

# **“All Sports” Speed Development Training Program**

By

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World Class All Sports Speed Development Program

One Very important component in developing great athletes for all sports is *SPEED* development. Many athletes come into our athletic programs with a certain amount of God given speed, but if we as coaches are willing to devote time to understanding this *SPEED* development component, it can drastically improves the athletes' speed over a very short period of time. This information I will be sharing with you will touch upon the components of basic *SPEED* development.

My Speed book and DVD “Package” will further help you to understand about the art of *SPEED* development as well as how to master many of the essential drills yourself. This item can be ordered thru the **Championship SSE Products** website at: [SSEproducts.com](http://SSEproducts.com) or by calling **1-972-307-3545**

In many high school athletic training programs today, we tend to spend too much time developing bulk, general strength and muscle endurance. As coaches, we find we have a number of athletes who are tremendously strong, but do not convert this strength into efficient movement such as *SPEED*.

To make athletes of the 2000's faster, we must learn to train the body by using neuro-muscular development to work and stimulate the body's fast twitch muscle fibers. The simple saying with regards to speed is:

## **IF YOU DON'T USE IT, YOU LOSE IT!**

As athlete and coaches we must continuously train the body for speed if we want to become faster. All athletes have the ability to become faster over a period of time if both coaches and athletes are willing to work at it.

Speed development training is an activity which seems to depend on the coordination of muscles, nerves and the ability of the central nervous system to eliminate as many breaking and friction movements as possible. Mechanically speaking, high speed running seems to be a rather simple skill but is a blend of efficiently applied forces through the human lever system. The application of forces yields maximum performance when the particular strengths of the athlete are properly balanced to coordinate the actions of the entire body.

Some very important characteristics for greater speed development in athletes are as follows.

**1.)COORDINATION**-The skill of sprinting at very high rates of movement requires great coordination. This ingredient, though often overlooked by coaches, may be the most crucial because of the simple fact that athletes must be able to coordinate all of the limb movements and force applications to truly optimize their true sprint potential, all of these exercises in the learning process contribute to increase the coordination of the sprinter and thus their speed performance.

**2.)SPEED** this component is tied in closely with coordination, and is a must. The athlete must have the ability to move his limbs at a high rate of movement and express power through those movements to propel the body down the field or track at high speeds. The key for greater *SPEED* development is the ability to add technical work at maximal and near maximal paces at efforts of 90%-95%.

Speed development should be done on good surfaces which are level and dry. Before the athlete is allowed to embark on this type of Speed training, be sure the athlete is well warmed up and loose. Temperature should be warm to facilitate the efficiency of this type of training. Some examples of this are:

2 sets of (30, 40, 50) yards/meters 3 minute rest and a critical 8-10 minute rest between sets. Effort is 90-95% and recovery is critical. Use a standing, three-point or crouched start. Speed training needs to be done prior to weight training or regular football practice. **THE KEY TO RUNNING FAST IS STAYING RELAXED!**

The three types of SPEED Energy Systems I use in Speed training are:

- **Speed (Under 50 yards/meters)**
- **Speed One (Over 50 yards/meters but under 100 yards/meters)**
- **Speed Endurance (Over 100 yards/meters)**

*SPEED* involves the numerous areas of the body - muscle groups, circulation (blood supply to these muscles), the mind and most importantly the central nervous system. As an athlete prepares the body for *speed*, he/she must develop his/her motor skills so the necessary components for *speed* are stored as muscle memory.

The Speed Drills and Techniques that I teach my athletes must be learned and perfected at a slow rate of speed first gradually increasing until the athlete can perform them correctly but at faster rate of speed. After the athlete has mastered the drills and techniques, they can increase their range of motion and stride rate. For an athlete to become fast and stay fast, we must utilize their fast twitch muscles regularly. We must continue to stimulate the body's fast twitch muscle fibers.

**3.) STRENGTH/POWER**-Athletes who are sprinting fast are required to overcome inertia in as short a time as possible. It is critical that the athletes have superior strength of the primary muscles involved in speed development. Strength contributes to stride length and stride frequency as well as power to start, ability to lift at the end of a race such as a 100, 200 or 400 meters. Strength work can be split into one of the two areas:

**General Strength** work is designed to provide an "all around" balance basis of strength. This is also the foundation upon which the specific strength and technique is based. These do not relate closely to a sport or event or sports movements, but have the primary objective of developing fitness to prepare for more advanced training. Examples are circuit training, general weight training or body weight circuits.

