



WINNING TREADMILL WORKOUTS

**BURN FAT
IMPROVE FITNESS
RUN FASTER
ENHANCE AGILITY**

**Workouts for Winning Results!
By Richard Diaz - Diaz Human Performance**

Copyright © 2022 by Diaz Human Performance LLC

All rights reserved. No part of this publication may be reproduced, distributed, or transmitted in any form or by any means, including photocopying, recording, or other electronic or mechanical methods, without the prior written permission of the publisher, except in the case of brief quotations embodied in critical reviews and certain other noncommercial uses permitted by copyright law. For permission requests, contact publisher, addressed “Attention: Permissions Coordinator,” at the address below.

Diaz Human Performance LLC

Franklin Tennessee

<https://diazhumanperformance.com>

CONTENTS

<i>ABOUT THE AUTHOR.....</i>	<i>9</i>
<i>INTRODUCTION.....</i>	<i>11</i>
<i>A BRIEF HISTORY OF THE TREADMILL.....</i>	<i>13</i>
<i>WHAT TO LOOK FOR IN A TREADMILL</i>	<i>16</i>
<i>MOVEMENT PREP EXERCISES.....</i>	<i>24</i>
The Deep Squat.....	25
Inch Worm.....	27
Lunges.....	29
Glute Bridge	31
Low Plank	33
The Press up “Cobra’s”	35
The Push up.....	37
<i>SHOE SELECTION</i>	<i>39</i>
<i>IS THERE A RIGHT OR WRONG WAY TO RUN?.....</i>	<i>43</i>
<i>HEART RATE</i>	<i>55</i>

BEGINNER WEIGHT LOSS WORKOUTS.....	65
A la Carte Weight Loss Workouts	72
The Basic Interval March	72
The Power Climb	73
The Threshold Builder.....	74
The French Intervals	75
A Treadmill is weight losses best friend.....	77
Coach Diaz's 8 Week Fat loss - Fitness Challenge	79
 WHICH WORKOUTS ARE BEST FOR ME?.....	 83
SKILL TRAINING.....	93
Peg Leg.....	99
Peg Leg Incline	101
 THE FLOW.....	 103
Basic Flow #1.....	107
Basic Flow #2	108
Basic Flow #3	108
Basic Flow #4	109
Speed Flow	109
Recovery Flow.....	110
 LACTATE TOLERANCE.....	 113
Lactate Tolerance Phase One	117
Lactate Tolerance Phase Two.....	117

Lactate Tolerance Phase Three	118
Lactate Tolerance Phase Four.....	119
Steady State LT	119
Negative Split (40/20).....	120
Negative Split (20/40).....	121
The Master Class	122
Tread Hell.....	123
The SweatFest Workouts.....	125
SweatFest - A	125
SweatFest - B	126
SweatFest - C	126
SweatFest - Rehab.....	127
<i>TIME TRIALS</i>	<i>129</i>
Aerobic Time Trial.....	130
Race Pace Time Trials	131
4X1K Time Trial	131
The 5 by 5 Time Trial	132
Hill Climb Time Trial	133
<i>HILL CLIMBER.....</i>	<i>135</i>
Lung Buster	137
Tread Hill Breaker	138
Speed Indoor Hill	140
Speed Indoor Hill "MLSS"	141
Speed Indoor Hill Long Version	141

The Goat.....	142
Tread Climber	143
The Tread Creeper.....	144
The Big 5.....	144
<i>OVER SPEED TRAINING</i>	<i>147</i>
<i>AGILITY TRAINING.....</i>	<i>153</i>
<i>DYNAMIC REHABILITATION.....</i>	<i>157</i>
<i>DEALING WITH INJURIES</i>	<i>161</i>
<i>ACCOUNTABILITY</i>	<i>166</i>

ABOUT THE AUTHOR



Richard Diaz “Coach” brings over 30 years of experience as a coach, clinician and athletic trainer to these pages. Few clinicians have the depth of experience in providing performance assessments for athletes from a variety of competitive arenas. He is internationally recognized for his coaching skills with athletes in his care from around the globe. Most know him for the unique talents he brings to training athletes on his high performance treadmill. In this book, he shares a great many of his favorite treadmill workouts.

In this book he felt it critically important to provide workouts to benefit those who aspire to use a treadmill to improve their fitness and shed body fat. No matter who you are or what you train for, there are workouts here to benefit you! Beyond that, there is a comprehensive chapter on proper running mechanics, a chapter dedicated to heart rate implementation and even shoe selection!

This is an unusually valuable book for anyone that wants to perform at their absolute optimal best!

INTRODUCTION

It would be safe to say, over the past 20 years, I've made my living working almost exclusively on a treadmill. I'm not sure how many others could say that. I know that the treadmill for many athletes is Plan B, few athletes prefer a treadmill over running outdoors. I can't say that I would argue with them. However, as I hope to share with you, incorporating treadmill workouts into your global training plan is about the smartest thing you could do. It will improve your performance and speed, minimizing injury while out on the road or trail.

I began by saying that I made my living with a treadmill. For me, a treadmill is principally a necessity to perform VO₂max tests, something that I've done for nearly 30 years. Aside from clinical assessments, I also find that for gait evaluation and correction, a treadmill is an incredible asset. On social media athletes will often question why I am always employing a treadmill vs. running outdoors? This is a fair question. My short answer is, when I put a client on a treadmill I have ultimate control over the action. I can run my cameras from a variety of views. I can carefully critique gait, posture and of course, control the speed, inclination and a variety of other benefits that are not possible otherwise.

Because I travel to put on clinics around the country, I find myself having to adopt whatever treadmill is made available to me in order to conduct these tests. I might add that they are not typically the best of treadmills to work with. We always simply make do with what is afforded us under the circumstances. I can recall one such outing where the top speed of the treadmill was 6 mph with a 10% incline. Obviously this was not ideal, given that every subject we intended to test

was capable of out running the treadmill, even at max elevation. Our solution was to have them wear a backpack. As we escalated the intensity, we added more weight to the backpack to overload them to increase the stress and induce heart rate and fatigue. Clearly, this was not the best scenario but we got the job done. This writing is not intended to act as a soapbox to sell treadmills. Nor am I about to start casting favorites. I do have an opinion regarding features and the amount of money recommended to spend in order to arrive at a happy conclusion for a home Treadmill. That's about as far as I'm willing to go.

I am going to cover a lot of ground over these pages, much of what is written here may be more than you bargained for, little is left off, regardless who you are. If you want to bring your fitness to a new level, there is something here for you!

My intent is to share training approaches, tips and tricks I have learned over a long history training athletes on a treadmill. I should note that if you are training, for whatever purpose, at whatever level of fitness, you are an athlete. The less you know about how to apply yourself to exercise, the more benefit you will gain from reading this. Do not for a second feel that you are not fit enough or competitive enough to draw benefit from this writing. Your investment here is pale in comparison to the value I think you will obtain.

A BRIEF HISTORY OF THE TREADMILL

In the early days of what we know now as the treadmill, throughout history, the treadmill in most of its iterations held a strong connection to manual labor. The Romans used a human-powered device in place of a traditional winch. Men would walk continuously within a large diameter hamster-like wheel attached to a crane with incredible lifting capacity to lift heavy objects. The treadwheel was around 60 times more efficient than the man-powered construction methods previously used by the Ancient Egyptians to build the pyramids.

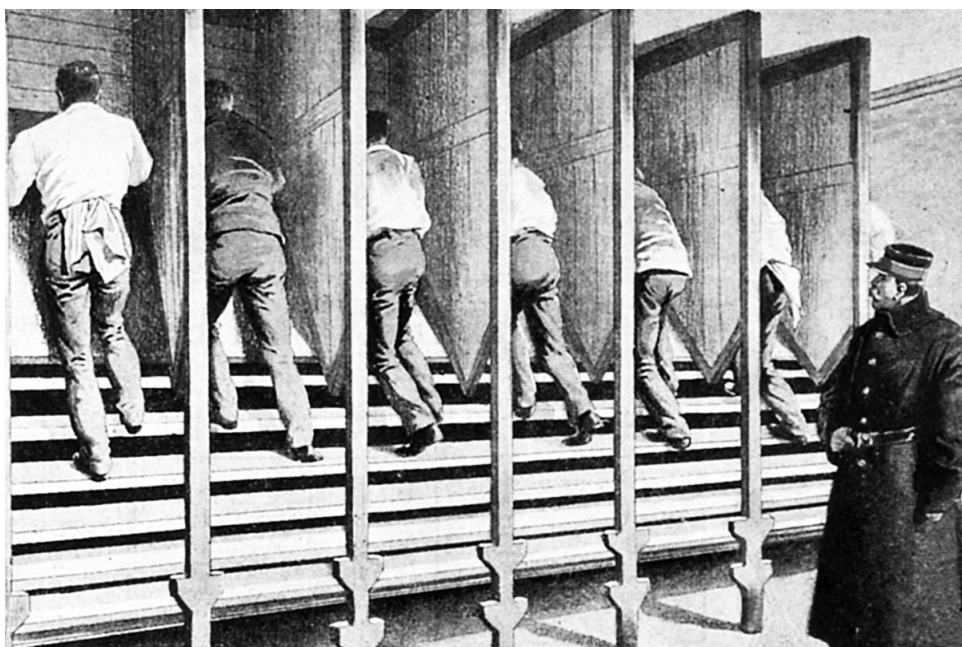
In the 19th century even horses were placed on treadmills when renewable power sources like wind and water were not available. In rare instances, horse treadmills were used to power boats, particularly on the east coast of the United States. Dogs, sheep and goats were used on smaller versions fashioned to operate butter churns, grindstones, fanning mills and cream separators.

In 1911, Claude Lauraine Hagen filed a patent in the US for a 'training-machine' which featured a treadmill belt. The patent was eventually granted in 1913. Hagen's design accounted for users of varying heights by including movable side rails to reduce the noise the machine would make by attaching four outer posts which raised the belt off the ground allowing for an adjustable incline.

The next significant iteration in treadmill design came in 1818 and it is

perhaps the most notorious application to date. A civil engineer named William Cubitt created a treadmill which was also called a treadwheel. Cubitt's treadmill design took many forms. His most popular offering was installed at Brixton Prison in London for dual purpose, one of punishment and utility powered by prisoners who would step down onto steps embedded into a very wide wheel which presents them with the next step. The Brixton treadmill was hooked up to subterranean machinery that ground corn.

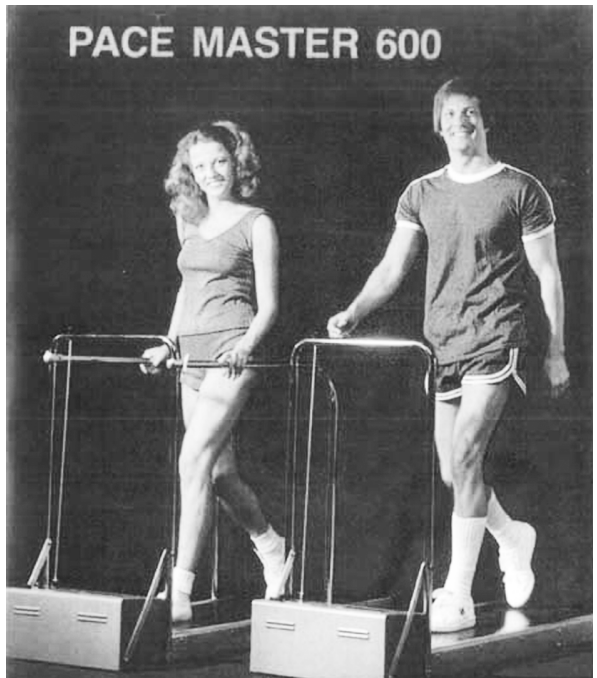
For a century, the prison treadmill was deemed cruel and inhumane in the UK. However, that did not stop it from being imported to the United States. In 1822 the treadmill was instituted in four different prisons the first being installed at a cost of \$3,050.99 to build. It was capable of accommodating 16 prisoners at a time, who ground 40-60 bushels of corn a day.



Throughout the 1920s and 30s, all models of treadmill were manually operated. They required the user to manually drive the wooden slat fashioned belt to create momentum. The first motorized treadmill was co-invented by cardiologist Dr. Robert A Bruce, often referred to as “The Father of Exercise Cardiology.” In 1952,

this new motorized treadmill was used to diagnose heart and lung conditions and diseases. Dr. Bruce devised a cardiac stress test, now known as the Bruce Protocol. The test called for a progressive increase in speed and incline while patients walked and/or ran hooked up to an electrocardiograph machine (ECG) to identify potential heart and lung defects. With the accessibility of a treadmill and the ability to accurately control speed and incline, it's easy to see how the Bruce Protocol became the standard in cardio metabolic assessment.

The world's first, mass-produced, home treadmill invented by William Staub, a mechanical engineer was released in 1960. Staub's inspiration came from a book authored by Dr. Kenneth Cooper named "Aerobics." Dr. Cooper's book advocated running for at least eight minutes a day, five times a week to improve cardiovascular fitness.



Staub built a prototype treadmill, the PaceMaster 600, and sent it to Dr. Cooper for approval. Seeing the immense possibility of a treadmill in the home, Dr. Cooper pledged to fund the machine through his company Aerobics Inc. By the 1980s, Aerobics Inc were selling 2,000 treadmills a year and by the mid-90s, sales had reached a momentous 35,000 units a year.

To this day, treadmills are a staple exercise device in nearly every fitness facility, hotel and home gym around the world.

WHAT TO LOOK FOR IN A TREADMILL

I get this very question all the time and my first response is, what is your budget? Regardless of the reply, I always recommend that you seek out a commercial grade treadmill over a home fitness treadmill. The distinct difference is in the motor. Home Fitness treadmills are not built to withstand the rigors a commercial grade treadmill faces, hours and hours of abuse from health club members. On a busy day in most health clubs a treadmill may run for several hours. I personally owned fairly large health clubs and purchased a great many treadmills over the years. I can tell you that the industry standard life of a treadmill is about 3 years. After a few years expect to need to replace the rear roller, a belt and possibly the deck the belt runs over. If you're lucky, you won't have to replace any electronic parts, such as a control panel. An average commercial grade treadmill can cost anywhere from \$5,000 to \$15,000 with a one year warranty on parts and service.

A home fitness treadmill will run from \$1,000 to \$5000. What you give up for this reduced price is a far less powerful motor and generally cheaper components. The assumption being, your treadmill will get a fraction of the use that a commercial grade treadmill will undergo. Where this is true, the potential for component failure is very high. The other thing you trade off for price is function. A typical commercial treadmill offers a top speed of 15 mph with 15% grade elevation. Home fitness treadmills tend to top out at 10 mph (due to the less

powerful motor) and rarely offer 15% grade elevation. Having said that, there are a few home fitness treadmills that offer up to 40% grade as a selling feature. They commonly have a much shorter running surface and, in my experience, these treadmills end up breaking down or end up very shaky and bouncy in operation even in a home use environment.

So you say, I don't have over \$5000 to spend on a treadmill? Rest easy, I have a potential solution! As unsavory as what I am about to recommend, hear me out, because I've seen a great many satisfied consumers who have followed this advice. To begin with, the fitness industry as a whole is a very difficult business to operate. Take it from someone who lived it for many years! Unless you have a massive investment group to support your initial costs and a fool proof operating plan, odds are, you are destined to fail within 3 years. The first year is always great. The new club in town is exciting. The prospect of new talent, new equipment, a clean environment and enthusiastic staff is appealing. This new vibe generally sucks members out of nearby, older, beat down facilities that members become frustrated with.



It is a dead giveaway of who you are dealing with as operators when a fitness center reaches the 3 year mark. It is not uncommon to see “out of order” signs show up on many pieces of equipment. Rest rooms and showers

un-kept and other issues that begin to annoy members present easy prey for new start ups. Here's my point... when these fitness projects fail and debt for rent, payroll and equipment leases add up, the next thing that results is closure and auctions.

I can tell you as a big box health club owner (over 10,000 square feet), I have attended many of these auctions with two specific intentions:

Try and negotiate a buyout in which we take on the liability of pre-paid existing members in hopes of picking up monthly auto-debit members.

As a part of the negotiations we gained relatively new equipment for 10 cents on the dollar!

At these auctions there will be the typical suspects (your local competitors) trying to beat you out of these negotiations and the bank! The bank is hoping to sell the equipment that was in default. Clearly, they hope to recover as much as possible but as a rule it generally shakes out like this: Treadmills, Stair masters etc, go out at about 30 cents on the dollar. Other weight training equipment much less. This inevitably results in an aftermarket.

I have consulted with many clients to search Online aftermarket services such as Craig's List, eBay etc, to look for these opportunities. A reseller will often refurbish and sell treadmills for a fraction of the initial sale price. For example: many such facilities failed during the pandemic. The result was that a great many treadmills found themselves on the aftermarket. One of my clients in particular, bought a nearly brand new treadmill with a retail value of \$9,000 for... ya ready? \$700 delivered! Of course, this was a highly unusual outcome but you can often find a very reliable commercial grade treadmill for better than 50% less than retail. What you'll gain is a treadmill that will last for several years. If you follow this advice and you end up as a happy consumer, let me know, I love hearing it!

It has become a bit of a cult where followers on social media have watched me work with clients in the infamous "Secret Lab." The feature is my massive and unusual looking treadmill. My treadmill has a built- in canopy with a pneumatic lift I use to un-weight and protect my clients from being tossed from the belt. The top speed on my treadmill is 28 mph with a 28% grade elevation in both directions! A treadmill that operates in both directions is rare. One that can achieve both directions at 28 mph is very rare. Needless to say, I spent a great deal of money on this machine. It might interest you to know, I bought it used and it still cost several thousand dollars. I've owned it for over 20 years and it was

about 5 years old when I purchased it. A few years ago I replaced the belt and was told it was unnecessary. I was so accustomed to typical treadmill longevity that I was in fear that it was time. The technicians from the manufacturer that replaced the belt told me I was good for another 10 years! As ridiculous a proposition as spending well over \$30k for a treadmill seemed at the time. In retrospect, it was the best investment I have ever made.

TREADMILLS I DO LIKE

Really across the board most commercial treadmills are relatively similar. The only brand that really stands out for me is Woodway. The distinct difference is in the belt which they do not have. They have a tread system that's made up of slats that are linked together (think Tank treads). The value in my mind is two fold, you are never going to need to replace a belt and you don't have to periodically lube or replace the deck beneath the belt. The workmanship is also very respectable but as is the case with everything, you get what you pay for and these treadmills are not cheap! Expect to pay north of 10,000 depending on the features you opt for.



TREADMILLS I DON'T LIKE

Back in the day in the health club business, I attended many Club Industry and IHRSA (International Health and Racket Sports Association) conferences. These are weekend affairs are geared towards health club owners where equipment manufacturers presented their new lines of exercise devices in expo fashion. Historically, my partner and I, like so many other club owners, would come to see the new releases of everything fitness. Most of the major brands would put on an extravagant booths to demonstrate their latest gadgets. Treadmills were a big part

of these shows. Realize that large box fitness facilities build their clubs around an assortment of cardio devices. Treadmills, bike ergometers and steppers were staples that members relied on for membership purchase decisions. Because of the wear factor associated with long hours of use and in some cases, thousands of members running on treadmills, a savvy club owner shops for dependable brands. In most typical use cases, a commercial treadmill lifespan is 3 years or less. This is generally how often replacement plans are budgeted. Incidentally, a commercial treadmill purchased for home use will last 2 to 3 times that lifespan. For this reason motorless treadmills have become very popular. No motor, no electronics equals no maintenance.

I will admit that these treadmills too operate with a slat belt system as does the Woodway, I guess I'll need to credit them for that. Motorless treadmills depend on the user to propel the belt which in most cases requires a ramp style running surface. This is where I draw exceptions. In order to move the belt the runner

needs to drive into the ramp. Think reach-grab-pull. The faster you hope to travel the higher up on the ramp you must reach. In essence, this treadmill teaches you to over stride and favor engaging the musculature along your posterior chain. If you refer to my chapter on proper running mechanics, your goal should be to push not pull!



With the advent of Spartan Racing and other obstacle course races, treadmills

with steep elevations became very popular for home use. Treadmills with a 40% incline were high on the list for home use consumers. I personally would rather invest in a better, more reliable motor than that significant of an incline. My

professional grade treadmill has a 28% incline which is rarely if ever visited. For fun, I will demonstrate that it has the ability to achieve such height but in all of the years I have owned it, I can't think of any time where it was called for. If you can gain a 15% grade, in most use cases this is an ample application.

SO, WHY A TREADMILL VS. RUNNING OUTDOORS?

For starters, I don't believe it is a matter of in or outdoors. It's all training and all beneficial. Not to mention the convenience, having to chase a treadmill belt up an incline is such a powerful training influence to prepare for long or even Ultra distance events. Being on a treadmill provides an opportunity to uber focus on the way you move. Set up a metronome on your smartphone, set it on your console and get lost in the rhythm that is far more cumbersome to do outdoors. A benefit that few coaches speak about is the ability to sync the balance of your stride, termed bilateral equivalence. Watching slow motion video captures so many runners over the years has shown me that most runners are generally dominant in force production off of one leg vs. the other. This is a critical revelation and is commonly the culprit behind most running related injuries. Some of the athletes I meet tell me that they run differently on a treadmill compared to running outdoors. This is a common misconception in that the approach of contact with a running belt or ground is generally the same. The difference is that with a treadmill, the belt is already moving. I use the term "rate independent" which suggests you must act to keep up with the moving belt. The belt moves regardless of your action. When running over a static surface, be it road or trail, you are either propelling yourself forward in a push off or pulling fashion, otherwise there is no movement or "rate dependency."

Having to respond to the rate of travel the belt is scheduled to provide requires the runner to act synchronistically. If your rate of movement doesn't match that of the belt, there will be a failure to communicate! This circumstance provides unique challenges and opportunities that running over ground does not. Running over ground is regulated by your effort. If you increase force and or frequency your connection with the ground will yield greater speed. This is the reality of the difference between the two activities. One might argue that their specific competition is conducted over ground and running on a treadmill does

not translate well relative to their needs. This, again, is something I feel could be considered a gray area in training.

SUPPLEMENTAL APPROACH

It's a rare occasion where races are conducted on a treadmill. The fact is, training on a treadmill, in great part, is intended to be supplemental to running and racing outdoors with the possible exception being those who train indoors almost exclusively for fitness and or weight loss. It's true, if you spend too much time on the treadmill you can develop a dependency to the belts rate independence. Ultimately you are chasing a belt that may be producing a pace you cannot generate outdoors. There is a flip side in that a sound marriage between the two training modalities does work in your favor. It really is a matter of striking a balance. As pointed out earlier, many runners find themselves stuck indoors due to inclement weather.

