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#1 Speed Training Workout For Faster Muscles In Record Time!

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#1 Speed Training Workout for Faster Muscles in Record Time!

"The Best Kept Speed Training Secret"

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"We'll bring you up to speed!"™

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Introduction

Dr. Larry Van Such, DC, BE, EE

Dear Athlete,

Thank you for your interest in *The #1 Speed Training Workout For Faster Muscles In Record Time!* Perhaps the best kept speed training secret ever. It is my sincere desire that the enclosed information opens up a whole new window of opportunity for you regarding your need to increase your athletic speed and improve your athletic performance – just as it has done for thousands of others.

For over 10 years I have been educating and training athletes on how to develop their muscles and nervous systems to be faster and quicker than ever before. The revolutionary speed training principles I have discovered as an athlete, engineer and doctor, cannot be found anywhere else.

Many people have asked how I discovered this amazing technique to increase speed and quickness.

I've been involved with sports since I was a youth. Even then I was searching for ways to get better at my sports skills. When I was about 12 years I purchased an isometric training product that came with springs and traction ropes. I was sold on the idea that I could increase the size of my biceps muscles by 2 inches in just 2 weeks or I could get my money back. Much to my surprise after following the directions, my biceps muscles grew exactly 2 inches bigger! I was extremely excited! Ever since then I have been a big advocate for this remarkable training technique.

Years, later I was trying out for the Youngstown State College football team. We had a kicker by the name of Paul McFadden. He was about 5-10, 160 and he was able to kick them from 60 yards out. He was later drafted by the Eagles and made NFC rookie of the year. I kept asking myself, "If this guy, who is smaller than me, and not as strong, why is he able to kick farther than me, what's going on? I experimented with everything I could think of to improve my technique as well as my training programs to get more distance.

Some years later after I graduated, and thinking back to my experience as a youth, I started experimenting with a new and different product known as the resistance band. I started using the combination of **isometric training with the resistance band** on specific muscle groups in my legs.

My goal was to build strength in my legs because I had just been approached to play on a competitive flag football team. Well, I applied this training strategy to every major muscle group in my legs and sure enough I got stronger and was able to re-establish a fairly good kicking leg. But something **amazing** happened that I had never expected. As a normal pre-game routine, I would always run a few sprints and pass routes to loosen up. When I did this I found I was able to **sprint faster** than in high school. I was able to push off with **incredible power!** I couldn't believe it!

I was so impressed with my new found speed that I spent the next few days recording the exact steps I took to achieve these phenomenal results in hopes of sharing this information with other athletes. As a result, I wrote my first book titled ***Run Faster With Isometric Training*** and it now helps thousands of athletes run faster every month!

I had discovered that with regards to kicking, as well as other athletic skills, bigger is not necessarily better, but speed is everything and, in my own opinion, nothing is better at getter faster than using the resistance band with an isometric training strategy.

I figured that if this type of training was so incredibly effective for sprinters, why wouldn't it be **effective for other athletes in their particular sport**? So, being a doctor having a good knowledge of anatomy and the workings of muscles, and also being an athlete and trained as an engineer, I set out to answer this question and began looking for ways to improve other athletic skills.

So what you have before you are these very same training techniques that I "stumbled" across for sprinters, only now they have been modified for other athletic skills. These techniques have already been **proven effective by thousands of athletes** across the nation and I feel very confident they can do the same for you!

Thousands have achieved incredible results of muscle speed in their athletic performance by using simple isometric exercises the way we teach them.

You will soon discover, like others have, that this is by far the most effective speed training program you will ever find!

In almost every sport the secret to improving your athletic skill is to make your muscles not only stronger but also faster.

Fast muscles give you the unbeatable difference in running, throwing, jumping, kicking, swinging a bat, tennis racket, or golf club and just about any other sports related skill you can think of.

These speed training exercises have helped thousands of athletes - of every level of fitness, conditioning, skill level and age - attain new levels of excellence in their sports performance by giving them the extra speed they had never experienced before.

It is my sincere desire that this program meets your needs – whether you are a coach, trainer or athlete.

Inside this resource manual, I reveal to you the exact training strategy that makes this by far the most effective speed training program ever.

Why do I say this? Because many are easily beating their personal bests in the 40 and other sports skills by doing the program for only 15 minutes or less per day – and they start seeing result in 14 days or less. See what I mean? I don't know about you, but I am not aware of any other program that can make such a claim.

For those who like to know *why* things work, I have also included a complete transcript of one of my speed training seminars. Inside this transcript you will learn about some of the common misconceptions regarding isometric training (believe it or not, this is to your advantage if others ignore these training techniques); why the *no pain no gain* theory can actually hurt your speed; the difference between gravitational potential energy (weights and plyometrics) and elastic potential energy (resistance bands); why training with elastic bands is far superior to training with weights when it comes to speed but only if you know how to do it properly; and a little bit about slow twitch muscle fibers and fast twitch muscle fibers.

Also included in this package are some of my recent articles, a video demonstrating exactly how to perform one of the primary exercises in sprinting faster and other information, tips and techniques you will find helpful.

For example, you will be amazed at how many athletes, including professionals, ignore perhaps the most important muscle group in their bodies when it comes to running speed. In one article you will find out what this muscle group is, and why almost no one is training these muscles for speed. And if you happen to be one of these people, then the most exciting part about this is that you have an incredibly huge reservoir of untapped running speed just waiting to be released!

Before you begin, allow me to offer this one bit of advice: *Do not let the simplicity of this program fool you.* The results that tens of thousands of athletes across the globe have achieved are absolutely amazing. You can read about these success stories on our website by clicking on the resources tab and locating the testimonials link. Maybe someday real soon, you will join this select group of people who have gained a huge advantage in the sports they play.

So take charge and read through this information. The possibilities of what you might accomplish are endless!

Sincerely,

Dr. Larry Van Such

Fundamentals of Muscular Contraction, Isometrics, and the Resistance Band

The secret to the success of these exercises are based on two principles that, when used together, condition your muscles specifically for speed and quickness in less time than any other speed training method available. And the ability of these exercises to improve your athletic performance is multiplied when used in conjunction with other training methods you may already be doing.

1st Isometric Training
2nd The Resistance Band

Muscular Contraction

In order to help you fully appreciate the value of isometrics training with the resistance band to increase your speed, agility and power, let's take a quick look at some basic principles of muscular contraction.

To start with all skeletal muscles consist of **three main fiber types**. These fiber types are:

1) Slow twitch fibers - Responsible for the strength and endurance of a muscle.
2) Intermediate twitch fibers - Possess qualities of both slow and fast twitch fibers.
3) Fast twitch fibers - Responsible for the speed of muscular contraction.

The fast twitch muscle fibers are responsible for giving the athlete his speed, agility, quickness, and power. Fast twitch fibers are up to 10 times faster than slow fibers.

In most muscles, these fibers are intermingled. However, there is usually a predominance of one or the other. For example, in postural muscles of the spine, the slow twitch fibers dominate. This is because slow twitch fibers can undergo extensive repetitive contractions without fatigue.

In skeletal muscles like those found in the arms and legs, the fast twitch fibers dominate. Fast twitch fibers allow for powerful forces to be generated over a relatively short period of time.

Because the fibers are intermingled it is not possible to isolate out a single fiber type during a muscular contraction. All of the fibers contract together, though at times one of the fibers may be dominant during the contraction.

All of these fiber types are arranged into groups known as "**motor units**". A motor unit is defined as one motor neuron and all the muscle fibers it supplies. There are many motor units within the overall muscle. When a muscle begins to contract, an action potential is carried down the motor neuron across the motor endplate to the muscle fibers it supplies.

Initially, only some of the motor units become active. As the demand on the muscle increases, more and more motor units are recruited to help support this demand. As the demand on the muscle decreases, the number of motor units also decreases. This is a general description of muscular contraction.

For an example of muscle contraction let's use the biceps muscle in your arm. If you stretch out your arm in front of you then your biceps muscle is also stretched. Now when you move your fist slowly towards your shoulder you will notice that your biceps muscle 'contracts'. The contraction of this muscle is causing your fist to move towards your shoulder. So, obviously the faster you can contract your muscle then the faster your fist will move.

Muscle contraction speed is the principle behind speed in all of your athletic skills… running, jumping, throwing, kicking and swinging a bat, tennis racket or golf club, for example, all require your muscles to move quickly. The contraction speed of your muscles will help determine how well you can perform in your sport.

Again, the fibers in your muscles that create this type of speed are called 'fast twitch muscle fibers'. They are not the same as the strength and endurance fibers, or 'slow twitch fibers', and therefore need to be conditioned separately.

You cannot condition your muscles for speed the same way you condition your muscles for strength.

Isometrics

With isometric training, a muscle opposes some form of resistance and is contracted to a certain length and then held for a certain period of time, usually 10 seconds or more. **There are no repetitions required in isometrics as in weight training**.

The advantage of this type of training for muscle speed is twofold.

First, by forcing your muscle to hold a position without changing the position for a certain length of time, your body will begin to recruit more and more motor units to

help maintain this contraction. **Motor units that are rarely exercised within a particular muscle are now brought into use, perhaps for the first time.**

Second, By limiting the amount time the muscle holds a position, fast twitch muscle fibers can be conditioned for their natural ability of speed and quickness – something that is rarely achieved when using extensive repetitions in your workout routine.

While the muscle is held in position against resistance the motor units that are recruited are forced to contract continuously, time after time, until your muscles achieve a state of maximum intensity, safely and effectively.

The end result is that the entire muscle matures very quickly.

The following is an example of an isometric contraction:

Example: Take a 20 pound weight and perform a biceps curl. Hold a position halfway between the repetition for 10 seconds. The length of your biceps muscle doesn't change during this time. A force is still being applied. See Figure 1-1 below:

Figure 1-1.

Isometric training has been around for a long time and so it is nothing new. Many extraordinary results in muscle size and strength have been achieved in a very short period of time with this type of training. However, because of the number of new training products and techniques out on the market today, its use by athletes is often overlooked.

Keep in mind that isometrics the way we are about to teach you is not intended to build muscle size and strength. The exercises will increase muscle speed instead, though some increase in strength may naturally result.

Resistance band training with an isometric strategy adds additional benefits to the athlete beyond traditional isometrics.

The Resistance Band

One of the more popular types of resistance training aids is what is known as the **resistance band or exercise band**.

Figure 1. The resistance or exercise band.

This is an outstanding product that has a very unique physical property known as a **variable elastic potential**. This means that the more you stretch the band the more force you will have to apply to maintain the resistance level.

The amount of resistance found within an elastic band is therefore a function of its length when stretched. **When the length of the band changes, even if by a small amount, the resistance level changes also.**

Here's a very basic idea of how and why the resistance band, when used with an isometric training strategy, will far outperform weights when training for speed:

Biceps curl using the band

Imagine first that you are performing a biceps curl, much like that shown in Figure 2 above, except that instead of holding a weight, you are holding one end of a resistance band with the other end either attached to the floor or perhaps secured under your foot.

Since we are using an isometric contraction, we keep the elbow flexed at about 90 degrees and hold it in that position for 10-15 seconds without moving it.

While holding this position, the band is stretched and exerting a significant amount of force back into your biceps muscle. After a few seconds, your biceps muscle will naturally start to weaken. When this happens, your arm will want to drop a little and **your biceps muscle will begin to recruit more and more motor units to help keep your arm and elbow in the fixed position**.

When your muscles start to shake keep holding the position

Eventually, and rather quickly if the resistance is high enough, you get to the point where you can no longer hold the band still and maintain the same fixed position. This causes your arm to give out or start to shake a little as the muscle weakens and your coordination dissipates. **This is a desired state for your muscles to be in to train them for speed and quickness.**

These movements in your elbow and arm, however small and in whichever direction, instantaneously alters the amount of resistance being applied by the band as the length of the band changes. **Even slight changes in resistance, whether greater or less than the original, will affect the amount of force your muscles exert to hold the position**.

Your muscles are becoming alert and responsive

Your muscles are constantly perceiving or sampling these small changes in resistance and must learn to continually and immediately alter the amount of force being applied to hold the position. Your muscles do this by quickly altering their typical recruitment pattern of motor units to try and maintain the held position.

This sampling and responsiveness to the resistance by the muscle is continual as the muscle fights to hold the position. As this happens, your biceps muscle will begin to recruit more and more motor units to help keep your arm and elbow in the fixed position. Your muscle fibers are now training to become quicker and faster.

Weaknesses are discovered and eliminated

With each ongoing recruitment pattern of motor units a muscle's weakness and lack of coordination is instantly exposed on a much deeper level than normally experienced. **This forces the muscle fibers to immediately get stronger and quicker and with more precision than before.**

The result is that **the muscles are conditioned to contract faster with increased strength, coordination and responsiveness.** The athlete will start to notice the difference in their athletic performance, often in just a few days.

Weights aren't made for this

An athlete cannot get the same benefits when using weights in an isometric routine. This is because of the difference between gravitational force (used by weights) and elastic force (used by the resistance band). Gravitational force never changes, no matter how great the mass of the object, and therefore when using weights for resistance the muscle does not go through the process of resampling and

responding to any changes in resistance and does not develop the same level of responsiveness and quickness.

A second benefit of this training strategy is that **the muscle does not get a chance to adapt to the force of the resistance and plateau, or level off**, at the level of resistance applied. "Muscle confusion" is the term often applied to the idea of keeping the muscle guessing as to what force to expect, and this promotes ongoing muscle development.

Third, **the mass of the muscle typically does not increase with this type of training**, which, if it did, could potentially offset speed gains. So, whenever you are able to increase a muscle's strength and coordination without adding any additional body weight, your speed and quickness will automatically improve.

These are just some of the reasons how and why this type of training works and **why athletes often see dramatic results in their sports performance in a short period of time**.

