

## **PRINCIPLES OF ENDURANCE AND MARATHON TRAINING**

Endurance, Triathlon and Marathon training can be a daunting process. Even the most experienced athletes may become overwhelmed by the latest and greatest theories and remedies for improving endurance, speed, and power. However, after having tried many different training methods from all over the world – Arthur Lydiard, Jack Daniels, Fred Moore, Dr. Robert Vaughn, Dr. Ed Burke, to name a few, it became apparent to me that all the successful training programs are firmly built around the four principles of training:

- 1. Overload and Recovery**
- 2. Individuality**
- 3. Specificity**
- 4. Progression**

### **The Principle of - Overload and Recovery**

All forms of physical training are based on your body's ability to adapt to stresses imposed upon it. To gain positive training effects, you must overload a muscle group or energy system. The training overload will cause these muscles to grow stronger, or the targeted energy systems to become more efficient. As you adapt, the training intensity and volume must progressively increase. If the training load does not increase as you adapt, your fitness will reach a conditioning plateau. However, training intensities and volume should increase in small amounts to avoid over-training or injury. You must recover from your training to get stronger. Recovery is extremely important, and an integral component in the training process. It is during the recovery period, not the training period, that your body adapts -- that is, grows stronger, faster, and more powerful. No recovery - no gains! The proper amount of training intensity, volume and recovery is critical, as over training can result from any imbalance among these three factors.

### **The Principle of Individuality**

Athletes respond differently to similar forms of training. One athlete may need to focus on training speed and power, while another may need more endurance training. Yet, on race day, they may perform equally. Your training must be specific to your physical needs, not to your training partners. For example, I am currently training two athletes for the marathon – one weighs in at 163 and does not lift weights whereas the other weighs in at 193 and does lift weights. Each athlete has a program specifically designed for his strength to weight ratio. Avoid comparing your training program and workouts to others, as your training progress is based on your individual ability. A common problem among distance athletes is that they “chase”, or do other runners workouts for the companionship or motivation. A group-training program that tries to train everyone in the same fashion will not give positive results to everyone. I will never take the “one size fits all” approach to training programs. Your program has been designed to closely match your training and racing abilities to your personal goals.

### **The Principle of Specificity**

There are several important questions to keep in mind when prescribing a multi-sport, endurance or marathon training program. What is your goal? Is your goal just to finish, or to finish in a specific time? Do you have adequate time to prepare for the event you are aiming for? What will the terrain of the race course be like? Will there be a wet-suit swim? Is the bike course hilly? Is

the running course flat? What are the weather conditions like? You will be assigned specific training programs that resemble the conditions of the event that you are training for. Also, your training program will take into account environmental factors such as altitude, heat or cold weather training. Because of the various conditions you may encounter, your training will be based on total training time vs. training miles. Whether your goal is just to “finish” or to “finish on the podium”, your training will be built each month to help you reach your specific goals.

### **The Principle of Progression**

Training needs to progressively move forward. To enjoy further training gains, you will need to increase training loads as you adapt to your current imposed loads. The progression principle is applied in daily workouts to broad, long-term training plans. For example, I will gradually progress your weekly training time as you adapt to a certain volume of training. You will increase for 3-4 weeks then when an overload is met, your training will be backed off for a week as your body recovers and gears up for another 3-4 weeks of progressive training. As adaptation occurs, you will find that you are able to increase your training time, increase the length of intervals and or increase the intensity of your workouts.

## **TRAINING COMPONENTS**

### **Training Components**

- 1. Intensity**
- 2. Volume**
- 3. Frequency/Repetition**
- 4. Terrain**

### **Training Intensity- How Hard?**

Training intensity is the measurement of how fast or at what effort you perform a workout. Intensity can be measured several ways. The most basic is perceived exertion; which essentially is how hard you think you are going. For example, a perceived exertion scale of 1-5 is often used to determine how hard you think you are going. Scientifically, this method of measurement is fraught with error, and I will use it as a rudimentary way to assess your intensity in a workout. The second way to measure intensity is a percentage of your best time for a specific interval. For example, if your best 5k race time is 21:45 (7 min. per mile pace) then your training program might prescribe repeats of miles at 7 min per mile pace (5K race pace). Your program will only use this method if you do not take a Field Test, but it is not a 100% accurate way to measure intensity. *The best measure of intensity is through the use of heart rate monitoring.* Heart rate monitors are helpful in tracking your training intensity and are the least expensive tool you can purchase for monitoring training intensity. Measuring training intensity can help you objectively evaluate your progress.