In this writing, my goal is to shed light on the benefits of treadmill training beyond simply avoiding inclement weather. Sure, when the weather is working against you and you are facing a race schedule or even fitness training that can't wait for a sunny day, a treadmill is convenient. As a coach, for this reason alone, I have had to adapt and creatively train athletes for Spartan races and even marathons. Coaching virtually has evolved my business internationally. I have clients all over the world who are accustomed to dealing with harsh temperatures both up and down. I might add that these challenges also include a variety of elevations. For example, I have clients preparing to race at very challenging terrain and elevation while living at or below sea level. Preparing to race at a ski resort at 10,000 ft poses a challenge that requires one to think out of the box. One of my clients lives in northern Canada where the snow and cold make it nearly impossible to train outdoors for over 6 months of the year! This is where a treadmill becomes an almost required training tool.

FROM A COACHES VIEW

Aside from clinical use such as VO2 max testing, having the ability to guide activities that as a coach you can observe, It is far more convenient than chasing an athlete down a road or trying to observe from a distance. The ability to stand next to a subject running on a treadmill, effectively cue adjustments to contact, stride and postural dysfunctions, provides a wealth of opportunity.

These corrections are difficult to identify while running alongside your client. One benefit that may not seem as obvious is to have your subject step off to the treadmill side rails mid-pace and restart with a renewed awareness of what needs correction and jump right back into the pace with these corrections in mind. Of principle benefit is the ability to video your client from multiple angles and review the gait patterns in slow motion together, frame by frame under magnification. I spend a tremendous amount of time with clients doing this very thing.



MOVEMENT PREP EXERCISES

Beyond the warm up you do, leading to whatever workout you take on, your body will appreciate your physical preparedness. By this I mean, developing and maintaining functional ranges of motion and general strength. Think of it as tuning your instrument, which is your body.

Regardless what your goals may be, to manage your weight, improve your fitness or compete in a running event, what you ask of your body will be met with greater success if you take the time to prepare your body for the work intended. Choose a few exercises that target the areas that demand your attention, the time required to make a significant difference in your training should not take more than 10 minutes.

I have selected a handful of exercises that are, what I refer to as “Task specific,” that cut to the chase and provide an incredible return on the time invested. These do not require any equipment other than a bit of space to conduct the exercises on your floor. These exercises do not necessarily need to happen just prior to your training session. As a matter of fact, the best time to do them is first thing in the morning right after you wake up before your coffee or morning meal. They are not so taxing that they will require a pre-training meal. If anything, possibly a 10 ounce glass of cool water is all you’ll need. I would also go as far as to recommend you do these exercises even on your planned days off.

A benefit aside from the obvious is, the habit you create will lead to daily production in everything you do! The sense that no matter what else happens in

your day, you will have the satisfaction of knowing you got your morning ritual done. The rest is just icing on the proverbial cake!

THE DEEP SQUAT



A proper deep squat begins with your feet, shoulder-width apart and flat on the floor. Your toes are pointed straight ahead, your knees are straight, and your trunk is erect.

A deep squat requires flexibility in your hips, knees, and ankles. In addition, it requires the muscles of your lower body to provide enough force to move your

weight. Your intent is to enhance and ultimately maintain functional range of motion in the hips, knees and ankles while providing the same functional capacity in the soft tissue along this chain from the ground up.

Begin by squatting down as if you're sitting on a chair. Your ankles, knees, and hips will bend in unison while your spine stays straight. As you begin to lower, your knees will travel forward over your toes and your hips will travel backward to keep your center of gravity over your feet.

Keep your feet flat on the ground which may be challenging due to limitations in range of motion, work at it... it's why you're doing this exercise to begin with to gain range! At the deepest point of your squat your pelvis should remain in a neutral position without tucking under or tilting backward. Your knees will stay in alignment with your feet. Push through your feet with your weight centered just in front of your ankles and return to the starting position.

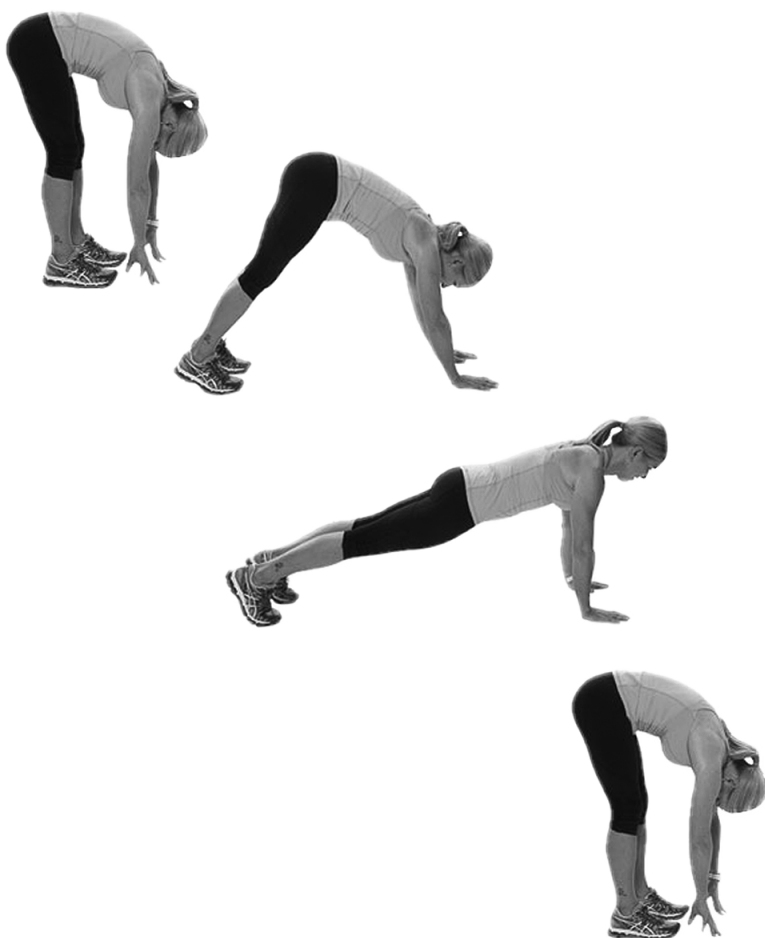
Once you achieve the squat position, sit there for 30 seconds to a minute.

Return to a standing position then immediately drop back into the squat for 10 repetitions. At the end of the repetitions, try to remain in the deep squat for another 30 seconds. This is the tough part! In conclusion, shake your legs out.

Repeat for 2 rounds

Now its time to move to the next exercise which is the Inch worm

INCH WORM



Inch Worm is one of my personal favorite movement prep exercises. As we age, we tend to sit too often which leads to shortening of the musculature and connective tissue along both the anterior and posterior regions of our legs. In short (pun intended), our hamstrings and quadriceps can potentially limit functional range of motion, especially along the back of the legs (our posterior chain) from the ground up which can really tighten up. Inch worms are also highly effective in increasing mobility at the ankle, which is of great importance for runners.

Inch worms address many imbalances in a simple and easy to do dynamic movement.

From a standing position reach down until your fingers touch the ground. If your range of motion is too limited to do this, flex your knees as much as needed to finally get your fingers to the ground. Your hand to ground contact should begin as near your feet as possible.

Walk your hands away from your body until you are in a starting push up position. From this plank position, begin walking your feet towards your hands. Try to do this by “ankling” your way forward as opposed to marching forward. This is where huge gains in ankle mobility will result. Once you arrive as near your hands as possible, you can either walk your hands back out and repeat the sequence or, if your space is limited, simply stand up, turn to the direction from where you began and repeat.

Perform 4 rounds

Take about 30 seconds to recover and move right into the next exercise.

LUNGES



Lunges with the use of your bodyweight only would be best if you're a beginner, performing the exercise from a static position (up and down in one place). Progress to bodyweight walking lunges, which need more balance and strength.

The lunge is a powerful lower body exercise that is easy to learn and safe to do. You can do lunges with your body weight or minimal equipment such as dumbbells, a medicine ball or barbells as you progress. Lunges target some of the largest muscles in our body. These muscles need a lot of energy to function, and as a result, burn a lot of calories! Our quads, glutes and hamstrings generate a lot of output, and all three get hit by this exercise.

Our hip mobility suffers as a result of our modern-day lifestyles. We spend a lot of time sitting for extended periods and lunges are a great way to increase your hip mobility. Tight hip flexors and weak glutes are main culprits for hip pain and stiffness. Lunges both mobilize your hip flexors and strengthen your glutes. They are a great exercise for mobility maintenance and improvement.

Your progression should begin with stationary lunges, drop into the lunge position, return to standing then alternate legs for 10 repetitions off each leg. As you become more capable you can turn the stationary approach into walking lunges. More proficient enthusiasts can consider adding external load via dumbbells, kettlebells or other loading practices. Bodyweight alone is highly effective and should not be considered “too easy.” The more control you have, the more commitment you’ll earn to your range of motion providing more extension of the hips and thighs.

10 repetitions off each leg

2 rounds

GLUTE BRIDGE



As the name suggests, the glute bridge primarily targets the glutes, (the muscles that make up your butt) specifically the gluteus maximus. Your hamstrings assist in this hip extension exercise. As a bonus, you can add a resistance band just above the knee to add extra glute activation.

Lay down on your back with your knees bent and your feet flat on the ground. Your feet should be hip-width apart with your toes pointed straight ahead, and your heels should be about 6-8 inches away from your glutes. Place your arms by your sides with your palms turned up toward the floor.

Squeeze your glutes and your abdominals as you start to lift your hips toward the ceiling. Raise your hips as high as you can without arching your back. The goal is to raise your hips until your body is in a straight line from your knee to

your hip and to your shoulder. Squeeze the glutes as tightly as you can in the top position while you hold for two seconds. Slowly lower the hips down to the floor, keeping tension in the glutes and abs as you lower down.

If you feel your hamstrings working the most, try moving your feet back, closer to your butt. If you feel the muscles in your low back working the most, return to the starting position and reposition your back so that your hips are tucked under, and your abs are engaged. When you raise your hips up, try to maintain a neutral core position to avoid arching the low back.

Repeat this sequence for 10 -15 repetitions

Roll over and prepare for the next exercise

LOW PLANK



Get into the top or start of a pushup position. Lower down to your forearms, maintain the same positioning and form. Keep your palms and toes firmly planted on the ground, your back straight, and your core tight. A saggy back or bottom during a plank can result in lower back pain later on, so be sure not to compromise your form. Do not let your head sag, if you were to lay a stick along your spine your head should be in alignment with your back.

While it may not feel like it, planks are a great way to stretch out the lower half of your body. Getting into the hold position lengthens your hamstrings as well as the arches of your feet. By strengthening your back, chest, shoulders, neck, and abs, this exercise makes it easier to keep your shoulders back and your lower back

in a neutral position while sitting or standing — two vital components of good posture.

Hold your plank with proper form for as long as you can, set a goal for 1 minute. Recover for 1 minute and repeat. Prepare for the next exercise.

THE PRESS UP "COBRA'S"



The “Press Up” or fondly referred to as “The Cobra” is a modification to the push up. Not to be thought of as an easier approach. This exercise is a staple in most military training plans. For one, it is an excellent way to place your lower spine in extension which also is a great stretch for the iliopsoas muscles which tend to become tight from a lot of sitting. It is also a great exercise for developing triceps strength which yes, ultimately leads to a better push up. Because your body weight is mostly on the ground, you are not challenged with bearing your entire weight. If you cannot complete 10 push ups with good form, this is a good workaround which leads to your ability to accomplish more work.

From a prone position (belly to floor) place your hands shoulder width apart and “press up” keeping your lower body on the floor. When you have complete arm extension, lower to the start position and repeat. This is a high repetition

exercise given the partial body weight loading. If you can do 10 push ups you may do as many as 25 or more press ups. As a movement prep exercise, it does a great job of “prepping” your hips for the treadmill and can accelerate your heart rate to assist in your global warm up.

Begin this sequence with 25 -30 repetitions

THE PUSH UP



The push up is quite likely the most recognized body weight exercise in the world. Push ups in their various forms can improve upper body function and enhance endurance, strength, and power to maximize functional fitness and performance.

The basic push up can be a cornerstone of a full body exercise routine. Typically thought of as an upper body only move, push ups can be extremely challenging to virtually your entire kinetic chain, from your toes to your head.

A basic push up begins with hands slightly outside shoulder width apart at chest level. Feet should be hip width apart and parallel to each other. Hips should be in line with the shoulders, and the lower back should have a neutral curve, not completely flat. To keep proper lower back alignment, pull your belly button in and tighten your abdominal muscles. Your head should be positioned so the ears are in line with the shoulders. They should not drop down toward the floor or look up in front of the body.

As shown in the lower picture, if you find that performing the basic push up to be too challenging, allow your knees to settle to the ground and perform the push from this altered position. Maybe you can perform a few strict push ups and then you can modify to the knees on ground posture to finish your set.

This being the final exercise in this series, fatigue may be setting in so only perform as many repetitions as you feel you can without straining to complete a set. If you follow the series of exercises in movement prep, you should be adequately prepared for the workouts you choose for the day!

Set a goal for 10 repetitions with perfect form

2 rounds

SHOE SELECTION

What shoes to wear while you train is an important decision that is fraught with confusion. The athletic shoe industry, in my opinion, has one concern... enticing you to buy their shoes. Billions of dollars are invested each year on marketing for this very purpose. It pains me to say it but the reality is, running shoe design is built around position statement and marketing ploy. Building a narrative around injury solutions such as motion control, stability and cushioning is nothing short of corruption! When my clients ask me which brand of shoe to purchase, my standard response is this:

Any shoe that attempts to influence natural foot function will ultimately lead to weakness and potential injury. This position leaves you with very limited choices on the market. Unfortunately, because you may have already fallen prey to over controlling shoes, simply reducing heel lift, cushion and arch support makes it hard to revert to natural function.

Before you run off to buy new shoes, let's begin by understanding why, what and how to regain the natural function I speak of.

I always rely on simple, irrefutable logic when I try and explain more complex subjects. Where understanding "natural foot function" is concerned I would often begin by asking a new client to step up onto my treadmill which is around 8-10 inches off the ground and ask them to hop down. In over a few decades of requesting this task, not one of them has landed heel first. Why? Because instinctively we are programmed to protect ourselves from injury. By landing

forefoot first we engage a system of impact absorption that begins with a bit of flexion from the big toe that tensions the muscles, ligaments and tendons of the mid foot. The outcome is mid foot stability. The mid foot stabilization leads to mobility of the ankle. Mobility of the ankle promotes stability of the knee. Stability of the knee results in mobility of the hip and further stability of low back. A sequence of events that are set in motion from initial contact with the earth. Afferent feed forward information instantly informs the central nervous system that impact is in play. The response termed GFR (ground force reaction) quickly learns and proactively, synchronistically provides a solution to protect you from said impact forces.

All of which occurred instinctively as the client jumped to the ground from my treadmill. The next step to synch my point, I'll further ask the client to jump down once more but this time, land heel first. This almost always results in a pause and reflection of the potential outcome which would be bone jarring impact right up into the spine. The problem is two fold: one, bypassing the sequence of events earlier explained, taking the impact directly into the calcaneus (heel bone), two, being late with information sent to the CNS is reactive rather than proactive, due to the bypass of the all important mechanoreceptors (nerve signaling agents) that reside in the fore foot that feed forward and receive solutions to impact.

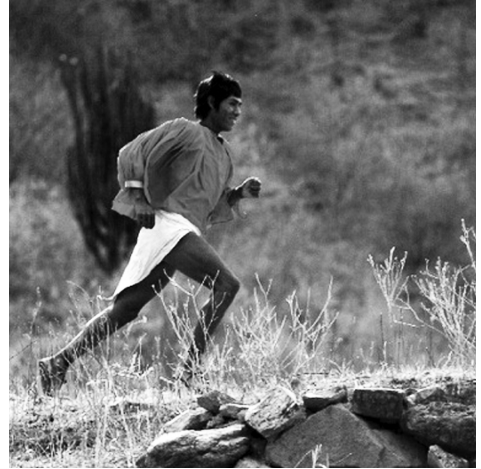
Lesson learned... landing fore foot first protects.

The new shoe design gaining massive popularity are shoes with tall stack height. The stack height refers to the thickness between your foot and the ground measured in millimeters. The selling position is cushioning promotes impact absorption. No matter what part of your foot you land in first, the cushions are on place to protect you. The reality is by dampening the afferent GFR every joint from foot to head is left unprotected. Think of it like this; while standing in front



of me, I tell you I'm going to punch you in the stomach. As I act on my threat, you instinctively begin to tense your abdominal muscles to prepare for impact. Same scenario, this time I tell you I'm going to punch you in the nose. Instead of ducking, first I hit you in the nose and then you duck! I'm sure you get my idea.

What was highly popular before stack height was zero drop "minimal" shoe design. This fad came after the best selling book "Born to Run" written by Christopher McDougall. In this book he made a strong "logical" argument built around the Tarahumara Indians of Mexico famed for their incredible running abilities either barefoot or with minimal sandals. His story was so compelling that seemingly every runner took a shot at running in the infamous "5 finger boat shoes".



Ironically this shoe / slipper was never designed for running. The sole is grippy (designed for boat decks) with a mesh upper and each toe was individually encased thus the name "5 Fingers."



What can I say about this shoe? In all intent and purpose, it has little influence over natural function. The problem stems from the fact that heel strikers, continued to heel strike and those who attempted to forefoot strike, still did so while over striding. This resulted in a whole new batch of injuries mostly to the anterior chain (top of the foot and front of the lower leg), metatarsal stress syndrome and shin splints just to mention a few. A sound concept gone

seriously wrong. The shoe was just enough to give you creative license to make dramatic errors in the way you run. I will say that there are the who survived

and corrected their gait and to this day love and swear by the shoes. Ultimately what happened is they were forced to strengthen their feet and began building on injury free running.

So what I have shared here are polar opposite designs from highly cushioned to highly minimal foot wear. The take away is this; it takes time to correct poor running form and to develop strong and naturally functioning feet. It's worth it! As you educate yourself through some of what I teach you here in this book and through other resources, making a change to natural running function is worth every step you take. I am 70 years old now, I went through a long period of uneducated running. Having run marathons and competing in triathlons, only late in life did I learn to correct my flaws and regain the ability to stave off low back, knee and shin problems. I wear a shoe that has a broad toe box so my toes are not cramped and are able to splay naturally under load. The shoe is a zero drop which means the forefoot and heel are on an equal level. The sole of the shoe provides just enough protection so as not to be concerned with the surface I run over but not so much that I lose the information I spoke of. Try lots of shoes on. Look for the same features I just listed. Do not allow yourself to be duped by a shoe salesman or an ill informed friend who really doesn't know what they are talking about. Most importantly, invest in yourself, strengthen your body from the ground up and learn to run the way you were born to!

IS THERE A RIGHT OR WRONG WAY TO RUN?

Odds are, if you have read any of my writings, you know my position on this question. That said, I'll assume that maybe you have not, you're new, which is awesome! At the risk of overstating the obvious, I am a trained, experienced observer of athletes in motion. Aside from irrefutable facts such as gravity, inertia and physics, I will relent to the fact that we are not all playing from the same deck of cards. We all (in general) began our journeys with the same tools; two feet, ten toes, two legs etc. However, along our life's path we manage to take some hits which affect the way we move. This does not discount the rationale for proper vs. improper approaches to the way we run. I believe at the very least, we should aspire to right the wrongs we have developed over time. This process begins with understanding the what, how and why of "proper" running mechanics.

Let me use a few logical comparatives that may resonate with you. If you were to decide you want to become a boxer, with little to no experience, you will (or should) seek out an expert. First thing this expert might ask of you is to throw a punch. As you flail wildly in an attempt to deliver what he's asked of you, this expert will quickly explain why your punch was sorely inefficient. The end game in boxing and any other sport, is efficient movement, maximal force production at minimal expense. Runners tend not to think in these terms. They would like to believe that everyone has their own style of running, which in part is true. Some runners get away with murder from a running form perspective, never seem to

get injured and are able to run pretty fast. I would argue that there is a better way. Refer to the amateur boxer, he can assuredly hit you, but odds are he will lose a fight to a well trained boxer. What I'm suggesting and I can back what I am saying with years of case study and experience is;

I can almost always take a runner who is inefficiently successful and make him a better runner. I have often helped a seasoned runner become more resistant to injury, ultimately faster and capable of putting in greater weekly volume.

Most runners who come to me do so, out of frustration with performance and or chronic injury. Changing the way they run is always the solution. Taking an athlete who over strides and lands heel first, teaching how to improve the way to move is a game changer.

Even though the focus of this writing is Winning Treadmill Workouts, before you can get the most out of the workouts, the first thing you need is to ensure that the way you run is as efficient as possible. So, let's address these concerns with my take on what you hope to achieve.

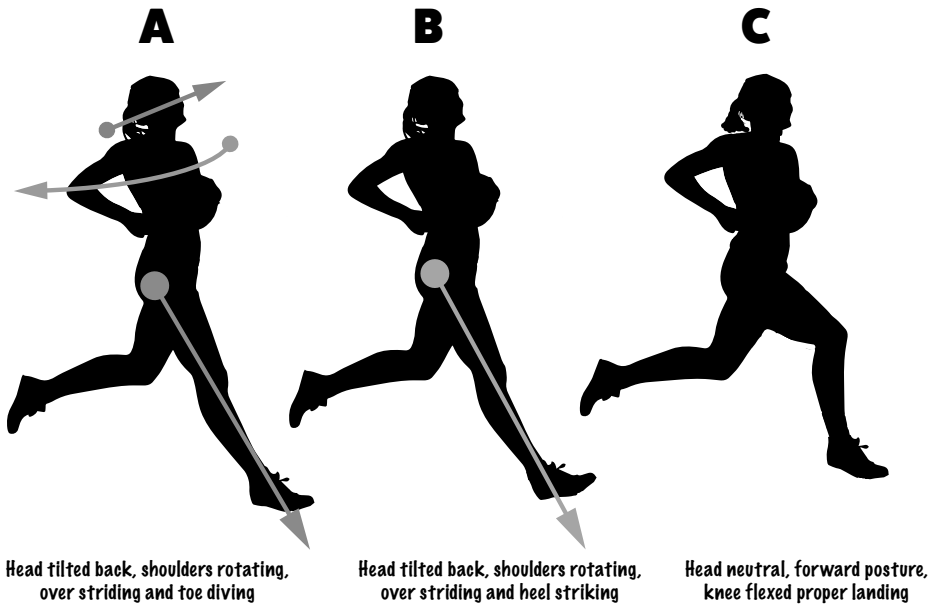
THE ACT OF RUNNING PROPERLY

To be successful as a runner, at any distance or pace, you must seek stability upon initiation with the ground. Not only should you seek stability, you must find it as quickly as possible. Doing so requires that you land near your center of mass. The next requirement is that you must also have functional mobility. Landing well is chiefly important, yet, having the ability to mobilize and stabilize what has landed is equally important.