Bands supply resistance in multiple angles and directions

Imagine now applying this strategy in not only conventional ways, as in the biceps example shown earlier, but also by using the band in positions and angles you may have never thought of before that **will immediately expose and then eliminate even greater weaknesses in your athletic performance**.

Perhaps you can begin to see the benefits found in the resistance band that are not found with weights or other training strategies.

We always use the resistance band with an isometric training strategy to increase the contraction rate and the coordination of the specific muscles used in your sports activities.

Including this training technique into your athletic training program will help you and any other athlete more quickly achieve their athletic goals

"I'd just like to say that the RUN FASTER speed training exercises that I did last season worked!! Initially, they helped me take a second off my best 100m and 200m times.

I was ranked second in my state and in the Southern Track Classic I broke the 200m record set by an NFL Pro-bowler.

Thank you for coming up with this program. I recently bought two more sets of resistance bands, so expect more reports from me very soon."

Anthony Chesson - Virginia

"I am 56 and my daughter is 16. We bought the Kick Farther program for my daughter's soccer. The results are amazing!

She is playing soccer at such a high level and will begin playing it in college next year. I also did the training and my legs just feel so revived, my health is better and I am able to practice with her with soccer!

We also bought your program for baseball since we also like other sports that use those types of upper body muscles and look forward to the same results."

Domingo - New York

"Hi, I purchased your baseball program at the beginning of last year's season. I must say that everything you said did come true.

I was able to hit 5 HRs on the season, when I never have done that before. Thanks for that. You don't know how much that does for my confidence."

Orlanda M. - Chicago, IL

"Guys, this product has made a great difference in my sports. I started these at the end of football season and the beginning of basketball season. I was already the fastest on my team, but this blew my teammates away!

In one game, I was under the boards and fell down, the other team got the ball and went for a fast break. I GOT UP, SPRINTED DOWN AND DEFENDED THE ENTIRE TEAM BY MYSELF WHILE GIVING THE REST OF MY TEAM TIME TO CATCH UP! I can't thank you guys enough! can't wait till football!

I want every athlete to know how much they can improve! I thought I was fast before I started using this stuff, but I can't believe how much faster I've gotten!"

Christian L. – Florida

HIP FLEXORS

The first muscle group that we will consider applying speed training to are a group of seven muscles located on each side of the body (for a total of fourteen) known as the *hip or thigh flexors.* Their names are: 1) Psoas, 2) Iliacus, 3) Sartorius, 4) Vastus Rectus, 5) Pectineus, 6) Adductor Longus, and 7) Adductor Brevis. These muscles are shown in Figure 1-4 below:

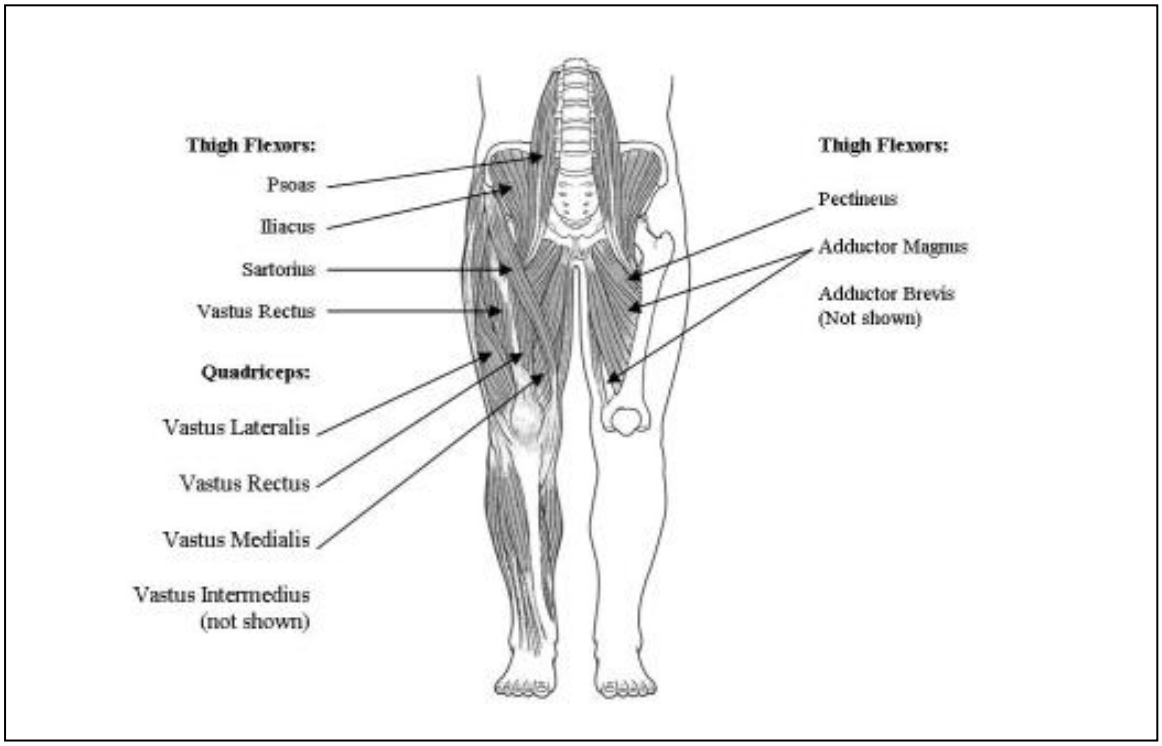


Figure 1-4. Hip or Thigh Flexors.

Collectively as a group, the thigh flexors are among the strongest muscle groups in the body. They are responsible for performing such functions as controlling posture, sitting, standing, walking, running, kicking, and jumping.

Ironically, in spite of their incredible inherent strength, they are still found to be developed far below their full potential in most athletes. This is simply because many people are unaware of their importance and function. For instance, when was the last time you heard someone say they were going to train their "iliacus" muscle?

With weak thigh flexors, your running speed will be significantly affected. The faster you can accelerate your thighs upwards into the flexed position, the faster you will be able to run - it's as simple as that!

For this reason, your thigh flexor muscles are considered to be a **primary muscle group involved in running.**

In the next section, you will learn how to train your thigh flexors for speed.

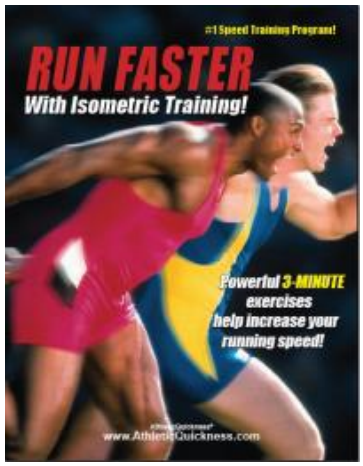
So unless you have applied isometric training to your thigh and leg muscles using the resistance band, you have a huge reservoir of untapped muscular energy just waiting to be released!

By doing the exercises the way we will show you, you can't help but run faster, jump higher and kick farther!

The Speed Training Challenge

"You Are About to Experience The Fastest and Easiest Way to Increase Your Sprinting Speed"

Like thousands of others you can <u>start</u> training in midseason and see improved performance in days!



The *Run Faster Program* consists of 10 specific running speed and lateral quickness exercises for the following muscles groups: Thigh Flexors, Hamstrings, Thigh Extensors, Adductors, and Abductors.

The video you will see shows you how to exercise the Thigh Flexors muscle group, which is one of the most important and the most overlooked muscle groups for sprinting speed. You will see dramatic increases in your sprint speed just by doing this one exercise.

Your objective is to see if just one of these simple three-minute exercises, the thigh flexor, dramatically improves your sprinting speed in less time than any other program out there.

Here's how to get started:

1. **Watch the video** at www.athleticquickness.com/fastmuscles.asp

2. **Get a resistance band or two.** We recommend the Cando Resistance Band because we believe it's elasticity is best suited for these exercises, plus they are inexpensive. (See images of the band on page 9). Check a local sporting goods store or order online at www.AthleticQuickness.com/order.asp . Go towards the bottom of the page and click on the link that says "Order the resistance bands". Select a red for light resistance, green for medium resistance or blue for heavy resistance. If you get two bands you can combine them for additional resistance. We normally recommend a red and a blue band. It will cost about $5.00 per band and there is no shipping charge for bands. Delivery is about 3 to 5 days.

3. **Review the material in this section.**

4. **Time yourself in the 40, 60 or 100 and record your time on the Progress Chart on page 19.**

5. **Do the exercise as demonstrated in the video (**www.AthleticQuickness.com/fastmuscles.asp **) for 2 weeks according to the schedule provided below. You will exercise only 6 times for just a few minutes each session.**

6. **Time yourself again in the 40, 60, or 100 and record your new time on the Progress Chart.**

7. **Start feeling really great about how much faster you are now then you were 2 weeks ago.**

That's all there is to it. Remember you are only exercising 1 muscle group out of the 5 that are involved in the sprinting process. Imagine getting even better results if you did all 10 exercises.

HOW TO GET THE MOST FROM THIS PROGRAM.

The isometric training exercises are very fast and easy to do. So before you begin, keep in mind the following helpful tips:

Tip #1: Perform approximately five minutes of light stretching for the muscles in your thighs and legs before starting these exercises.

Tip #2: Use a watch or clock with a clearly visible second hand so that you can accurately time your isometric exercises.

Tip #3: 70-80% of your strength is all that is required to achieve maximum results. Hold the position for 10 – 15 seconds. If you can easily hold the position for up 25 – 30 seconds you need more resistance. The exercises are meant to be physically demanding. 70-80% of your strength is a significant amount of effort to exert over a 10-15 second period.

Tip #4: Isometric exercises are to be done with normal breathing. Do not hold your breath during the exercises as this may cause a sudden increase in blood pressure and/or light-headedness.

Tip #5: If you experience any discomfort during these exercises, ease off just a little bit. If the discomfort persists, consult with your physician before continuing.

Tip #6: It doesn't matter what time of day you exercise. However, your body will respond the best if you choose the same time each day to train.

Tip #7: Do not over-train. Only do what is recommended in the training schedule.

Tip #8: If at all possible, do not do any other exercises (weights, plyometrics etc.) during the first fourteen days of training. Note: If you happen to be currently involved with weight training and/or plyometric training for your legs, such as squats, leg extensions, hamstring curls etc., performing our exercises for just two weeks may not yield the results you are looking for. This is usually due to the intense fatiguing of the muscles caused by these routines, which is counter-productive to muscle contraction speed. Therefore, we encourage those involved in weights and plyometrics to allow an additional two weeks of training before drawing any conclusions relative to this program.

Tip #9: Pay close attention to the way your body position is described as the correct positioning is needed to isolate specific muscle groups during each exercise.

Tip #10: The best way to increase your resistance for these exercises is to add more bands or use a heavier band. The best ones to use are the red, green and blue colored bands. By using any one or more of these, you can increment upwards to the proper resistance level that is specific to your strength

One final tip - have fun with this program. You might not even break a sweat!

IMPORTANT REMINDERS: Under ideal circumstances, all of the AthleticQuickness.com speed training programs recommend that you do not participate in any other types of training (weights, plyos, etc.) during the initial 14-day period. This is done to maximize your speed results quickly and will help eliminate any potential outside interference from strength training that might negatively affect your speed performance. It will also allow you to accurately assess the value of these programs.

If you are currently involved in a weight training or plyometrics training program and cannot put that on hold for 2 weeks then read the tips on this web page: www.athleticquickness.com/page.asp?page_id=91

IMPORTANT NOTICE: As with any exercise program, before performing this exercise, consult with your physician.

CAUTION: Make absolutely certain that the object you tie your exercise band around is really immovable. Also make sure that the immovable object does not have any rough or sharp edges as this will cause your exercise band to tear. Serious injury may result if the object gives way and/or the resistance band snaps back and hits you.

"With your newly conditioned leg muscles, especially your thigh flexors, you should feel your legs springing effortlessly forward when you go for that extra burst of speed!"

PROGRESS CHART

Name_____ Date Started_____

STEP 1: Record your fastest time in one or more of the following before starting this program:

40 yard dash_____seconds.

60 yard dash_____seconds.

100 meter dash_____seconds.

400 meter dash_____seconds.

_____Other_____seconds.

STEP 2: Complete the 14-day program for your thigh flexor muscles only (see the training schedule on the following page). Remember, your thigh flexor muscles make up only 1/5 of the complete Run Faster Speed Training Program, however, our experience has shown that even this one exercise delivers more speed training potential than a lot of other programs combined!

STEP 3: Perform the same sprint(s) as in STEP 1. When you are finished, record your fastest time and note the improvement.

40 yard dash _____ seconds, Improvement _____ seconds.

60 yard dash _____ seconds, Improvement _____seconds.

100 meter dash _____ seconds, Improvement _____ seconds.

400 meter dash _____ seconds, Improvement _____seconds.

Other _____ seconds, Improvement _____seconds.

Date Completed_____

Optional: To gain as much speed as possible, include all of the exercises in the *Run Faster Program* and continue to train three times a week for the next several months or until your speed levels off. Then watch the Afterburner Video which will show you how to modify the exercises for additional improvements in your performance.

Use the Checklist and Training Schedule Below to Document Your Daily Speed Training Exercises:

For each scheduled day, exercise each thigh flexor muscle 3 times as follows:

1. **Right** thigh flexors exercise; Hold position as shown for 10-15 seconds. Rest 15 seconds.
2. **Left** thigh flexors exercise; Hold position as shown for 10-15 seconds. Rest 15 seconds.
3. **Right** thigh flexors exercise; Hold position as shown for 10-15 seconds. Rest 15 seconds.
4. **Left** thigh flexors exercise; Hold position as shown for 10-15 seconds. Rest 15 seconds.
5. **Right** thigh flexors exercise; Hold position as shown for 10-15 seconds. Rest 15 seconds.
6. **Left** thigh flexors exercise; Hold position as shown for 10-15 seconds. Rest 15 seconds.