Are you aware that the great Herschal Walker former NFL star running back never lifted a weight in his life but did thousands of push-ups and sit-ups and was as strong as a bull? 1980 Olympic 100 meter Champion Alan Wells of Great Britain, also did thousands of push-ups, sit-ups, wall-squats and other types of body weight" only circuits each day but had a physique that most males would envy.

**Specific Strength** work is that which uses exercises and methods to develop the type of strength most consistent with the strength demands of the sport or event. Exercise related closely to the movements of sprinting directly contributes to the technical developments of the athlete as well. Examples of specific strength exercises are: Resistance harness work, High Knee drills A, B, & C skips, bounding, hopping, sprints up hill, hurdle hops, hurdle drills. It might be noted that the amount of specific strength for a football player running a 40 yard dash, 100 meter sprinter and a 400 meter runner should vary quite sharply as their specific strength requirements for each event are different.

*Power* is a quality in athletics that is often overlooked by coaches and athletes in their training. For the athlete to increase their power, he/she needs to improve in three main areas:

1. Functional dynamic strength
2. Improve their basic flexibility
3. Improve their speed and quickness

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Power is defined as: **POWER =  $\frac{\text{FORCE} \times \text{DISTANCE}}{\text{Time}}$**

**Force** = strength

**Distance** = a range of motion determined by flexibility

**Time** = speed or quickness

During the base training of any athlete, a considerable amount of time should be spent on *power training*. To address the need for *power training*, I often devote much of the fall training to doing lots of pre-conditioning on grass hills, stadium stairs and ramps. Much of the preseason work is done in the sand pit with “hurdle-hops” and low-impact “plyometrics”. The vast majority of our fall work is on either grass or sand which naturally creates more power and general strength.

**4.) FLEXIBILITY**-Good athletes must have a high degree of flexibility in the hips and the ankles. Increased flexibility allows for a decreased muscle resistance and easier movement through the range of motion. The suppleness within all of the legs muscles and major joints is important for the advancement of technique and prevention of injury. Areas of attention should be as follows:

- Achilles and gastrocnemius
- Hamstring group
- Hip Flexors and extensors
- Shoulders
- Trunk (Abdominals)

While doing camps I often find too many football players with tight hips. These Athletes will never become great nor stay healthy till they learn to have loose hips.

Core Strength is also highly important as it provides a strong foundation for the tremendous forces created by the arms and legs. I am a firm believer that the abdominal area of the body or the core is the control mechanism of the body. Without a strong core the athlete will never become a champion.

**5.) PROPER RUNNING MECHANICS**-Through the use of proper solid running mechanics, the athlete will become more efficient with regards to his movement of body parts. An athlete who is quick and efficient will be able to improve his own athletic performance. Types of running mechanic drills are as follows:

- Speed Drills
- Hurdle-Rhythm Drills

Leg power is necessary for speed. For an athlete to be able to maximize 100% of his leg power capabilities, the athlete must run “HIPS TALL” over his hips at all times and keep all parts of his body near or under the “center of mass” at all times. I often see many young athletes shrink 3-6 inches while running because they are over-rotating at the hips. This causes a loss of 20%-30% of leg power and a substantial loss in true SPEED performance.

The athlete must also have a tremendous amount of lower leg strength (below the waist) because each time the athlete strikes the ground he is applying three (3) times his body weight to the ground. The coaching cues when working on proper running mechanics that I use with my athletes on a regular daily basis are:

**1.) Toe-Up 2.) Heel-Up 3.) Knee-Up 4.)Chest-Up 5.) Head-Up 6.) Eyes-Up**

Most importantly the athletes must remain in “Hips-Tall” position at all times for the 6 coaching cues listed above to be effective. The athlete that does not stay in proper body position over his hips will give up 20-30% of their maximum leg power. This is a common fault of young athletes that have not been instructed properly.

Barefoot running is an essential part of a “complete” conditioning program. It is useful in order to strengthen the athlete’s tendons, ligaments and small muscle groups of the feet. Training shoes act as a mere cast and do nothing to strengthen the foot.