As soon as your foot makes contact with the earth, an opportunity exists for the many thousands of mechanoreceptors in your feet to intercept information regarding the collision. They relay this information to your brain so timely decisions can be made regarding how to act. They decide which muscles and connective tissue need to stiffen or relax to develop ground force reaction. If this information is late, the body is caught by surprise and "simply takes the hit". This is why you would not want to wear a shoe that is heavily cushioned. When the landing is correct and the ground force reaction is timely, a synergistic response

is produced. This response not only mitigates impact force, this force is also harvested as eccentric elastic energy to propel you forward.

Realize that gravity is at work to keep us grounded. A runner moves through



A. Represents a common error made by runners in transition who identify they need to stop heel striking but still over stride.

B. Represents the classic over striding heel striker.

C. Shows a flexed knee - forefoot approach with good posture.

space by opposing the forces of gravity. The process of running is initiated with a push off “acceleration” into space followed by a landing “deceleration”. How and where this landing occurs is what sets us up for success or failure. Over striding robs a runner of stability. Heel striking robs a runner of the opportunity to harvest elastic energy. When we come in contact with the earth the primary concern is stability. The further ahead of our center of mass we land, the less stable we are on ground contact. This collision begins a chain of disruption from the ground up, joint to joint. Add to this, the dampening of afferent feedback that protects us from this collision as a result of heavily padded shoes and you

have a self induced recipe for disaster.

As of this writing there has never been any credible research that can support the claim that stability, motion control or cushioning added as a “style of shoe” can make you a better, safer runner. All of these designs are marketing gimmicks to get you to purchase a shoe. Few in the industry are willing to admit it but time and again when put to an unbiased evaluation, these gimmicks fall short of their claims.

Those who have attended any of my running clinics or listened to my podcasts, know that I am prone to spout off ridiculous analogies to try make a point. Every now and then, I’ll spit one out that hits the mark perfectly. The topic of conversation was of course, running mechanics. This analogy resonated for those whose heads I seem to occupy while they run. Some feel it was the best analogy they had ever heard as a comparison to proper running. It goes like this:

Imagine a kid on his skateboard, with one leg posted in the center of his board. He is about to propel himself forward along the road. The knee of his posted leg is slightly flexed as he begins to lean forward as he draws his thrusting knee up, his foot dangling, dorsiflexed beneath the knee as he drives his forefoot into the ground. His ground contact of his driving leg is directly in line with his posted foot, his energy is directed behind him. If his intent was to go faster, he would draw his knee up higher to create more thrust.

Intuitively, he knows that in order to maintain balance on the board, his thrusting foot must not land ahead or behind the posted foot. Once he has driven his foot into the ground, his leg will sweep behind him and create hip extension. The elastic energy created from this driving leg results in a reciprocal action to flex the knee back into a starting position for the next stride. Successful runners share these nuances.

In order to create an efficient stride, ground contact must be drawn near the center of mass. If the foot is extended ahead of the body the result is a braking action that has negative consequences.

Anyone who has studied the art of running knows that fast running is a result of two very important elements: stride frequency and stride length. As I explain this to my athletes, the most common question is; “how do I lengthen my stride without over striding?” First, stride length is created by increasing hip angle which is measured from the hip socket (the apex) through the forward knee and from the apex to the trailing knee. The broader the hip angle, the broader the stride length. The caveat being that this angle needs to be opened behind the runner.

Think back to my analogy of the skateboarder. Some of the greatest runners in the world, Ethiopian and Kenyans have an average running hip angle of as much as 110 degrees. Most of the amateur athletes I’ve performed gait analysis for, exhibit hip angles that are about half this distance. The typical assumption is a need to stretch, thinking lack of flexibility is the barrier to the creation of a great stride. Often I’ve read threads on social media on the topic, comments like, “I think I need to start taking Yoga classes.” While Yoga may hold benefits for some, I feel this may not be the solution.

I think of Yoga as I do vitamin supplements. Anyone who has visited a vitamin/ supplement store has seen offerings of pills in packet form which may contain as many as 8-10 pills, each with their own formulation. There may be a few pills that offer the user some degree of benefit, maybe due to a specific mineral deficiency in their body, the rest leave the body through urination. Testament of this is the fluorescent color of your urine. “You simply pissed away your money!” With Yoga, some movements might be just what you need to resolve tightness in a region, yet other movements may promote laxity to regions that should not be stretched and lead to contrary results. A tight spring for example, has better rebound or energy production than a loose spring.

Hip angle is a result of force production combined with proper ground contact. There are many studies on the topic of force production in sport and the potential or lack thereof, relative to an increase of flexibility. Realize that force is what needs to be managed or created. One of the most important measures of performance in sport is the vertical leap.

Studies have repeatedly shown that athletes who performed a pre-stretch routine prior to a vertical leap attempt were out performed by athletes that did not pre-stretch.

Keep in mind, a tight spring has greater energy potential than does a stretched spring. If the runner's posture is angled in favor of forward moving inertia, the force driven into the ground results in eccentric loading of energy. Think of a rubber band; stretching the rubber band generates energy, the further the stretch, the greater the energy potential.

Muscular and connective tissues contract in three ways: eccentric which is lengthening, concentric which is shortening and isometric which is a contraction with no change in length. Kinematics relates to the movement of an object. In this case, human locomotion results from the sequence of these aforementioned contractions. Think of this contractile sequence another way; concentric action creates acceleration, pushing or pulling the body into flight. Upon landing, the body decelerates to assume the weight of the body. At the end point of this loading phase the body stiffens and becomes isometric. Energy is created as the body is eccentrically stretched (think rubber band), stabilized at the endpoint of the stretch and then energy is harvested with a powerful reciprocal action and the cycle repeats. I know it's a lot to think of, however, it all boils down to this, the angle of motion and force production. When all things are in sync during the stride sequence, this force generation pushes the body forward. The greater the force, the greater the hip angle created.

The part of the equation I've not thus far explained relates to frequency. Stride frequency is a controversial topic. Many pundits in the running world would argue that stride frequency should not be fooled with. They would argue that each runner has a unique and naturally occurring frequency that is most efficient and to mess with this rhythm disrupts their economy. For a moment let's table the idea of changing frequency and think of what's irrefutable, gravitational force. I find it interesting that due to gravity, every creature on earth must launch itself skyward 7 centimeters to cover a distance of one body length. Think of it; 7 centimeters is just shy of 3 inches of vertical flight to travel a body length.

According to this factoid, what is required of me, being a bit over 6 feet tall, I need only leave the ground 2.75 inches to fly 6 feet forward. In reality, I am incapable of a stride any greater than a bit more than half this distance. Which means, my vertical flight demand is really no more than half, or less than 1.5 inches of vertical liftoff. Having said all that, consider that the shortest distance between two points is a straight line. All this means is that effective running mechanics should propel you forward not upward and the less time we are in contact with earth, the less energy is needed to oppose the relentless force of gravity. This suggests that a quicker cadence (stride frequency) will minimize work, however, there is a point of diminishing return. If the cost of generating frequency exceeds the demand of gravitational loading, the frequency is too great.

On the flip side, as a result of too slow a frequency, there is a consequence of greater vertical oscillation (bounce). Reaching too far ahead of the body (overstriding) is what causes this. If too quick or too slow, a stride is less efficient. This suggests that there is a frequency that is more efficient. Countless studies have shown that a frequency of 180 strides per minute is most efficient, not only in increasing sustainable pace, but also in reducing injury. A typical over-striding runner produces an average 164 strides per minute.

Research has shown that a 5% increase in frequency yields a 20% reduction in injuries to the ankle, knee and hip. A 10% increase in frequency provides a 32% reduction in injury. If you do the math, that's an increase of 16 strides per minute (180 spm). The reason this works is because a quicker stride draws the ground contact closer to center of mass which reduces impact forces from braking while reducing vertical oscillation (bounce). This lends us to the question; If there is a more efficient stride that I could plausibly adopt, why would I not attempt to train myself to do it? Back to the arguments the pundits present: What I hear a lot, is how changing gait risks injury and increasing frequency increases metabolic cost. There is merit in these arguments. What I find a shortcoming is that they typically don't investigate beyond initial findings. Initial changes in gait, especially brought on too aggressively, does greatly increase the risk of injury. If one were to train with a heart rate monitor, they would quickly identify that this shift in frequency alone would come at a far greater expense than what was

naturally occurring from their previous running gait.

What I've learned from countless clients over the years is that proper application of these gait alterations, both frequency and point of contact, improve sustainable pace, economy and efficiency. These runners report that they are able to increase training volume and intensity without what would historically result in injury. It's logical to me that if an athlete can train more frequently with less mechanical stress, improvements are sure to come.

Another and rarely spoken result of adhering to a specific stride frequency is what's referred to as bilateral equivalence. This simply means by adhering to a step or stride frequency, typically by employing an audible metronome, the work that both legs are doing is equalized. Whenever running injuries occur, they happen one knee, hip, hamstring, calve or foot at time. Rarely do you hear someone say, "I strained both my knees at the same time." This is because one lever (leg) is dominant in the stride. By balancing the work evenly between the levers, load and stress is greatly reduced.

If you ever have a chance to watch great endurance runners during an event, you will find that what's common is that the leaders in a marathon or even a 10k hover very near a frequency of 180 spm. You will also realize this amazing stride and hip angle that seems so effortless is opened behind them. They do not overstride. They lead out with a high knee carry, (which coincidentally, is a result of the eccentric repayment from force production). By the time their feet make ground contact their bodies are posted nearly above the foot.

A great example of this can be found by watching the American 5 and 10k record holder Galen Rupp as he runs. I believe he has the most efficient stride of any American runner of his time. Galen ran a 12:58:90 5k personal best (as of this writing) and did so with a spot on stride frequency of 180 spm. Knowing what I've just shared, what's remarkable is that his change in pace typically occurs relative to an increase in stride length not frequency.

An untrained runner nearly always increases frequency first, with no awareness

of how to increase a favorable stride length. Generally, what happens, in hopes of increasing pace, is reaching ahead to “paw the ground” at a straining increase in frequency. Both of these triggers are expensive propositions. By expanding stride length properly the cost is far more manageable. Less energy is spent, less toxins are produced from anaerobic acidosis (lactic acid production) and the stride expansion and contraction serves as a highly effective pace management system.

The wonderful thing about working to improve your skill as a runner, is that there are so many little things you can tweak to gain speed, sustainable pace and best of all, stop hurting yourself.

CORRECTING COMMON RUNNING ERRORS

From the ground up

1. *Begin with your feet positioned beneath your hips with your feet pointed directly in front of you. If you look down and one or both of your feet are canted outward, correct this problem now.*
2. *Soften your knees; stay loose and “springy” from the hips down and tall from the hips up.*
3. *Peeling your foot off of the ground (heel first) but don’t leave contact with the ground. In essence, you have just buckled at the knee; your toe is still in contact with the ground. Now set your heel back down and do the same with the other foot. Now alternate this action fluidly.*
4. *March in place implementing the same approach as in step 3. Avoid raising your feet any higher than needed to clear the ground. Begin moving by employing the approach in step 3. You have now effectively caused the correct initiation of your new running gait.*
5. *Slowly begin running using the aforementioned steps. A treadmill is a great tool to help this process along.*
6. *Earn your speed! Trying to run faster than you are capable of with good form will quickly erase any progress you may have made.*

The things to avoid:

Don't point your toes down on too steep an angle.

Avoid raising your knees too high or kicking your heel up behind you.

Don't try to admire your work by looking down to see what you are doing.

Avoid tipping the head down or up.

I recommend using a full length mirror to help you monitor your gait.

THE DETAILS...

POSTURE

A tall posture with a soft stance and a forward lean from the ankles provides the most efficient locomotion. Being bent at the waist places excessive load on the back and interferes with the ease of hip flexion/extension. The head should be positioned in an erect, relaxed, neutral spinal alignment with the eyes in a forward gaze some 20 yards ahead.

ARM SWING

An arm swinging across the body or one that is held static, swung too low, or turns in an odd circular fashion, are all very disruptive to forward movement. The shoulders should remain calm, relaxed and pointing squarely in the direction of intended travel. The elbow should rock forward and back in an arc beginning with the hand in line with the hip at a bit less than a 90 degree angle and allowed to fall forward into a natural arc until the elbow is now aligned with the hip in harmony with your stride tempo. Aim to limit the cost of work by taking advantage of the forward momentum gained from an efficient rhythmic forward swing. When the arm swing is orchestrated properly there is a subtle energy return that helps propel the body into forward motion.

FOOT CONTACT

To begin with, as your foot comes into contact with the ground, imagine you are landing a plane. The goal is to avoid pointing the toes too sharply towards the ground in a crash-like fashion. The angle of approach is subtle and gentle. Once the mid foot senses contact with the ground, the heel is allowed to briefly make contact in order to gain a proprioceptive recoil, which serves to generate forward movement. As you land forefoot to heel (yes, allow the heel to make contact), energy is created as the calf, achilles and tendons rebound releasing energy eccentrically. Think of it like this: Heel striking requires 100% work to transition stride to stride. Landing forefoot properly requires half of the work of heel striking due to the elastic recoil provided from the stretch reflex. You gain 100% of the locomotion at a fraction of the cost minus the transient impact.

CADENCE

Stride frequency is the key to forefoot running. All great coaches will tell you that in order to run faster, you'll need to increase your cadence (stride frequency) and stride length. Together, these two components spell speed. Over the past few years I have experimented with my clients on the science of stride frequency and stride length and have discovered a few very important results. A stride frequency of 180 strides per minute is optimal. Optimal, meaning that the amount of time we spend in flight rather than in contact with the ground and much closer to the center of mass. The cost of running is greatest when you are in contact with the ground, at which time, you are either in the process of accelerating, stabilizing or decelerating, all of which puts us at odds with gravity. What I have done with amazing success is set my runners to a metronome that taps out a precise cadence of 180 beats per minute. Begin this running exercise on a treadmill. Adopt this stride frequency at about 4 mph with good running form keeping with 180 bpm. After about 5 minutes increase the speed by 1 mph for 1 minute intervals, still keeping them on cadence, still focusing on proper form (not allowing them to over stride or heel strike).

The first thing you will notice is an obvious “sweet spot” in speed as the treadmill speed increases. The stride and effort may seem forced and expensive to manage initially, then, even though the pace increases, you should fall into a relaxed state. Much like a perfect storm all things align to cause a decrease in effort even though there is an increase in production. Like entering the eye of a Hurricane, you’ll weather the storm and find peace in the nucleus.

HEART RATE

Think of heart rate as a means of determining training intensity... Lower heart rate less intensity. The greater the heart rate /greater intensity. Training is a function of exposing oneself to specific intensity and volume in hopes of an adaptive response.



Assuming that you'll not likely have an opportunity to have a clinical assessment conducted and have a firm understanding on how to best wield your heart rate. Let's begin by identifying the terms associated with the shifts in your energy pathways.

(AeT) Aerobic threshold - is a relatively low level of intensity marked by light breathing that occurs somewhere near 50% of VO₂max or as much as 30 beats per minute below your lactate threshold heart rate.

(AnT) Anaerobic threshold - marks a sudden and steep departure from your ability to use fat to using primarily carbohydrate as your energy source. The difference between AeT and AnT is the amount of oxygen your body is using to produce energy. At the effort level where carbohydrate becomes the dominant fuel, you are crossing the "threshold" between aerobic and anaerobic intensity.

(LT) Lactate threshold - is quite similar to AnT, the chief difference is in how the result is determined. An LT test is based on the resident lactate within the bloodstream sampled at 2 minute intervals during a progressive treadmill test. When the athlete's blood sample reveals 4mmol/L (millimoles per liter) the assumption is that the athlete has achieved lactate threshold. Incidentally both AnT and LT have a very close if not identical correlation in effort. At the end of the day the term only implies the method in which the information was obtained either via direct gas analysis, which is a ventilatory consequence or by blood sampling.

Aerobic capacity - refers to the "maximum volume of oxygen" an athlete can use per minute relative to body weight to produce energy. The more commonly used term for this is VO₂max. This bit of information is also determined via direct gas analysis (VO₂max test). This value has long been coined as the gold standard of fitness evaluation. The more oxygen an athlete can process per minute relative to his or her weight (VO₂/mls/kg/min) the greater potential for endurance performance.

Anaerobic capacity - is a measure of how much maximal power or speed can be produced in an all out 30 second effort. This assessment is often used in power

sports and conducted via a Wingate test that is done with specialized equipment that can convert human force into watts generated over time, a highly reliable power indication.

The most critical “zone” of all is the threshold between the aerobic and anaerobic energy system. As stated earlier, referred to as the anaerobic threshold (AnT), which implies you are about to shift from low intensity energy to high intensity energy. This metabolic turn point is key to your training. The difficulty in determining this threshold stems from the fact that everyone is unique in how their body responds to work, based on genetics, history of training, etc.



What’s a VO₂max Test? A VO₂max test measures the ventilatory consequence of work conducted via direct gas analysis. This is achieved by the athlete breathing through (generally) a mask that separates the air flow being inhaled vs the airflow exhaled. The sampling of respiration is precisely measured to determine the amount of oxygen (O₂) taken in, relative to the amount of carbon dioxide (CO₂) exhaled.

These gasses are segregated and accounted for in milliliters per minute and dished out into several equations: indifferent of body mass, relative to body mass and relative to heart rate as work is progressively made more difficult, until the subject being tested can no longer continue. As the data pours out during the test, in most cases, at the lower levels of intensity, the prominent gas is oxygen.

What's important to take from this is that fat is the primary fuel source in the presence of oxygen, thus we derive the term "aerobic" which means exactly that. Carbon dioxide is a marker of lactate being present and lactate is principally produced as a result of carbohydrate metabolism. As these gasses exchange and intensity increases, more and more CO₂ is being produced which indicates carbohydrate is lending to be the greater share of energy provided for work. The consequence of this is greater lactate production.

The advent of such an occurrence over a few hours can result in a sudden onset of fatigue, infamously referred to as "hitting the wall". Essentially what occurs is the carb stores are dangerously depleted and the potential for lactate to support the energy demand in an untrained athlete is unlikely. This is a good reason to have a precise measure of your metabolic turn point. To train under misconception can end in frustration. This is where experience comes to be so important when developing training protocols.

Determining AeT (aerobic threshold) through reliable prediction – To reliably predict your aerobic threshold in lieu of clinical assessment, simply subtract your age from 180. This will give most people an effective, albeit conservative, aerobic training heart rate. For example, if you are 45 years old: $180 - 45 = 135$, your predicted AeT is 135 bpm. If you straddle this number (130-140 bpm) on average you'll gain an effective aerobic treatment.

For some, this may be an underestimation, but rarely will it be an overestimation. I think at this juncture it's important to point out that in the absence of a clinical evaluation (VO₂max test) everything that you are basing your threshold on is a prediction. If you are predicting, better to under prescribe than over prescribe. If you are low by 5 or 10 bpm, guess what? You are even

more aerobic which may not help your ego, but the future test results will still paint the correct picture. If you over prescribe and are anaerobic when you think you are aerobic, this holds grave consequences as you get into heavier training volume and could easily cause you to plateau in training or hit the wall before you hit the finish line!

Determining AnT (anaerobic threshold) - If you add 10-15 bpm to your AeT prediction you should be darn close to your anaerobic threshold (AnT). Always error on the side of being conservative, some may argue that they are capable of as much as 30 bpm beyond the predictive measure before arriving at (AnT). If with time you find the effort is too conservative you can always push a bit harder and you will be anaerobic. The mistake you don't want to make is to initially overestimate your effective anaerobic capacity. As a result you would be anaerobic all the time which is very common practice with most recreational runners.

Determining Maximum Heart Rate – I have a hard time recommending that you go out and beat yourself down to arrive at this value. With an exercise prescription, I always weigh the risk versus benefit before I decide to venture off into the unknown. Clearly, without knowing you personally or your previous health history, this is a risky proposition. As far as benefit goes, I think the accuracy of finding your max heart rate is pointless, because the principal reason for doing so is to establish a multiplier to find your threshold, which has been shown to be ineffective anyway. I suggest that if you are curious, go ahead and use the 220-age formula to estimate your max heart rate and fore-go the beating. If you're off by 10 bpm, big whoop! This value is going to expand and contract with time and training anyway. It is a rare occasion that you will ever train at your max heart rate. Quite frankly, the return on that investment is never good. You may visit 90% of max often during interval training, but even then, never for very long. So I am satisfied with the 220-age equation for estimation purposes. Keep in mind that most of the interval work you'll do will be less than max effort and even in some cases perception may dictate the top end of your interval sets.

Perceived Exertion – I use perceived exertion often when training clients on a treadmill. I find it to be a quick and easy method of communication that over

time becomes very dependable. I'll say something like, "On a 1-10 scale 10 being, 'oh my god I am about to die' and 1 like sitting on the sofa eating pizza, how do you feel?" A 5 to me means we're doing OK. While running near maximal speeds, I'll ask my client to spout out a number to reflect the intensity they feel since I can't feel what they are feeling. This is especially effective during high intensity intervals that are very short in duration.

Jumping on to a treadmill for under a 30 second effort is too short a duration for your monitor and heart to relay what is happening second by second and perception is the most reliable method for determining an athlete's state. Having said that, I would never rely on my client's perception to determine whether they are aerobic or not during moderate intensity training. More often than not, they could be either over or under training.

THE "BORG SCALE"... RATING PERCEPTION OF EFFORT

- 0..... Nothing at all
- 0.5..... Hardly noticeable
- 1..... Very weak
- 2..... Weak
- 3..... Moderate
- 4..... Somewhat strong
- 5..... Strong
- 6.....
- 7..... Very strong
- 8.....
- 9.....
- 10..... Very, very strong

I suggest you perform a field test and have an observational conversation with yourself: "How do I feel now, am I a 3 or a 4?" "What sensation is common with

this perception?” Figure it out and make a mental note. Do the same thing at 5, 6, 7 and 10. Based on your findings, consider that 3 to 4 should represent an aerobic influence and that efforts ranking over 5 or 6 are anaerobic influences.