Note: You will be exercising your right and left thigh flexor muscles three times each per day. That's it. No more, no less. And do them on the days numbered 1, 3, 5, 8, 10 and 12 as shown on the chart below:

	Place a ✓ on the line when finished.			**Place a ✓ on the line when finished.**
Day #1	_____		Day #8	_____
Day #2	REST DAY		Day #9	REST DAY
Day #3	_____		Day #10	_____
Day #4	REST DAY		Day #11	REST DAY
Day #5	_____		Day #12	_____
Day #6	REST DAY		Day #13	REST DAY
Day #7	REST DAY		Day #14	REST DAY

The Thigh Flexor Exercise from the video

AthleticQuickness.com Speed Training Seminar

Session 1 – Isometrics and The Resistance Band

Transcript of Presentation given by Dr. Larry Van Such

Download The Seminar mp3 Audio Recording At:
http://www.musclespeed.com

SESSION 01 – ISOMETRIC TRAINING WITH THE RESISTANCE BAND

PART I

Hi, I'm Dr. Larry Van Such. And today I want to talk to you about isometric training and why I believe it is the best speed training technique available today. There are a lot of misconceptions regarding isometrics and its value as a training strategy and before I get into some of these misconceptions I want to first explain to you what isometric training is.

Isometric training is a training strategy where you apply a constant force with your muscles for about ten seconds. With Isometrics there are no repetitions involved as in weight training and plyometric training and so the lengths of your muscles never change.

A good example of this is if you held a 20 lb weight in your right arm and performed a biceps curl and held a position about 1/2 way up without moving your arm for ten seconds. At this point, your arm is no longer moving, but a force is still being applied.

The way isometrics was taught years ago dealt strictly with using weights as the resistance aid and not resistance bands. And still today when you mention isometrics to coaches, trainers and athletes that's the only thing they think about.

One area of isometrics that these people are familiar with is using isometrics to help athletes get past a sticking point in their bench press. This is where the coaches would study their technique and figure out where in the repetition they were the weakest, and then he would make them hold the bar at that same position for as long as possible.

But our programs don't teach using isometrics with weights. Instead, we teach Isometrics using the resistance band for the resistance, and there is a very important reason for doing that which I will explain to you in a minute.

Now resistance bands aren't necessarily new, you will see people working with them all the time, but you don't exactly hear anyone claiming to make a significant breakthrough in their speed by using them. Such as dropping their 40 yard dash time by 3/10's of a second or more.

And the reason for this, I believe goes back to what I call a weightlifting strategy or a weight lifting mentality. A lot of people are conditioned to do repetitions with every type of exercise. For example performing dumbbell curls, bench presses, jumping up and down off of boxes, over and over again, as in plyometric training, that when they get a resistance band in their hands, they do the same thing; they start forcing their muscles through repetitions.

And I am here to tell you that if that's the case, performing repetitions with resistance bands will not make your muscles contract any faster either.

So, let me summarize for you what I have said to you so far. Isometric training with weights won't help you get faster and using resistance bands with a weightlifting strategy (that is, performing repetitions with them) won't work either. ***It's only the combination of isometric training with resistance bands that makes muscles contract faster.***

This is what I believe many so-called speed training experts, trainers, coaches and athletes never take into consideration. Again, when you mention isometrics, they immediately think of using weights for resistance, this won't work for speed; and, when you mention resistance bands, they immediately think of performing repetitions with them, which again, won't work either.

Now let me clarify that last statement, any training routine that involves putting your muscles through repetitions is not good for speed.

And I know this goes against what a lot of you listening out there have been taught. We are constantly being told about the no pain no gain theory. And That's a good mantra for strength and endurance training, but let's face it, do you or anyone else really know or heard of anyone having a major breakthrough in their athletic speed by involving themselves in a routine that literally forces their muscles to complete exhaustion?

And I am not talking about someone who normally runs the 40 yard dash in 5 seconds and in one particular day put up a 4.9 and then they never see this number again. The kind of breakthrough I am talking about is someone who used to run the 40 yard dash in 5 seconds and now each week they are hitting 4.5's and 4.6's.

And, for those who may be thinking about promoting plyometric training, which also involves a lot of repetitions, they should consider this: Running is a plyometric exercise involving repetitions with your legs. And if all you had to do to run faster was to go out and run (a plyometric exercise), then each time you ran, you should be faster than the previous time. Right? But we all know this is not true. This is because running more won't make you faster, rather, running more will give you the strength and endurance to run longer.

For a better understanding of exactly what a training routine that involves repetitions does to your muscles and how it conditions them specifically for strength and endurance

and never for speed, I have put together an entire seminar on this subject that's due out shortly after this one.

Now there are some who may ask, doesn't performing repetitions really fast make you faster?

And again, the answer is no. And the reason why will be explained in the next seminar.

And I will also tell you why could be hazardous to the speed in which a muscle contracts.

Part II

Now, back to isometric training with the resistance band. I want to give you a little insight as to how and why the programs work.

So let me start out by asking you a question: If you were to stretch a regular elastic band from the ground up to about three feet, and at the same time you released the top end of the band, you dropped a barbell weighing about ten pounds from the same distance, which do you think would hit the ground the first?

Well, in case you are wondering, its the rubber band.

In fact it wouldn't even be close. This is because, in this example, we are dealing with two very different types of forces, or for those of you listening interested in physics, two very different types of energy.

The two energy types are gravitational energy with is found in weights and Elastic Energy which is found in rubber bands.

Now you don't have understand any of this to actually benefit from it, but sometimes its nice to know why something works. And the reason why a stretched rubber band will beat a barbell plate or dumbbell to the ground every time is because the acceleration properties that exist with a rubber band are far superior to the acceleration properties that exist in weights.

Weights have a standard acceleration known as the acceleration of gravity, which for you physics students out there will remember is 9.8 m/s2 or 32.2 ft/s2.

But, the acceleration properties found in our resistance bands is many times greater than this. This makes them unquestionably the best speed training tool you'll ever find IF YOU KHOW HOW TO TAKE ADVANTAGE OF THIS FACT!

Now here's how it applies to speed training, you are going to like this. Let's start out again by taking a simple rubber band. You stretch it and then release one end of it. What happens?

Well, the rubber band contracts back toward you, doesn't it? And with amazing speed too. Now imagine taking a very large rubber band, like a resistance band that you see at your local gym, you stretch it apart, and instead of letting go of one end, you hold it apart for ten seconds. Now what is happening?

Well what's happening is that the elastic energy properties that exist within the stretched resistance band, the speed of contraction properties if you will, get downloaded or transferred directly into the muscles that are opposing it. This information is now being stored in your muscle memory. So in effect, you are training or programming your muscles to respond with the same acceleration as the resistance band - that is to contract with amazing speed when stretched. And the reason why your muscles will do this is because they are elastic in nature as well. They too share similar qualities like a rubber band.

But, the thing to understand here is that you cannot get this type of elastic contracting effect through weight training or plyometric training. And I'll clear this up for you in the next seminar.

Also, it doesn't even matter if you increase the amount of weight you are training with because the accelelation of gravity, remains the same no matter how much weight is involved.

Therefore the elastic energy found in the resistance bands is what makes them the ideal training device to transfer speed into your muscles.

Now one other thing I want to mention here is that you cannot use just any type of resistance band. Some bands are too weak regardless of what level or resistance you use and, likewise, some bands are too strong. After using many different types of bands, the ones I've found to be **the most effective** are the ones produced by a company by the name of CANDO.

The CANDO elastic bands, I believe, are the ones that **most accurately resemble the elasticity found in your skeletal muscles**. And as a result, this makes them **the most suitable bands to use** when it comes to speed training. These are the ones we supply with our programs and sell on our website. So if you ever find yourself needing more bands, don't reach for just any one you can find. Using the proper band ensures that you are getting the best possible results from your speed training exercises.

Part III

Now I want to talk about a little bit about skeletal muscles. Skeletal muscles are the muscles that create movement in our arms, legs and so forth. All of them are designed for strength, endurance and speed. And you might be wondering how is it that one muscle can perform these different functions?

And the reason your skeletal muscles can perform different functions is because muscles are made up of different fiber types; These are your **slow twitch fibers** and **fast twitch fibers** which everyone seems to be talking about these days.

Now I will discuss these two fiber types in greater detail in the next few seminars. But for now, the thing we need to understand here is that because our muscles have these two different fiber types, they have to be trained differently. In other words, you cannot train for speed in the same way that you train for strength.

But the interesting thing that I've seen when I looked into a lot of the different so-called speed training programs on the internet and in the bookstore is that practically all of them are very similar to strength and endurance programs. Some of them are almost identical.

But you have to ask yourself, if there are two different fiber types in the body with two different functions, wouldn't you think there should be at least two different ways to train your muscles?

Because I certainly think so.

I saw this training routine on the web, and I am going to list some of its exercises for you: Here they are: cable pulls with weights, lunges, squats and pushups. Now let me ask you this, what type of athlete or sport do you think this training program was designed for?

Some of you might be thinking of an offensive or defensive lineman in football?

And if you are, you're right, lineman in football do these exercises to help them get stronger to block for the quarterback and open holes for running backs on offense or to fight through blocks on defense, but this same information was found on a golfing website. And that website claimed that by doing these you will be able to swing a golf club faster!!!

Now I don't know about you, but this makes absolutely no sense to me.

Up until now there has been very little difference in strength programs and what people are advertising as speed programs. And I know this leads to a lot of disappointment for you athletes out there trying to become faster by using them.

That is what makes isometrics with the resistance band so vital to speed training. Because the fibers that produce faster muscles respond to this type of training. Fast twitch fibers, which again I'll talk about another time, won't respond to weight training and they won't respond to plyometric training. In fact, when you do these types of exercises, you are literally re-training and re-programming your fast twitch fibers to behave like slow twitch

fibers –. Not only will they not make you faster, but they will probably make you slower as well.

This is why you will always feel wiped out, totally exhausted after doing plyometrics and weight training. These routines strip your muscles of their elastic contracting ability which makes even doing the simplest routines afterwards such as washing your hair or brushing your teeth almost impossible and likewise shooting baskets or hitting golf balls?

However, after you train with our programs you will immediately start to feel lighter, faster and more responsive. This is the complete opposite of what happens after using these strength training programs.

And if you've read our testimonial page on the website you will see the excitement in the athletes who have used our programs because it is such a thrill for them to finally be able to affect such a positive change in their speed and quickness.

PART IV

So a well rounded training routine really should include speed training as well as strength training, but it will do you no good if your so-called speed training program is really a strength and endurance program in disguise.

And the way to know this is to ask yourself these three questions: Number 1, Does your current training routine involve repetitions, Number 2, Does your current training routine take longer than 45 minutes to perform and Number 3, Do you feel tired, heavy and sluggish afterwards? In other words, do you feel slower instead of faster when you are finished. And if you answer yes to these three questions, then you do not have a speed training program, you have a strength and endurance program.

And I will be willing to bet that a lot of people out there would answer yes to these questions.

And again, what most coaches and athletes do not understand is that muscle speed cannot be developed by training for strength. That is why most athletes are always struggling to increase their speed with little success.

Now it is sometimes said that speed is something you are born with and cannot be developed. Don't believe this for a minute. If you use the resistance band with an isometric training strategy the way our programs teach, you can actually develop this trait. I've seen it done literally thousands of times and it's a lot easier than you would expect.

Now I'm going to end our discussion on isometric training right here. In the next seminar on slow twitch fibers and slow twitch training programs, I will clarify a lot of what we

talked about today and hopefully further prove to you how using the resistance band with an isometric strategy is really the only pure way to train for speed.

In the meantime, if you are wondering which program is best for you, any one of the Run Faster, Kick Farther, Jump Higher, and Tennis programs are fantastic to increase your running speed as well as other athletic skills. For upper body speed, we recommend either the baseball, tennis, golf program or martial arts programs.

Thanks again for tuning in, For AthleticQuickness.com I'm Dr. Larry Van Such!

When It Comes To Speed, Even The Best Weight Machines At Your Gym Will Disappoint You.

The Only Weight Machine in The Gym For The Most Important Muscle in Running Speed Is Never Used By Guys.

I like lifting weights. I try to get to the YMCA about four times a week. I am usually there for about an hour. In between sets I like talking to people along with watching some of the basketball games taking place.

The other day I was there and a friend of mine, whom I've known for about a year now, asked me to spot him on the incline bench press. We got to talking and he informed me that he will be trying out for a local semi pro football team next season. He's about 22 years old, 6'2" and weighs about 235. "Solid as rock" is the best way I can describe him. He has more than enough strength to be competitive as his 315lb incline bench press would demonstrate.

Of course, like most competitive athletes though, strength wasn't his biggest concern. Speed was. He runs the 40 in about 5.0 seconds flat and for him, that's not good enough.

Knowing what I know about speed training, I asked him what he does to help him with this. He went around the gym pointing at most of the equipment; leg extensions to help my quads he said. Leg curls for hamstrings he added. Continuing on he stated that he liked doing hack squats for explosiveness, adductor and abductor machines for his lateral mobility, calf raises for more speed and jumping, squats for overall strength and speed, lunges for more overall strength, and plyometrics by jumping up and down off of these wooden boxes about 2' X 2'.

I listened patiently and after he was finished, I asked him if he knew about isometric training. His answer didn't surprise me. He said he didn't know too much about it. But at that very moment, another "light bulb" if you will, turned on in my head.

The Most Important Muscle Group Involved in Sprinting is Being Ignored

Of all the machines he mentioned, not one of them was designed to help him with, in my opinion, **the most important muscle group involved in sprinting - the thigh flexor muscles**. I wondered why. To me this was common knowledge, but now that I think back on the countless number of questions we receive through our online support, it seems

that no one really pays too much attention to these muscles. Instead, there seems to be an over-emphasis on the quads and hamstrings and what can be done to these muscles to help them get faster.