### **Training Volume- How Much?**

Training volume is the amount of training performed during a specific workout or the number of training minutes done each week. You can measure the training volume of a single workout or add up your weekly and monthly training minute totals. Generally, miles or hours (minutes) are

how you measure your training volume – daily, weekly or monthly. I will prescribe training volume in terms of minutes trained per week since minutes provide a better measurement of training volume than miles or kilometers. Training by minutes rather than miles allows athletes living at altitude vs. sea level to avoid over training by trying to do too many miles. Miles run at elevation are generally 12-15 seconds slower per mile than those run at sea level. Also, many runners have a tendency to push their running pace if their workouts are based on miles vs. minutes and end up training too hard or not at their prescribed heart rate ranges.

Longer training sessions at lower intensity levels will lead to improvements in aerobic endurance. This is why your training program will call for at least one endurance workout per week. Peak fitness will not be achieved unless a large base of volume training is established. An old and very successful coach once said, “The larger your mileage base the higher you will peak”.

### **Training Frequency/Repetitions- How Often?**

Frequency is the number of times a specific form of training is performed during a given training phase or period. For example, you may perform Running Strides twice a week after recovery runs; this is the frequency of training for Running Strides. Repetition, on the other hand is the specific number of exercises during a single workout. This could mean you are performing *two* Running Stride workouts a week with *four* Running Strides performed during each workout.

### **Terrain – Where?**

Training on varied terrain requires that muscles be used differently in the performance of each skill. One of the obvious applications of this training component is running on dirt or grass versus pavement, or pavement versus an all weather track, cycling on dirt vs. road, swimming in a pool vs. open-water. As you will undoubtedly encounter different terrain in your races, the terrain component must also be included as part of your workouts when constructing your training program. Your training program will include workouts for you that will require you to train the muscle groups for various terrain conditions of your goal race. If you wish to excel on hilly terrain, you will incorporate training that targets the muscle groups that are used while climbing. Note: your perceived exertion will be higher while climbing. This is because you are using more muscles (your arms, back and butt muscles), so your heart rate needs to beat faster to push blood to these working muscles.

### **Intensity Guideline for your Workouts**

Workout types, as they appear on your workout schedules, are a guideline for what you will be doing day-to-day. Field Test, Intervals, Tempo, Steady State, Foundation, Endurance, and Dirt Trail Runs, for example, are basic descriptors of the type and intensity of the session, and the general layout of the practice. Your workouts have been designed to make sure to address all the energy systems used throughout your periodized program. Below is a description of the workouts you will most likely see in your training program along with a level of Intensity Scale. Your program will be designed so that you regularly hit each energy system. Generally speaking your workouts will correspond to one of five levels. The Intensity Scale listed below will help you determine how hard or how much effort your workout requires. This scale is only if you are not training by Heart Rate percentages. If you are then I will assign you a specific Heart Rate range for each of your workouts.

**INTENSITY SCALE**  
**FOR RUNNERS AND TRIATHLETES**

<u>Intensity Scale</u>	<u>Swim Workouts</u>
1	Warm-up, Cool Down, Recovery Swim
2	Pull, Kick & Drill Sets, Stroke Rate
3	Base Interval Sets, Fartlek Sets, Open Water Swims
4	Swim Field Test, Threshold Sets, Hypoxic, Time Trial
5	Race, Short Sprints, Anaerobic Threshold
<u>Intensity Scale</u>	<u>Bike Workouts</u>
1	Recovery Bike, Warm-up, Cool Down
2	Endurance Bike, Foundation Bike, Bike Drills
3	Spin Class, One leg peddle, Tempo
4	Field Test, Climbing repeats, Steady State
5	Race, Fast Pedal, Bike Stomps, Sprints
<u>Intensity</u>	<u>Run Workouts</u>
1	Warm-up, Cool Down, Recovery Run
2	Foundation Run, Endurance Run, Steady State Run
3	Steady State Intervals, Tempo Run
4	Field Test, Fartlek Intervals, Speed Intervals
5	Race, Running Strides, Short Sprints

**TRAINING PERIODS**

Your workouts will correspond to a specific training period. Each workout represents a training segment within the training year. This method ensures that you are following the periodization approach to training structure. This method helps move you from one training segment to the next training segment. From time to time, your training plan may include workouts from other training segments into your training program. This provides variety and maintains the individuality training principle. Training intensity is specific to your own lactate threshold heart rate that is determined by your field test, which eliminates the old training zone approach to determining training intensities. Traditional training zones give you either too broad of a training intensity or at other times narrow the training into a very small band of intensity. Once you have taken your field test I will help you determine your training intensities.

