCYCLE

After a postseason transition mesocycle, begin a base mesocycle. Cyclists usually find it easy to push themselves physically. Each workout is a "hard" effort. Conversely, cyclists usually find aerobic endurance miles—which are easy aerobic efforts (e.g., <75% Max HR or <60% of 20-minute SP)—difficult, because riding easy does not "feel like working out." Aerobic endurance miles, the backbone of base miles, will prime your aerobic engine and allow you to perform harder work in development, taper, and race mesocycles.

In tandem with aerobic endurance, the base mesocycle focuses on improving strength via low cadence–high tension workouts, along with honing neuromuscular fitness via moderate cadence–low tension workouts. While strength and neuromuscular fitness are briefly covered, this handout focuses primarily on the machinations of aerobic endurance, because it is the largest portion of workout volume (~80%) during the base mesocycle.

Base: Intensity

By doing long, evenly paced, steady efforts of *less than* 75% Max HR or *less than* 60% of 20-minute SP in situations with sustained power (i.e., climbing or into the wind), you are building the aerobic engine that will drive lactate threshold, anaerobic threshold, leg speed, and power training in the warm spring and summer to come. Aerobic endurance work can be achieved at HRs up to 90% Max HR, but the most efficient way, with the least wear and tear on your body, is to perform aerobic work in base at <75% Max HR. This will allow you to perform more work, because you will be able to ride for extended periods and perform multiple sessions per week without exhausting your body's glycogen supply.

You may find <75% Max HR to be incredibly easy—for some it may seem extremely easy. Do not panic or worry that you are not "really training." If you ride at 70% Max HR or even 65% Max HR, you will still be working on your aerobic system. Matter of fact, the lower you can reasonably keep your HR, the better, because you will be able to ride *longer and more efficiently*. If you can ride longer, over the long haul you will have done more aerobic work!

Please note, you may not be able to train at <75% Max HR at all times, because the terrain may force you to stand or push harder gears. The objective is to *average* <75% Max HR over a training ride. It is important to minimize spikes in power or HR though, so avoid charging up hills, sprinting, or tempo riding, which slowly allows your HR to drift higher over time. The key is even pacing.

Ride at a pace at which you can talk. Enjoy the scenery. Enjoy the company of fellow riders. Remind yourself that going easy on the bike is training, too. You have the rest of the winter and spring to pile on the "hard" miles. With each aerobic mile you pedal, think about how much more intense and how much more effective your intense training later in the season will be. You are setting yourself up for success.

Neuromuscular work should be of very low HR intensity as well (i.e., <70% Max HR). Power is not measured, but should remain low (<50% of 20-minute SP) if using the proper easy gears. Utilizing easy gears will shift the focus of the workout away from high heart rates or high tension, and instead "teach" your body how to pedal efficiently—that is, in a coordinated fashion to develop the most power with least loss of energy. If your heart rate drifts during neuromuscular exercises, choose an easy gear.

Strength work is also at low HR intensities (<80% Max HR) with power averages between 70 to 100% of 20-minute SP. Utilizing large gears at low cadences—high tension—you will build your leg strength allowing your body to endure long races and back-to-back high intensity training in the development mesocycle. If your heart rate drifts >80% Max HR during strength exercises, slow your cadence or increase your gear.

Base: Volume

It is good to think of volume for base training in saddle time (hours), as opposed to distance (miles). Because base training is at slower paces than other training, you will most likely not cover the same distances in the same

amount of time. For example, a 3-hour race might cover over 70 miles, while a 3-hour base training ride might only cover 40 miles.

As a general guide, your largest weekly base volume should be a minimum of 100% of your largest weekly training volume during the spring or summer months of the year when you are racing. It should build up to 150% of this weekly volume as the base mesocycle progresses.

For example, if the largest weekly volume you achieved during your past season was 15 hours, then plan on your largest weekly base volume to equal 15 to 22 hours. You should try to build up to this large weekly volume over a few weeks minimum.

For daily volume, use the same percentages. If your largest daily volume during the past season was 3 hours, then your largest daily volume should be approximately 3 to 5 hours.

Please note that 80% of your weekly volume should be aerobic endurance workouts with neuromuscular and strength workouts making up the remaining 20%.