Before I go on, let me just say that training these muscles properly is very important to speed, and our programs do just that. But my concerns here are, why is there so much emphasis placed on these muscles (and so little on the thigh flexors) and why are the weight machines often looked upon as the best (and sometimes only) means to quicken them? More on this in a moment.

Running is not all that complicated of a motion. When you look at a sprinter taking off from the starting blocks, you will notice that they first have to push themselves forward with one of their legs. This pushing motion involves mainly the quadriceps, calf muscles and thigh extensors. It is a very recognizable motion to just about everyone watching. The second thing that happens at about the same time is that the opposite thigh is flexed upwards, followed by leg extension. This is the main function of the thigh flexors and quadriceps. This too is a very recognizable motion. See Figure 1 below:

Thigh flexors.(See Arrow)
Main function of your thigh flexors.

Both of these movements are equally important in running, however, as my good friend stated earlier, none of the machines he uses are designed to help him with this part of running, and that is to help you flex your thigh upwards (the primary function of your thigh flexors).

Where's The Weight Machine For The Thigh Flexors?

As I looked around the gym something very interesting suddenly became apparent to me. There was only one machine, hidden among the 100 or so other machines, that was designed to help exercise the thigh flexors muscles. This one machine is called a rotary hip machine. See Figure 2 below:

Rotary hip machine.
The only machine for thigh flexors is ignored.

In my opinion however, it is not all that effective. Still, it remains as the only machine I am aware of in the entire gym that even stands a chance of helping you exercise these all important muscles.

Besides training the thigh flexors, it can also help train your thigh extensors, abductors and adductors depending upon how you stand on the machine. These multi purpose machines sometimes add a little confusion to the user as to their actual purpose and tend to diminish their effectiveness. The funny thing about this machine is that it is very popular among females. Males wouldn't be caught on this machine even if you paid them. I am not sure why. There is nothing embarrassing about it.

Hey Buddy, You forgot something!

If my good friend continues to go to the gym looking for ways to help him with his speed training, he is going to have at least two problems I can think of. One of them might be obvious to you by now: And that is, he is doing absolutely nothing to help him with the most important muscle group involved in sprinting - his thigh flexors. He trains every other leg muscle he can think of except these. He leaves the gym every night unintentionally forgetting to train half of the muscles in his body designed to make him run faster. Do you see a problem with this? Do you see room for massive improvement? I sure do.

But He is Not The Only One.

The reality of this is that he is like a lot of athletes, trainers and coaches who are simply unaware of the importance of the thigh flexor muscles. There can be many reasons why. Maybe it's because there is really no good way to train them on a weight machine at the gym and therefore they go unnoticed. Maybe it's because you really can't see them since they are located deep in the anterior hip region further adding to their obscurity. Or

maybe people think they are training them when they really aren't. It could be there funny sounding names, like "iliacus" and "pectineus" and "psoas". I don't know, but for whatever reason, since they go untrained in the gym, they go untrained altogether.

If you want to increase the acceleration speed of your muscles, don't bother with the machine anyway.

The second problem my good friend is going to have with regards to his speed training workouts is the fact that - even if he were to train his thigh flexors effectively on the only machine in the gym designed to isolate these muscles (the rotary hip machine) - weight machines in general were designed primarily to help increase your strength and endurance, and not speed. So before you rush out to your gym and search out this piece of equipment, read on.

It's a proven fact that lifting weights makes you strong. We all can attest to that. It's one of the reasons I go to the gym. But, is it a proven fact that lifting weights makes you faster too? I am not so sure.

When it comes to speed training, "Think outside the gym"

Here's one that's bound to generate a little controversy: When it comes to speed training, the best thing you can do doesn't involve going to the gym. And no, it doesn't involve running down a football field with a weighted sled attached to your waist or a parachute.

Can you guess the main reason why these two strategies have only a limited effect on your running speed? Here's a hint – Guess which muscle group is completely unaffected by the weighted sled and parachute? Did you guess "thigh flexors"? If you did, you are absolutely correct. Running down a football field with a weighted sled or parachute tied to your waist is not much different than training on the weight machines at the gym.

First, these exercises mainly train your quads, thigh extensors and calf muscles. As mentioned earlier, these muscles help with only about half of the running motion. They don't train your thigh flexors (an equally important muscle group responsible for flexing the opposite thigh upwards, out in front of you). In fact, your thigh flexors are not being exercised any harder than if you had nothing attached to your waist while you ran.

The acceleration speed and maximum velocity speed of your muscles remains well below it's potential.

With weak and slow thigh flexors, your running speed will be significantly affected more than you could ever imagine. Second, like weight training, these exercises will primarily

help you develop your strength and endurance within these muscles, and not the speed of contraction. Any increases in muscle speed will be secondary to strength and as a result, the true muscle contraction velocity will never be even close to being realized.

The most effective method for developing muscle speed – even if you're not at the gym

The only way that I have ever been able to effectively isolate the thigh flexors is with resistance bands. No other method is more effective. The only way I have ever been able to increase their contraction velocity is with isometric training. Again, No other method is more effective. This combination of using the resistance band with an isometric training strategy can be done basically anywhere. You don't need to go to the gym to do it. You can do our exercises in the privacy of your own home.

Tapping into a huge reservoir of undeveloped muscle speed.

Because of the importance in properly training your thigh flexor muscles for speed, four of our isometric training programs (run faster, jump higher, kick farther, and tennis) list them as the very first muscle group to be exercised. This is because these muscles form the foundation for dramatically improving your running, jumping and kicking abilities.

Now here's the exciting part about using our speed training programs: There's a very good chance that you have never trained your "iliacus", "pectineus", "psoas", "sartorius", "vastus rectus", "adductor longus" and "adductor brevis" muscles, (also known as your thigh flexors). Even if you did, you probably never properly trained them for speed (using isometric training with the resistance band the way our programs teach).

Instead, if you are lucky, you may have used the rotary hip machine, but like I said earlier, weight training is great for strength, but not for speed. So if this is the case, **you then have an incredibly huge reservoir of untapped muscular energy just waiting to be released** inside your body! By doing the exercises the way we show you, you can't help but run faster, jump higher and kick farther! And the same methods will work for throwing, hitting a baseball, tennis ball or golf ball!

But wait, it gets even better!

Unlike a lot of other programs, – you are not going to have to train for hours and hours a day before seeing even a glimmer of results. No, about 10 minutes a day will get the job done. Most people don't even break a sweat. Also, you are not going to have to train for months and months either. Take a good look at our testimonial page [athleticquickness.com/page.asp?page_id=66]. The majority of these athletes have achieved results beyond their wildest imaginations in less than two weeks, all the while training less than ten minutes a day! This is unheard of with a lot of other programs, yet it is absolutely true and very common with ours!

I promised my good friend whom I mentioned earlier that I would personally show him the exercises to run faster the next time I saw him. He was very excited. Of course he was anxious to know what makes our programs so incredibly effective for speed? Simple; I told him,

"We show you how to train muscles you probably never heard of in a way you probably never thought of."

Always glad to help!

Dr. Larry Van Such

To read this article on line or other similar articles, go to:
http://www.athleticquickness.com/page.asp?page_id=85

The 3 Types of Muscle Contractions: Concentric, Eccentric, and Isometric

Your best sports performance is achieved when training your muscles with all three!

Part 1 of 2

Weight training, plyometric training and cardio training, as effective as they are, only incorporate concentric and eccentric muscle contractions and therefore, if that is the extent of your training, you will be missing out on the third key ingredient in sports training, known as isometric contractions. Sports skills have very dynamic movements and with varying body positions and by training your muscles for every position and movement in the sport skill you give yourself the greatest opportunity to succeed.

Think how good you will feel and perform when your muscles have been conditioned using all three types of muscle contractions. Each contraction type plays a part in developing or performing most every sports skill - including running, jumping, kicking, swimming strokes, swinging a bat, tennis racket, golf club, or hockey stick.

When talking about exercise, most people generally do not speak in terms that describe the type of muscle contractions (Concentric, Eccentric, and Isometric) they are going to put their muscles through, but rather, they tend to speak in terms that describe the exercise itself.

For example, people generally tend to say they are going to lift weights, such as bench press, lat pull downs and maybe some biceps curls. You may also hear them say they are 'doing cardio today' which implies running on a treadmill, a bicycle and/or running on a track.

Sometimes you hear athletes say they are going to do some plyometric training which may include exercises that involve medicine balls, or jumping up and down off platforms, or perhaps lifting lighter weights at a higher pace than normal.

But with the exception of isometric training, which actually defines the type of muscle contraction one is putting their muscles through, rarely will you hear, if ever, that someone is going to do some eccentric and/or concentric muscle training.

So in this article, we are going to define the different types of muscle contractions and give you examples of exercises where these types of contractions take place, and why each type of exercise is important to reach your peak performance level.

So let's get started.

Getting The Terminology Right

First, (and to make matters a bit more complicated), the term contraction, when used along side the word muscle, as in muscle contraction, is generally understood by most as a shortening or reduction in the muscles' length - and this is the dictionary definition. However in the athletic fitness world, this definition doesn't take into account the ability of a muscle to work while being forced in the opposite direction, as in muscle lengthening, nor does it take into account a muscles dynamic ability to work while remaining in a fixed position.

So while the words muscle contraction have taken on a broader meaning in the athletic fitness world, the actual definition of the word contraction, as defined in the dictionary, is a bit of a misnomer when talking about the different types of muscle "contractions".

What are the 3 types of muscles contractions?

So, the term tension, rather than contraction, is better suited to define the actions (dare I say, contractions!) of a muscle.

Therefore, muscles, under tension, may

1. Shorten,
2. Lengthen, or
3. Remain the same length.

And it is these three different types of muscular tensions that are used to define the three different types of muscular "contractions". The three different types of muscular contractions, therefore, are:

1. Concentric contractions (shorten),
2. Eccentric contractions (lengthen)
3. Isometric contractions (remain the same).

Concentric contractions:

A concentric contraction is a type of muscle contraction where the length of the muscles shortens while undergoing tension.

For example, when you pick up a curl bar and perform a biceps curl, the length of your biceps muscles shorten. Your hands start down by your sides, and ends with your hands up by your shoulders. The biceps muscles shorten during this motion.

Another example would be if you were to perform a couple of leg curls on a hamstring machine. As your knee is flexing, your foot is approaching your buttocks, and your hamstring muscles shorten in the process.

Any muscle activity where the strength of the muscle can overcome the resistance of an object forcing the muscle's length to shorten, is considered a concentric contraction.

Therefore, most of the exercises that you would typically do at a gym by using the various machines and/or dumbbells, etc. involve concentric contractions.

Eccentric contractions:

An eccentric contraction is a type of muscle contraction where the length of the muscle elongates, or lengthens, while undergoing tension.

This can occur in two different ways:

a) Voluntarily Contractions, and
b) Involuntarily Contractions

a) Voluntary eccentric contractions: Let's use the same example above for the biceps curl. After you have completed the first part of the biceps curl, where your elbows are flexed, and your hands are holding on to the curl bar up by your shoulders, it is now time to return the weight back down towards your waistline. Typically this is done in a smooth and controlled motion where the muscle, in this case the biceps, acts to decelerate the elbow joint at the end of the movement.

The same muscle that started this motion, the biceps, is now undergoing tension in the opposite direction. It is now lengthening as it returns the weight back down towards your waist. This is an example of a voluntary eccentric contraction.

Another similar example involves the hamstring muscles. Like the example above involving leg curls, as you return the weight back to its starting point, the knee joint extends slowly with the aid of the hamstrings. These muscles undergo tension, but now in the opposite direction, where they are lengthening. This is another example of a voluntary eccentric contraction.

b) Involuntary eccentric contractions: Involuntary eccentric contractions occur when the weight or resistance you are attempting to move or lift is too heavy or strong for the muscle to accommodate. The main difference between this, and the voluntary eccentric contractions, is the lack of control over the weight/resistance during an involuntary eccentric contraction.

We can use a similar example for involuntary eccentric contractions as we did for the voluntary eccentric contractions.

Using the biceps curl exercise, let's say that you have both of your elbows flexed, with your hands up by your shoulders, and someone hands you a 100 lb barbell. The average person who had been handed this weight, (if they don't just drop it) would immediately have their biceps muscles lengthened, even if they tried to prevent it by tensing them. This would be an example an involuntary eccentric contraction.

It should be noted that muscles subjected to heavy involuntary eccentric loading beyond your control can suffer potentially greater damage as compared to concentric (muscle shortening) and/or voluntary eccentric loading.

Now, voluntary eccentric contractions are just as much a part of weight training as are concentric contractions. A concentric contraction is typically associated with the exercise itself, as in biceps curls, triceps push downs etc. But, concentric contractions only account for half of the repetition of that particular exercise. (ex. Biceps curl – the muscle shortens under tension while the elbow is flexing). The other half, the returning of the weight to the starting position, is controlled through voluntary

eccentric contractions. (ex. Biceps curl – the muscle lengthens under tension while the elbow is extending)

Many times, however, exercises are purposely designed around a slow return of the weight back to its starting position only. This is what is termed as negatives with respect to weight training. And it is a known fact that muscles are typically stronger during voluntary eccentric movement (muscle lengthen) when compared to a concentric movement (muscle shortening). To understand why this is, just think that it is much easier to set a 100 lb package to the ground than it is to raise one up off the ground.

Weight training therefore, involves concentric muscle movements, voluntary eccentric muscle movements, and occasionally, involuntary eccentric movements.

Isometric contractions:

An isometric contraction is a type of muscle contraction where the length of the muscle doesn't change while undergoing tension. An example of this would be if you were to take a 20 pound weight and perform a biceps curl and hold a position halfway between the repetition for 10 seconds. The length of your biceps muscle doesn't change during this time; however a force is still being applied.

Training with all three types of contractions

No training program would be considered complete without incorporating, to some extent, each of the three different types of muscle contractions mentioned thus far. They all play a part in sports performance.