<u>Yearly Training Periods</u>	<u>Training Goals</u>
1. Foundation	General aerobic & strength development
2. Preparation	Aerobic capacity / lactate threshold development
3. Race Prep	Event or Race specific development
4. Recovery	Active physical regeneration and recovery

### **Foundation Period**

As you approach your specific goal or racing season, a foundation of physical conditioning must be developed. When building a house, the first step is laying the foundation. The most effective training foundations are laid with aerobic and strength training. In the foundation period, workouts focus on developing the aerobic system while training at low heart rate intensities. While the training intensity is low during this time, a resistance-training program normally is incorporated into your workouts to develop muscular strength. It is my experience that long endurance miles and resistance training don't work well together. One must come before the other. Accordingly, your training miles will increase during the foundation-training phase. Your training will include a variety of workouts, such as Foundation Runs, Tempo Runs, and Fartlek Runs. These workouts will help maintain aerobic conditioning during the heavy resistance training.

Your Foundation Period will last anywhere from 8-10 weeks depending on your current condition and the amount of time before your target goal. Your training volume will typically increase (hours or minutes) in small, step-by-step amounts during the Foundation Period. During your Foundation Period you will build for three weeks then back off the intensity for one week in what will be called your "restoration week". During your "restoration week" you will need to allow yourself to recover from the accumulated training. If you are progressing according to the training schedule you will look forward to the "restoration week". Don't feel guilty!

I advise beginning athletes to take more time building their Foundation Period. This is an important period for all athletes, but beginning athletes will see greater results if they take time to fully build their Foundation. You need to gain enough fitness during this training period in order to handle the more intense workouts coming in the next period. The new athlete needs a larger fitness base in order to improve fitness and sharpen their skills. For experienced athletes, this training period usually lasts eight weeks, but they should extend this training period if they are coming back from an injury or illness.

### **Preparation Period**

The length of the preparation period will be dependent on your fitness and experience and is usually six to twelve weeks. The Preparation Period involves higher training intensities and an increase in volume. The workouts that you might see prescribed in your preparation period may include Steady State Runs, Tempo Runs, Fartlek Intervals, Endurance Runs, Lactate Threshold Swimming, Open Water Swims, Endurance Bikes, Tempo Bikes, and many more. Sprint training will also be added into the workout schedule during this period. The sprint workouts will focus on maximizing turnover while still performing with proper technique in swimming (stroke rate), cycling (pedal cadence), or running (stride rate). At the end of this training period you will have attained enough fitness to be ready to race. The aerobic and resistance training you did in the foundation period is still maintained during this period, but you may see the foundation workouts slowly phase out.

During the preparation phase of your training I encourage you to enter a few local races. Competition during this training period helps avoid boredom by breaking up the routine of daily workouts, thus maintaining the effectiveness of the workouts. However, participation in

competitions during the foundation or preparation training periods should not be taken too seriously; instead they should be regarded as supplemental to your training program.

In the preparation period, like during all training periods, the training structure that is employed accounts for proper recovery. During this period you may see 4-7 consecutive days of active recovery every third or fourth week. During the tough preparation period, your body often needs more time to fully recharge and ready itself for the next training period. In fact, the adaptation you can experience after following these workouts will very likely be positive.

### **Race Preparation**

As you advance to the race preparation period, it is important to assess your current fitness level and re-establish heart rate intensities. Evaluation of your fitness is necessary because you have just finished 14-24 weeks of tough, intense training designed to improve your fitness. You may be advised to undertake another Field Test (covered in the Glossary section) to evaluate your current physical conditioning. This is easy to do and provides you and me with important physiological information and feedback that will help confirm your training intensities.

Improvements in endurance from aerobic training occur due to adaptations in volume and training at intensities below your lactate threshold. These changes occur within the muscles, but most improvements result from your energy systems improving their efficiency. The focus of your training is now in need of a change. Your workouts will focus less on energy system development and more on the specific demands of your races or upcoming events.

Normally, aerobic endurance training provides little improvement for speed and race speed agility. Speed training and race specific training during the Race Preparation period is advised only after sufficient aerobic endurance training adaptation has occurred. Speed training is needed to help you move quickly and comfortably, through the water, on your bicycle, and in your run shoes, at high speeds and quick turnovers.

Workouts in this period emphasize speed and repeatability at high speed; that is, the ability to repeat high-speed efforts with little recovery between efforts. Training intensity is at its highest and the weekly training volume is reduced to accommodate the demands of increased training intensity. If you are racing, many of the workouts need to be race specific and reflect the same work demands you will experience in your races. I may suggest that you enter local races as part of your weekly training. Each time you race, you learn to conquer the “pain demons” that enter your thoughts and you learn to push through them. In addition, training races can test your progress and ensure race specific training. Workouts in the race preparation period are either speed work at 90% or greater of race speed or workouts that will allow you to recover from these high intensity workouts.