Base: Frequency

It is best to space aerobic endurance workouts throughout the week to allow your body to recover and to also allow for other types of workouts (i.e., strength and neuromuscular). What usually works for many cyclists is a long endurance ride during the middle of the week with two longer endurance rides on the weekends. Since aerobic endurance training is not very exhausting on a daily basis, although it is cumulatively tiring over weeks, you can even incorporate other training (i.e., strength and neuromuscular) into an aerobic endurance ride to maximize your time.

Rest and Recovery

It is ill-advised and somewhat impossible to perform multiple months of base without rest periods. Breaking the base mesocycle into microcycles allows for opportunities to build to higher volumes, plus work in rest and recovery. Rest microcycles do not mean deceasing frequency or intensity of workouts, just reducing weekly volume by 30 to 50%. Most cyclists can handle microcycles of 3 to 5 weeks in length, with increasing volume or intensity, before requiring a week of recovery. There is an old adage that you become stronger not through great training, but in recovering from great training.

Microcycles Within the Base Mesocycle

To set microcycles within the base mesocycles, first plan out how many weeks or months you will be conducting base training. Then plan in recovery according to the 3 to 5 week advisement above. Within your base-building microcycles, plan on increasing the volume by 10 to 20% each week building to the 100 to 150% of your largest training volume from the spring and summer months. For example, if your base mesocycle is scheduled for 3 months, you may divide it into 2 or 3 microcycles, each 4 to 6 weeks long. Work in a recovery week at the end each microcycle. See the table below for an example, using the previously mentioned 15-hour week example over a 2-month base mesocycle.

EXAMPLE BASE MESOCYCLE VOLUME

	Week Number	Weekly Volume	Volume Increase
MICROCYCLE #1	1	12	N/A
	2	14	+15%
	3	16	+12%
	4 (Recovery)	8	-50%
MICROCYCLE #2	5	14	0%
	6	16	+12%
	7	18	+11%
	8 (Recovery)	9	-50%

CONCERNING WEIGHT TRAINING

It is not the goal of this handout to delve deeply into weight training for cyclists, yet it is worth mentioning. Weight training for cyclists is an important aspect of fitness especially in the off-season. During taper and race mesocycles it is not advisable to perform lower body weight work nor exhaustive upper body weight work as it may detract from leg speed and may add unnecessary stress or fatigue, thereby decreasing overall performance. For athletes older than 30-years of age, it is advisable for overall body health that they continue a weight regime year round, with less emphasis on leg work during taper and race mesocycles.

Weight training can be periodized like your cycling training (i.e., transition, base, development, taper, and race). During transition, it is a matter of acquainting the athlete with weights and workout modalities using high repetitions and low resistance. During base, the athlete is training the body to handle the rigors of weight lifting, using medium repetitions and medium resistances. During development, the athlete is working to strengthen the muscles specific to cycling, using low repetitions with medium to high resistances. During taper and race, the athlete is either not lifting weights or only continuing upper body resistance training at medium repetitions and medium resistances.

When lifting weights the cyclist should keep a couple of points in mind: (1) workouts should be efficient and minimally time consuming and (2) weights should be chosen conservatively to avoid injury or strain. Example workouts many cyclists choose in order to bring a degree of specificity to weight training are: lunges, squats, dead lifts, step-ups, crunches, back extensions, rows, and pushups.

BASE MESOCYCLE WORKOUTS

Following are example on-the-bike workouts, which should form the crux of your training during the base mesocycle. This is not an exhaustive list; more base workouts exist. These particular workouts have developed with the idea of creating the largest gains in the most efficient manner. The following table gives one example of how to incorporate base workouts into a weekly plan.

EXAMPLE BASE MESOCYCLE WEEK		
DAY	**WORKOUT**	**VOLUME (hr)**
Mon	Day Off	0
Tue	Strength	1
Wed	Aerobic Endurance	3
Thu	Neuromuscular	1
Fri	Day Off	0
Sat	Aerobic Endurance	4
Sun	Strength/Aerobic Endurance	4

Be advised, before starting any workout regime, please check with your doctor.

Aerobic Endurance

These workouts will build your aerobic base, enabling you to work at higher maximum intensities later in the season.

Aerobic Endurance Workout #1:
Ride 2 to 3 hours averaging <75% Max HR or <60% of 20-minute SP on a rolling course. Cadence 90 to 100 rpm. Hands on the tops or hoods. Ride in the saddle mainly by equipping your bike with proper gearing. Mainly small chain ring on hills and big chain ring on flats.