Many athletes who have been training for speed believe they "have tried everything" and are having difficulty getting faster. Often they are missing the final piece of the puzzle because they have not incorporated into their training all of the muscle contraction types. Simply knowing these different types of muscle contractions will go a long way in helping an athlete design a complete training program that delivers increased athletic performance.

Like building a wrist watch, for example. You can have all the parts, gears, screws, etc., but your watch may not work very well. Now If you add a simple spring, *you have not just added one more thing, you have a whole system that works in harmony* - and, in the case of athletics, it would have an exponential effect on your training.

In part 2 or this article, we will discuss some of the different types of exercises available today, including weight training, plyometric training, and cardio training, to name a few, and identify for you the types of muscle contractions involved with each of them.

Once you know the type of muscle contraction(s) involved with each of these training methods, you will gain a better appreciation for what each of them has to offer by way of improving your overall athletic performance.

The 3 Types of Muscle Contractions: Concentric, Eccentric, and Isometric

Your best sports performance is achieved when training your muscles with all three!

Part 2a - Weight Lifting

In this section, we are talking about several different types of weight lifting exercises and define which types of muscle contractions are involved in the exercise, and why that exercise is important to overall athletic performance.

Weight Lifting:

Weight Lifting, otherwise known as strength training, forms the foundation of most sports training exercise programs. No training would be considered complete without a solid strength training schedule. Weight training helps increase strength, and strength helps to overcome resistance, carry your body weight more efficiently, and prevent injury.

Having enough muscle strength to perform a sports skill, such as running, jumping or swinging a bat, though critical to better performance, is rarely sufficient to maximize one's athletic performance, yet is often over emphasized in relation to the other types of training exercises.

Weight lifting exercises often target individual muscles used to flex or extend a joint. It is important, therefore to balance a weight lifting routine among several exercises so that all of the muscles and joints in a sports skill are trained proportionally.

The following are examples of weight lifting exercises:

Biceps curl.

During flexion of the elbow, the biceps muscle contracts or shortens and therefore undergoes a concentric muscle contraction.

During the return of the weight back towards your waistline, the biceps muscle lengthens, while undergoing tension. This is an eccentric contraction.

Unless the weight is dropped after the targeted muscle contracts, there will always be an eccentric muscle contraction that follows after the concentric contraction. This is true with all weight training.

Triceps push down using a bar attached to a cable and pulley machine:

During extension of the elbow, the triceps muscle contracts or shortens and therefore undergoes a concentric muscle contraction.

During the return of the weight back to the stack of weights, the triceps muscle lengthens while undergoing tension. This is an eccentric contraction.

Again, unless the weight or bar is let go after the targeted muscle contracts, there will always be an eccentric muscle contraction that follows after the concentric contraction.

Leg extensions performed on a seated leg extension machine.

With your knees flexed, and your ankles placed behind the bar, you extend your knee, also known as leg extension. The quadriceps muscle is responsible for this motion and during the extension of the knee, the quadriceps muscle shortens, which is an eccentric muscle contraction.

When the weight is returned, the quadriceps muscle still undergoes tension, but in the opposite direction. The quadriceps muscle lengthens in the process. This is an eccentric muscle contraction.

Leg curls performed on a prone leg curl machine.

While you are on your stomach and the back of your ankles are placed under the bar, you flex your knee. This is also known as leg flexion or leg curls. The hamstring muscles are primarily responsible for this motion. During flexion of the knee, the hamstring muscles shorten. This is a concentric muscle contraction.

When the weight is returned, the hamstring muscles still undergo tension, but in the opposite direction. The hamstrings lengthen during this process. This is an eccentric muscle contraction.

Other types of weight lifting exercises use body weight for resistance, such as pull-ups and push-ups.

Again, these concentric (shortening) and eccentric (lengthening) muscle contractions are common with most weight lifting exercises, but the concentric (shortening) contractions are the primary contraction type found in weight lifting.

Some exceptions would be when an athlete, such as an Olympic power-lifter, raises the weight over their head and then drops it to the ground. This would be an example of when concentric muscle contractions are taking place with respect to your chest, shoulders, and triceps.

Another example would be when you are performing bench presses, but instead of pressing the weight up from your chest, your spotters hand you a much heavier weight than you normally work out with, and you slowly lower it to your body. This is an example of an eccentric (lengthening) muscle contraction with respect to your chest and triceps muscles.

The 3 Types of Muscle Contractions: Concentric, Eccentric, and Isometric

Your best sports performance is achieved when training your muscles with all three!

Part 2b: Plyometrics

In this section, we are talking about several different types of plyometric exercises and define which types of muscle contractions are involved in the exercise, and why that exercise is important to overall athletic performance.

Plyometric training:

Most people use plyometrics training because they involve what is termed explosive reactions. Plyometrics is like weight training in reverse, which means the muscles are lengthened first and then shortened. The idea of an explosive reaction comes from the muscles quickly going from a lengthening state to a shortening state.

Plyometrics typically use body weight for resistance. You therefore are better able to simulate sports motions better than with a weight machine or free weights, resulting in all the muscles involved in the sports skill being conditioned during the plyometrics exercise.

Because the exercise is not locked into a specific range of motion, stabilizer muscles are also brought into use to improve balance and coordination. Improved balance and coordination will transfer into greater speed and agility because the muscles ability to anticipate, react and work together is vastly improved.

What is Plyometric Training

Let's first define what is meant by plyometric training. Plyometric training involves basic movements, such as those ordinarily done during weight training, and/or sport specific movements that are typically done outside the weightlifting environment, such as jumping or throwing a ball. The movements are designed to strengthen muscle tissues (much like weight training) and train nerves to stimulate a specific pattern (swinging a baseball bat or golf club, jumping, etc.) of muscle contraction so the muscle generates as strong a contraction as possible in the shortest amount of time.

A plyometric contraction involves first a quick muscle lengthening motion, otherwise known as a voluntary *eccentric* muscle contraction, followed by a short resting phase, then a rapid muscle shortening movement, otherwise known as a concentric muscle contraction.

One of the main differences between plyometric training and weight training is the order in which the different types of contractions take place. With weight training, you typically have a concentric muscle contraction followed by an eccentric muscle contraction. With plyometric training, it is just the opposite; you have an eccentric muscle contraction followed by a concentric muscle contraction.

Another difference between weight training and plyometric training is the speed in which contractions take place. With weight training, you typically have a slow concentric contraction followed by an equally slow eccentric contraction. With plyometric training, your goal is to attempt to force a very strong eccentric contraction followed immediately by a very strong concentric contraction. You can turn a weight lifting routine into a plyometric routine if you use less weight and perform the repetitions as fast as possible. But this is typically not recommended due to the high probability of injury.

The other main difference is that weight lifting involves weights above and beyond your own body weight in the form of plates, dumbbells etc, whereas plyometric training typically involves your own body weight and/or lighter weighted objects, such as medicine balls. This allows your muscles to overpower the resistance they are subjected to enabling them to contract faster (upon request) due to the lowered demand that is placed on them.

Some people believe the action of quickly going from an eccentric contraction to a concentric contraction helps develop a reflex response in the muscles, tendons, and nerves. However, since the concentric contraction immediately following the eccentric contraction is done voluntarily, upon request, the development of the reflex, an involuntary response, is limited.

Examples of Plyometric Exercises

Now let's take a look at a few examples of plyometric exercises.

***Box jumps*.**

This is done by first standing in front of a box about the size of 1 foot by 1 foot and one that is capable of supporting at least two times your body weight. Next, squat down with your thighs parallel to the ground and make sure all of your weight is on your toes and not on your heels.

Doing it this way stretches or lengthens three specific muscle groups: the quadriceps (knee flexion), the calf muscles (ankle dorsiflexion) and the hip extensors (gluteus maximus and hamstrings).

This stretching or lengthening of these muscles is the *eccentric muscle contraction* part of the plyometric exercise. You then want to jump up as fast and hard as you can so that your legs straighten out and you land on top of the box.

As soon as you gain your balance on the top of the box, you will want to jump back down, *landing on your toes only*, and as soon as you land you'll want to go straight back down into the squat position where your thighs are parallel to the ground (once again loading/stretching these three muscle groups) and jump again. This process is repeated about ten times before taking a rest.

The most important part of this exercise and all plyometric exercises is knowing that muscles have to be fully stretched first eccentrically before undergoing a rapid contraction concentrically. If this is not done properly, you will not benefit as much as you can from the exercise, nor can you effectively call it a plyometric exercise.

So again, since this is a very popular exercise, let's take another look. When you land back down to the ground, you need to make sure you land on your toes first. This will make sure that the calf muscles get properly stretched. If you land on your heels first, you remove the calf muscles away from this particular plyometric exercise.

You also need to make sure that after touching back down to the ground on your toes first, you immediately go into a squat position. This will make sure that your quadriceps (knee extensor) muscles and hip extensors get properly stretched. When the calf muscles, hip extensors and quadriceps muscles get stretched, they are undergoing an eccentric muscle contraction. This is the first part of the plyometric exercise.

Now you are ready for the second part of the plyometric exercise. This is when you jump back up again. When you jump up again, your legs straighten out and you land on top of the box. This is the concentric part of this exercise where all three muscle groups contract concentrically. The hip extensors contract, the calf muscles contract and the quadriceps muscles contract.

***Medicine Ball Sit-Ups*.**

This is done by sitting on the floor with your knees flexed and your upper body leaning slightly back. A training partner standing a few feet away from you passes a medicine ball to you. You catch the ball, allowing the force to push your upper body back and down. You then try to sit up quickly and pass the ball back to the training partner.

The first part of this exercise where you catch the ball and lean back, stretches your abdominal and hip flexors. This is the loading component of the plyometric exercise and involves a lengthening of these muscles. Therefore, the abdominals and hip flexors undergo an eccentric contraction.

The second part of this exercise is where you raise back up as fast as you can. This is done by contracting your abdominals and hip flexors. These muscles shorten and therefore undergo a concentric contraction.

This process is repeated, usually ten times in a row before taking a break. These are incredible exercises to build strength, definition and speed in these muscles. The challenge is overdoing them, and causing injury.

There are many other types and forms of plyometric exercises. For example, running itself is a plyometric exercise, as well as running up stairs, and various types of agility exercises are forms of plyometric exercises.

Injury is one of the biggest setbacks with plyometrics in that while they really give your muscles a great workout, it is very easy to get carried away with the exercise and injure yourself, especially those involving extra weight such as the use of medicine balls. You should at least consult a personal trainer before doing these and others to be safe.

With weight training as the foundation, plyometrics training compliments weight training and develops the athlete and his athletic abilities in ways that weight training is not capable of. Speed, coordination, balance, agility, cardio, skill development, and strength can all benefit from this type of training.

Most of your normal exercises in the gym and in a sports environment along with most of your activities of daily living revolve around muscles that contract concentrically and eccentrically. Life as you know it wouldn't be possible without these types of contractions.

The 3 Types of Muscle Contractions: Concentric, Eccentric, and Isometric

Your best sports performance is achieved when training your muscles with all three!

Part 2c: Isometrics

In this section, we are talking about several different types of isometric exercises and define which types of muscle contractions are involved in the exercise, and why that exercise is important to overall athletic performance.

Isometric Training:
Isometric training exercises are unique for several reasons. First, they are the only type of exercise where the type of muscle contraction is identified by name. Many times we hear people wanting to compare plyometric training with isometric training, and weight training with isometric training, but to do so is not practical. This is because you are trying to compare a type of exercise (weightlifting and/or plyometrics and/or cardio etc) with a type of muscle contraction.

Weightlifting and plyometrics, as well as cardio exercises for that matter, primarily involve concentric and eccentric muscle contractions. Isometric exercises, have, well, isometric contractions, which as you may already know, are a type of muscle contraction where muscle undergo tension but do not change length in any direction.

Isometric exercises are also unique in that they are generally much safer than other types of exercises. Sometimes this limits their effectiveness, while other times it enhances it. And up until recently, many people associated isometric training with weights only as the resistance aid and this also minimized their effectiveness.

But with new resistance tools, such as resistance bands, and more creative exercise strategies, isometric training is proving every day that it can target those hard to get at muscles very effectively that other strategies simply cannot.

But for the purposes of this article, we are only going to show you some of the age-old isometric exercises that your parents were probably taught. The modern day version, with resistance bands, and unique athlete positioning will have to wait!

Isometric biceps curl with weight
Take a 20 pound weight and perform a biceps curl and hold a position halfway between the repetition for 10 seconds. The length of your biceps muscle doesn't change during this time. A force is still being applied while the muscle works to hold the position.

Bench Press
Get on a weightlifting bench and grab hold of the bar with whatever weight you are comfortable with. Lower the weight to a point in your repetition where you feel you are at your weakest. Hold the bar at that position for 7-10 seconds. The bar doesn't

move and neither do the muscles in your arms and chest. A force is still being applied and the muscles are forced to work harder.

Isometric exercises have been around for a long time and so it is nothing new. Many extraordinary results in muscle size and strength have been achieved in a very short period of time with this type of training. However, because of the number of new training products and techniques out on the market today, its use by athletes is often overlooked.

No Training Program Is Complete Without Isometrics

As we stated in the first section, no training program would be considered complete without incorporating, to some extent, each of the three different types of muscle contractions mentioned thus far.

Plyos and weights are great because they involve eccentric and concentric contractions. They are extremely beneficial for size and strength, and in some cases this added strength transfers over into speed.

Since many athletes are already doing these types, they are probably hitting plateaus because they are still missing the third type of muscle contraction, isometric. When they apply the strategy of isometrics with the resistance band to their existing routines, the completion of all three contraction types within an exercise program has an exponential affect on their performance.

Lessons to Improve Your Athletic Performance

Lesson I – Identify and Properly Train the Correct Muscles to Improve Your Sprinting Speed

The Running Process

Section 1 - A General Overview and Introduction

In order to improve your running speed, it will be very helpful to understand the 'Running Process' and the muscles involved in each phase or the running process.