### **Recovery Period**

As the season draws to a close, training enters the recovery period. This is the time to allow your body to completely recover from the intensity of the racing and training seasons. Physical recovery is needed, but it is equally important to give yourself a mental break. Typically, I will not want to write any training for you after the last race of your season or your final goal race. I suggest that your training be unstructured and that you channel your energy in other activities in

order to let your mind and body regenerate. Cross training in other sports will help maintain physical conditioning and give you a needed mental break from a highly structured training program. This period lasts 4-6 weeks, depending on the intensity level of your last training and racing period. Remember that you need to recover from the season but you also need to stay physically active.

*DO NOT FEEL GUILTY!*

You have now learned about your body's energy systems and the periodization method. The next step is to learn about the specific training components that make up your daily workouts.

# **TRAINING GLOSSARY**

## **1. Aerobic Training** (training that requires oxygen)

The aerobic system is the backbone of all endurance training. If your fitness goals include 5k-marathon running, triathlons, duathlons, or bicycle racing, the aerobic energy system will be the primary target of your training program. The aerobic energy system functions when training at low intensity levels, using fat and carbohydrate as the primary sources of fuel. This system is very efficient and can be used for a long period of time, producing little lactic acid. As training intensity increases, the primary energy source becomes carbohydrate, either from blood glucose or from glycogen, which is stored form of glucose, found predominately in your muscles and liver. Glucose is the fuel used to meet increased energy demands. Training the aerobic energy system will improve endurance, and overall efficiency. Your body's aerobic system requires large amounts of specific training to increase its rate of oxygen delivery, absorption, and efficiency. Your workouts will bring you the right mixture of training intensity, volume, and recoveries, thus helping you reach your best aerobic results.

## **2. Anaerobic Training** (training without oxygen)

In anaerobic efforts, adenosine triphosphate combines with creatine phosphate to form the ATP-CP system for fueling short, high intensity efforts lasting 10 seconds or less, such as the Running Strides at the end of your workouts or sprinting at the start of the swim.

After 10 seconds, you continue to produce energy by breaking down carbohydrates, producing the needed ATP for muscle contraction. This system is very efficient when you cannot deliver enough oxygen to the muscles (hence the name anaerobic). Unfortunately, this system consumes carbohydrates very rapidly, and the by-product of this is lactic acid. The accumulation of lactic acid in the blood and muscles eventually causes fatigue and limits you from continuing exercise at this intensity. (The fat lady starts singing!) Training the anaerobic energy system will improve your speed, power and sprints. Anaerobic training is an ongoing process that will be linked into your aerobic workouts.

## **3. Drills (RD)**

Running Drills help to isolate and improve a particular aspect of a runner's stride. It will also help coordination and neuromuscular recruitment of specific fibers for running. In other words, Running Drills can improve you running form.

Drills may be incorporated into your running workouts, as well as performed on their own. Drill work should be done at least two times a week to have an effect. After a Foundation or Recovery Run move to a flat section (a football field, or straightaway of the track) and commence with 2-3 sets of drills interspersed with Running Strides (RS), . The drills I will have you do are:

- **Slow Motion Form drill:** these are simply drills where you walk 30 meters down the track using a slow motion running form. Your arms swing from the shoulder like a pendulum at a 90 degree angle, your foot impacts the ground at the mid foot and your knees are lifted as if you were running a 400 meter. This drill helps your running balance and it will put you in the correct running form. The key points to doing "Slow Motion" are to keep your head up, get high knee lift, co-ordinate opposite arm with opposite leg, and to maintain your balance.

- **High Knees:** these are done as if you were skipping. You want to skip 30 meters quickly using an over exaggerated high knee lift and arm action.
- **Butt Kickers:** these are done as running, the runner runs on the spot with a high heel lift, tapping their heels lightly and quickly to their behind.
- **Bunny Hops:** your ability to spend less time on the group will greatly improve your running form. Bunny Hops are for strengthening your ankles and to help encourage a mid-foot strike. Heel strikers are typically slow runners! To perform the Bunny Hop you want to get up on your toes to mid foot and pop off the ground. Using your arms for propulsion hop at the ankle back and forth. You will not move very quickly down the track, however, you will move quickly off the ground. Remember to use your arms.
- **Walking Lunges:** Walking lunges are difficult to describe. Step forward as far as possible with right leg, until upper right thigh is almost parallel to the floor. Keep the left leg straight as possible. Step forward with the left leg until you are back in the starting position. Continue to repeat this process, alternating right and left legs. Walk for 30 meters in this exaggerated running style. You should use a swinging arm action and pushing leg motion on your bent leg to switch legs and arms. Keep you head up and eyes focused ahead of you. It may be difficult to maintain your balance. Be patient. As you do these you will find that your balance will improve and you legs will not become sore.