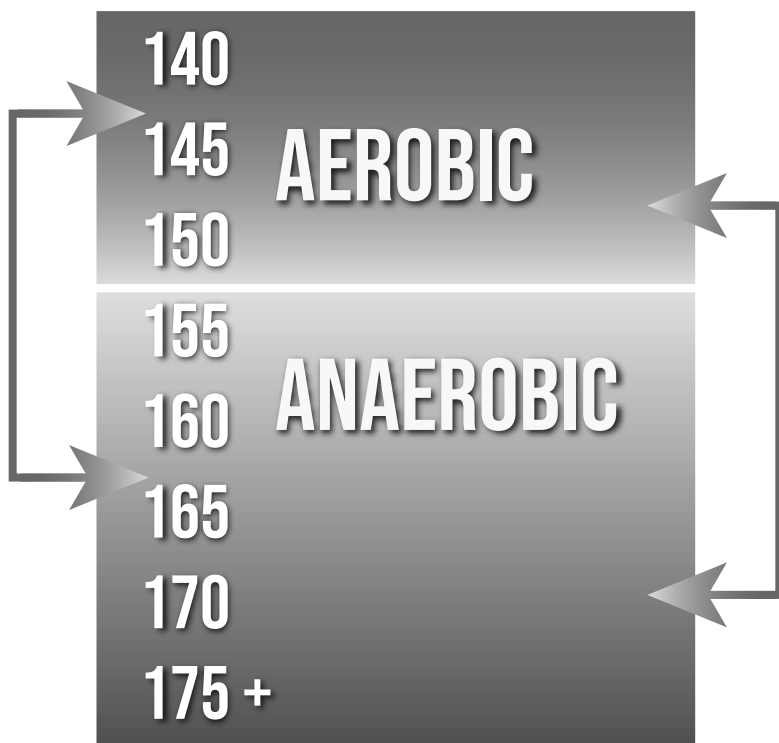
The critical point to remember is that fat burns in the presence of oxygen. The less oxygen available, the more the body relies on sugar stores for energy. This is important, because of the limiting nature of our energy stores from sugar, and our abundance of fat for energy. Research has shown that an average-build male (14% body fat) with a total body weight of 145 pounds is able to store in excess of 55,000 calories from fat, yet is limited to somewhere in the region of 500 grams of carbohydrate in the form of glycogen (no more than 2000 calories). 100 grams of which is stored in the liver and 400 grams is stored in the muscles. This is assuming that your energy stores are topped off before you begin training or racing. This sugar is in the form of glycogen in the muscle and glucose in the liver and bloodstream. These stores are enough to take you to about mile eighteen (thirty kilometers) depending on the rate in which you are burning calories, related to your body mass and intensity. It is not unheard of for even a 150 lb. athlete to burn in excess of 1000 calories an hour and draw almost exclusively from the carb stores on the body if he presses his pace for too long above threshold. Above threshold he would be burning sugar, not fat, from an energy perspective alone, he would run out of energy in less than 2 hours. There are other potential extenuating exceptions but this theory holds true in a general sense.

This is the principal reason so many people fail when trying to run a marathon and why so many people are able to walk it. Regardless of whether your goal is to run a 5K, a 10K or any other further distance, when your blood sugar plummets, so does your performance. You don't have to hit the proverbial "wall" to see sharp drops in performance due to low blood sugar, which will result from training too hard for extended periods too often.

In a nutshell, if you're not properly trained and you shift to the anaerobic energy path too often your body is forced to rely almost exclusively on the carbohydrate stores on the body and the performance potential is very limiting.

The good news is that, through proper training, you can change the efficiency with which your body seeks out energy. In order to realize this dream, it is important that you learn how to train your energy pathways (aerobic/anaerobic) and how to arrange these training influences in such a way that your progress is consistent and predictable.

THE TRAINING SWEET SPOTS



This book is packed with all sorts of information yet, if I had to bet, what I am about to share is what most of you reading this really want to know. So what intensity should I be training at to get the greatest return on my time invested?

If I were to overly simplify an answer to this query, it would go something like this.... Not too easy and not too hard. If you exercise at too low a heart rate there is not much benefit to be had. If you train at too high a heart rate, odds are

you will over train and will arrive at the polar opposite approach with the same outcome, not much in the way of progress.

This is how most training scenarios should look... If your goal is to prepare for longer challenges, an event that will exceed 3 hours, your low end heart rate floor should be lower and your high end heart rate fairly conservative. If you are training for fitness or an event that will require more speed for a shorter time frame, say, under 2 hours, both your floor and ceiling should be higher. For example, based on the predictive measures shown 30 years old (180-30) Aerobic HR is 150 bpm, conservatively sets you up to burn dominantly fat. Going Anaerobic from here, add 15 -20 bpm will insure you are firmly into your carbohydrate stores.

Here's how you might put this information to work for you...

	Steady State	Interval 1	Interval 2	Interval 3
Less than 1 hour	150 - 160	145-165	150-170	140-175
More than 1 hour	145 - 155	145-160	150-170	140-175
More than 3 hours	135 - 150	140-160	145-160	140-165

The ranges indicated from steady state workouts to intervals at progressive intensities are just a rough approach, albeit conservative. The Sweet Spot as I refer to it is a range that is not too intense and not too easy. Staying within these ranges should provide a good training effect.

It bears repeating that this is NOT a one size fits all prediction. Some will find this aggressive, others far too conservative. The sure fire way to conclude correct values is through a VO2 max test.

BEGINNER WEIGHT LOSS WORKOUTS

As often suggested, the two variables to control your workouts are volume (how much time you spend) and intensity (how hard an effort) you apply. The best indicator of effort is your heart rate. Your heart rate reveals your effort, measured in beats per minute and calories expended. Heart rate is also an indicator of where the calories spent are drawn from, fat and or carbohydrates. Everyone hoping to lose weight is concerned with burning fat. Unfortunately, the less fit you are, the less intensity you can apply to access your fat stores. The cardinal rule is: fat burns in the presence of oxygen. This state of effort is termed aerobic. The conundrum is the less fit you are, the harder it is to burn an appreciable amount of fat at lower heart rates.

Some may argue that the best path to weight loss is long duration aerobic exercise. Clearly, this will work if you have a few hours to spend at a crawls pace every day. In most scenarios, this is a losing proposition. Who has the time or interest to grind out 2-3 hours each day to insure the weight you lose is coming from fat?

In my experience, the more effective approach is to focus on building your fitness as a primary concern. By doing this, your tolerance to greater intensity will result in a higher percentage of fat to be liberated as your fuel source. For example, if your fat burning threshold is 120 bpm and relative to your mass, you

burn 500 kcal per hour and only 20% of those calories come from fat, your fat burn is 100 kcal. If you didn't already know, you need to burn 3,500 calories to lose 1 pound. Even if you dedicate 2 hours per day each week, you stand to burn (7,000 kcal burned) 1,400 kcal from fat per week or less than 1/2 pound per week. That is a lot of work for such a dismal return on your investment. Mind you, the math is not perfect. There are variables that influence the outcome. However, as a general calculation, this is pretty much how things will evolve. Odds are, if you're really dedicated, you'll last a week before you surrender to this foolishness.

When you are out of shape, your body does a terrible job burning fat. You stand a far better chance building your fitness. Putting in some high intensity work along with your fat burning, you will not need to suffer through the hours needed to make a difference. The workouts I'll provide will get you to your goals quicker and more efficiently than the previous proposition.

Rule #1 Early on, walk don't run. Attempting to run when you are out of shape leads to significant soreness and potential for injury. We can progressively improve intensity via interval fashion and see great results. Clearly, many of these workouts are built around running ability. It may not be in the cards for you today, that's okay. That day will come, not likely all at once but in baby bites. Walking a little, running a little will eventually result in walking a little and running a lot.

Rule #2 It's important to have a sense of your fat burning threshold. Absent the ability to have a clinical evaluation, simply subtract your age from 180 to arrive at an aerobic training heart rate. While performing your intervals, during the recovery phases of the workouts, be sure to let your heart rate regress below this level of intensity.

Rule #3 It's better to employ 3 great workouts consistently than training randomly without a plan.

Rule #4 Don't judge your progress day to day. Life hands us good and bad days, some days you will be sore, you may not feel like training. You may be pleasantly surprised to learn, if you brave the challenge, get off your butt and get

started, things will come together. What you feared was a false sense of inability where all you needed was to start moving!

At the end of the day, running will ultimately set you on a path to success, doing so ill equipped can lead to disastrous outcomes. Alternating between an aggressive march pace with bits of running intervals will show you progress in your ability to eventually run at a steady pace. Here is a workout that will get you there the right way, sooner!

What's to follow is a sample week of training. They are not scripted for any particular day of the week, they are marked in sequence; Day, One, Two etc. If you were to do no more than repeat these workouts every week, you will see considerable success. Having said that, there are many workouts here. I suggest you experiment with some more aggressive workouts as you start to realize improvements in your fitness. Keep an eye on the icons associated with the workouts. Don't get in over your head or deviate too far from the theme of improving your fitness and dropping excess weight.

DAY ONE

BEGINNER WEIGHT LOSS

MOVEMENT PREP

WORKOUT SUMMARY:

INCH WORM 10 REPETITIONS

GLUTE BRIDGE 15 REPETITIONS

PRESS UPS 25-30 REPETITIONS

PLANK 1 MINUTE

DEEP SQUATS 15-20 REPETITIONS

TOTAL PREP TIME <10 MINUTES

BASIC INTERVAL MARCH

WORKOUT SUMMARY:

5 MINUTE WARM UP 3% INCLINE AT 3.5 MPH

3 MINUTES AT 5% INCLINE AT 3.5 MPH

5 MINUTE RECOVERY AT 2% INCLINE AT 3.5 MPH

3 MINUTE INTERVALS AT 6% INCLINE AT 3.5 MPH

2 MINUTE RECOVERY AT 2% INCLINE 3.5 MPH

3 ROUNDS

5 MINUTE COOL AT 0% INCLINE AT 2.7 MPH

TOTAL WORKOUT TIME 59 MINUTES

DAY TWO

BEGINNER WEIGHT LOSS

MOVEMENT PREP

WORKOUT SUMMARY:

INCH WORM 10 REPETITIONS

GLUTE BRIDGE 15 REPETITIONS

PRESS UPS 25-30 REPETITIONS

PLANK 1 MINUTE

DEEP SQUATS 15-20 REPETITIONS

TOTAL PREP TIME <10 MINUTES

POWER CLIMB

WORKOUT SUMMARY:

WARM UP WALKING OR EASY JOG 5 MINUTES

3 X 2 MINUTE MARCH, 1 MINUTE RUN 3% INCLINE

30 SECONDS RECOVERY ONTO SIDE RAILS

2 X 3 MINUTES AT 4% INCLINE

2 X 3 MINUTES AT 5% INCLINE

2 X 3 MINUTES AT 6% INCLINE

30 SECONDS RECOVERY BETWEEN ROUNDS

5 MINUTE COOL DOWN AT EASY PACE

TOTAL WORKOUT TIME 37 MINUTES

DAY THREE

BEGINNER WEIGHT LOSS

MOVEMENT PREP

WORKOUT SUMMARY:

INCH WORM 10 REPETITIONS

GLUTE BRIDGE 15 REPETITIONS

PRESS UPS 25-30 REPETITIONS

PLANK 1 MINUTE

DEEP SQUATS 15-20 REPETITIONS

TOTAL PREP TIME <10 MINUTES

BASIC INTERVAL MARCH

WORKOUT SUMMARY:

5 MINUTE WARM UP 3% INCLINE AT 3.5 MPH

3 MINUTES AT 5% INCLINE AT 3.5 MPH

5 MINUTE RECOVERY AT 2% INCLINE AT 3.5 MPH

3 MINUTE INTERVALS AT 6% INCLINE AT 3.5 MPH

2 MINUTE RECOVERY AT 2% INCLINE 3.5 MPH

3 ROUNDS

5 MINUTE COOL AT 0% INCLINE AT 2.7 MPH

TOTAL WORKOUT TIME 60 MINUTES

DAY FOUR

BEGINNER WEIGHT LOSS

MOVEMENT PREP

WORKOUT SUMMARY:

INCH WORM 10 REPETITIONS

GLUTE BRIDGE 15 REPETITIONS

PRESS UPS 25-30 REPETITIONS

PLANK 1 MINUTE

DEEP SQUATS 15-20 REPETITIONS

TOTAL PREP TIME <10 MINUTES

POWER CLIMB

WORKOUT SUMMARY:

WARM UP WALKING OR EASY JOG 5 MINUTES

3 X 2 MINUTE MARCH, 1 MINUTE RUN 3% INCLINE

30 SECONDS RECOVERY ONTO SIDE RAILS

2 X 3 MINUTES AT 4% INCLINE

2 X 3 MINUTES AT 5% INCLINE

2 X 3 MINUTES AT 6% INCLINE

30 SECONDS RECOVERY BETWEEN ROUNDS

5 MINUTE COOL DOWN AT EASY PACE

TOTAL WORKOUT TIME 37 MINUTES

DAY FIVE

ACTIVE RECOVERY

WORKOUT SUMMARY:

INCH WORM 10 REPETITIONS

GLUTE BRIDGE 15 REPETITIONS

PRESS UPS 25-30 REPETITIONS

PLANK 1 MINUTE

DEEP SQUATS 15-20 REPETITIONS

TOTAL PREP TIME < 10 MINUTES

BEGINNER WEIGHT LOSS

BASIC INTERVAL MARCH

WORKOUT SUMMARY:

10 MINUTE 2% INCLINE AT 3.5 MPH

3 MINUTES AT 5% INCLINE AT 3.5 MPH

5 MINUTE RECOVERY AT 2% INCLINE AT 3.5 MPH

3 MINUTE INTERVALS AT 6% INCLINE AT 3.5 MPH

2 MINUTE RECOVERY AT 2% INCLINE 3.5 MPH

3 ROUNDS

5 MINUTE COOL AT 0% INCLINE AT 2.7 MPH

TOTAL WORKOUT TIME 74 MINUTES

DAY SIX

MOVEMENT PREP

WORKOUT SUMMARY:

INCH WORM 10 REPETITIONS

GLUTE BRIDGES 20 REPETITIONS

PUSH UPS 10 - 15 REPETITIONS

PLANK 1 MINUTE

DEEP SQUATS 20 - 30 REPETITIONS

TOTAL PREP TIME < 10 MINUTES

BEGINNER WEIGHT LOSS

THRESHOLD BUILDER

WORKOUT SUMMARY:

WARM UP 5 MINUTES WALKING 2% INCLINE

5 MINUTE THRESHOLD PACE

1 MINUTE RECOVERY TO SIDE RAILS

10 ROUNDS

5 MINUTE COOL DOWN

TOTAL WORKOUT TIME 70 MINUTES

DAY SEVEN

BEGINNER WEIGHT LOSS

ACTIVE RECOVERY

WORKOUT SUMMARY:

INCH WORM 10 REPETITIONS

GLUTE BRIDGE 15 REPETITIONS

PRESS UPS 25-30 REPETITIONS

PLANK 1 MINUTE

DEEP SQUATS 15-20 REPETITIONS

TOTAL PREP TIME < 10 MINUTES

BASIC INTERVAL MARCH

WORKOUT SUMMARY:

10 MINUTE 2% INCLINE AT 3.5 MPH

3 MINUTES AT 5% INCLINE AT 3.5 MPH

5 MINUTE RECOVERY AT 2% INCLINE AT 3.5 MPH

3 MINUTE INTERVALS AT 6% INCLINE AT 3.5 MPH

2 MINUTE RECOVERY AT 2% INCLINE 3.5 MPH

3 ROUNDS

5 MINUTE COOL AT 0% INCLINE AT 2.7 MPH

TOTAL WORKOUT TIME 74 MINUTES

SCORE CARD

BEGINNER WEIGHT LOSS

MOVEMENT PREP

WORKOUT SUMMARY:

NUMBER OF TOTAL REPETITIONS

MARCHING AND RUNNING

WORKOUT SUMMARY:

TIME ON THE TREADMILL FOR THE WEEK

AVERAGE HEART RATE FOR THE WEEK

MULTIPLY HOURS PER WEEK X AVERAGE HEART RATE

TRIMP STRESS SCORE

Your Trimp Stress Score is a measure of the work you did over the entire week. Add your time and heart rate from movement prep to gain a more accurate value.

A LA CARTE WEIGHT LOSS WORKOUTS

THE BASIC INTERVAL MARCH



Set your treadmill to 3% incline. Take your time adjusting to the moving belt by starting at a slow walking pace. Bring your speed to an aggressive, “sustainable” marching pace, typically this is about 3.5 mph for most novices. Maintain this pace and incline for 5 minutes. For the next 5 minutes, increase to 5% incline without changing pace (5% incline x 3.5 mph). Recover to 3% incline for 2 minutes. Begin intervals (6% incline x 3.5 mph x 3 minutes, recover to 2% incline x 3.5 mph x 2min) for 7 repetitions. Bring the elevation down to 0 incline, reduce speed to 2.7 mph for a 5 minute cool down.

Good to know: Think of the time lines I provide in the workouts as a guide not gospel! Face it, I don't know you or what you're capable of. If I ask for 5 minutes and you have an honest 3 minutes, don't feel shame, own it and move on. With time, odds are you will exceed expectations and move to more challenging workouts.

WORKOUT SUMMARY:

5 minute warm up 3% incline at 3.5 mph

5 minutes at 5% incline at 3.5 mph

5 minute recovery at 2% incline at 3.5 mph

3 minute intervals at 6% incline at 3.5 mph

2 minute recovery each round at 2% incline 3.5 mph

3 rounds

10 minute cool at 0% incline at 2.7 mph

Total workout time 70 minutes

THE POWER CLIMB

Warm up with an alternating 1-1 ratio of walking vs. easy jogging for 5 minutes.

Set treadmill at 3% incline; set pace for a forced march at max sustainable pace.



Begin 2 minute march 1 minute jog intervals at 3% incline take a 30 second break by stepping off to the side rails. Repeat the 2 minute march / 1 minute jog and 30 second recovery and increase elevation by 1%, x 3,4,5,6 percent incline twice each. 24 minutes work / 4 minutes total recovery. Reduce elevation to 3% incline and try again. Continue until you can no longer keep up with the intensity or achieve 6% incline. See if you can exceed your last fail point. 2 Total Sets 48 minutes work 8 minutes recovery.

Set a goal for an elevation increase of 6% incline for all rounds. Reduce elevation to 2% grade and pace to 2.7 mph and walk for 5 minutes to recover.

WORKOUT SUMMARY:

Warm up walking or easy jog 5 minutes

3 X 2 Minute march, 1 minute run 3% incline

30 Seconds Recovery onto side rails

2 x 3 minutes at 4% incline

2 x 3 minutes at 5% incline

2 x 3 minutes at 6% incline

30 Seconds Recovery between rounds

5 Minute cool down at easy pace

Total workout time 65 minutes

THE THRESHOLD BUILDER

Steady state suggests that there is a fixed pace without deviation in incline. This workout helps to increase sustainable work rates and ultimately improves your ability to burn a greater share of fat for energy.



5 minute walking warm up. Set incline to 2% grade (this subtle incline is believed to mimic the effects of outdoor running) establish a pace you can run a minimum of 5 minutes without fail or need to reduce speed. This speed will act as your threshold pace. Even though this is a steady state workout the goal is 4-1 ratio (4 minutes running fixed pace / 1 minute recovery to the side rails. This is a great opportunity to develop your proper running skills. Set your metronome phone app to 180 steps per minute and focus on an efficient forefoot landing. Set a goal for 10 rounds then, decrease pace to a walking cool down for 5 min.

WORKOUT SUMMARY:

Warm up 5 minute walking 2% incline

5 minute threshold pace

1 minute recovery to side rails

10 rounds

5 minute cool down

Total workout time 70 min

THE FRENCH INTERVALS

The French intervals are not what you may think. “French” is not a function of origin, it happens to be someone’s last name! One of my clients was having a terrible time recovering from a knee issue which kept her from running over flat terrain. We discovered by keeping her on an incline she could keep up with her training while undergoing therapy for the knee. I have often named workouts after clients, generally when the workout was customized for their unique needs. Her last name was French. In order to protect the innocent, I’ll refrain from giving up her first name. Incidentally, most overuse injuries from running occur on flat terrain, this is where mistakes in running form tend to show themselves most often. If you are experiencing issues like knee or “IT” band discomfort, this workout may be for you!



Good to know: Hydration is an important element in all your training sessions. If your workout is less than one hour, all you need is water. Cool water is more refreshing so add some ice to your water bottle. Most all treadmills control panels are molded with a place to hold your water bottles, use them so that your workouts won't be interrupted by having to get off to get a drink.

WORKOUT SUMMARY:

Warm up 2% incline walking 5 minutes

4% incline at 4 mph 1 minute

30 second recovery to side rails

3 rounds

4% incline at 4 mph 5 minutes

30 second recovery to side rails

2 rounds

5% incline force march 10 minutes

30 second recovery to side rails

3% incline at 5 mph 5 minutes

30 second recovery to side rails

8% incline march 5 minutes

30 second recovery to side rails

2% incline at 6 mph 5 minutes

30 second recovery to side rails

5% incline march 10 minute cool down

Total workout time 57 Minutes

Good to know: Unless otherwise indicated when “recovery” is shown without a specific change in pace or incline, simply hop to the side rails to recover for the allotted time.

A TREADMILL IS WEIGHT LOSSES BEST FRIEND



Let's face it on a global scale, most consumers purchase a treadmill as a weight loss tool. You do not need to run to gain benefit from a treadmill. Convenience is the #1 reason people purchase treadmills for home use. You don't need to dress up, you can safely train in the evening or early morning. You can entertain yourself by watching television, take calls all while being home for your kids if need be. All of this adds up to consistency!

If you spend 60 minutes a day walking on a treadmill, possibly evolving into a walk/jog with some incline, you will improve your fitness. Of course, consistency leads to progression and progression of intensity and duration accelerates further caloric expense and generates even greater fitness gains.

and you might opt to skimp on the clock or a few repetitions here or there. This doesn't make you a failure, you just need to make it up! Each workout provides an opportunity to subtract the goal debt. When the week is done you should have worked out 5 days of the week. This is actually much easier than it seems. I programmed it this way to provide a win for the first week. Success will get you pumped up to win again!