The Running Process consists of three major phases:

1. **the <u>push phase</u>**
2. **the <u>swing phase</u>**
3. **The <u>return or pull phase</u>**

These three phases constitute a complete leg sequence for each leg during the entire time one is running. For example, the right leg will sequence as follows:

Push phase > Swing phase > Return phase > Push phase > Swing Phase > Return Phase etc. etc. etc.

The left leg follows a similar pattern; however, the phases of running for the left leg are, of course, not in synch with the phases of running for the right leg.

Many people associate the push phase with the first few steps at the start of the race, where your body is lowest to the ground (as in the starting blocks) and where this phase is most dominant. However, the push phase occurs throughout the entire running process even while your body is upright, at which point it shares in importance with the other two phases. Since your body is upright for most of the time and distance you spend running we will address each phase of the running process as it happens while your body is in this upright position.

Each phase of the running process uses a distinct set of muscles to propel the body forward. By focusing on each phase individually, you will learn which muscles are involved in sprinting and how to properly train them to gain the maximum speed possible from each set of muscles.

You will also see that muscles work as a group; in other words, a single muscle rarely does its job in isolation. This is important to understand in order to condition them in a similar manner as to how they are used when you are performing an athletic skill (and not as individual isolated muscles).

<u>How each phase of the running process is defined</u>:

To help us identify and define each phase of the running process, let's start out by taking a look at a couple of photos of an athlete running. In Figure 1 we see the toes of the left foot only still touching the ground. In Figure 2 we see the entire body off the ground. And in Figure 3 we see the right foot about to strike the ground.

Figure 1 – Left foot on the ground

Figure 2 – Both feet in the air

Figure 3 – Right foot on the ground

In the figures above, we can observe three things:

1) Most of the time, there is one foot in contact with the ground;
2) Sometimes, no feet touch the ground, and;
3) There is never a time when both feet are on the ground together.

All of these provide us with important information regarding the running process, for now, we are only going to focus on the running phases when *there is one foot in contact with the ground*.

By studying the thigh, lower leg, and foot position when one foot is on the ground and when the other is not, we are able to create **4 general rules** for determining which phase of running an athlete is in. The first 3 rules relate to the foot that is on the ground. The last one relates to the foot that is in the air.

Rule #1 - In regards to the foot that IS touching the ground;

Any position where the thigh of the foot touching the ground is in flexion (that is in front of your hips or waistline) you are in the *Return phase*. This figure shows the right foot on the ground with the right thigh in flexion. Therefore, you are in the **Return Phase**.

Quick Tip: Foot touching ground + thigh flexion = return phase.

Rule #2 - In regards to the foot that IS touching the ground;

When the knee and thigh of the foot touching the ground is perpendicular to the ground (or directly below your hips or waist line, anatomically know as a neutral position), this is where the return phase transitions into the push phase for that leg. The figure shows that the right thigh and knee (not lower

leg and foot) are perpendicular to the ground and is **transitioning from the Return Phase to the Push Phase**.

Quick Tip: Thigh straight down = transition from return phase to push phase

Rule #3 - In regards to the foot that IS touching the ground;

Any position where the thigh of the foot touching the ground is in extension (that is behind your hips or waist line), you are in the **Push Phase**. This figure shows the right foot on the ground with the right thigh in extension, or beyond the perpendicular position. Therefore, you are in the **Push Phase.**

Quick Tip: Foot touching ground + thigh extension = push phase.

Rule #4 - In regards to the foot NOT touching the ground:

Any position where the foot is not touching the ground (while the other IS touching the ground) is part of the **swing phase**, This figure shows the right foot not touching the ground. Therefore, you are in the **Swing Phase**.

Quick Tip: Foot not touching ground (while other is) **= Swing Phase** for the leg not touching the ground.

These are general rules to follow in determining which running phase we are in, and we will expand upon them in future lessons when we talk about each phase more specifically. For now, let's go ahead and apply them:

The Push Phase
Begins when the thigh and knee of the same foot touching the ground are perpendicular to the ground and ends when the toes of this same foot are barely touching the ground behind you. See the figures below for the ***right*** leg:

Start of push phase

Middle of push phase

End of push phase

Notice the right thigh/hip in extension throughout this entire phase

The Return phase
Begins when the foot strikes the ground in front of you and ends when the knee and thigh of the same foot are perpendicular to the ground directly beneath you. This is the shortest of all the phases and is often overlooked. However, it has a huge impact on your speed and when a 1/10 of a second can mean the difference between winning and losing, training for this phase properly will help give you an extra advantage**.** See below for the ***right*** leg**:**


Start of Return Phase


Middle of Return Phase


End of Return Phase

Notice the right thigh is in flexion throughout this entire phase

The Swing Phase
Begins where the toes of the foot that is behind you have just left the ground and ends where the same foot strikes the ground in front of you. Since one leg is always off the ground and moving forward, there is always one leg that is in the Swing Phase while the other leg may be in the Return or the Push Phase. The distance covered by the swing phase is what many people call your stride. Training to improve your stride speed is not very difficult however; it is perhaps one of the greatest oversights athletes make. Improving this phase of running can make a big difference in your running speed. See the figures below for the ***right*** leg:


Start of Swing Phase


Middle of Swing Phase


End of Swing Phase

Notice the right foot is off the ground and moving forward throughout this entire phase

This completes the basic motions of the running process in their most basic form. Athletes have different styles of running that best suits their needs, however the muscles involved all remain the same.

Conditioning for speed each of the muscles groups in the running process is one of the keys to getting faster.

Next we will cover which muscles are involved in each of the sprinting phases and how to train them for speed and faster sprint times.

Section 2 - Muscles and training of the Push Phase
Section 3 - Muscles and training of the Swing Phase
Section 4 - Muscles and training of the Return Phase

Lessons to Improve Your Athletic Performance

Lesson I – Identify and Properly Train the Correct Muscles to Improve Your Sprinting Speed

The Running Process:

Section 2 – Muscles and Training Of The Push Phase

The Push Phase
As we mentioned in The Running Process Overview, many people associate the push phase with the first few steps at the start of the race, where your body is lowest to the ground, as in the starting blocks and where this phase is most dominant. However, the push phase occurs throughout the entire running process even while your body is upright, just like the other two phases. Since your body is upright for most of the time and distance you spend running, the push phase will be addressed while your body is in this upright position.

Also, since we know the sequence of the running process is: **Push phase** > Swing phase > Return phase > **Push phase** > Swing Phase > Return Phase etc. etc. etc., we will pick up our discussion of the push phase somewhere, and at no particular distance, in a given race.

Therefore…

The push phase begins when the thigh of the foot touching the ground is perpendicular to the ground. It ends when the toes of this foot have just left the ground behind you. See the figures below for the ***right*** leg:

Start of push phase

Middle of push phase

End of push phase

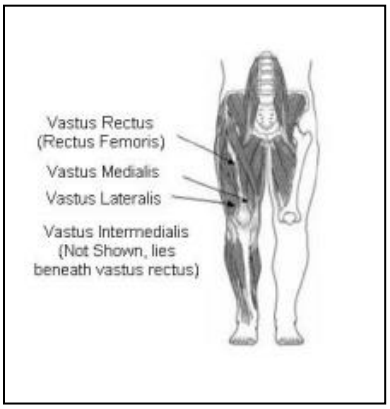
Notice the right thigh/hip in extension throughout this entire phase

This is the push phase of running in its most basic form.
The muscles involved in the Push Phase:

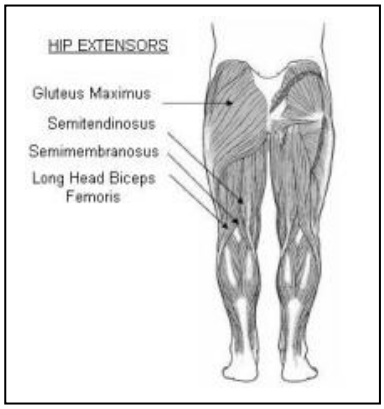
1) **Knee Extensors. A.K.A. Leg Extensors. Commonly known as the Quadriceps.** These include rectus femoris, vastus medialis, vastus lateralis, and vastus intermedius. These muscles provide for leg extension at the knee. (The rectus femoris also provides for thigh/hip flexion, however, thigh flexion is not part of the push phase, but rather the swing phase.)

2) **Thigh/hip extensor muscles.** These include your gluteus maximus muscle, and your hamstrings. Most people associate the hamstrings strictly with flexing the leg behind the thigh, however, the hamstrings are also very powerful thigh/hip extensors. The hamstrings involved in thigh/hip extension are: semimembranosus, semitendinosus, and the long head of the biceps femoris. Note: the short head of the biceps femoris does not act to extend the hip/thigh.

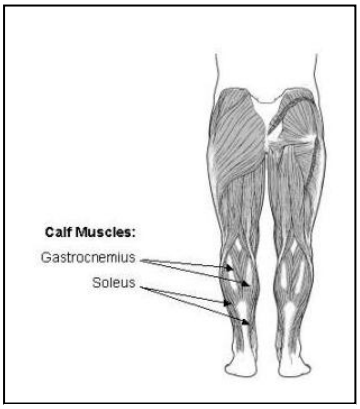
3) **Ankle flexors. AKA Foot flexors. Commonly known as the calf muscles.** These include the gastrocnemius, soleus, and plantaris muscles. These provide plantarflexion of the foot.



Quadriceps



Thigh/Hip Extensors



Calf Muscles

Most of one's training, and perhaps your current training, (with respect to at least trying to increase your running speed), involves various exercises designed to increase the muscular strength within these muscle groups that make up the push phase. This is due, in part, for several reasons:

First, there tends to be a disproportionate amount of emphasis (training methods, running techniques, etc.) placed on increasing one's running speed during the first few steps in a race by athletic trainers and coaches. This is where your body position is lowest to the ground and where the *Push Phase* dominates the other two phases.

The majority of coaches will teach the importance of an athlete to stay as low as possible for as long as possible at the start of the race. This is done to take advantage of the superior strength of the quadriceps muscle which drives the push phase.

There is nothing wrong with trying to improve the first few steps in a running race, I for one, advocate this. However, once your body becomes upright, like the majority of most sports activities involved during football, basketball, baseball, soccer, tennis, etc, and like the majority of time and distance spent in a 40 yard dash, 100 meter

dash etc., the push phase no longer dominates the running process (this is because the leg and thigh are no longer flexed as much as they were in the beginning), but rather, gives way and is reduced to equal importance to the *Swing Phase* and *Return/Pull Phase* of running. Let's repeat that,

"Once your body is upright, the push phase no longer dominates the running process and becomes equal in importance to the **Swing Phase** which is equal in importance to the **Return/Pull Phase"**

Just because the Push Phase provides the initial momentum to start forward movement, does not mean that is the most important phase for achieving and maintaining top running speed.

Another reason why there seems to be an over-emphasis placed on improving the Push Phase of running is because the majority of exercise equipment found in your typical gym is designed around strengthening the muscles involved in the Push Phase only.

Below are some of these pieces of equipment that you would typically find in the gym as well as some other exercises that you might do for your lower extremities:

Leg Press: **Quadriceps**, **Hip extensors** (includes hamstrings and gluteus maximus)
Squats: **Quads** and **Thigh/Hip extensors**
Leg extensions: **Quadriceps** muscles
Leg curls: Hamstrings
Lunges: **Quads**, Hamstrings
Toe raises: Calf muscles

That's about it. And when you look at the muscles involved, it's easy to see why many people believe that sprinting is all about the quadriceps muscles. They dominate the activity these machines are designed around. But, while the quadriceps muscles are important, there are other, equally important muscle groups, that play just as much of a significant role in the running process that we will discuss in the next two sections.

Now, what about running down a field with a weighted sled attached to your waist or a parachute? Which phase(s) of running do these affect? They too primarily affect the Push Phase of running and to a lesser extent, the Return Phase. Same goes for the popular plyometric routine of jumping up and down off of boxes – Push Phase again. Also, which muscle group do you think gets the most exercise during these exercises? You guessed it, the quads.

Now, I am all for doing these exercises. I think no training would be complete without incorporating some, if not all of them. But my guess is, if you have tried these types of exercises and were hoping to see some marked improvement in your running speed, you probably were a little disappointed with the results. This is because these exercises train the same muscle groups as do the machines and other exercises you are already doing at the gym. In essence, your body is already maxed out with respect to what these exercises can give you in terms of running speed.

On top of that, when you consider that most of these activities affect only the push phase of running, which makes up 1/3 of the running process, you are essentially leaving 2/3's of the muscle groups involved in sprinting virtually untouched or untrained. That's a significant amount of training to *leave on the table*.

So what does all of this mean? It means that if you go to the gym and train to become faster, and, if you head out to a ball field and run sprints with a sled or parachute, you may leave with a false sense of security that you are doing all you can to help make yourself a faster athlete.

But, there is plenty of hope for you and that's what we will be talking about in the next two sections of the running process.