#### 4. **Endurance Run (ER)**

Endurance workouts are long steady workouts done at a prescribed heart rate percentage below your threshold. Endurance workouts are long in duration yet kept at a controlled pace. You will increase your endurance runs each week for 3-4 weeks then you will encounter a “restoration week” where your endurance workouts will be reduced. After your restoration week you will resume increasing your endurance workouts. Endurance workouts are written for time vs. distance. I find that an athlete’s physical and/or mental performance can suffer if distance or miles are prescribed. There are many factors that can change from workout to workout like altitude, terrain, footing, weather conditions etc. If an athlete is prescribed “20 miles” on a cold hilly route at altitude this athlete could end up running many more minutes than an athlete at sea-level on a flat cool day. Over time it is easy to become over-trained by using the miles method.

#### 5. **Fartlek Intervals (FI)**

Fartlek Intervals tend improve lactate threshold and work on pacing, while simulating the pace changes that can occur during a race. Coaching legend Arthur Lydiard revolutionized Fartlek training and the African runners have perfected Fartlek Intervals in races.

After your Warm Up, you will begin your Fartlek Interval workout. Fartlek Intervals are to be run at 98-108% of your field test average HR. In other words, this is a hard workout! You will run the Fartlek Interval at your prescribed HR percentage and the recovery at 82-90% of your field test average HR. Meaning, you will run the hard portion hard and the recovery portion just slow enough to allow you to recover. You do not want to come to a stop or jog after the Fartlek Interval.

A typical Fartlek Interval workout will look like this:

15 min Warm Up (WU)

3(3,2,1) 3 min hard, 3 min easy, 2 min hard, 2 min easy, 1 min hard 1 min easy...  
15 min Warm Down (WD)

*or*

15 min Warm Up (WU)  
(5,4,3,2,1) 5 min hard, 5 min easy, 4 min hard, 4 min easy...  
15 min Warm Down (WD)

## **6. Foundation Run (FR)**

Foundation Runs are the “meat and potatoes” of your training runs. In medical terms Foundation Runs are used to improve aerobic development by: Increasing mitochondria size and density, increasing stroke volume, increasing capillary development, increasing respiratory endurance, and improving thermodynamic regulation. In everyday terms, Foundation Runs are used to improve and maintain your overall running fitness.

## **7. Heart Rate Training (Heart Rate Monitors)**

Perhaps no training tool has been as revolutionary as the heart rate monitor. Since their introduction over 15 years ago, heart rate monitors have given athletes huge advantages by providing an efficient tool for gauging the use of metabolic energy. Heart Rate Monitors can be purchased at your local specialty running/cycling/triathlon store and prices range from under \$50 to over \$300! I recommend training with a heart rate monitor at specific times in your training to help you gauge your intensity and to prevent you from training too hard or not hard enough. However, I caution you on becoming “dependent” on your heart rate monitor. Heart rate monitors are strongly recommended for field tests and monitoring specific training, however, I do not like to see athletes use their Heart Rate Monitor during a race.

## **8. Intervals (RI)**

Intervals are specific distances with differing amounts of intensity and rest. I will have you do intervals that are: all-out (anaerobic), 100% effort but paced to complete the set evenly, intervals that are controlled but still anaerobic, i.e. still at a level that is faster than what is possible to stay just above anaerobic threshold, or intervals at race pace or a controlled pace, i.e. right below anaerobic threshold. Most often rest and volume will dictate the pace for the set. The effort level required in the Intervals will be set based upon events coming up, injury, or level of training fatigue, etc. A typical RI workout will look like this:

15 min Warm Up (WU)  
4 x Running Strides (RS)  
4 x 1 mile Running Intervals (RI); 5 min. recovery b/t  
15 min Warm Down (WD)

*or*

15 min Warm Up (WU)  
4 x Running Strides (RS)  
4 x ½ mile, 3 min. recovery  
4 x ¼ mile, 90 sec. recovery  
4 x 200 meters, 90 sec. recovery  
15 min Warm Down (WD)

## **9. Lactate Threshold**

Lactate is a by-product or *poison* of anaerobic metabolism within the muscle. It is produced continuously at all levels of exercise. As training intensity increases, more and more lactate is produced within the muscle, some of which cannot be handled internally and diffuses from muscle tissue into the blood. The harder (more intense) the training, the more lactate appears in the blood. The accumulation of lactate in the muscle (and, therefore, in blood) has been related to pain, fatigue and “muscle burn”. When you reach “lactate threshold”, lactate accumulates quickly in the muscles and blood levels rise rapidly, as your body’s production of lactate is equal to its ability to remove the lactate. At intensities above this level your lactate production exceeds your ability for removal. In time, you will no longer be able to maintain the same level of training intensity because of the accumulation of lactate.