Evaluating your workloads: There are many ways to measure progress or work performed (not the same thing), I defer to what is termed "Trimp" which is a metric value achieved by multiplying the time you spent by your average heart rate. TRIMP is the acronym for (TRaining IMPulse)"Training Impulse". The simplest approach is to use training volume (or time) multiplied by average heart rate. There are various Heart Rate methods to establish training load with varying degrees of complexity and sophistication. It is also possible to use perceived exertion or other metrics. It should be remembered that we are imperfect creatures and results will vary, especially when we are trying to model something as sophisticated as the human body. Running at an easy pace for a long distance creates different training stresses from a shorter distance at a high intensity, and the two cannot be equally compared. However, if we are to evaluate and understand a training program, TRIMP can be used to evaluate the effect of training over time.

So there you have it! If you succeed in this challenge, dip into some of the more aggressive workouts provided here. Maybe you can fashion your own challenge based on the success you earned from this challenge. I will not say "good luck," as I have often told my clients... "Chance favors the prepared mind and body." Don't hope for luck, just show up each day and chip away at the work!

COACH DIAZ'S 8 WEEK FAT LOSS - FITNESS CHALLENGE

Who's it for? I guess I should begin by stating the obvious... who doesn't feel like they could stand to drop some body fat? The Challenge can be modified where intensity and duration are concerned. What will botch the challenge is not attending the daily plan. It doesn't get easier than that! Really showing up is half the battle. Whether you are exercising at home or at your local gym, rule #1 is... Showing up! If you show up, odds are you will put in some work. I will provide goals for you.

WEEK ONE GOAL

3 hours on the treadmill

3 minutes in a plank

150 cobras

100 air squats

On day one your goal might be to perform a total of 100 cobras, 3 minutes of plank, 50 deep air squats and 30 minutes on the treadmill. All of which can be broken up at your own discretion. You might do 15 air squats, 30 seconds in a plank followed by 25 cobras before hitting the treadmill. After a bit you could opt to hop off and catch up and chip away at the balance of exercises before retuning to the treadmill. Breaking the work up like this can take the sting out of the daunting number of repetitions of an individual exercise. As for the 30 minute treadmill work, the incline should be set to 5% grade. Perform a 5 minute forced pace march into 1 minute run efforts at the same pace and incline. Do this for 5 rounds to complete the 30 minute time frame.

Nobody blows off the first day of a challenge! Day two is a repeat of day one. Maybe if you're fresh off the couch, your first day could leave you a little sore

Regardless how unfit you begin or fit you are, the cardinal rules still apply:

- *Work from simple to complex - you have to walk before you can run.*
- *Trying to get ahead of your initial ability will ultimately work against you.*
- *Develop your skill before adding intensity.*
- *Add volume. When you can do a thing well, you can and should do it more often.*
- *Respect your need for appropriate and adequate recovery.*
- *Hydrate and replenish electrolytes!*

And finally, a good friend and author of many books on fitness and nutrition once told me, “Earn your weight loss.” If you cut calories too far back in hopes to accelerate your progress, odds are, it will end badly. Put in the work, feed sensibly and allow the process to unfold over time.

I have had the opportunity to train athletes for a variety of applications following these same rules, for fitness, football, baseball, basketball, soccer, of course, runners and even professional boxers. As we work towards more complex workouts, I highly recommend you approach the more technically challenging workouts CAREFULLY! I've learned to take steps to avoid the potential for injury and have the ability to harness my athletes in a canopy to catch them if they misstep. Most of you that read this are not likely to need the type of set up that I have. I guess another rule to consider is; “if it seems too edgy, don't do it!”

BEGINNER WEIGHT LOSS WORKOUT SUMMARY

While variation is important, consistency wins the day. I think it is also important to point out that I am not standing next to you while you do these workouts. The pace and elevation described in all of these workouts are my best guess of what may be feasible in a general sense. If you are struggling to keep up

or, if you are capable of more than what is prescribed, do not feel that increasing or decreasing the intensity of the workout is not appropriate. Success will always lend itself to those who are consistent! Do your best, this is not a pass or fail situation. Sitting on the couch instead of attempting to get the work done reserves that title!

Of these four workouts, the interval approaches of marching/jogging will lead to fitness quicker than steady state running workouts. As a beginner, putting together 2 days of work followed by a rest day (a total of 4 workouts weekly) is a great place to start. I recommend a minimum of 4 weeks of consistent workouts before moving into the more demanding workouts to follow.

This doesn't suggest that you won't see progression in your workouts, each of these workouts leave the door open to increase intensity. Challenge yourself wherever possible. During the early stages of your weight loss journey, building your fitness is critical in establishing your ability to create a fat burning engine!

WEEK ONE GOAL

3 HOURS ON TREADMILL
PLANK 3 MINUTES
150 COBRAS
100 AIR SQUATS
20 ALTERNATING LUNGES

TRIMP SCORE: _____

WEEK TWO GOAL

3.5 HOURS ON TREADMILL
PLANK 3 MINUTES
200 COBRAS
150 AIR SQUATS
20 ALTERNATING LUNGES

TRIMP SCORE: _____

WEEK THREE GOAL

3 HOURS ON TREADMILL
PLANK 3 MINUTES
60 PUSH UPS
200 AIR SQUATS
20 ALTERNATING LUNGES

TRIMP SCORE: _____

WEEK FOUR GOAL

4 HOURS ON TREADMILL
PLANK 3 MINUTES
100 PUSH UPS
100 AIR SQUATS
20 ALTERNATING LUNGES

TRIMP SCORE: _____

WHICH WORKOUTS ARE BEST FOR ME?



I think the problem people face when setting out to workout, is which workout is best for them? We all tend to have a vision of what we would like to accomplish, knowing what to do and how often to do it is where things get a little confusing. As a coach, advising athletes on the what, how and when, is what my clients expect from me. My job is to lead them on the correct path as expeditiously as possible. I talk a lot about “adaptation,” the things we do to mold our bodies to our will. Exercising on a treadmill is really pretty straight forward. It comes down to approach, time and intensity. Even still, the application and how your body responds is where things can get tricky.

In my world, the athletes I work with can get a little too ambitious. Like walking up to a buffet table and seeing all the luscious food, you can end up with too much on your plate and some things may not agree with others. The result, compared to training, is maladaptation.

I struggled writing this chapter knowing that science can be overwhelming for many who prefer a simple explanation to a complex subject. What's to follow is my attempt to do just that, simplify the biochemistry that goes on in your body when you do the things you do where exercising is concerned.

Think of your brain as the governor of activity. Its principle responsibility is to keep you from harm. Expose yourself to threat and your brain (specifically your central nervous system) imposes a response to nullify the threat. Your CNS decides if what you are doing should be allowed to continue. It measures how well you are able to deal with the stress and decides to support your efforts or shut you down. A good example of this is your attempt to run as fast as you can. As your heart rate soars in an attempt to meet the demand imposed, left unchecked, your heart is in potential peril. Your CNS (it is believed) will begin putting on the brakes. Yes, over striding is a braking action that you may not realize is one way of shutting you down. Another is a chemical response. As your heart rate increases and the energy system called upon being carbohydrate, generates lactate. The more intense the effort, the more lactate produced. As I am sure you have experienced when too much lactate is produced and you are incapable of clearing it. The outcome is temporary muscle failure, ultimately shutting down the activity that posed a threat. These checks and balances are constantly ongoing. Another example might be if you were to touch a hot oven, your reaction is to pull away quickly. This is a neurological response from your CNS, again, to save you from yourself!

Now let's talk about adaptation using the hot oven analogy. If you were to heat the stove slowly and check how hot it was progressively as it becomes hotter and hotter, you would adapt to the heat in progressive fashion until it becomes too hot to touch. This is a progressive adaptive response. If you were to visit running speed in similar fashion, you would earn trust from your CNS over time. I refer to this as earning a hall pass. As long as you do not ask too much of your ability, you will meet with an adaptive response.

I want to shift away from this concept for a minute and move towards metabolic responsiveness. Pick your goal. Are you interested in running a marathon,

possibly further? These activities place high demand on energy availability. Training for such a task requires that you become as economical as possible. Fat storage on the body is almost limitless if the intensity of work is aerobic. The slower you run the more access you'll gain from your fat stores. An average size person who weighs between 145 and 170 pounds has enough energy storage from fat to run across the United States! This of course, assuming that energy availability was the only inhibiting factor.

The caveat is, if you hope to win a marathon or set a personal record, you're going to move into your carbohydrate stores which are highly limiting. This same individual, assuming he or she woke up with a full tank before the race, will have less than 2000 calories from carbohydrate energy to draw from. If you do the math, running at an average race pace, expending as much as 800 calories per hour, if you're lucky, half of which is coming from fat. This means the drain on your carbohydrate stores being 400 calories per hour, 1600 calories will be depleted in 4 hours.

The ugly reality is that setting a personal best will take you way deep into your carbohydrates early. If you reach your metabolic turn point, that will cost you 800 calories from carbohydrates per hour. The energy demand alone will cause you to fail in less than 3 hours. The missing piece of the puzzle is what your body is able to do with the ensuing lactate production. As you will learn in greater depth soon, when you burn carbohydrate for energy, you produce lactate. The more intense the effort the more carbohydrate you burn and the more lactate you produce.

If you train properly, a good bit of this lactate will convert back into glucose in your liver and push back into your working muscles as glycogen. I like to refer to this outcome as "an energy rebate." It's hard to precisely determine how much of this energy you can rely on, I would venture to speculate as much as a few hundred calories per hour of expense. That is a big deal! It will encourage sustainability at race pace for far longer than if you had trained incorrectly.

The takeaway here is: your training should focus on progressively moderate

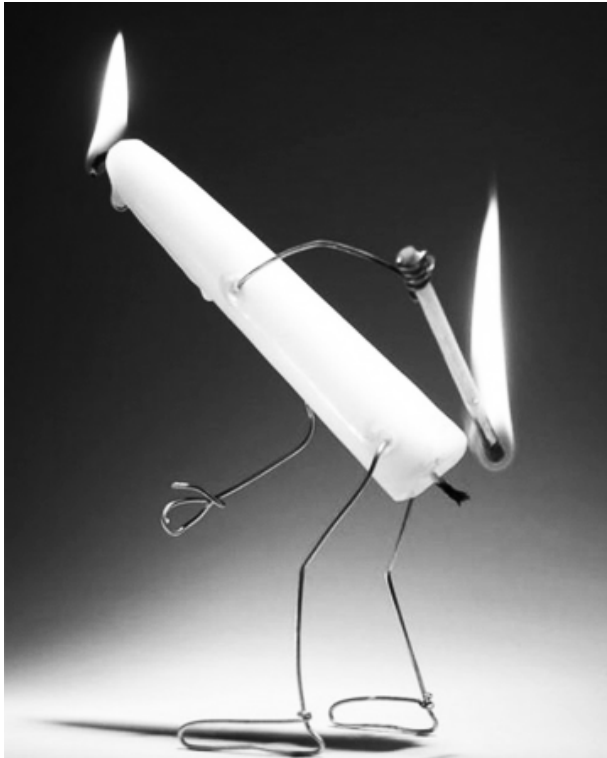
interval intensity. The weekly volume of training must be dominantly aerobic with peak intensities carefully visited. You also need to control how much recovery you take between sets. The goal is to give your body enough time to sort out what to do with the ensuing lactate. If the rush of lactate comes on too quickly, you lose. If you feather carefully in and out of the flow of lactate your body's intuition will figure it out. This, my friends, is how the lactate shuttle system works. There is a very specific metabolic transporter (MCT1) that is nurtured in this training environment that results in the re-manufacture of this misunderstood substance.

If your goal is to compete in an event that does not exceed an hour, your demands are very different. It's no longer a problem of energy availability. The problem now is toxicity and the early onset of fatigue. Given the earlier scenario, it's nearly impossible to blow through 2000 calories in one hour, even if all of those calories are drawn from carbohydrate. In which case, energy availability is less of a concern. However, the new challenge is in managing a high rate of lactate influx. Your approach to training now is greater intensity and shorter in duration. This type of training leans heavily on fast twitch muscle fibers and in so doing, promotes the development of another metabolic transport system which is MCT4. The primary function of this system is to evacuate the toxins from your working muscles that left unchecked will become debilitating to your process.

Again, in an attempt to simplify things, the workouts shown will be coded to let you know what workouts are most complimentary to your end goal. There are many ways to assemble the workouts, as a rule, do not place intense workouts back to back. All this does is extend the time required in recovery. Also, do not judge the work after a few sessions. Give the workouts time to allow for the adaptive process to take hold. "Rome wasn't built in a day."

A sure fire way to measure your progress is through the Time Trial Workouts to be shared in coming pages. Here you'll see shifts in metabolic response to your workouts. A lower heart rate relative to a task is a great indication things are going well. Recovery response is another great indicator of progress. Next would be faster times for the same distances. Once these responses become evident,

it would be a good time to assess next steps. Once again, all dependent upon the end game. Adjusting your heart rate to accommodate progress by raising the lower recovery heart rate limit is another way to significantly influence the workout. Or, you might raise the higher limit in your training. Generally I do not recommend doing both.



As I suggested earlier, you never want to “burn the candle at both ends.”

If you have read *“Training The Dark Side,”* you know that I believe that teaching you how, what and when will do more for you than simply writing a training plan for you. Honestly, when addressing a global audience as is the case when writing a book, it is difficult to provide just the right mix of workouts that will serve everyone. That said, for those who do not do well left to their own designs, I have included what I feel is an effective endurance build month of training which is pretty easy to follow. All of the daily workouts are explained and taken from the workouts in the book. Yes, it would be wise to review them all before trying to simply decipher the workouts in the template.

THE ENDURANCE BUILD MONTH

The workouts in the Endurance Build Month are offered in up to six days each week. This may be a bit much for some. The volume ramps up pretty quickly with not much in the way of days off. If needed, add another day off. If so, I recommend a 2 day on 1 day off schedule instead of the 3 on 1 off as shown.

You might wonder where to take it after the month is up? As is common with most training schemes, add 10% volume every other week and schedule out as far as you feel necessary for the event you are training for. When your plan is to run far, keep in mind that it can get pretty boring if you try and spend anything beyond 2 hours on a treadmill!

A marathon plan should evolve over 20 weeks assuming you are just getting started. If you are looking for something more specific, checkout my *Marathon Training Plan* which can be found at <https://diazhumanperformance.com/product-category/training-plans/>

WEEK ONE

DAY ONE	DAY TWO	DAY THREE
<p>CADENCE 15 MINUTES MSD 10 MINUTES</p> <p>BASIC FLOW #1 35 MINUTES</p> <p>TOTAL TIME 60 MINUTES</p>	<p>CADENCE 15 MINUTES MSD 10 MINUTES</p> <p>BASIC FLOW #1 35 MINUTES</p> <p>TOTAL TIME 60 MINUTES</p>	<p>HILL REPEATS 20 MINUTES*</p> <p>BASIC FLOW #1 35 MINUTES</p> <p><i>* Set incline to 6% max sustainable pace for 3 minutes, reduce incline to 2% easy pace recovery for 2 minutes. 4 rounds.</i></p> <p>TOTAL TIME 40 MINUTES</p>

DAY FOUR	ACTIVE RECOVERY - NO RUNNING
----------	------------------------------

DAY FIVE	DAY SIX	DAY SEVEN
<p>MSD 10 MINUTES</p> <p>BREAK OUT RUN 40 MINUTES</p> <p>TOTAL TIME 50 MINUTES</p>	<p>RECOVERY FLOW 30 MINUTES</p> <p>TOTAL TIME 30 MINUTES</p>	<p>5 BY 5 TIME TRIAL</p> <p><i>The trials can be separated with rest for better results.</i></p> <p><i>* Approximate total time between the two trials.</i></p> <p>TOTAL TIME 55 MINUTES*</p>

WEEK TWO

DAY EIGHT	DAY NINE	DAY TEN
<p>CADENCE 15 MINUTES MSD 10 MINUTES</p> <p>BASIC FLOW #1 35 MINUTES</p> <p>TOTAL TIME 60 MINUTES</p>	<p>CADENCE 15 MINUTES MSD 10 MINUTES</p> <p>BASIC FLOW #1 35 MINUTES</p> <p>TOTAL TIME 60 MINUTES</p>	<p>HILL REPEATS 20 MINUTES*</p> <p>BASIC FLOW #1 35 MINUTES</p> <p><i>* Set incline to 6% max sustainable pace for 3 minutes, reduce incline to 2% easy pace recovery for 2 minutes. 4 rounds.</i></p> <p>TOTAL TIME 40 MINUTES</p>
<p>DAY ELEVEN</p>	<p>ACTIVE RECOVERY - NO RUNNING</p>	
DAY TWELVE	DAY THIRTEEN	DAY FOURTEEN
<p>INCH WORM LUNGES, GLUTE BRIDGES</p> <p>BASIC FLOW #2 60 MINUTES</p> <p>TOTAL TIME 65 MINUTES</p>	<p>RECOVERY FLOW 45 MINUTES</p> <p>TOTAL TIME 45 MINUTES</p>	<p>INCH WORM LUNGES, GLUTE BRIDGES</p> <p>BASIC FLOW #1 90 MINUTES</p> <p>TOTAL TIME 95 MINUTES</p>

WEEK THREE

DAY SIXTEEN	ACTIVE RECOVERY - NO RUNNING	
DAY SEVENTEEN	DAY EIGHTEEN	DAY NINETEEN
<p>INCH WORM LUNGES, GLUTE BRIDGES</p> <p>UNIVERSAL FLOW #3 90 MINUTES</p> <p>TOTAL TIME 95 MINUTES</p>	<p>BASIC FLOW #1 35 MINUTES</p> <p>TOTAL TIME 35 MINUTES</p>	<p>INCH WORM LUNGES, GLUTE BRIDGES</p> <p>UNIVERSAL FLOW #4 90 MINUTES</p> <p><i>60% Aerobic, 30% 15 bpm above threshold 10% max pace in a cyclical fashion.</i></p> <p>TOTAL TIME 95 MINUTES</p>
DAY TWENTY	ACTIVE RECOVERY - NO RUNNING	
DAY TWENTY ONE	DAY TWENTY TWO	DAY TWENTY THREE
<p>INCH WORM LUNGES, GLUTE BRIDGES</p> <p>BASIC FLOW #1 30 MINUTES</p> <p>TOTAL TIME 65 MINUTES</p>	<p>INCH WORM LUNGES, GLUTE BRIDGES</p> <p>MSD 15 MINUTES</p> <p>TOTAL TIME 45 MINUTES</p>	<p>AEROBIC TIME TRIAL 20K</p> <p><i>Maintain form and cadence without exceeding your aerobic heart rate target.</i></p> <p>TOTAL TIME TBD MINUTES</p>

WEEK FOUR

DAY TWENTY FOUR

ACTIVE RECOVERY - NO RUNNING

DAY TWENTY FIVE

INCH WORM
LUNGES, GLUTE BRIDGES

BASIC FLOW #1
35 MINUTES

TOTAL TIME 95 MINUTES

DAY TWENTY SIX

10K SPEED FLOW

*Be sure to read the
instructions listed with
this workout.*

**TBD is time to be
determined*

TOTAL TIME TBD* MINUTES

DAY TWENTY SEVEN

INCH WORM
LUNGES, GLUTE BRIDGES

BASIC FLOW #1
30 MINUTES

TOTAL TIME 95 MINUTES

DAY TWENTY EIGHT

ACTIVE RECOVERY - NO RUNNING

DAY TWENTY NINE

INCH WORM
LUNGES, GLUTE BRIDGES

UNIVERSAL FLOW #4
90 MINUTES

*60% Aerobic, 30% 15
bpm above threshold
10% max pace in a
cyclical fashion.*

TOTAL TIME 65 MINUTES

DAY THIRTY

INCH WORM
LUNGES, GLUTE BRIDGES

RECOVERY FLOW
30 MINUTES

TOTAL TIME 45 MINUTES

DAY THIRTY ONE

RACE PACE TIME TRIAL
20K

*Maintain form
and cadence without
exceeding your aerobic
heart rate target.*

TOTAL TIME TBD MINUTES

SKILL TRAINING



Before you get too wrapped up in how hard or how often, your first consideration should be “How?” I said it earlier, “First, do a thing well, then do it often.” Virtually all of my training clients are taught that injuries depart and speed appears once they master correct running skill. In all of the training programs I’ve written, skill is always a very specific workout that generally occupies 20% of total training volume in the early stages of training. The workouts to follow are frustrating affairs until they are not. The frustration is worth the investment of time. The corrections will earn you freedom from injuries and an increase in your ability to achieve sustainable speeds that you may have thought were reserved for the gifted.

Take your time with these skill workouts, they are not endurance events! If you become fatigued you’ll get sloppy and anything to follow will only lead to future corruption.

MSD - MOTOR SKILL DEVELOPMENT

MSD - Motor skill development drills are wholly focused on the creation of speed minus error. I have found over the many years of teaching this drill that the learning curve can get a little blurred. Making a mistake here can result in an utter waste of your time and the results will never manifest from doing them wrong. On the other hand, when you better understand and approach these drills as I explain, they are without question, the most powerful asset in your training.

Once you have been adequately warmed up, begin working towards “peak velocity”. To be clear, this is the point where you are running as fast as you are capable. There are strict rules to follow along this path. Anytime along your attempt to achieve speed you identify a flaw in your mechanics, you **MUST** back off, reset and make another attempt.

The flaws I am speaking of are:

- *Over striding*
- *Increased or decreased stride frequency*
- *Heel striking*
- *Faulty arm swing*

Under these restraints you will become quite frustrated with your inability to generate any reasonable speed. The desire to create speed generally overrides the discipline to back off, knowing that you are cheating!

Motor skill drills are problem solvers, as you focus on doing things correctly, each time you repeat, you’ll get a bit more efficient. The more efficient you become, the less errors you make, the faster you will be capable of running.

As you develop into a better student of this drill, you will run faster and less prone to mistakes. Everyone, given the amount of speed they generate, will

eventually make a mistake.

I rarely ask an athlete to dedicate more than 45 minutes including warm up and recovery total time to these drills. If you keep pushing as the wheels are falling off the bus, I promise, it will one day end badly. High intensity training unguarded leads to incredible soreness if not injuries.”

STANDARD MSD DRILLS

On the treadmill it is wise to have an audible metronome scheduled to 180 spm.

Warm up for 5 minutes at an easy aerobic pace

Incline should be set to 0 and remain there throughout the drill

Increase belt speed by 2 mph

Remain here for 5 minutes

It is important that you are hyper focused on your ground contact and all of the aforementioned potential errors. If you identify that anything is off, jump to the side rails and reset your mind and form. This should still be an easy pace.