Lessons to Improve Your Athletic Performance

Lesson I – Identify and Properly Train the Correct Muscles to Improve Your Sprinting Speed

The Running Process

Section 3 – The Muscles and Training Of The Swing Phase

The Swing Phase
Begins where the toes of the foot that is behind you have just left the ground and ends where the same foot strikes the ground in front of you. Since one leg is always off the ground and moving forward, there is always one leg that is in the Swing Phase while the other leg may be in the Return or the Push Phase. The distance covered by the swing phase is what many people call your *stride*. See the figures below for the ***right*** leg:

Fig. 1 Start of Swing Phase

Fig. 2 & 3 Middle of Swing Phase

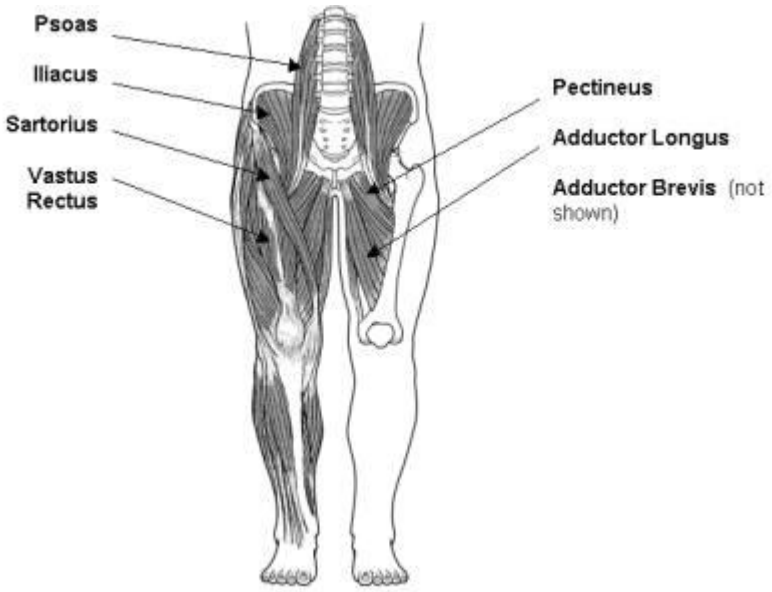
Fig. 4 End of Swing Phase

Notice the right foot is off the ground and moving forward throughout this entire phase. Also notice the movement of the right knee and thigh during this phase.

The muscles involved in the swing phase are:

1 - Thigh Flexors (also known as Hip Flexors)

These include 1) psoas, 2) iliacus, 3) sartorius, 4) vastus rectus, 5) adductor longis, 6) adductor brevis, and 7) pectineus. These muscles flex the thigh on the pelvis as shown in the images above.

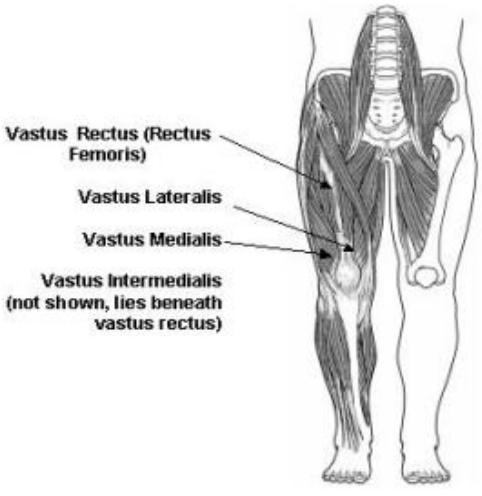


Thigh/Hip Flexors

Collectively as a group, the thigh flexors are among the strongest muscle groups in the body. They are responsible for performing such functions as controlling posture, sitting, standing, walking, running and jumping. Ironically, in spite of their incredible inherent strength, they are still found to be **developed far below their full potential** in most athletes.

This is simply because many people are unaware of their importance and function plus there is really no good way to train them on a weight machine at the gym, and therefore they go unnoticed. Maybe it's also because you really can't see them since they are located deep in the anterior hip region further adding to their obscurity. Or maybe people think they are training them when they really aren't. But for whatever reason, since they go untrained in the gym, they go untrained altogether.

Therefore, if you are looking to make an immediate difference in your running speed, training your thigh/hip flexors would be a good place to start.



Quadriceps

2 - Quadriceps muscles:
These include 1) vastus rectus, 2) vastus medialis, 3) vastus lateralis, and 4) vastus intermedius.

The quadriceps function to extend the leg, or knee extension. Observe the lower right leg in Figure 2 as it is flexed behind the thigh and then look at this same leg as it is extended on the thigh in Figure 3. While leg extension is important during this phase, the relative

strength of the quadriceps is not fully appreciated here since leg extension during this motion takes place with the leg off the ground, or in a non weight-bearing position. The quadriceps, therefore, contribute more during the Push Phase when the foot is on the ground, than they do during the Swing Phase when the foot is in the air.

3 - Hamstrings:
These include 1) semimembranosus, 2) semitendinosus, and 3) biceps femoris (long and short heads).

The hamstrings play a limited role in the swing phase. Their only function during this phase is leg flexion (or knee flexion). Observe the right lower leg in Figure 1 and watch how the leg flexes behind the thigh in Figure 2. There is no other function of the hamstrings during this phase.

It is interesting to note that the majority of one's training, with regards to the hamstrings, revolves primarily around leg/knee flexion exercises, such as those performed on a leg curl machine. However, as you can see, leg flexion (leg flexing behind the thigh) has very little to do with running. The real value of your hamstrings, with respect to running, is their ability to provide for powerful thigh/hip extension, which makes up a big part of the push phase and return phase.

Hamstring Muscles

So, if you go to the gym and really hammer out your hamstring on the leg curl machines, you shouldn't expect to improve your running speed all that much. Take a look again at the movement of the lower right leg from Figure 1 to Figure 2. This is a non-weight bearing movement, and so, simply exhausting your hamstrings on a leg curl machine won't make much difference in your running speed.

Lessons to Improve Your Athletic Performance

Lesson I – Identify and Properly Train the Correct Muscles to Improve Your Sprinting Speed

The Running Process

Section 4 – The Muscles and Training Of The Return Phase

The Return phase,
Begins when the foot strikes the ground in front of you and ends when the knee and thigh of the same foot are perpendicular to the ground directly beneath you. This is the shortest of all the phases and is often overlooked. However, it has a huge impact on your speed and when a 1/10 of a second can mean the difference between winning and losing, training for this phase properly will help give you an extra advantage**.** See below for the ***right*** leg**:**

Fig. 1 Start of Return Phase

Fig. 2 & 3 Middle of Return Phase

Fig. 4 End of Return Phase

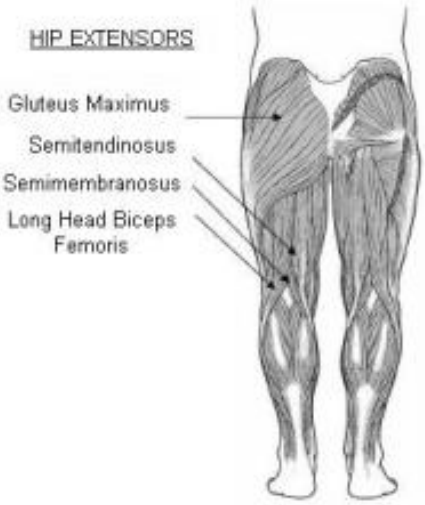
Notice the right thigh is in flexion throughout this entire phase

This is the return phase of running in its most basic form. The muscles involved in the *Return Pha*se:

1 – Thigh Extensor muscles.

These include your 1) gluteus maximus, 2) semimembranosus, 3) semitendinosus, and 4) biceps femoris (long head).
Note: the semimembranosus, semitendinosus, and biceps femoris (long head) are also known as the **hamstring** muscles. These are perhaps one of the most misunderstood muscle groups among today's athletes. Here's why: What's the most common way to train these muscles? On a leg curl machine, with weights, right? That's correct. It is

a very popular exercise. But as you may have picked up here in these articles, the hamstring muscles have *two* functions: 1) leg flexion, as seen during the Swing Phase, and 2) thigh extension, as seen in this Return Phase as well as the Push Phase. And between the two, the ability of the hamstrings to extend your thighs plays a much more significant role in athletics than does their ability to flex the legs. (Remember, the *leg* is the portion between your knee and ankle, while the *thigh* is the portion between the hip and knee.)



Thigh Extensors

Thigh extension, along with thigh flexion (Swing Phase), are your power generating motions, and improving these will enable you to reap huge rewards in your performance. Leg flexion, on the other hand, is a motion that typically follows after the power moves, sort of like a recoil, or a change in the momentum, after the muscular energy is spent. This was seen in the Swing Phase where the leg was flexed behind the thigh.

Now take a closer look at our athlete in the picture above. You will notice that the position (angle) of his right leg relative to his right thigh in Figure 1, doesn't change all that much in the rest of the figures. In other words, the leg does not really flex all that much behind the thigh while the foot is on the ground throughout this motion. The real change is seen in the position of the right thigh. As shown in these figures above, the right thigh is really extending, a function of the **gluteus maximus** and **hamstrings**. By going through extension, the thigh (since it is in front of you) helps to *pull* your body forward. That is why the Return Phase is sometimes referred to as the *Pull Phase*, because of the pulling effect the hamstrings have on the thigh. **It is also where the phrase "pulled a hamstring" comes from, since it is during this motion that the hamstrings are often injured.**

Muscular Contraction, Speed Training & Sports Anatomy

How To Get The Most Speed Out Of Your Muscles

I. MUSCLE TISSUE AND CONTRACTIONS

Muscle tissue is a contractive type of tissue that can undergo tension by shortening (concentric contractions), lengthening (eccentric contractions) or remaining the same length (isometric contractions).

An example of a concentric contraction is performing the first part of a biceps curl where you hold a dumbbell down in one hand down by your side and then flex your elbow upward. The bicep muscle shortens in the process while undergoing tension. See the figures below:

Figure 1. Phases of a concentric contraction during a biceps curl.
First picture shows the start, second picture shows an intermediate position and the third shows the final position.

An example of an eccentric contraction is performing the second part of the biceps curl, where you slowly lower your hand back down to your side. The biceps muscle is still undergoing tension only this time it is lengthening. The same figures are shown below, just in reverse order.

Figure 2. Phases of an eccentric contraction during a biceps curl.
First picture shows the start, second picture shows an intermediate position and the third shows the final position.

An example of an isometric contraction is holding a bicep curl at a halfway point, or one where your forearm is parallel to the ground, for about 10 seconds. The length of the bicep muscle remains the same during this time period, however, it is still undergoing tension.

Figure 3. Isometric contraction.
This position is held for about 10 seconds.

The cells that make up your muscle tissue consist of the proteins actin and myosin. Each of these proteins is arranged into very fine threadlike filaments within the cell.

Myosin is a rather thick and active protein and is considered a molecular motor protein that is able to ratchet along the surface of a suitable substrate (actin). With each "turn of the ratchet", they are able to grab the substrate and pull themselves in a given direction. Thus they are able to convert chemical energy into mechanical work. This is their main function.

Actin is a rather thin and passive protein when compared to myosin and has several functions within the cell. One of these functions is to give mechanical support to the cells and another is to allow for cell motility. With regards to muscle contraction or tension, actin serves as the substrate on which myosin proteins ratchet their force.

The basic unit of arrangement for the actin and myosin filaments within the cell is called a sarcomere. A sarcomere is arranged with the thick myosin filaments bordered by two actin filaments. See Figure 4.

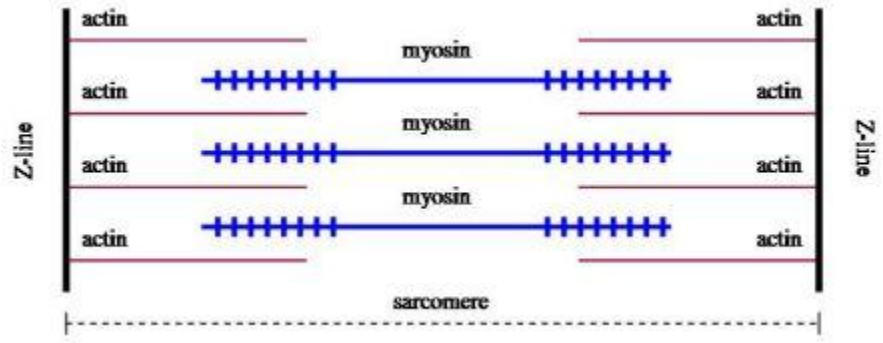


Figure 4. Sarcomere before contraction.

The ends of each thick myosin filament grab the adjacent thin actin filaments repeatedly, ratcheting and then letting go; the actin filaments are pulled closer together in the process and the sarcomere shortens during a concentric contraction.

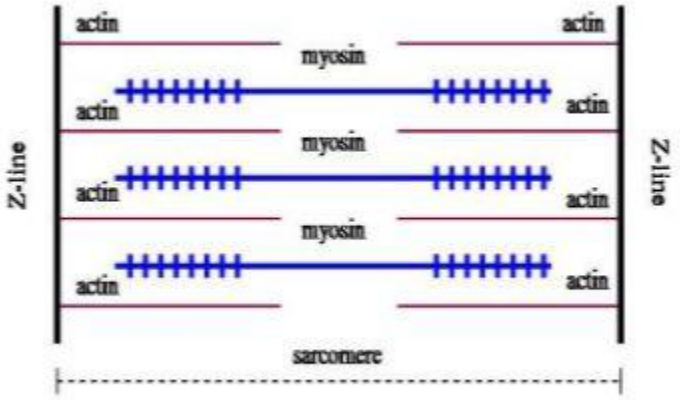


Figure 5. Shortened sarcomere after contraction.

During an eccentric contraction, or one where the muscle lengthens while undergoing tension, this myosin filament detach from their actin filaments.

During an isometric contraction the myosin filaments hold firmly to the actin filaments without any movement.

II. Types Of Muscles

There are three different types of muscles: 1) cardiac muscle, 2) smooth muscle and 3) skeletal muscle.

Cardiac muscle is an involuntary muscle type found only in the heart. It has striated fibers with its sarcomeres packed into extremely organized groups. This type of muscle relaxes and contracts in intense short bursts. You are probably well aware of this fact, especially after completing exercises such as running where you can feel the pounding of your heart through your chest.

Smooth muscle is also an involuntary type of muscle found inside the walls of the organs of your body. Your intestines, blood vessels, stomach are a few of the structures in your body lined with smooth muscle fibers. Like cardiac muscle, smooth muscle is also under unconscious control.

Skeletal muscle is the only voluntary muscle of the three. These muscles attach to the bones of your body through a highly elastic tissue know as tendons. They are located throughout your arm, legs, and torso and provide for movements of your body such as walking and running, as well as less visible movements such as maintaining an erect posture.