## **10. Recovery Run (RR)**

Most athletes know what this means, however, have a real hard time implementing recovery into their training. Guilt seems to get in the way. Recovery is aerobic, and should not be completed at a rate, which induces further fatigue, but facilitates blood flow to the muscles, removal of waste product and healing of tissue. Whenever you feel totally wiped out or unmotivated to train I strongly suggest that you take a day or two recovery.

## **11. Running Strides (RS)**

Running Strides are used to help maintain speed between training cycles by keeping the fast twitch muscle fibers activated and teaching your body to be more dynamic. Running Strides are also used after Warm Up and just before a race to open the lungs and prepare the muscles for difficult efforts. Running Strides coupled with a good Warm Up are essential before any race or Interval workout.

**How to do them?** On a flat, preferably grassy section (a football field is appropriate), run at 30-60 seconds faster than 5K race pace for 100M. In other words, run these fast! I suggest that you accelerate within the stride and descend each one so that by the end you are running you’re fastest. Focus on your mechanics including foot strike, knee drive and arm swing. Do 4-8 Running Strides. Recovery between the Running Strides is an easy jog back to your starting point. *Caution!* If you feel tightness in your hamstrings or calves you will need to stretch and or warm up better. Running Strides are a good way to improve speed however they also can cause a hamstring or calf injury if you are not properly warmed up and stretched

## **12. Steady State Run (SSR)**

Steady state is a controlled steady effort, where your heart rate elevates, but you do not ever struggle to maintain pace. For example, running 30-60 minutes Steady State workout is at a pace that is in control and below threshold. On a day when Tempo is listed and I tell you to “keep things in control, and finish feeling strong”, this would mean running in the upper limits of Steady State to the lower limits of Tempo. Your heart rate ranges for Steady State will be calculated based on your most recent field test.

### **13. Tempo Run (TR)**

Tempo is a strong steady effort typically 20 minutes in duration, which simulates the mental and physical state you encounter while racing, though never leaves you totally wasted like you are (or should be!) after an important race. I will use Tempo Runs to train the same energy systems to different levels of intensity, again based on training fatigue and the purpose of the session. Your heart rate ranges for your tempo efforts will be calculated based on your most recent field test.

### **14. Time Trial (RTT)**

A Time Trial is a maximal effort for the given distance or amount of time. You finish a Time Trial feeling as though you can't do another step/stroke/pedal, much like the feeling you get in a single sport race.

### **15. Treadmill Run (TMR)**

Most often treadmills are used when the weather conditions in your area are too hot, too cold, or too dark. However, treadmill running can be used to improve running technique, while working in an aerobic state. Treadmill Runs can also be used in the Race Preparation Period to simulate exact racecourse conditions, for variety, or during heavier weight training to keep aerobic conditioning.

You will want to use a treadmill that has mirrors in front of it and or beside it. Having a mirror in place will help you maintain your balance for safety and to observe your form while you are running. As you increase your pace, watch for changes in your running technique. During the Treadmill Run concentrate on your running form in terms of high knees, looking forward, relaxed arms, to help you achieve proper technique

### **16. Warm Up/Warm Down (WU/WD)**

A Warm Up is used to prepare your body for intense efforts by increasing blood flow to working muscles and opening up the lungs. Warm Up is essential for achieving the maximum out of each workout and preventing injury. Warm Down is used to aid recovery by helping to remove lactic acid in your muscles.

Jog, swim, bike easy for 10-30 minutes and complete a mild stretching routine for a Warm Up. After your Warm Up stretch for a few minutes then begin your workout. A Warm Down is done by jogging, swimming, cycling easy for 10-30 minutes at a pace well below threshold. A very easy pace will allow for the removal of lactic acid.

### **17. VO2 Max**

VO2 Max stands for the maximal rate at which oxygen is consumed, and is synonymous with the term aerobic capacity. The VO2 Max test is a commonly used physical test to determine the maximal rate at which a person can use oxygen. You need oxygen to metabolize food into energy, so if you can use more oxygen in this process, more energy will be produced and the faster you will go. If you think of your body as a machine, then your heart, lungs and muscles represent the engine and VO2 Max is the engine's output. A high VO2 Max value means you have a large powerful engine. The larger and more powerful your aerobic engine is, the faster you can deliver oxygen to your muscles--the end result is that you go faster.