Increase belt speed by 2 mph

Remain here for 2 minutes or fail to hold form

Recover to side rails for 1 minute

Increase belt speed by 1 mph

Remain here for 30 seconds or fail to hold form

Recover to side rails for 30 seconds

Assuming that your starting speed was 4 mph you should now be at 9 mph by 30 second intervals. Speed and duration is relative to ability.



The goal is to visit as much speed as you can support minus error for 30 seconds at this juncture. If you can hold 30 seconds for 3-4 intervals without error, move to a greater speed. I'll remind you, if you sacrifice form for speed, the lesson is lost. *Continue on this path for 30 minutes performing peak efforts for 30 seconds with as much recovery between efforts as needed. This is not an endurance test, it's a skill test!*

AMSD - ADVANCED MOTOR SKILL DRILL

AMSD's are similar to Standard MSD drills with the exception of a one minute duration at peak velocity.



WORKOUT SUMMARY

Warm up for 5 minutes at an easy aerobic pace

Incline should be set to 0 and remain there throughout the drill

If your starting speed was 6 mph you should work towards 10 mph

Perform 30 second intervals with 30 seconds rest progress from 6 to 10 mph

Once you achieve 10 mph, shift your timeline to 1 minute intervals

Recover to the side rails for a minimum of 130 bpm between intervals

Continue on this path for 40 minutes. Keep in mind, the title of this workout is "Advanced," if you cannot support 10 mph for 1 minute with reasonable recovery, revert back to standard MSD's.

AMSD II - ADVANCED MOTOR SKILL DRILL II

When you reach this level of skill all that's left is the ability to tolerate the ensuing lactate production that wants badly to shut you down. If you are capable of interval sets beyond 10 mph without sacrificing form, the next elephant is the room is sustainability. The toxins that are choking muscular function need to be tamed. To do this, you need to increase the time at speed and progressively reduce the recovery times.



WORKOUT SUMMARY

Warm up at a steady state pace of 10 bpm above threshold for 10 minutes

Reduce to a walking pace for 2 minutes or until heart rate is less than 120 bpm

Set speed to 8 mph, run for 2 minutes (note your heart rate at conclusion)

Recover from your working heart rate by 20 bpm

Set speed to 9 mph, run for 2 minutes

Recover from your working heart rate by 20 bpm

Set speed to 10 mph and run for 2 minutes

Recover from your working heart rate by 20 bpm

Set speed to 11 mph and run for 1 minutes

Recover from your working heart rate by 20 bpm

Take note of your working heart rate at the conclusion of each interval.

2 rounds

Set speed to 9 mph and run for 2 minutes

Recover from your working heart rate by 30 bpm

Set speed to 8 mph and run for 7 minutes

Recover from your working heart rate by 20 bpm

Set speed to 10 mph, run for 2 minutes

Recover to an aerobic pace for 10 minutes

*Total Work time 40 minutes. Recovery is relative to level of fitness,
approximately a total of 10-15 minutes.*

PEG LEG

This workout may seem silly, until you try it. It is nearly impossible to over stride while hopping on one leg! Keep in mind, running is a one leg at a time exercise, you essentially leave the ground and take flight only to land again. How well you land dictates your outcome as a runner.



This workout is incredibly helpful for those that struggle to find a stable landing in their stride.



Hopping on one foot forces you to find the correct foot fall. It is impossible to over stride or heel strike. If you miss the correct landing you will lose your balance. After a few attempts you will intuitively find the correct landing.

On the treadmill set at 0 incline carefully hop forward on one leg without setting the other foot to the ground. Set the speed to no more than 3.5 mph to start. Alternate legs as prescribed below...

WORKOUT SUMMARY

Hop ten strides (as if you were running on one leg).

Shift to the other foot

Recover and repeat

Hop for 10 strides off each leg (alternating feet) and continue for 4 sets

Increase the speed by 1 mph

Hop for 5 strides off each leg (alternating feet) and continue for 4 sets

Increase the speed by 1 mph

Shift to 2 hops (alternating feet) for a total of 20 hops

Now simply begin running (you are now at 5.5 mph)

If all went well, begin ramping the speed up and introduce a cadence of 180 spm.

PEG LEG INCLINE

The focus now changes from developing the correct landing to simply developing functional integration from joint to joint. The incline will force you further forward onto your forefoot and put a lot of load into your calves. Having your great toe flexed upon landing creates a powerful Windgate effect which further stabilizes your mid foot, firing the structures on the bottom of your feet. It will also force more ankle flexion (which is a good thing) and the sequence upon impact force is a synchronistic loading from foot to ankle to knee and hip. Think of this action as a dynamic strength exercise.



Let me share that this is tough! You don't want to over do this exercise but you certainly want to toss it into your shorter workouts.

WORKOUT SUMMARY

Warm up for 10 minutes on a 2% grade easy pace

Increase incline to 6% grade

Set speed to 4 mph

Peg leg for 6 hops alternating from one leg to the other

Recover to side rails long enough to collect yourself

Increase incline to 8% grade

Peg leg for 6 hops alternating from one leg to the other

Recover to side rails long enough to collect yourself

Reduce incline to 6% grade

Peg leg for 4 hops alternating from one leg to the other

Hold your alternating 4 hop sequence for 1 minute intervals with 30 seconds rest for 4 rounds. This will be challenging. If you require more rest to gather yourself, take the time! Again, this is skill based training not endurance.

THE FLOW



It is well understood that beyond how well you move, the cost of work in great degree, is what determines success or failure as an athlete (FYI: If you train, you are an athlete). Cost of work - energy demand and availability - is closely tied to intensity of effort. As pointed out all through this text, low intensity burns fat, high intensity burns sugar. Our endurance is supported by fat utilization and our fitness by carbohydrate utilization.

To simply put things into perspective, think of training as “energy in and energy out.” In order to perform work (energy out), we need to consume fuel (energy in). We take in energy over the course of our days and weeks, typically morning, afternoon and evenings to balance out our energy consumption. Most people (I hope), realize that our energy consumption consists of an appropriate amount of carbohydrates, fat and protein which should comprise a well rounded meal. I would say this is a pretty logical approach to meet our energy demands. What we don’t do is eat our carbohydrates on Monday, fat on Tuesday and protein on Wednesday in a segregated fashion. Who would think this would be an effective method of fueling the body? Now, consider the way we train (energy out). For

the longest time, training plans have been written along these same patterns, segregating efforts and intensities over days, weeks or months. The hope is the arrangements over time will result in progress.



Flow training provides all of the elements of training needed to realize progressive change in each workout. Here's how it works:

Based on what you have learned regarding heart rate and the energy system, let's assume you have determined that your metabolic turn point is 145 beats per minute. Heart rates below this number are dominantly aerobic, above this heart rate, dominantly anaerobic. The theme for the day is to dedicate an hour to a training run. Logically, you would begin with a warm up, allowing the body to settle into the efforts to come, say on average, 140 bpm. Some days this warm up may take a little longer, other days a little less. In this scenario, today's warm up was 10 minutes. This decision was based on your perception of preparedness.

When the time is right, you may elect to push up to a threshold pace, say 150 bpm, just above the aerobic window. Today, it feels right, you decide to hold this pace for approximately 10 minutes (you are not restrained by a scripted timeline). Afterwards, you feel its best to throttle down, lower the intensity to an aerobic pace, possibly 10-15 beats per minute lower than your anaerobic effort (135 bpm) and reside there for (again an approximation) 15 minutes. Now, fully recovered from the push, you elect to revisit intensity, this time, at a greater pace/intensity than the earlier push (upwards of 160-165 bpm). This pace is more demanding than the previous push and less sustainable, so you identify (via perception) that you can only hold this pace for 5 minutes. Once again you regress to recover, this time only to around 145 bpm, possibly a few bpm higher. Your recovery this time is only 5 minutes and you feel ready to go again! Your body is telling you that things are going well. You elect to revisit 165 bpm and lo and behold, this time, the effort feels easier, more sustainable so you “go with the flow”. You hold the pace for 10 minutes before throttling down into a recovery heart rate of 140 bpm for the final 10 minutes.

This scenario has resulted in 35 minutes of aerobic influence and 25 minutes of anaerobic influence. Put another way, the results are, an appreciable sampling of endurance development and a near equal amount of fitness development. We could have fashioned the workout to provide either a greater amount of each of these components, all of course based on desired outcome. If you are working towards an endurance based challenge, you could lend a greater share of time spent each week to aerobic efforts. If a shorter, high intensity outcome is your goal, you could shift your efforts in the opposite direction. Regardless, at the end of the day, what is important is you visit all aspects of your intensity spectrum so that your body becomes well adapted to the demands you face.

What we hope to achieve through “Flow” is a fundamental balance of endurance, strength and power, both from an energetic and muscular perspective. We all need our fitness as well as our endurance. The idea of leaving one element of training off the training table for another is ill effective. I will confess, it’s difficult to summarize the concepts of flow training. What is important is that you pay attention to what your body and mind are trying to tell you. Add to this

what you've learned about your energetic responses to your efforts.

The flow workouts to follow will lay out a percentage of time to spend at specific levels of intensity based on heart rate. When you apply intensity or recovery, it is up to your intuitive perception. What you do not want to do is, stack the efforts for the sake of simplicity in an orderly fashion. That is the easy way out but it misses the point entirely. If you give credence to your perception of effort, your body will reward you with much greater progress.

Good to know: After reading this description of “Flow Training,” you may think why do anything else? One might argue that traditional approaches to training are easier to follow, it’s what you are accustomed to. My goal is to introduce a variety of approaches to your training, you might elect to dedicate a month or two to learning how to embrace the concepts of Flow.

Many who “drank the kool aid” and dedicated themselves to the adoption of Flow, have reported to me that once they got into it, “There was no turning back”. It’s the way they intend to train forever. I think the lesson to take away from this novel approach to training is the relationship you build with yourself and the efforts you impose upon yourself along your training journey. Are my theories correct? Some may push back in favor of what they have always done and the results they have earned from their processes.

I am a firm believer in the idea that there is so much about how our bodies respond to the influences imposed, we would be short sighted not to see the value in the concepts of Flow.

THE FLOW WORKOUTS

BASIC FLOW #1

Earlier in this text in explaining the concept of “Flow” I depicted a scenario that should have set the stage for how to approach this and similar flow workouts to come. When the work is done you should have ended up with 70% of the effort being aerobic and the balance (30%) 10 bpm greater than your aerobic pace. This is a relatively gentle workout which fits nicely between or after more intense workouts.



70% aerobic pace

30% 10 bpm above threshold

Total workout time 60 minutes

Good to know: Do not simply segregate the energy systems, retreat and revisit in a cyclical fashion. All of the flow workouts are “cognitive by design.” The pattern is such that at the end of your training bout, the influences intended are present but the timeline in which they occur is based on your “flow.”

As described in earlier predictions of threshold, the example being 150 bpm, unless otherwise indicated, I recommend recoveries, to be about 10 bpm below or 140 bpm.

BASIC FLOW #2

Basic Flow #2 provides a more intense segment (20% 15 bpm above threshold) and a reduction in time spent aerobically. This workout makes for a great follow up to Basic Flow #1 featuring the intensity progression. What might fit nicely behind #1,#2 would be a Recovery Flow.

60% aerobic

20% 10 bpm above threshold

20% 15 bpm above threshold

Total workout time 60 minutes.



BASIC FLOW #3

Here once again there is a regression in aerobic influence and an increase in time spent at 15 bpm over threshold. Basically 50% dedicated to endurance and 50% dedicated to tolerance, strength and stamina. The recommended timeline is now shortened by 15 minutes due to the increase in intensity.

50% aerobic

20% 10 bpm above threshold

30% 15 bpm above threshold

Total workout time 45 minutes



BASIC FLOW #4

Basic Flow #4 features an extension in overall time and 10% at max pace effort which works out to a total of 9 minutes and 27 minutes 15 bpm over threshold and 54 minutes at an aerobic recovery pace.



60% aerobic

30% 15 bpm above threshold

10% max pace (9 times)

Total workout time 90 minutes.

SPEED FLOW

This is a great workout to hone your perceptive intuition. You should find that each 2 minute anaerobic effort will yield different results. Each 2 minute anaerobic effort will yield around 400 meters. For some, a typical 400 at this intensity will yield quicker results or further distance. I used 2 minutes as an average. The 3 minute recoveries between each interval adds an additional 400ish distance to the total volume. Ample recovery with about a 70% effort for 2 minutes will build lactate tolerance while placing a challenge upon the muscles of your heart (myocardium) which results in greater cardiac output (basically a stronger pump).



These intervals also go a long way in building a relationship with your central nervous system which in turn provides allowance to work unrestrained producing easier sustained paces well beyond simply setting into a steady state effort.

Set elevation to 2% grade. Begin with a 5 minute aerobic pace, focus on run technique and cadence. Roll up to a pace that is no longer sustainable beyond 2 minutes, hold the effort for 2 minutes. If you can't, you pushed too hard. If it was too easy, bump it up next interval. Recover to aerobic pace for 3 minutes, continue this “flow” for the duration of the distance.

WORKOUT SUMMARY

5 minutes aerobic pace

2 minutes anaerobic pace

3 minutes aerobic pace

5 rounds

5 minute aerobic cool down

Total workout time 55 minutes

RECOVERY FLOW

Recovery Flow is an excellent way to actively recover from a more intense workout. Not too long, not too easy with brief visits of intensity to access the entire spectrum of our muscle fibers. These brief bouts of intensity will help free up metabolic waste and better prepare you for your next workout. I have experimented with the inclusion of Recovery Flow training during tapers leading up to key races interspersed with days off to great effect. Aside from the physiological benefits earned from this type of recovery, a bonus value we (myself and my coaching clients) appreciate, is the confidence building aspect of these sessions. Briefly checking to see if you still have the “snap” to power into an aggressive pace at will. Feeling the freshness associated with the taper and recovery flow melding make this an excellent approach to active recovery.



WORKOUT SUMMARY

10 minutes aerobic pace
30 seconds 10 bpm above threshold
5 minutes aerobic pace
30 seconds 10 above threshold
5 minutes recovery pace
2 rounds
Total workout time 42 minutes

Good to know: this arrangement can be shortened to whatever feels right, I have experimented with 30 to 45 minutes. Much longer than that defeats the intent.

FLOW WORKOUT SUMMARY:

I provided a few simple iterations of what could be possible with flow. Altering the time spent at various intensities changes the way your body will adapt. The greatest influence will come from the duration of the workouts and or increases in intensity. You can add weekly volume progressions / regressions and tailor the program to suit your needs.

Most of the athlete's that are following the flow methods have told me that they are recovering faster, they are able to sustain faster paces and are able to hold them for far longer than ever before.

LACTATE TOLERANCE



In 1936 a Scientist by the name of Hans Selye introduced his ground breaking research which he coined “The General Adaptation Syndrome”. Hans, recognized as “the father of stress research,” explained that when the body is exposed to external biological stress, this stress is met with a biological response to attempt to bring the body back to internal homeostasis. Chronic influence causes our body to find balance under these newly imposed stressor’s whatever they may be, to create a newly adapted you, be it fitness, adaptation to the environment, cold or heat. It’s all a matter of time and exposure.

Of course, as in all things, life is cyclical, if you continue to over stress the body you will encounter a maladaptation. You simply fall out of balance in your training and begin to lose the desired effects. In the best case, you’ll need some time off. In the worst case, you may encounter an injury or illness as the body begins to break down.

All of the workouts shown in this book are geared to stress the body at various intensities and durations. In the case of someone who is simply trying to shed excess weight, the hope is for an adaptation to better metabolize fat while improving fitness. Those who opt for more lofty goals like setting a personal

best in a marathon, the same premise applies, applying an application of the appropriate stressor's to cause a goal specific adaptation.

An effective training plan is a carefully orchestrated balancing act. Manipulating your energetic pathways and musculature to bend them to your will. Where lactate tolerance is concerned, evidence clearly shows that lactate/lactic acid is not the reason for post workout soreness and does not linger in the muscles on the days that follow. Not only is it not the culprit of soreness, it is in fact a critical component of energy delivery during exercise. We have learned that lactate production is a result of carbohydrate being the dominant energy source during greater intensity. If the rate of lactate production is managed effectively, it can be bent to the will of the athlete. For endurance based training, it can be shuttled into the liver via Monocarboxylate transporters or MCT1 (Pronunciation Mono-carbox- a-lit).

When intensity of training is high and fast twitch fibers are chronically dominant, the need to clear lactate quickly is accomplished by MCT4 whose role is to move the lactate out of the muscles.

Many athletes I have worked with and tested often have created a false positive in their training. Spending a great deal of training time at a heart rate that is a little too high or a little too low. What makes all of this perplexing is in knowing which of these limits both high and low are most effective. For example: If you've determined that your turn point (threshold) is 150 bpm and your training intensity chronically sits at 160 bpm, the intensity may not be great enough to promote a clearing response. Meaning that if in competition your effort reaches 10-20 bpm above your common training intensity, your body will be ill equipped to effectively clear lactate. Absent this ability, the toxicity of your competition effort will cause you to fail. Your body is overwhelmed by the rush of lactate and incapable of solving the problem.

In all of this, a reasonable approach would be to begin approaching upper and lower limits of intensity progressively. Using the same equation noted (150 bpm threshold), build your upper limits based on the time required to recover. If your

hour training session plan is to tag 170 bpm cannot be sustained longer than a few minutes and recovery of 140 bpm takes longer than 2 minutes, duration at the higher limit must be shortened. Based on this scenario your intervals should remain at 1 to 1 ratio, until your recovery time shortens. You should not attempt greater intensity until the lower or higher limits improve. Another way to view this is, if initially you are incapable of holding 170 bpm for beyond 2 minutes and now capable of holding the same effort for 4 minutes with a recovery within 2 minutes at 140 bpm, you are improving your clearing capacity.

Now we have some choices to make. Depending on our desired outcome, we could increase the intensity and hold our interval peaks to 2 minutes or raise our recovery target. Possibly 150 bpm on the lower limit and 175-180 bpm on the upper limit. This would be the case if your goal was to clear lactate and reduce toxicity in order to maintain intensity for shorter events. Or, continue with the 170 bpm limit and hold it for as long as possible without having too slow your pace. Once you find you can no longer sustain the pace, reduce your pace until your heart rate drops to 150 bpm. This approach will help to develop the shuttling effect. “Shuttling” is where the lactate is moved to quieter parts of your body rather than simply “clearing” via respiration (blowing it out as you exhale). The shuttling will, as explained earlier, result in an “energy rebate.”

There are a variety of ways to improve lactate tolerance and these workouts are very critical to race performance. I advise my clients to focus on interval based LT sessions in which a guarded amount of time is spent above and below threshold. The musculature we carry around with us is first influenced by our parents. Genetics plays a dominant role in our athletic selection. Those born with a greater percentage of fast twitch muscle fibers will intuitively prefer shorter high intensity and more explosive sports. Fast twitch muscle fibers are dense, less porous and rely heavily on glycogen as its preferred fuel. Because oxygen does not pass as easily through this environment, due in part to dense muscle and limited capillary density, there is a reliance on anaerobic metabolism. Alternatively, blessed with a high percentage of slow twitch fibers are capable of amazing sustainability for long events. With slow twitch bodies fat is the principal energy source and seemingly in infinite supply. It's no wonder that someone

predisposed to either of these genetic profiles would select the sport that best suits their natural makeup.

How far above or below and for how much time is what controls the influence of the session. The intensity and exposure is managed in progressive and regressive ratios of recovery vs. work time. Unlike “Flow” workouts where progression or regression are guided in part by intuition and perception, the following workouts are time based.

These workouts present a more traditional approach to training which I find appeals to those “A” personality types who work more efficiently if they have a script to follow. The efficacy of this approach to training is time tested. They are also easier to relate to comparative analysis of previous workouts.

For example: Phase One will be set at a 3-1 ratio (3 times the amount of rest vs. the amount of time at work) and may be scheduled as 3 minutes aerobic and 1 minutes anaerobic efforts and repeated for the intended duration of the workout.

The specific heart rate targets above and below, relative to your test results or predictions. Phase Two, Three and Four will result in this fashion, 2-1 ratio, 1-1 and 1-2. This process can be carried on infinitely but the process is a function of how much exposure (lactate) we take on relative to time.

Good to know: Notice there are no recovery segments between the higher heart rate efforts and lower heart rate efforts. As you reduce pace, with time your heart rate will recover to the target intended.

LACTATE TOLERANCE PHASE ONE

Phase One will be set at a 3-1 ratio (3 times the amount of rest vs. the amount of time at work) 3 minutes aerobic and 1 minutes anaerobic and repeated for the intended duration of the workout. At a 3-1 ratio the duration can be held for a greater length of time.



An hour session will result in 45 minutes below threshold and 15 minutes of anaerobic efforts in 1 minute intervals. Phase one allows for lactate production to clear fairly well.

Warm up at easy pace for 5 minutes

3 minutes aerobic

1 minute 10 bpm above threshold

15 - 20 rounds

5 min aerobic cool down

Total workout time 60 - 80 minutes

LACTATE TOLERANCE PHASE TWO

Phase Two will be set at a 2-1 ratio (2 times the amount of rest vs. 1 time the amount of work) 4 minutes aerobic and 2 minutes anaerobic and repeated for the intended duration of the workout. The subtle adjustment in recovery and work is surprisingly more difficult than Phase One. It is however a meaningful progression of work.



Warm up at easy pace for 5 minutes

4 minutes aerobic

2 minutes 10 bpm above threshold

15 rounds

5 min aerobic cool down

Total workout time 100 minutes

LACTATE TOLERANCE PHASE THREE

Phase Three will be set at a 1-1 ratio (1 times the amount of rest vs. 1 time the amount of work). This workout can be approached in a few ways... You can increase the intensity of the anaerobic segment by another 5-10 bpm which would put you as much as 20 bpm above threshold and decrease the heart rate in recovery by another 10 bpm. Or, you can stick to the numbers as indicated in Phase One, 3 minutes aerobic and 3 minutes anaerobic, repeated for the intended duration of the workout.

Warm up at easy pace for 5 minutes

3 minutes aerobic

3 minutes 15 bpm above threshold

10 rounds

5 min aerobic cool down

Total workout time 70 minutes

LACTATE TOLERANCE PHASE FOUR

Phase Four will be set at a 1-2 ratio (1 times the amount of rest vs. 2 times the amount of work). 2 minutes aerobic and 4 minutes anaerobic and repeated for the intended duration of the workout. If you have evolved through the phases, the obvious progression is a further regression in recovery and an increased amount of time under stress.