Skeletal muscle is the type that all athletes seek to directly improve through various types of exercise. This is naturally due to the fact that these muscles are under your conscious control.

III. FAST TWITCH AND SLOW TWITCH FIBERS

Skeletal muscle consists of two main fiber types:

Type I fibers and Type II fibers.

The Type II fibers are further subdivided into two groups: 1) Type IIa and 2) Type IIb

Type I, Slow twitch Fibers.

They are called **slow twitch fibers** because when compared to the Type II fibers, they are slower to contract. Some studies suggest that their contraction rate is two to three times slower than Type II fibers.

The slow twitch fibers are found throughout your body but they are in higher concentrations along the postural muscles of your spine. They are highly resistant to fatigue. This allows them to maintain your posture, both sitting and standing for hours at a time before you feel any tiredness or soreness in them.

They have the ability to withstand fatigue because they contain large and numerous energy producing mitochondria when compared to Type II fibers plus they also contain high levels of myoglobin that gives them a dark reddish color. In laymen's terms, slow twitch fibers are known as "dark meat"

Other characteristics of Type I fibers are their large number of capillaries per cross section and their ability to generate ATP aerobically. Athletes who are born with a higher percentage of slow twitch fibers in their body tend to excel in events where endurance is required, such as in running a marathon.

Type IIa, Fast Twitch Fibers. These are called **fast twitch fibers** because when compared to Type I fibers, they are considerably faster to contract, however, they don't contract as fast as the Type II b fibers, which are the fastest of them all.

Type IIa fibers are similar to Type I fibers in that they also contain high level of mitochondria. This makes them moderately resistance to fatigue.

Their capillary density is relatively high, although not as high as Type I fibers, but still it is considerably higher than Type IIb fibers. This along with an equally high concentration of myoglobin as the Type I fibers gives them a reddish color as well.

These fiber types are also found throughout the body but are predominantly located in the extremities. Generally speaking, the amount of force a Type IIa fiber can produce is typically greater than Type I but less than Type IIb, but this also depends upon the situation you find yourself in since all muscles are capable of extremely strong contractions given the right circumstances.

An example of how all of your muscles can contract very strongly is when you are playing a contact sport such as football and are getting prepared to take a hit from a defender. Slow twitch muscles along your spine clamp down on your vertebrae to prevent injury just as hard as the fast twitch fibers in your extremities. However, since there is no real lever where these slow twitch fibers are attached to measure their force, they are often mistakenly considered weaker in comparison.

Athletes who are born with a higher concentration of Type IIa fibers tend to excel in your middle distance track events such as the mile and ½ mile as well as team sports such as basketball and soccer.

Type IIb, Fast Twitch Fibers. These are the **fastest fibers types in the body**. They are located predominantly in the arms and legs. Their ability to contract fast along with their location in the body enables them to generate very powerful contractions over a short period of time.

The downside to this is they fatigue very easily. One can maybe sustain an activity such as sprinting at a high rate for only 20-30 seconds before their speed begins to drop off.

This is due to their low myoglobin content, lowered numbers of energy producing mitochondria when compared to Type I fibers, and lowered density of capillaries per cross section. These characteristics also give them a pale colored and in laymen's terms, this fiber type is referred to as light or "white meat".

IV. PHYSIOLOGICAL EFFECTS OF STRENUOUS EXERCISE

Most of the exercises people find themselves in the gym or out on a track or field involve routines that put their muscles through concentric contractions (muscle tension during shortening) or eccentric contractions (muscle tension during lengthening).

Exercises in the gym that fit these descriptions are most of your dumbbell exercises such as bicep curls, shoulder presses, and chest presses along with other routines such as rows, squats and leg extensions.

Exercises away from the gym would include most of your running sports or drills along with any jumping routines such as those done during plyometric box jumps or perhaps the field events such as the long jump and high jump.

All of these exercises and more have value to an athlete. No training routine would be complete without at least involving some of them.

So what effect do the many commonly performed exercises have on your body and in particular, on your muscles?

The primary goal of most exercises is to build strength within the muscle. If workouts are performed for say 30 minutes or more, endurance within your muscles and body also increase with those specific exercises or movements.

How then does this occur?

When muscles undergo tension, either by contracting or lengthening, the resultant effect on the muscle is first to open up the blood supply to these muscles providing them with the much needed oxygen and nutrients.

Repetitively performing exercises on your muscles will ultimately stimulate growth in the cells known as hypertrophy, which means, to get bigger.

Hyperplasia, another term used to define a change in an organ or tissue, is a general term referring to the proliferation of cells beyond that which is normally seen, such as in the case of a tumor. Hyperplasia doesn't occur with exercise.

When muscles hypertrophy, the most common physiological changes that take place within the muscle are an increased number of mitochondria formation and an increased number of capillary formation per cross section. The mitochondria are the energy storehouses of the cells and it stands to reason that when you get stronger in doing a certain exercise, the mitochondria would naturally have to increase to accommodate this change.

Likewise, with the increase in size of the muscles cells, more and more oxygen and nutrients will be required to support this new development and the capillaries, which are responsible for transmitting them, would naturally have to increase to service the cell.

These two main changes, increased numbers of mitochondria and increased numbers of capillary formation, are common with increasing muscle size.

Is that a good thing? Sure it is.

Larger muscles always look more attractive on an individual than smaller ones and muscular strength typically adds to your confidence as well as to the much desired athletic performance and injury prevention.

With all positive changes however, there's always the potential for negative ones to go along with them. In the example above, regarding the physiological changes in the mitochondria and capillaries, you may remember that high numbers of these two found within a cell are characteristics of Type I fibers, or slow twitch fibers. Type IIb fibers typically have lower numbers of them.

Does that mean that when your muscles get big that your fast twitch fibers are changing to slow twitch fibers? No.

As of the writing of this article, this has not been proven. However what has been proven is that by overdeveloping your muscles, especially the ones containing high amounts of Type IIb fast twitch fibers, you create characteristics of slow twitch fibers and therefore, these **muscles begin to behave a little more like slow ones and not nearly as much as the fast ones**.

If, when you exercise, your goal is to build strength and endurance, then this wouldn't be seen as a problem. However if, when you exercise, your goal is to build speed and quickness, then you might find yourself struggling against the very laws of nature that prevent you from achieving this goal.

With all things there needs to be a proper balance for everything, including your athletic performance, to work at maximum efficiency. Performing concentric and eccentric exercises are necessary and needed to form a solid strength foundation in which to develop your athletic skills.

Sometimes these types of exercises translate into your being able to get faster and perform with greater endurance. Other times however, your strength and endurance improve, but your speed ends up dropping.

We haven't mentioned too much about isometric training yet, but now is the time. Isometric training, where the resistance band is used instead of weights for the resistance aid, is a unique training strategy that enables your muscles to get stronger and faster with very little or no hypertrophy, providing that you don't engage in this activity for longer than 15 or 20 minutes a day.

Figure 6. Example of an isometric contraction using the resistance band.

Unlike weights, the resistance band offers hyper-elastic resistance forces that change the amount of tension being supplied back into your muscles with even the slightest of movements. You can learn more about how the bands with isometrics increases your speed here on page 8.

Since your muscles typically won't hypertrophy with this technique, the strength and coordination you develop within your muscles won't be offset by any additional body weight that is quite common with most other strenuous exercise routines.

Including isometric training exercises with the resistance band into your current training routine will complete the three different types of muscle contractions your body needs to excel:

1) isometric contractions
2) concentric contractions and
3) eccentric contractions.

The results will be seen in more complete development of your athletic skills and improved overall athletic performance. Whether you are trying to make the team, get off the bench, standout from the crowd, or advance your athletic career - adding isometrics with the resistance band to your workout routine for increased muscle speed may by your key to success.

Read what others just like you have had to say regarding this remarkable training strategy. http://www.athleticquickness.com/page.asp?page_id=66

Conclusion - AthleticQuickness.com - Speed Training Programs That Make Your Muscles Faster and Quicker in All Your Sports Skills.

Athletes Now Out Run, Out Jump, and Out Hit Their Competition Like Never Before... Results In 14 Days – No Matter What The Age, Sport, or Fitness Level.

Most athletes know how to get stronger, but very few know how to get faster – Simple 3 minute exercises can condition your muscles for speed and quickness like never before.

Athletes are often frustrated in their attempts to get faster and they sometimes make the excuse that speed is something we are born with and can't be changed.

But the truth is muscles can be conditioned for blazing speed and quickness as long as you do it properly.

And we are not just talking about running speed.

Fast muscles give you the unbeatable advantage in **running, kicking, jumping, throwing, swinging a bat, tennis racket, or golf club** and just about any other sports related skill.

There is no substitute for blazing speed to turn your game around, ignite your team, discourage your opponent, or just have a great time. Even your ability to compete in your future athletic activities will be affected by how fast you are.

Athletes have been trying to learn their entire careers how to get their muscles to be faster.

Thousands of athletes and recreational players alike have dramatically improved their athletic performance in their favorite sports as a result of conditioning their muscles specifically for speed and quickness.

Players of sports like football, baseball, basketball, soccer, lacrosse, tennis, golf, volleyball, and even martial artists have achieved amazing results in their sports skills - even if they were already excellent performers.

The secret to the *AthleticQuickness.com* programs' success lies in their training strategy- **isometric training with the resistance band**.

Isometric training using the resistance band is a very effective training method that forces your muscles and nerves to reform the neural networks and motor pathways, and condition fast twitch muscle fibers **for the fastest speed possible.**

That means that your muscles and nerves start working together in a more efficient way, and the fast twitch muscle fibers (which are responsible for muscle contraction speed) are now **conditioned for maximum speed and quickness.**

Because your muscles are composed of different fiber types they are capable of both strength (the ability to move against heavy resistance) and speed (the ability to contract instantly). You therefore cannot condition your muscles for strength with

weight training or plyometrics training (a slow twitch response) and expect them to develop blazing speed also (a fast twitch response).

If you train with elastic bands and an isometric training strategy, the way we teach it, then you have an unbeatable combination to increase the speed of contraction within your muscles and virtually **leave your competition in the dust.**

Adding speed and quickness to your other sports training with isometrics and the resistance band, will give you the **complete conditioning package that others have been totally missing!**

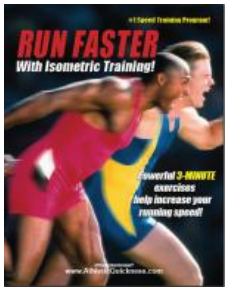
Even if you are currently in mid-season you could start seeing results in your performance in days. This is due partly because fast twitch muscle fibers respond to training faster than slow twitch muscle fibers.

Many are getting superb results in just a matter of days, not weeks or months! This is unheard of with many other types of training programs, but is common with the speed training we will teach you. Why? Because these are pure speed training programs, and not strength and endurance programs trying to do the work of a speed training program!

Now we are well aware of the offense that many people initially take to these statements, however, **by no means are we trying to offend anyone**. Our enthusiasm comes from the countless testimonials we have received of people achieving stunning improvements in their speed in short amounts of time. They support our belief that you can and will get faster and **it is our sincere desire and belief that it will work for you!**

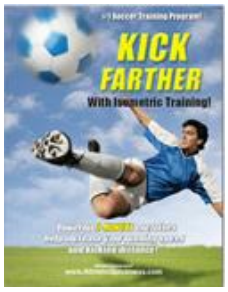
Currently the following programs are available from *AthleticQuickness.com* that will develop speed and quickness within specific muscle groups like never before.

Each of these programs has a set of exercises that will improve performance in a specific sport's skill. They can be done in just a few minutes each day, practically anywhere and anytime without any weights or special equipment. **Results from these programs can be expected in just 14 days or less.**



Running Speed For Football, Track, and any other sport.

Speed training exercises for fast running speed and quick side to side lateral movement in all athletic activities that involve running - including running a faster 40.



Soccer

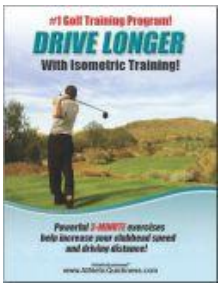
KICK FARTHER & RUN FASTER - This program is specifically designed for soccer speed and kicking and football kickers. It includes most of the RUN FASTER exercises plus the KICK FARTHER exercises.

Basketball & Volleyball

JUMP HIGHER - Conditions muscles for vertical leaps and jumping higher in Basketball, Volleyball, Track and all other jumping activities.

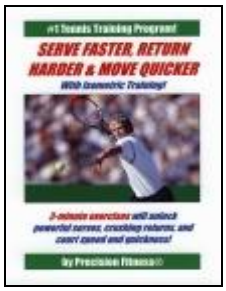
Baseball & Softball

Swing Faster and Throw Harder - Will add distance and power to your hits by increasing of your baseball bat speed or softball swing speed. The program also includes exercises to throw and pitch faster.



Golf

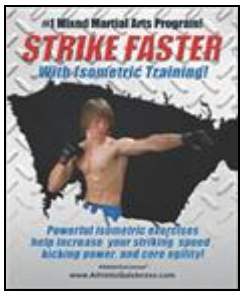
Drive Longer - Drive longer and add distance to your golf shots with faster club head speed.



Tennis

SERVE FASTER, RETURN HARDER & MOVE QUICKER Specifically for tennis speed, this program increases speed of serves and volleys as well as increasing court quickness. Includes all of the exercises in the Run Faster program.

Each exercise program comes complete with 2 resistance bands (1 red [light] and 1 heavy [blue]) specially selected for developing muscle speed.



Martial Arts and Full Body Workout

Designed for Mixed Martial Arts. 28 exercises Isolate, quicken and strengthen muscles in your lower body, upper body and core. Perfect for any Martial Arts program or anyone desiring a complete full body workout.

www.AthleticQuickness.com/getfaster