## Running Equipment, Clothing and Shoe Selection

Unlike many sports where equipment costs can run into the thousands of dollars running is one of the least expensive sports you will engage in. This does not mean that the equipment is any less important! On the contrary, because equipment requirements are few, they become much more important to your overall health, injury prevention and enjoyment. I recommend that you purchase the following equipment prior to beginning your running program:

1. Running Shoes (3-4 pairs a year)
2. Hydration Belt – Fanny Pack
3. Absorbant socks (not 100% cotton socks)
4. Hat/Sunglasses
5. Sunscreen
6. All weather jacket and pants for rain/wind/warmth
7. Gels/Sport Drinks
8. Heart Rate Monitor

Running shoes are the single most important piece of equipment you will own as a runner/walker. I recommend that you replace your shoes every 3-4 months. Shoes wear out from the inside long before wear and tear is noticeable from the outside. Simply checking for wear on the outside of your shoes is not a good indicator of when it is time for you to replace them. Remember, the soles of running shoes are typically made of carbon rubber - the same material used for making automobile tires.

To help you keep track of the running age of your shoes I suggest that you mark the purchase date of your shoes on the inside tongue with a permanent marker. If you find a particular shoe model that you like be sure to purchase several pairs right away. Shoe manufacturers are constantly modifying shoe designs and your “favorite” model may soon be discontinued. You do not want to be forced into trying a new model two weeks before your big race because your favorite shoe is no longer available.

When selecting a running shoe be sure that you are fit by an experienced shoe salesperson. I suggest that you go to your local specialty running shoe store in your area and try on several brands and models of shoes. The best indicator of whether the shoe is right for you is “comfort”. Does the shoe feel comfortable right out of the box? Don’t think that the shoe will break in and eventually become comfortable. Chances are it will never feel right. Shoes also come in various widths so be sure to find one that is right for your particular foot. Most local specialty running stores allow you to run on a store treadmill or jog around outside to test the shoe before you purchase them.

A shoe’s *last* construction has a major impact on its performance characteristics. Most running shoe manufacturers use three types of *last* construction to deliver the optimal blend of stability and flexibility.

- A. **Board Lasted:** Board lasted shoes have a sturdy insole board that runs the entire length of the shoe. This type of construction provides the greatest stability and is recommended for the heavier runner.
- B. **Combination Lasted:** Combination lasted shoes employ slip lasting in the forefoot for enhanced flexibility and an insole board in the rear foot to

control excessive motion. Runners who are prone to ankle turns should try a combination lasted shoe.

- C. **Slip Lasted:** Slip lasted shoes are constructed without an insole board. This provides the greatest possible flexibility and lightest weight. Slip lasted shoes are recommended for lightweight runners and for those who have a predominant forefoot plant. Slip lasted shoes are also ideal for shorter races.

(\*Coaches Recommendation? New Balance)

Also, invest in socks that are made of an absorbent material such as CoolMax or a wool blend. You do not want to run in 100% Cotton socks because they will retain moisture and cause blisters. Visit your local running store and try out some socks that are specifically made for running.

(\*Coaches Recommendation? Smart Wool Socks)

In addition, you will need a Hydration Belt or commonly referred to as a Fanny Pack. As the duration of your long runs increase you will need to drink at least 6-8 ounces of fluid every 15-20 minutes. Having your own fluid supply will ensure that you are staying hydrated, getting the most out of your training and helping your body recover more quickly from the workout.

Dress according to the weather. Check your local weather station for conditions in your area before heading out for a run so you are prepared for the weather. Dress in layers and shed clothing as you begin to heat up. On chilly days start your long runs with the wind *in your face*. End your run with the wind at your back. If you have ever done the opposite you will know just how cold one can get!

You will want to invest in clothing that is made of synthetic materials especially designed to wick moisture from your body so that you stay warm and dry. A visit to your local running store in search of rain gear, warm clothing, hats and mittens will expose you to fabrics such as CoolMax, Lycra, Spandex, Micro Fleece, Polypropylene, etc.

Sunglasses or a hat can be worn to help prevent eyestrain, squinting and eventual crows feet around your eyes! Also, a hat can be worn to keep the rain out of your eyes or help to keep your head warm during the winter months.

Sunscreen should be used on exposed skin at all times during training to help lessen the possibility of skin cancer. The exception to this is during a race. You do not want to put sunscreen or any other type of lotion on your skin that may clog your pores and inhibit your bodies ability to sweat. During a race apply sunscreen only to your face and upper shoulders for sun protection in these areas.