When it comes to an athlete's *SPEED*, it starts from the ground up. First, for any athlete to excel in Speed Development, he or she must learn to use "*Dorsi Flexion*" with his/her foot. Unfortunately, most young athletes use "*Plantar Flexion*" instead. "*Plantar Flexion*" is a BAD habit. Because this downward pointing of the toe causes a braking effect upon contact with the ground it is similar to continually "riding" the brakes in a moving car. "*Plantar Flexion*" keeps the athlete's foot on the ground too long, maximizing ground time which translates into slower speed performance. In addition the "braking effect" can put a lot of strain on the ankle, shin, and most of all the hamstring muscles. In my opinion, "*Plantar Flexion*" is the number one cause of "Shin Splints" and Hamstring Injuries.

Hamstring injuries are very common in sports that involve speed. In my opinion the hamstring muscle is the weakest muscle in the body. "*Plantar Flexion*" increases hamstring weakness. It is important to emphasize strengthening the hamstring muscles one leg at a time as well working on lower back flexibility by spending focused time to strengthen these areas. In addition to the problems caused by "*Plantar Flexion*" I feel that many hamstring injuries are caused by poor lower back flexibility and this is an area that is often neglected by the athlete.

Great Speed Performance starts with "*Dorsi-Flexion*". "*Dorsi-Flexion*" is keeping the toe and heel up while running. The runner is literally stretching the calf muscle while running. When running the athlete pulls the heel tight "through to the buttocks" and then places it on the ground under the knee. When the athlete's foot lands on the track surface or the ground, the foot is then cycled backwards or pulled up to the buttocks. At this point, the foot is then brought back down to the ground with again, the toe up, as it makes contact with the ground underneath the knee. A common mistake made by coaches is to tell their athletes to take "longer strides". "Over-striding" causes a "braking effect" as the athlete often lands on his heel and the athletes also lose *power*.

How does the use of "*Dorsi-Flexion*" make an athlete faster and why is it better than "*Plantar Flexion*"? *Dorsi-Flexion* makes an athlete much more active upon contact with the ground or track and also allows the athlete to "get-off" the ground or track surface quicker. "*Rome was not built in a day*" and don't expect your athletes to pick up this new technique overnight. The bad habits of athletes took years to develop and it will take him/her weeks to correct it, but once the athlete learns "*Dorsi-Flexion*", the he/she will be much more efficient in landing. Efficient landing minimizes both ground time and air time which translates into faster speed performances. Again but not using proper *Dorsi-Flexion* it creates the following negatives:

- More Strain on the hamstring muscles
- Braking effect at ground contact
- Increased ground contact time
- Hinders Speed performance

To run fast an athlete must run on the balls of his/her feet at all times. This means landing on the "widest part" of the front of their foot each and every time. Athletes must also learn how to strengthen the tendons, ligaments and small muscle groups in the foot, ankle and below the knee if they are to be able to run on their toes. An athlete's body cannot be supported unless these areas are strong. Good exercises to strengthen the feet are:

1. Bare Foot Running
2. Sand-Pit Plyometrics
3. Weight Training exercises focusing below the knee

If an athlete attempts to land and push off their heel, he/she can never master *SPEED*. **Remember:** *Unless you plan on running a marathon nothing good ever happens on your heel.*

Proper arm action is important for *speed* as well. The athlete must move the arms in a quick and efficient manner stopping the hand near the chin on the upward motion and at the hips on the downward motion. **Remember!** *A short lever is a quick lever; a long lever is a slow lever.* To run fast the athlete must have a "Piston" type arm motion to maximize their *SPEED*! Two key points you should take note are:

**A. The arms never cross the mid-point of the body.** Find the “mid-point” by drawing a line down the middle of your body to separate it into two equal parts. Crossing the mid-point with either the arms or the legs will cause slowing down of SPEED performance because of inefficiency of movement.

➤ Hands moving to the center line of the body at shoulder height and back to the hip.

**B. The elbows must be kept within 2- 4 inches of the body at all times.** If the arms are too far away from the body, this “Chicken Wing” movement will cause the athlete to lose maximum SPEED performance.

➤ Arms should be at a loose 90 degree at the elbow

➤ Palms in and thumb up.

➤ Hands should never go any higher than shoulder height.

➤ Short levers are quicker and stronger levers.