- Warm up at easy pace for 5 minutes
- 2 minutes aerobic
- 4 minutes 10 bpm above threshold
- Cool down at easy pace for 5 minutes
- 10 rounds
- Total workout time 70 minutes*

STEADY STATE LT

As a reminder, “steady state” suggests no deviation in effort. If your goal is to hold 150 bpm you do this regardless of pace. However, if your pace becomes untenable, you may have overstepped. In which case you’ll need to lower the heart rate by intentionally slowing to a sustainable yet aggravated pace. If the pace is too easy, you defeat the purpose. It may take some experimentation to arrive at just the right intensity and you may need to adjust to higher workload as your body begins to adapt to the workout. The progression here would be extending the duration of the workout initially, then, increasing the intensity.



Do not try to burn the candle at both ends. All you will learn from this is when you will eventually blow up!

Warm up at easy pace for 5 minutes

Push up to 10 bpm over threshold and hold for 50 minutes

5 min aerobic cool down

Total workout time 60 minutes

Good to know: as described in earlier predictions of threshold, the example being 150 bpm, I recommend recoveries, unless otherwise indicated be 10 bpm below this value (140 bpm).

NEGATIVE SPLIT (40/20)

A negative split suggests that the pace you create towards the later part of your workout or race is faster than the early part. I'm trying to over simplify this concept but generally speaking, you leave some energy in the tank

to finish strong. This, like many of the workouts provided, are progressive in nature. These workouts are categorized as lactate tolerance workouts similar to the workouts that preceded these. What you will come to learn with time is a far more efficient pacing strategy in races, if that's your end game.



This negative split workout begins with an aerobic pace effort for 40 minutes. Increase the pace to somewhere between 10-15 bpm above your threshold heart rate. The shorter the overall distance the greater the intensity over threshold. For example: an hour total effort may result in 10-15 bpm over threshold pace where a longer distance effort may only reach 5-10 bpm over threshold pace.

Warm up at easy pace for 5 minutes
40 minutes aerobic pace
20 minutes 10-15 bpm over threshold
5 min aerobic cool down
Total workout time 70 minutes

NEGATIVE SPLIT (20/40)

Easy enough to figure out. The script is flipped to double up on the intense portion of the training session. In the initial sessions, I recommend a conservative approach, like 5-10 bpm over threshold. Here you'll begin to

learn what is possible in future sessions or even in a race situation. 10 beats per minute beyond your aerobic pace can make a significant difference in your overall outcome. If it shaves off 30 seconds per mile, that's better than a 3 minute faster time in a 10k and potentially a bit more than 6 minutes in a half marathon.



Warm up at easy pace for 5 minutes
20 minutes aerobic pace
40 minutes 10-15 bpm over threshold
5 min aerobic cool down
Total workout time 70 minutes

THE MASTER CLASS

I refer to this workout as a “Master Class” for one reason, having command of your cadence provides further control over your cost of work and your speed. At this juncture I speak great deal about a cadence of 180 steps per



minute. Rarely, if ever, had I recommended exceeding this frequency for good reason. While a faster cadence will still offer the benefits I spoke about being at 180, the cost of work will chase your cadence. Along with more expense comes more lactate and the potential for becoming toxic. That said, being in control of the expense, knowing when its the right time to push cadence up and what the predictable outcome will be when you do, could be what changes the outcome of a heated competition.

Here is what I am sure of... most runners are not skilled runners. They may perform well, this does not mean they are skillful. They may have incredible conditioning yet still have a leak in their game where skill is concerned. I once used the analogy of a skilled boxer vs. an unskilled boxer. The unskilled boxer may be stronger, possibly even faster but is not in command of the fight. Knowing when to jab, how frequently and being a skilled tradesman seeing mistakes as they unfold. Runners have the same potential.

If you know the difference in proficient running mechanics and the associated expense of poor mechanics, you can force your competitor to spend what he or she doesn't have. The more sustainable speed you can create at 180 steps per minute while your competition is extending him or herself to stay ahead or close behind, the more opportunity you have to cause them to go toxic! For example, if you identify your competitor is working hard to keep pace.

Pushing your cadence up 10 steps per minute will separate you. The response is for your competitor to expend more energy. Certainly the same goes for you, the difference is you have far more control. Like the jab, you stick and recover,

possibly in as little as 10 second spurts.

This strategy will take your competitor from a bad situation to worse. When the lactic acidosis settles in, it will take far too long for them to recover. You are long gone! The beauty is they generally never know what hit them! They just assume you were the better runner and they are right, they just don't know specifically how you did what you did.

THE MASTER CLASS

Warm up run aerobic pace 5 minutes

Set cadence to 180 spm

Increase pace 10 bpm over threshold 2 minutes

Reduce to aerobic pace 2 minutes

Push to 15 bpm over threshold 2 minutes at 180 spm

Increase cadence to 190 spm for 2 more minutes regardless of heart rate

Recover to aerobic pace 180 spm for 2 minutes

5 rounds

Recover to an easy pace for 5 minutes between rounds

Total workout time 80 minutes

TREAD HELL

As the title indicates, this is a hell of a workout, no inclines, just fast running! As the efforts are shown, they are based on perceived exertion not any particular heart rate target.

This workout will enhance your VO₂max,

build your heart strength and is an excellent

workout to improve your general fitness. Pay close attention to the progressions.

For example, if you set your speed to 8 mph and your perception is that you are



working at an 80% effort, after 1 minute recovery 9 mph will undoubtedly be a 90% effort. Another increase by 1 mph will surely put you at 100%. The recovery times are going to seem shorter as the intensity goes up but try and stick to it. If you need to reduce speed to achieve the same level of effort as prior intervals, so be it. It's all about effort.

10 min aerobic pace warm up

2 min flat run 80% effort

Recover to side rails for 1 minute

2 min flat run 90% effort

Recover to side rails for 1 minute

2 min flat run 100% effort

Recover to side rails for 1 minute

4 min flat run 80% effort

Recover to side rails for 1 minute

3 min flat run 100% effort

10 min aerobic cool down

Reduce pace to a forced march at 10% elevation for 10 minutes

Reduce elevation to 0% incline and run at an aerobic pace for 15 minutes

Total workout time 62 minutes.

THE SWEATFEST WORKOUTS

These workouts are interval based and progressively intense. A, B and C are over similar time frames, designed to provide options based on ability. As the name implies, you will sweat a ton! The goal is to build endurance and sustainability for longer events from a half marathon or greater challenges. SweatFest -A being the most challenging. If you cannot sustain 8 minute pace for 10 minutes, I suggest you attempt the B version. If you alternate B and C, 2 days on and one day off, you will get a tremendous week of workouts.

SWEATFEST - A

Warm up at 8 min pace for 10 minutes
Set treadmill to 10 mph run 2 minutes
Recover to side rails 1 minutes
Repeat for 5 rounds (do not include warm up)
Increase incline to 4%
Run 5 minute at 7 minute mile pace
5 rounds
1 min recovery between rounds
Run 6:30 pace for 2 minutes
2 rounds
1 min recovery between rounds
Recover at 6 mph for 10 minutes
Total workout time 71 minutes



SWEATFEST - B

Warm up at 10 min pace for 10 minutes

Set treadmill no incline and 7 mph

Run 2 minutes

Recover to side rails 1 minutes

Increase to 4% incline

Run 5 minutes at 9.5 minute mile pace

5 rounds

1 minute recovery between rounds

Run 8:30 pace for 5 minute

2 rounds

1 minute recovery between rounds

Recovery run at 6 mph for 10 minutes

Total workout time 60 minutes



SWEATFEST - C

Warm up at an easy pace for 10 minutes

Set treadmill to 2% grade run at 70% PE* 2 minutes

Recover to side rails 1 minute

5 rounds

Set incline to 4% run 5 minutes at 65% PE* pace

5 rounds

Recover to side rails 1 minute between rounds

Run 80% PE* pace for 1 minute

5 rounds



Recover to side rails 1 minute between rounds

Recovery run at 6 mph for 10 minutes

Total workout time 115 minutes

**PE is the acronym for “perceived exertion.” I will often prescribe workouts based on perception of effort opposed to a specific heart rate intensity. In many cases, it’s not what it costs you to do the work, it’s what it feels like when you do the work. I will indicate a percentage of effort.*

For some, an 80% perception may be sustainable for beyond 10 minutes, for others, it may not be the case. As you become more proficient with your training, you will come to identify what the actual cost of work is in terms of heart rate vs. perception. This is an incredibly useful bit of education that can only come from putting in the work.

SWEATFEST - REHAB

Here’s a tip that you may never have considered. Running injuries are most commonly manifested while running on flat terrain. Pull a hamstring, back and hip pain, IT band syndrome are almost always developed on flat ground. I have found that when I meet an injured runner who seeks my advice, I may ask... Does it hurt when you run uphill? Common reply, no. Does it hurt if you jump rope? Common reply, no.



If you tell a runner to stop running, he or she will maybe take a day off and try running slower the next day. What’s changed? Nothing other than the pace. The problem in almost every occasion can be temporarily resolved by shifting to an uphill run, especially on a treadmill. Realize this is not going to work for all injuries but it does seem to be a solution for most. Especially in the short term. Runners fear losing their fitness if they take too much time off. Running uphill

will help you hang on to your fitness while you work at correcting the problem that caused the injury to begin with.

Where this approach does not work: Ankle, calves, achilles or plantar fascia injuries. Stressing these regions in a climbing gait will cause more trouble.

Warm up with some floor exercises (see movement prep)

Set treadmill to 3% incline and run at 50% PE* 2 minutes

Recover to side rails 30 seconds

10 rounds

Set elevation to 5% incline, run 2 minutes at 60% PE* pace

5 rounds

Recover to side rails 1 minute between rounds

Total workout time 45 minutes

TIME TRIALS



A time trial is what I like to refer to as “The Race of Truth”. By periodically performing time trials while training, you are assessing the success of your program. Traditionally, a time trial is seen as an all-out effort to determine who is the fastest, often seen in cycling events. Where this is certainly a useful measure of how fast you are, it has nothing to do with what made you fast. It is a “reactive” event; you push as hard as you can to see how fast you can go against the clock for a given distance, the outcome is the reaction to your effort.

Performing Time Trials on a treadmill can be very precise. It is easier to control the intensity of your effort either in a “steady state” or in interval fashion. Time trials are an incredibly useful tool. They can be used as a measure of your progress, pacing strategies and so much more. You may be thinking, how does this equate to running outdoors? It really doesn’t. What it does do is provide a pretty good measure of what intensity is sustainable and that alone is a powerful bit of information that does equate well outdoors.

AEROBIC TIME TRIAL



Start your heart rate monitor, warm up, stretch (if you do this commonly) and begin running. When your heart rate rises to your pre-determined aerobic heart rate target, begin timing and measuring your distance until you cover one mile, without allowing your heart rate to exceed your target. If you need to slow down or even walk, do so in order to keep from violating your target heart rate. Record your results for later comparison. Time Trials, regardless of intensity, duration or technicality, serve to inform. They let you know where you stand. They tell you if what you are doing is working or not and, with time and experience, what you need to do to adjust your process so that you stay on track and continue to progress.

AEROBIC TIME TRIALS OVER VARYING DISTANCES

Our initial time trial was pretty simple, it was conducted over a short distance and the training infused only had two components. I'll tell you now, that as simple as it may seem to you, almost seeming ridiculous, I have witnessed incredible results from countless clients who followed this simple process. These are people who came from far more complicated training programs, hit a plateau and were virtually lost. We broke things down into two simple components, addressed the volume and intensity and within a few weeks their time trials revealed serious improvements.

Depending on the specific event you plan to prepare for is what determines the progression and distance of your forthcoming time trials. The key word here is "Progression". You may find that your mile pace aerobically for one mile is not sustainable for five miles or ten. Other factors arise as we expose ourselves for longer duration, things like, hydration or dehydration, electrolyte balance or imbalance, muscular endurance just to name a few. These hurdles represent opportunities to learn and adjust.

If you jump too far forward, say by following your one mile time trial by a ten mile, you miss what may have been different over five miles of exposure.

RACE PACE TIME TRIALS

Race Pace Time Trials serve as the acid test. They should not be introduced early in your training, nor too late. The value leading into this type of trial is to determine what is possible and what is not. An aerobic time trial demonstrates if, in fact, your pace held at an aerobic intensity is improving and, theoretically, if so, one might take from this that all paces moving beyond aerobic too will improve.



My feeling is that absent a legitimate race pace trial you may find out too late that when you pressed into an anaerobic effort the aerobic conditioning did not save you from the ensuing toxins that higher heart rates will surely serve up. Training is about learning and development. You would be wise to take lessons from a series of assessments and nothing is more telling than a sampling of the challenge you hope to crush! The idea of “Race Pace” does not necessarily suggest an all out effort. I suggest you approach the trial at a bit lesser distance than your competition, yet, long enough to provide good feedback from your efforts.

4X1K TIME TRIAL

This is a very unique and task specific Time Trial. I use this in much of my training for clients who compete in Hyrox Competitions. For those unfamiliar with “Hyrox” it is a new functional fitness competition that has recently gone global with a full season of events in the USA. As of this writing, the current World Champion male is Hunter McIntyre whom I have a long relationship with as a friend and as a coach. I had also recently had the privilege of working with the female World Champion (as of this writing) Kris Rugloski. In a Hyrox competition there are 8 functional fitness stations and 8 1K runs between each station.



Anyone who has competed in one of these events will tell you... If you can't run well, you can't win! I will often schedule this particular time trial to measure progress with our efforts.

Beyond Hyrox, this time trial workout is very challenging and will go a long way in developing your fitness and lactate tolerance. The goal is to see what pace is sustainable with a controlled amount of recovery. Use your split timer on your watch for the 1k splits and the recoveries too! Watch how your pace unfolds over consecutive trials along with your working and recovery heart rates.

Warm up / aerobic pace 10 minutes

1k- race pace

Recover to side rails 1 minute

1k- race pace

Recover to side rails 1 minute

1k- race pace

Recover to side rails 1 minute

1k- race pace

10 minutes cool down

THE 5 BY 5 TIME TRIAL

The 5 by 5 Time Trial is unique in that it allows you to recognize the variability between an aerobic effort and a race pace effort. From this trial you can examine the difference in cost via heart rate and outcome via pace. From this information you will have a better understanding as to what may be a sustainable pace for future competitions.



Be sure to adequately warm up and stretch if needed before beginning the trial.

Warm up for 10 minutes at an aerobic pace

Run a 5k aerobic time trial maintaining form, cadence and heart rate

Collect average heart rate and finish time

Hydrate, stretch, allow adequate recovery

Run another 5k trial at race pace maintaining form, cadence

Collect average heart rate and finish time

No restriction on heart rate.

HILL CLIMB TIME TRIAL

If you compete in offroad terrain events, climbing at race pace is often a challenge. As pointed out earlier, if you are a flatlander, a treadmill is a necessity to create the climbing efforts you need to succeed in events such as Spartan or other OCR races.



Warm up for 10 minutes at an aerobic pace

Establish an incline you wish to compare efforts

I recommend a 6% grade

Starting trial distance, target 1000 meters

Run the distance as fast as possible, mark heart rate and elapsed time

Recover until your heart rate returns to 100 bpm

Repeat 3 times to find the average heart rate and finish time

Cool down 10 minutes at 2% incline at an aerobic pace

The trial is to measure the best of 3 efforts

No restriction on heart rate.

HILL CLIMBER

Many of the clients I work with compete on trails, typically at elevation. As I shared early in this text, many are flatlanders who travel to compete, in some cases above 10,000 feet altitude. This presents some interesting challenges. First, those that live in these environments are acclimated to the altitude and have a significant advantage. Their cardiovascular system is adapted to the thin air. It takes a few weeks on average to start to see improvements in your ability to adjust your cardiovascular system to these highlands.



Second, running on flat terrain does not develop the same musculature that climbing a steep incline does.

Training on an incline solves the second problem fairly well, the first problem poses a physiological problem that is a little more challenging. Your VO₂max will decrease by as much as 2% for every 390 feet above 4,900 feet of elevation. This means your oxygen uptake will be compromised by as much as 10% at 8,000 feet.

This reduction points to cardiac output. Cardiac output is the gross product of ejection fraction and stroke volume. Short story, how well your heart can push blood and oxygen into your working body. High intensity training has far more influence over this outcome than lower intensity “aerobic conditioning.” Given this reality, unless you are able to arrive at your race location a few weeks prior to racing to acclimate, all you can do is work the incline on your treadmill at high intensity intervals.

The workouts to follow are not for the faint of heart! Pick a few that pose a challenge and when you've mastered them, move on to another one. They are all equally evil, they just are presented in a variety of approaches.

LUNG BUSTER

Have you ever gone into a Mountain race where the start line is at the base of a steep grade? The gun goes off and the leaders sprint off to break the herd, you try to keep up and soon after find yourself fading. Lung Buster



is a workout that provides a solution to this problem. It's a workout you may wish to employ once each week leading up to an "A" race. I would caution you to avoid too many of these and certainly not following a previous intense workout.

Put in a reasonable warm up, get off the belt and stretch your legs

Set the incline to a 3% grade

Begin with zero incline

Sprint for approximately 100 meters or 20 seconds

Introduce the incline rapidly for 45-60 seconds

Do not decrease the speed that brought you into the incline

Shoot for a climb you can sustain for 45 seconds

Get off the treadmill and walk until you recover by 30 bpm

Repeat the process minus your warm up for 10 rounds

Cool down 5 minutes at an easy paced walk

Finish with a 10 minute easy pace run at zero incline.

Good to know: This workout, assuming a one minute interval followed by a 2 minute recovery should take about 45 minutes from warm up to cool down.

TREAD HILL BREAKER

This is the only workout thus far that incorporates exercise off and on the treadmill. It was originally written to serve the athletes I coach for obstacle course races such as the Spartan Super or Beast. In OCR, the challenge is in how well you run and how quickly and efficiently you can navigate the many obstacles in these races. Upper body strength and grip is something that you must have. If you fail an obstacle there are generally time wasting penalties they will impose, such as burpees. This is not a very complicated workout but the strength component taxes your musculature before and after you run, exactly what you'll face in these types of races.



Begin with a traditional warm up along with some upper body exercises to prime the shoulder girdle before pulling your body weight.



Perform 20 thrusters at the max load you can successfully perform for the number of repetitions.

A thruster is a deep squat with the weights (preferably dumbbells) held at your shoulder height. Push out of the squat to a full standing position as you accelerate the dumbbells to a fully overhead extension. Recover smoothly back to the squat position with the weights for the number of repetitions.

The chin up is with palms facing you at shoulder width apart, pull until your chin reaches bar height, recover to full extension. Amrap* is a Crossfit term which is short for as many reps as possible.

I indicate alternating grip, this cue is for you to change from an under hand to an over hand grip every round you do chin ups.

Set incline to 8% grade run max sustainable pace for 10 min

Chin ups Amrap*

Alternate grip each round

Recover to side rails 1 minutes

5 Rounds

*As many reps as possible

Total workout time approximately 75 minutes



SPEED INDOOR HILL

Speed Indoor Hill does not present much in the way of elevation. What it does do is offer up speed on decent running inclines. Trying to run fast on a steep incline is a short-lived proposition. An incline of 4-6% allows for greater pace and serves up an excellent workout that is beneficial for road racing, trail racing or simply to get a solid fitness workout.



Warm up at easy pace for 5 minutes (no incline)

Set treadmill at 4% incline 6 mph 10 minutes

Recover to side rails 1 minutes

Run 4 min 4% incline at max sustainable pace

Recover to side rails 1 minutes

5 rounds

Set treadmill at 6% incline run at max sustainable pace for 2 minutes

Recover to side rails 1 minute

5 rounds

Recovery run at 6 mph for 10 minutes

Total workout time 60 minutes

SPEED INDOOR HILL "MLSS"

Maximum lactate steady state workouts are a staple in most training camps for runners. Doing so on an incline takes the workout to a whole new level of effort.



Warm up at easy pace for 5 minutes (no incline)

Set the treadmill to 4% incline, run 6 mph 10 minutes

Set the treadmill to 5% incline, run 40 minutes at max sustainable pace

Recovery run 6 mph no incline for 10 minutes

Total workout time 65 minutes

SPEED INDOOR HILL LONG VERSION

Climbing for 90 minutes on a treadmill is an incredible bit of determination. Putting in the work here will pay huge dividends when you race outdoors.



Warm up at easy pace for 5 minutes (incline)

Set treadmill to a 4% incline and run 6 mph for 10 minutes

Recover to side rails 1 minute

2 rounds

Set treadmill at 6% incline run at max sustainable pace for 2 minutes

Recover to side rails 1 minute

5 rounds

Set treadmill at 8% incline run 1 min at max sustainable pace

Recover to side rails 1 minute

10 rounds

Set treadmill at 4% incline run at max sustainable pace for 4 minutes

Recover to side rails 1 minute

2 rounds

Recovery run 6 mph no incline for 15 minutes

Total workout time 92 minutes

THE GOAT

The Goat is one of my go-to workouts for the athletes I coach for Spartan Beast distance races. Most of which are held at elevation with very steep inclines. This workout, if done properly will break you a few times before you finally conquer it. Finding your limits and pushing through them is what this workout is all about.



Warm up at an easy running pace 6% incline for 10 minutes

Increase pace to 6.5 mph at 6% incline for 10 minutes

Increase incline by 1% every minute until failure

(Most treadmills top out at 15%)

When you fail or achieve 15%, reduce incline to 6%, repeat to 15% or failure

2 rounds

If your treadmill can reach a 15% incline that means, if you succeed you will have accomplished 9 intervals for 1 minute each after the 10 minute warm up

Between rounds cool down 10 min at 5.5 mph and 4% incline

Recover to a forced brisk pace march at 4% incline for 5 minutes

Total workout time 83 minutes (Time shown is an average estimate)

Good to know: Time to completion is difficult to predict. If you fail after 2 increases in incline rather than completing 9 the duration of the workout will be shorter. Watch your comparative progress over time.

TREAD CLIMBER

This is a very difficult workout, perfect for preparation leading to events at altitude with long climbs! You may need to scale the rounds back a little. No worries, with time you'll surely be able to handle the load.



Be sure to keep hydration handy and extend the recoveries if need be.

Warm up at easy pace for 5 minutes (no incline)

4% incline at 5mph for 10 minutes

Recover to side rails 1 minute

2 rounds

7% incline at 5mph for 5 minute

Recover to side rails 1 minute

10% incline at max pace 1 minute

10 rounds

Recover to side rails 1 minute between rounds

2% grade at 7 mph 30 minutes.

2 rounds

Total workout time 2 hrs 20 minutes.

THE TREAD CREEPER

This workout is not quite as intense as the few previous ones, shorter in duration, moderate incline. Let's face it if, you survived the last few workouts this is "Duck Soup."