Aerobic Endurance Workout #2:
Warmup 20 minutes. Ride 2 hours averaging <75% Max HR or <60% of 20-minute SP, but pushing it to <80% Max HR or 75% of 20-minute SP on very hilly course with climbs longer than 5 minutes. Cadence 80rpm+ on hills and 100rpm+ on flats. Hands mainly in the drops, even on hills. Ride in and out of the saddle on climbs, without causing surges in heart rate or power.

Neuromuscular

These workouts will improve your body's ability to pedaling efficiently, thereby wasting less energy for each pedal stroke. Effectively you are teaching your brain to fire your legs in a coordinated fashion to develop the most power with least loss of energy.

Neuromuscular Workout #1:
Warmup for 10 minutes. Isolated leg training (ILT) by unclipping one foot and pedaling with other leg at 80 rpm in your *easiest* gear for 3 minutes. Clip back in and switch legs. Repeat this exercise 3 times each leg. Perform ILTs at <70% Max HR or <50% of 20-minute SP on a flat course. Alternate hands on tops, hoods, and drops. This drill takes skill and practice, but has a quick learning curve. Ensure you can control your bike well before unclipping and pedaling with one foot. This drill should not be performed on active roadways or roadways with uneven surfaces.

Neuromuscular Workout #2:
Warmup for 10 minutes. One leg does 90% of the work until fatigue, then the other leg does 90% of the work until fatigue for 4 to 6 minutes. Easy gear at 80 to 90 rpm. Repeat 3 times each leg. It is important to concentrate on pedaling smooth circles with the active leg and "turning off" and floating the inactive leg. Perform ILTs at <70% Max HR or <50% of 20-minute SP on a flat course. Alternate hands on tops, hoods, and drops.

Strength

These on-the-bike strength workouts will build your leg strength allowing your body to endure long races and back-to-back high intensity training in the development mesocycle. These workouts will also help your body deal with repeated jumps and sustained hard efforts in races.

Strength Workout #1:
Warmup for 20 minutes. Isolated leg training (ILT) by unclipping one foot and pedaling with other leg at 50 to 60 rpm in hard gear, which allows the cadence parameters, for 3 minutes. Clip back in and switch legs. Repeat this exercise for 3 times each leg. Perform ILTs at <80% Max HR or <70% to 100% of 20-minute SP on a hilly or flat course. Alternate hands on tops, hoods, and drops. Concentrate on pushing down hard on the downstroke and letting the momentum carry your foot through the upstroke. Do not pull up when bringing your pedal up over the top. Ensure you can control your bike well before unclipping and pedaling with one foot. This drill should not be performed on active roadways or roadways with uneven surfaces.

Strength Workout #2:
Warmup for 20 minutes. Climb long steady hills of 5 minutes or more with 4 to 6% gradients. Cadence 50 to 70 rpm. Perform at <80% Max HR or <70% to 100% of 20-minute SP. Do not ignore heart rate zones as the objective is building leg strength, not working on cardiovascular capacity. Protect knees by watching pedaling form and not pulling up to vigorously on the upstroke.

CONCLUSION

Periodize your training to provide a framework to promote long-term training and performance improvements. The base mesocycle is the physical foundation that will help you reach your peak potential. During the Base mesocycle, focus mainly on endurance miles, but also include strength and neuromuscular drills.

While learning how to ride endurance miles is an acquired skill, it is important to note that in development, taper, and race mesocycles, it will be necessary to increase intensity. When you go easy in base, go really easy, when you go hard in other mesocycles, go really hard. This is cruz of improving performance and maximizing your physical potential.

GLOSSARY

Macrocycle: 1 year, 1 season, or longer. Macrocycles can be stacked. For example, for a 5-year goal, you would stack 5 macrocycles, considering the overall 5 years as its own macrocycle.

Mesocycle: 2 weeks to 3 months. Base: 1 month to 3 months; Development: 1 month to 2 months; Taper: 2 weeks to 1 month; Race: 2 to 3 weeks; Transition: 1 month

Microcycle: 1 week to 6 weeks.Within each mesocycle, you will setup segments, called microcycles, to provide a platform for increasing intensity or volume, and recovery. From the microcycles, you develop daily workouts.

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