➤ Always run with a stiff or locked wrist

It should be noted when the athlete flexes his hands when sprinting, it sends flexor messages as he runs down the football field or track. When he has his hands open but palms down and promotes the hand, it turns off the athletes’ bicep muscles/ Using these flexors are bad and will hurt the athletes speed performance.

Last but certainly not least, is the posture for the upper body:

1. The shoulders should be kept low and relaxed at all times
2. The face and the jaw should remain relaxed.
3. The athlete’s head should remain in its normal position which I refer to as “Neutral Head Position” as if he was merely standing in place.

If the athlete drops his head or eyes slightly when running, it hinders the ability for a nice high knee lift while running. By dropping the head, the athlete now lowers his center of mass causing a domino effect on the rest of his body which in turn causes his performance level to decline. To help the athlete keep his head up, have him raise his eyes and look forward 30-50 yards. Have him focus on an object that is 6-8 feet above the ground that is located past the finish line. Examples of this would be a tree, building or a set of windows. Doing this ensures that the athlete’s head and hips remain tall throughout the entire distance run or the race.

**6.) ENDURANCE**-This area is often not considered as part of the speed process but it is an important quality which must be part of every athletes program. I have seen many college and pro players go for a light jog the day after a game. This also helps the reduce soreness to have them ready for a great practice on a Monday. Endurance can be classified into one of the following areas.

**General Endurance**-the purpose of this type of work is to develop aerobic capacity with drills such as:

- Continuous running ½ miles to 2 miles
- “Fartlek” or Swedish Speed Play: (alternating pace)
- Tempo Runs of 100 to 600 meters with short recovery
- Circuit Training

**Specific Endurance**-the purpose of this type of endurance is to develop the types of endurance which is consistent with the demands of various speed events. All sprinting requires some type of general endurance. Even the 100 & 200 meters require a high development of their alactic anaerobic (without air) endurance. Examples of this type of training are as follows:

- 50-80 yards/ meters at (90-95%) intensity 3-5 reps & 3-4 sets with 2-4 min. recovery
- 80-150 yards/ meters at (90-95%) intensity 4-8 reps & 5-6 min recovery

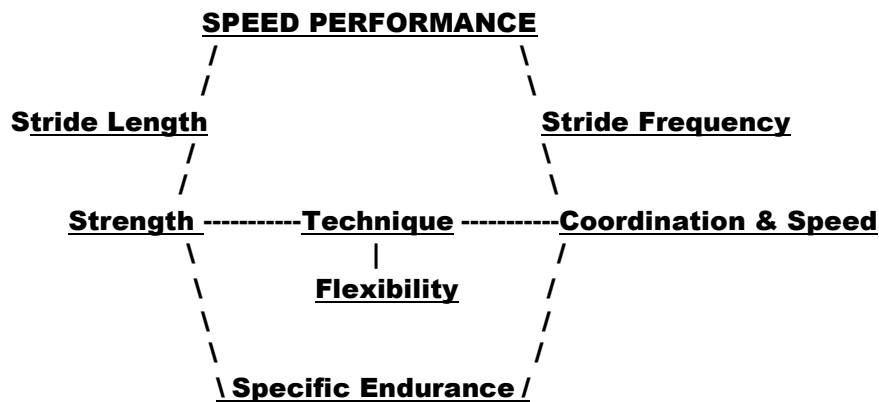
**For a 400 meter runner in the sport of track & field this might differ slightly:**

- 150-500 meters at 90-95 % intensity, 1-3 reps and 10-20 minute recovery

**7.) PSYCHOLOGICAL**-Common psychological traits for Speedsters are as follows:

- Aggressive
- Confident in game or competition
- High Self image
- Relaxed in competitive & pressure situations

**8).REACTION TIME**-Athletes who are general fast, have a shorter reaction time than other athletes. This is important in the crouched start, three point stance or starting blocks. Listed below:



#### GENERAL SPEED PERFORMANCE DESCRIPTORS

In speed training, general performance descriptors identify how well an athlete is doing, but will not explain how the athlete is mechanically producing the results. Below is a list general descriptors directly related to speed performance.

1. Stride Length
2. Stride Rate
3. Horizontal Velocity
4. Ground Contact Time
5. Air Time
6. Acceleration

#### STRIDE RATE vs. STRIDE LENGTH

Maximum speed development is determined by stride length and stride frequency. For the athletes to improve speed, one or both of these factors must be increased within the context of sound technique. Coaches, please be aware that it is possible to increased speed by improving one component and at the same time hurting another component.