Warm up at easy pace for 5 minutes (no incline)

Set elevation to 3% incline run 5 mph for 10 minutes

Push pace to 6.5 mph for 5 minutes

Recover to side rails 30 seconds

Increase elevation to 5% incline hold pace at 6.5 mph for 3 minutes

Recover to side rails 30 seconds

Reduce elevation to 3% incline and speed to 5 mph for 10 minutes

Increase pace to 7 mph at 3% incline for 5 minutes

Recover to side rails 1 minute

Total workout time 40 minutes

THE BIG 5

The Big 5 is a series of hill repeats that are 5 minutes in duration at peak effort in a climb. 5 minutes is a long time to climb at peak effort uphill without interruption or reprieve. Finding the speed you can manage



initially can be tricky. I suggest the incline be set at 8% grade from there, once you are able to complete the interval successfully at your chosen pace, increase the elevation for the next interval. At the conclusion of the interval wait until you are well recovered to at least 120 bpm before you climb again. Rather than simply

hopping off to the side rails, walk away from the treadmill to recover.

Repeat these intervals AT PEAK EFFORT.

The goal is to provide an increase in cardiac output and to challenge your heart to push up your VO2max. Be sure to hydrate well, feed as needed. This workout is going to be tough, perfect as prep work for Spartan World Championship or Sky Racing.

WORKOUT SUMMARY

Warm up on a 6% incline, march don't run for 5 minutes

Set incline to 8% and ramp up the speed to peak sustainable pace

Run for 5 minutes

Recover by walking off the treadmill until your heart rate drops to 120 bpm

Or, 2 minutes (which ever comes first)

Continue these intervals for a total of 90 minutes

Total workout time 90 minutes

OVER SPEED TRAINING



As the title describes, “over speed” suggests a running pace that is beyond your capability, unprovoked. This provocation I speak of is where the rate of speed produced by the treadmill is set upon the runner and the runner must do the best he can to contend with this provoked speed.

Most all conventional treadmills are incapable of issuing a speed beyond 16 mph, for most recreational athletes this could be construed as “over speed.” Rate of speed beyond 16 mph are scary to put it mildly. Beyond common applications, there are treadmills that are capable of producing 28 mph (45 kilometers per hour), my treadmill is one of those rare machines. I have spent nearly 20 years experimenting with over speed applications, most often for power athletes that are seeking explosive sprint speed for the sports such as American and European football. Certainly this would also be very important to track athletes running short of 300 meters. The trick is in how you expose these athletes to such high rates of speed. Before I get into the details, let me offer this disclaimer:

Dropping an athlete onto a moving belt all by itself can lead to mishap. Hitting the belt without support before you find balance can put you on your butt! Doing so at high rates of speed only compounds the potential for injury. Never do this without proper guidance and safeguards. I have very unique equipment and one of the features of my treadmill is a custom made canopy with a pneumatic lift and harness. When I begin an over speed session, I put my client into this harness and reduce this persons weight by a minimum of 10%. This reduction of load is first

to provide assurance that if you mis-step the harness will catch you. You cannot fall off the treadmill. It also has a fail safe brake that if you do loose footing, you can actually hang and be suspended above the danger of the moving belt. When you read what I explain in the following text, remember two things: 1.) My client is protected and cannot fall. 2.) I am a highly experienced professional and have earned my ability to orchestrate these highly intense workouts.



I think it's also important to note that this is not an exercise you administer to yourself! You need a trusted, experienced partner to control the session, able to shut the machine down in the event of a mishap and or to coach you through your approach. You may not see what you are doing right or wrong. Think of it like a corner man in a professional fight... "You keep dropping your left, you're going to get hit!" Guidance during these highly explosive speeds is critical.

How to move forward assuming you have some type of safeguard in place I begin in step fashion, I first have the client hop onto the moving belt at a marginal

rate of speed without holding on. This might be at as slow as 6 mph. As soon as the client successfully finds balance and is running, I have him or her step to rails. This could be within 15 seconds. I then have the client repeat the process at progressively quicker speeds - from 6 to 8 to 9, 10, 11, and possibly 12 mph all for a brief few seconds. The task being to find dynamic balance while running. Once successful, jump to the side rails. This progression may all told have taken just a few minutes. I typically then have my client take a break to digest what just transpired before proceeding. After the break we begin again at 12 mph with the same work flow from 12 to 14, 15, 16 and possibly 18 mph all with the same brief intent.



Let me remind you that my client is in a harness! Feeling safe is critical at this point. What we hope to achieve is progressive allowance from the central nervous system and an increase in motor unit excitation. In essence, the muscles are learning to fire as quick as needed on demand. This is getting to be foreign territory for your nervous system, musculature and connective tissue. One of the benefits of the harness is in this controlled state your body is forced to find a solution to the speed. You can't simply elect to slow down as would happen outdoors. The other chief attribute of hopping onto a speeding belt is you cannot

approach the speeding belt incorrectly and succeed. If you overstrike, you meet a speeding belt in a head on collision. The braking force is magnified and you will know immediately that you did something wrong. When you land correctly, you will be rewarded with the ability to complete the task.

The next phase of this process is obvious, more speed! Following the same tack, we'll attempt 19, then 20, 21 and possibly 22 mph. The intent is successfully finding dynamic balance and timing, resulting in a run even for as brief as 10 strides. Once we find the speed limit of this session, I typically will measure the progress by reducing the speed by 4 mph and having the client run for as long as possible or until I am satisfied that the session was successful. What generally results is an incredible ability to sustain speeds well beyond the clients pre-session ability. When the system at large is excited and educated the sustainability becomes very apparent.

Know that this high intensity comes at a cost. What I commonly see is very sore hip flexors and extensors. This will not result immediately. It's important to have the foresight that this soreness will result within 24 hours. It is unwise to attempt greater speeds in this session.

I generally will not offer a follow up session for at least 2-3 days. Keep in mind this is not like weight training where overload is often repeated more frequently to see gains. This is in great part a neurological education. You will not loose what you learned in a few days but your muscles will recover assuming you provide adequate time to allow them.

The next session is far more entertaining, the client has learned how to approach the speed, what worked and what didn't. After a 5 minute warm-up run at an easy pace and a good dose of region specific dynamic stretching we take up where we left off. 19 mph, 20, 21, 22 and beyond until we can no longer successfully complete the task. Commonly the speed limit is about 24 mph for a successful entry and run for 5 seconds. Rather than trying to escalate speed from here, we'll simply repeat this segment after about 5 minutes recovery. This time around we will regress to 20 mph and test sustainability as before. If we have good success, we'll recover again and begin a series of intervals with a time line. 10 seconds on at 18 mph for 5 rounds to complete the session.

One might ask, what's the top speed? I have had clients on many occasion successfully run 28 mph (the max speed my treadmill allows) for 5 second intervals and exhibit 15 second intervals over 20 mph. When you have an athlete command these speeds the carry over in sports performance is incredible.

Keep in mind this is a cerebral training session. You are challenging your electrical system not the motor. Endurance is not the game here. Trying to extend the session beyond what is optimal for time sake will result in a contrary outcome. We're shopping for explosive speed, trying to extend the session will slow you down.

What I have found to be very successful for my competitive athletes is a minimum of 6 sessions with 72 hours recovery, followed by a minimum of 3 weeks break to follow. Most of the athletes I work with are doing so mid or pre- season. This is not something we would attempt on Friday with a game on Saturday! Having said that, a session on Wednesday has shown great carry over to a game on Saturday. Running speed is sharp and explosive and quite noticeable to the athlete. A side benefit is the awareness of the advanced speed provides confidence and enhanced gamesmanship.

AGILITY TRAINING



In sports such as football both American and European, running is never in a straight line. The ability to change directions quickly and evade your opponents is a necessity. You might not think this is something you might be able to do on a treadmill, once again it's a matter of equipment. My treadmill is not only equipped with a unweighting canopy and harness, it will also travel in both directions. This affords the ability to operate multi-directional. Linear training omits muscular development of our lateral stabilizers. For athletic performance that places demands outside of a straight line, developing a balance of power and coordination requires training to be multi-directional and this works well on a treadmill assuming you have the right tools.

I realize that some who read this may feel left out, given my constantly speaking in regards to “proper equipment.” However, there are some workarounds, especially where Agility Training is concerned. What's to follow is the approach I take when introducing a new athlete to these workouts. As is the case in all athletic training the work flow should always be orchestrated in simple to complex fashion.

The first limitation I work on is the ability to run backwards. I refer to this as “Retro-training” (of Latin origin meaning “backwards; behind.”) Because our natural movement patterns are always moving forward most all of the athletes I have worked with suffer from retro-movement amnesia (I just made this term up). If I put them onto the treadmill facing the rear of the deck with the belt moving at a slow pace (3-4 mph) and even persistently reminding them that in order to successfully navigate onto the moving belt, they need to reach behind rather than stepping forward in order to keep from falling. I actually repeat the consequence of not doing exactly what I asked them to do and go so far as to have them repeat the task to me 3 times. What will you need do? “Step back not forward.” About 80% of those I’ve gone through this entry level drill with needed to be caught to keep from falling!

We are not wired to work in retro, it is an acquired skill that is an important step in developing multi-planar movement patterns.

After getting over the realization that they could not successfully complete a seemingly simple task, we try again and again. Within about 5 minutes of failed attempts, they commonly figure it out. This is motor learning at its finest! As they achieve the slow rate of speed attempts I’ll begin escalating the pace in interval fashion, from 3 to 5 to 7 mph for example. I’ll have them run backwards for 10 seconds each interval. This seems so simple but it is surprisingly taxing on the mind and musculature that are not often engaged. The hip extensors and glutes are lit up like crazy. Just reading this should offer an “Ah Ha” moment for coaches. These are the prime movers in sprint speed.

So far, this drill could be reasonably safe on any treadmill, assuming you have a spotter or two standing by to catch the athlete if things go wrong. Speed at this juncture is not as important as neural-musculature activation. Getting the right muscle to fire and the coordination development is a huge benefit.

Once this task is relatively mastered, I move to lateral strides. Now facing the front of the treadmill I’ll have the athlete run at an easy pace and ask them to turn and face left and shuffle laterally. In early stages I would have them hold the side rails to insure safety. While striding left for about 30 seconds, I would have them



turn face forward and resume the easy paced run as “Home,” the safe place in the drill. After collecting themselves, we now turn to the right and shuffle lateral once again. We would repeat this process a few times to get the hang of it and then put the movements together, “turn left, recover, turn right recover.” On command I will try and mentally trip the reaction of the athlete. Once we’ve accomplished a handful of these drills we take a break to digest the work.

The next phase is to introduce the retro run into the lateral movements and perform “360’s.” The

commands might be from “Home” to left, left again (retro) left again and then home. The athlete has just ran in a forced circle or 360. Once we are able to successfully accomplish some 360’s we begin increasing the pace. I hate to keep shining the light on my set up but appreciate if you will, with an unweighting canopy we can push the envelope of performance, knowing there is no risk to the athlete.

With a few sessions under our belts, we begin to earn success at speed and move into a more complex movement pattern by introducing karaoke 360 drills. Moving the feet quickly in this more complex pattern is very challenging but the skill sets earned pay huge dividends on the field. There is in my opinion, only two places left to progress, adding load and increasing the pace.

In the picture seen here, is an athlete performing karaoke drills with a 16 pound Dynamax ball held away from center of mass and rotating while running 7 minute per mile pace in 360's. An extremely taxing interval set done in 2 minutes repetitions.

What I've witnessed is incredible abilities to change direction at high rates of speed with perfect balance. Keeping foot contact very near center of mass improves balance and lightning speed in evasive movement.



DYNAMIC REHABILITATION



What, you may ask is “Dynamic Rehabilitation?” This my friends is a fascinating frontier that few have been exposed to. Life has a way of imposing its will on our bodies, we start out (most of us) with a relatively clean slate. Evidence of this is, watch how children play. Their bodies are supple with very little physical inhibition; they run with near perfect gait. Then as we grow older... that time we tripped and were hobbled for a week from pain. We develop compensations. These compensations can add up and left unchecked can wreak havoc on what once was a perfectly functional neural-musculature system.

I had the great fortune to meet with some great minds that thought well outside the proverbial box. I was introduced to the benefits of partial unweighting and gait corrective processes. In short, while being lifted in a harness, reducing a small percentage of your body weight and strapping, we are able to dynamically re-educate how our system works and develop adaptations to the corrections imposed. Sounds a little far fetched? Meet Sarah Little, when I met her she was a beautiful 14 year old tall and slender with a pigeon toed gait. Her parents were at their wits end with trying to seek out a solution. Her father, a radiologist, being embedded in the medical community was at a loss for how to correct Sarah’s dysfunctional gait. The concern grew to a point where there was serious

consideration for surgical intervention.

Through word of mouth recommendation, Sarah's mother called me and asked if I could help. My honest answer was, I am not sure. I suggested they come see me on a Saturday when traffic was light (they had a great distance to travel) and I would see if the methods I learned would be a solution. The sequence of images you see here are of the process in brief. I did a video analysis of her gait, identified the severity of the gait dysfunction and began the process. While unweighted, I strapped her legs into the correct gait pattern. This is a subtle imposition that encouraged her ground contact to be re-aligned. The first treatment was about an hour with several breaks along the way. I would adjust the system as needed and reintroduce her to the treadmill in a walking interval fashion. After the hour, I suggested they take a break, get some lunch and return for another round of treatment.



The outcome after those two sessions is, Sarah walked out of my facility with a perfectly corrected gait. This was (as of this writing) over a decade ago. I still have a hard time wrapping my head around just how incredible the outcome was. Sarah came to me each weekend for six visits to go through this process and progressed to a running, then sprinting gait with amazing results. I share this story because it presents the potential that as a coach and clinician a treadmill has powerful application well beyond simply running in a straight line.

In most rehab scenario's the ultimate goal is pain mitigation. Where this is of chief importance, the cause of injury is not often met with the appropriate



“fix” so to speak. Where gait analysis and corrective coaching does wonders, treating an injury dynamically proves to be incredibly effective. In the two images shown, one, where a runner had been dealing with chronic hamstring issues, a traditional approach may be to apply ultrasound treatments and other passive approaches.

Consider the value of taking the muscles and connective tissue through the functional ranges of motion while being treated. As shown, a trigger point ball is tightly flossed into the region that needs

mobilization. The floss helps to reduce inflammation in an active state. Within a 5 to 10 minute session we’ve found nearly instantaneous relief. As is the case with the cupping treatment. Rather than simply lying on a treatment table we mobilize the afflicted region by walking and lightly jogging as the cups purge inflammation and help to free up congestive connective tissue. We have been able to effectively treat a variety of soft tissue injuries in similar manner all with incredible results based on consumer reflection.

Athletes who were being treated with traditional therapeutic interventions



found relief and the ability to get back to training and competition far quicker than ever before.

In these past few chapters I shared some of the unique applications I was able to put into place to help athletes get well beyond convention and unleash performances that are nearly impossible to gain otherwise.

DEALING WITH INJURIES



As a workout, running has much to offer. Runners don't need classes, fitness facilities or equipment. All they need is a pair of running shoes, which makes running very inexpensive compared to other modes of exercise. It's an easy and accessible sport that can be done nearly anywhere, so it is not difficult to fit a run into a busy schedule. There is one disadvantage to running as a workout: People who do a lot of it tend to get hurt. In fact, at least 50 percent of regular runners get hurt each year—some estimates put the percentage even higher—sometimes from trauma, such as a fall, but more often from overuse.

As a coach, I spend far more time dealing with injuries than I would like. I also spend a great deal of time educating myself in the art of dealing with these injuries as a first responder. No joke! I have earned certifications in treatment processes over the years out of necessity. The bottom line is: if you're injured, we can't move forward with training or hope to race in the near future.

My job has been to identify the difference between soreness and injuries early, develop a plan to mitigate these injuries if they present a concern and turn my



athletes around as quickly as possible.

Quite frankly, I've gotten pretty good at it! It's important to note up front that I am not a licensed therapist or medical practitioner.

When an injury presents as something beyond my scope of knowledge or ability to treat, I refer the athlete to the proper medical professional. All that being said; as part of my weekend training clinics I present first aid solutions that athletes are able to treat on their own. This has turned out to be a favorite element of the entire weekends training!

The reason? Almost everyone who attends these clinics do so because they have been or are currently struggling with a chronic running related injury.

I would like to credit the RockTape company for the decade long relationship I have had with them and the things I learned from their amazing medical research cadre. They have been an incredible resource for much of the education and solutions I put to work in my daily practice dealing with injured athletes. I often explain that my mantra is "evidence based." As in the words of the late President Reagan, "Trust but verify." This is how I have approached treatments over the past 30 years. I am not one to fall prey to gimmicks, gadgets or supplements.

Show me something that works, not once but often and you have my attention.

Because I have the great fortune of working with so many athletes, I am able to test theories and treatments for efficacy. For example, early on in my career my company would set up a booth at pre-race expo's commonly marathons. In our booth we would feature a massage/treatment table. Here we would offer treatments the day before the race when athletes came to pick up their race packets. Back then, our go-to treatment was to apply kinesiology tape to troubled knees, calves, ankles etc. Once someone was being treated, others would see what we were doing and a line would form. We would end up treating people from early morning until the expo closed for the evening. Post race a great many of those we treated came to us raving about how the treatment literally saved them! Being able to run the marathon pain free. This cause and affect outcome got my attention. I learned the value and rationale for the treatments and the potential for the treatments to perform. These treatments are not a function of healing, what they did principally is reduce inflammation and in so doing, reduced pain. Of course this is no cure nor does it correct faulty movement patterns that led to injury. All it really does is buy time and relieve discomfort for the short term.

Now is a good time to remind you that, how you run is where your focus needs to be in order to reduce the potential for injury!



My learning accelerated into novel treatment approaches that are even more powerful than simply applying tape. What also has made its way into my treatment bag is floss, cupping and scraping. All of which are not new, scraping which

is an ancient Chinese treatment has evolved into highly effective treatment for

connective tissue disorders and inflammation relief. This all may seem like Voodoo, it certainly did to me until I learned many of these approaches. Let me remind you, I am an “evidence based” guy! You have to prove something to me before I buy into anything.

I have found, collectively, that in early detection of an injury applying some of these approaches are highly effective. In the pictures I share here you’ll see athletes I have worked with who were on the edge of being incapable of running, were able within minutes, to return to running for me, literally pain free. Once again, I want to take care and remind you, these are not cures, they are short term relief applications. Collectively they can reduce pain of injury and allow an athlete to return to training.

This does not mean you are free to resume 50 miles of weekly volume, it is merely a chance to begin moving and set proper corrections in place as you recover from the issue that side lined you.

The goal of this chapter is not to teach you how to treat injuries. It’s more an introduction to the process that may result in a go-to treatment you could easily employ when the potential for injury due to overuse is rearing its ugly head.



What has been incredibly beneficial in getting my athletes back to training goes like this: I will scan the area with a scraping tool which relays details such as adhesions through the metal of the tool in my grip. Once I find an area of concern I will lightly brush the area towards the heart in gentle strokes. If there is pain, I'll be even more careful. If I find that in a matter of a few minutes the soreness eases up, then I'll move to the next step. I may elect to cup the area and mobilize the region. When working on the lower leg, I will generally have them walk on a treadmill while cupped. You can do this for yourself.

After a few minutes of walking, I will remove the cups, clean the skin of any body oils with rubbing alcohol and finish by applying tape. All of which may take less than 10 minutes. Sound ridiculously simple? It is and it works. If it doesn't, there is a good chance the injury is more involved than you may have suspected. See a medical professional.

You may not have this type of relationship with someone who orchestrates your workouts for you and that's okay.

I do highly recommend that you keep account of the work you intend to do and what you have done. This can easily be put in place via Online training journals such as Strava and other such programs. I use Training Peaks for my clients, Like Strava it provides a free version which is really all you need to keep track of your efforts.



I recently set a goal to ride my bike for 700 miles in one month to celebrate my upcoming 70th birthday. The first month I set this plan in motion, I covered a little over 450 miles. The very next month I managed to cover 715 miles with 5 days to spare! Mind you, I was not in the best of shape when I set out

to challenge myself with this goal. I attribute my success to the accountability. Tracking my rides and distances and adding up the mileage help me to see the possibilities. In the beginning I figured it would take me a few more months to pull this off.



The number of miles covered began to help me establish a reasonable strategy. I completed the goal with the belief that had I wanted to, I could have pushed another 100 miles easily with the final week left to me. I decided it was a bad idea even though I was absolutely confident I could do it. For me, that was enough. I share this personal scenario because it's how success works. You may not see what's possible a month or two down the road given your current

state of affairs. Everyone has heard, "The journey of 1,000 miles begins with one step." Being accountable, however you might set your plan in motion, no matter what you hope to achieve, the odds will fall in your favor if you simply track what you do (or don't do) every day.

I have provided a host of workouts here for you, some may be far too difficult for you today. It does not mean that you will never be able to complete them. It does not matter who you are, how fit or not you may be today. If you chisel away at the work, stay the course, keep track of your progress, you will succeed. Accountability sets consistency in motion!

I know that many of you may think, “if I had a training partner” I would be more consistent. I know this works for lots of people. It may be a stepping stone for you to get started on your quest for a better you. Honestly, I see relying on someone else to show up to motivate you as a crutch. I can’t tell you how many times I waited for a training partner to show up that never came. Once this happens a few times, you begin to lose trust. You may decide, “I am not getting up early to meet this guy, he or she never shows up!” To truly be successful, you need to build your own process, train at a time that works for you. Do the work, you plan to do. Take the days off that work best for your schedule and stay the course.

The first week is always the toughest. When you look at your journal and see that you did what you planned to do and put in a solid week, the next week is easier. The deeper you get into your process, failure becomes less and less an option. No one knows what the future holds. So many of the athletes I meet will ask me if I think they are able to achieve “X” goal? I hate this question because there is no way, I in good confidence can answer this question for them. I may think they are capable, I just don’t know what the future holds for them. At risk of sounding like a broken record, I can only say that; consistency is key. Apply yourself with your best ability, over and over again. One step will turn into two steps, two will become four.

Set yourself up for success by sitting down, developing a training strategy you are comfortable in knowing you can commit to and achieve today. Don’t ask yourself to attempt something that you know in your heart you cannot achieve today. Once you have a plan, begin your accounting process. Like in my example, I started to see what was possible. I would never have developed this awareness had I not begun my accounting process.

Writing workouts for people is something I have done for better than half of my life. That is the easy part. Helping people put a plan in motion and seeing success down the road is more complicated. I hope this little pep talk will help those that may need a leg up!