Using sports drinks and Gels in combination with water during your training is critical to your success as an endurance runner. Finding out what you like and what your body can tolerate in terms of taste, volume and timing should be a part of your weekly training routine. Your local running store can be a resource for you to find the products available or visit Runnersworld.com for information on where to find products if they are not available in your area.

Finally, I recommend using a Heart Rate Monitor during training. Polar Heart Rate Monitors are the industry leader and can be purchased at your local specialty running store. Your training program will often require you to do a Field Test. To do this test effectively you must have a Heart Rate Monitor.

Having and using the right equipment and rotating in a new pair of shoes every 3-4 months will help prevent injuries, add enjoyment and keep you running smooth.

## **How to take the RUN Field Test**

The RUN field test for running fitness is an 8-minute maximal run on a track. You are trying to cover as much distance as possible in the 8-minute time. I will be looking for the following data to be recorded from the Running Field Test:

1. Total distance of the effort (to the nearest 25m)
2. Average Heart Rate for the Field Test
3. Maximum Heart Rate during the Field Test
4. Each 400m split time
5. Heart Rate at the end of each 400m
6. Perceived exertion for each effort (1-10)
7. Track type (dirt/cinder, rubber, indoor/outdoor, 200/400 meter)
8. Weather conditions (hot/mild/cool, rain/dry)

### ***Step One: Find a test track***

Go to a local track that is not busy so that there is no one in your lane when you conduct the test. Run the test in lane number one. Try to choose one at the same time of day to conduct your test. Repeatability is always important for testing. The reproduction of exact test conditions will ensure that comparison of results is as accurate as possible. If it is an outdoor track, try to conduct the RUN field test when the wind is relatively calm and temperatures are mild. Conditions are usually more favorable in the early evening.

### ***Step Two: Fuel your body properly***

Do not eat for at least two hours before your test. During the 40 minutes prior to your test, drink a sports drink that is high in carbohydrates to help aid in hydration and fuel replacement. As always, eat the same as you did during the last test.

### ***Step Three: Warm-up***

Prior to the RUN field test warm-up by doing approximately 15-20 minutes of jogging or walking with some strides at the end to loosen up your muscles and open your lungs; you will need them.

### ***Step Four: Start of the 8-minute effort***

Start your test in the inside lane at a specific mark. Don't go out too fast and fizzle at the end. Pacing is very important.

### ***Step Five: Find your ideal pace***

Avoid the impulse to over-stride or sprint, and instead focus on finding your rhythm and pace. The secret is to use a turnover and stride length that is most efficient for your personal running style. It will take some experimentation to find your optimal stride rate and your most efficient arm carriage. The key is to stay relaxed.

***Step Six: Find Control***

Settle into a steady rhythm of breathing. From here on, you are going struggle to maintain control. What you don't want to happen is for your pace to steadily become slower and slower. You want to remain in control of the pace and effort.

***Step Seven: Time yourself***

Take your splits at each 400m and measure your exact final distance to within 25m. Keep track of the time. Record your data on the spreadsheet provided below and give a copy of it to me so I can assign you your training schedule. Record all of your field test results so you can compare and mark your progress.

***Step Eight: Cool-down***

Run 15-30 minutes easy after your test to flush your system after the challenge and perform some light stretching.

***Step Nine: Record your data:***

After each field test record your data on the spread sheet. Submit this data to me each time you do this test. It will help up adjust your training accordingly.

## Field Test Data Recall:

Name _____	Date _____	Date _____	Date _____	Date _____
#1 Total Distance (to the nearest 25m)	_____	_____	_____	_____
#2 Average Heart Rate for the Field Test	_____	_____	_____	_____
#3 Max Heart Rate	_____	_____	_____	_____
#4 Each 400m Split time:	_____	_____	_____	_____
Lap #1	_____	_____	_____	_____
Lap #2	_____	_____	_____	_____
Lap #3	_____	_____	_____	_____
Lap #4	_____	_____	_____	_____
Lap #5	_____	_____	_____	_____
Lap #6	_____	_____	_____	_____
Lap #7	_____	_____	_____	_____
#5 Each 400m Heart Rate:	_____	_____	_____	_____
Lap #1	_____	_____	_____	_____
Lap #2	_____	_____	_____	_____
Lap #3	_____	_____	_____	_____
Lap #4	_____	_____	_____	_____
Lap #5	_____	_____	_____	_____
Lap #6	_____	_____	_____	_____
Lap #7	_____	_____	_____	_____
#6 Perceived Exertion for the effort (1-10)	_____	_____	_____	_____
#7 Track type (dirt, cinder, rubber, indoor etc.)	_____	_____	_____	_____
#8 Weather conditions (hot, mild, windy etc.)	_____	_____	_____	_____