<u>Athlete #A</u>	<u>Stride Length</u>	<u>Stride Frequency</u>	<u>Total Feet/Second</u>
<b>Pre-season</b>	<b>6 feet</b>	<b>3 feet per second</b>	<b>18 feet per second</b>
<b>Late-season</b>	<b>5 feet</b>	<b>4 feet per second</b>	<b>20 feet per second</b>

***By merely shortening his stride, Athlete #A now has a greater frequency and now can cover more ground in the same amount of time. Result is faster to the finish line.***

The athletes' stride length and frequency can improve through strength, technique, endurance and flexibility. These factors all work together to produce more speed in the athlete. The key to making you athlete faster is a balanced program and teaching sequence that will improve both stride length and frequency.

Recent research on sprinting indicates the improvement in stride rate is the means by which the better sprinters improve their performance. In fact, when the differences in body size and velocity are factored out, the stride length of the elite or world class sprinter is no different than that of the typical college sprinter. Thus the superior elite sprinter will maintain an acceptable or slightly above average stride length, while producing an excellent stride rate.

Elite men sprinters will produce greater force upon ground contact that will allow them to quickly get off the track. The quicker the athlete can produce superior ground forces which are required to successfully project the body into the next air phase, the faster the sprint performance. Furthermore, studies show that regardless of the quality of the sprinter, there is no difference in the air time results between a 9.90 and a 10.50 100 meter sprinter. The success in short sprint performance is achieved through increasing stride rate by decreasing ground time.

How fast a sprinter moves the legs (stride rate) and how far each stride covers (stride length) determines the success of performance since the product of these two important variables equals horizontal velocity. But just because the athlete has a long stride length or tries to initiate as stride length does not guarantee success in sprinting. Often the young athlete will try to force a long stride length, only to hinder him, by causing a breaking (reaching) or over-striding. This will actually slow down his speed performance and fatigue the muscles used in sprinting at a quicker rate than if he had used his normal stride length.

### **GROUND TIME & AIR TIME**

Of all of the general performance descriptors ground time and airtime provide us with insights on how the elite performance of the athlete is accomplished. Since airtime dictates stride length, and the combination of ground time and airtime dictate stride rate, these results provide further information regarding how the sprinter is allocating his resources to achieve and maintain horizontal velocity. Ground time is dependent upon how quickly the sprinter can produce the ground forces required to successfully project the body into the next air phase. The better the athlete can minimize air time, the better the increase in stride rate, and therefore, in horizontal velocity.

### **HORIZONTAL VELOCITY**

Horizontal velocity is a measure of the athlete's speed moving down the track, and it is typically expressed in feet or meters per second. This is the most obvious general performance indicator because if you have a high degree of horizontal velocity then you will run fast. Acceleration is the positive change in horizontal velocity. This is measured by timing the athlete through zones of prescribed distances. Mean acceleration is usually measured using zones of five or ten meters for track and five to ten yards for football. When the athlete is in his start position his velocity is zero, but over the first five meters the change in velocity is extremely great. In speed development, when the athlete is no longer producing a positive change in velocity, maximum velocity is reached.

Acceleration is divided into three separate phases: the start, pure acceleration and transition. Acceleration begins with the first movement response and concluded when the athlete reaches maximum velocity. The duration of acceleration is surprisingly constant, regardless of the level of the athlete. Absolute maximum velocity, when maximum acceleration efforts are used, is obtained in between five and six seconds. When 97% of absolute maximum velocity is attained, then for all practical purposes, the athlete has achieved his maximum velocity.

### **EVALUATION OF ACCELERATION**

For the typical evaluation of acceleration, parameters are 5, 10, 20, 30 and 40 yards for football and meters for track and field. A standing start or a crouched start with a 30 meters/yards maximum acceleration has often been used as the most common distance for evaluating acceleration ability. Younger athletes, such as junior high, should be evaluated at 20 meters/yards. A general rule for relating the athletes maximum velocity time with acceleration time is to use the fly 30 meter test and the block or crouched start 30 meter tests. A goal differential of 1.00 is considered very good results.

## **PURE ACCELERATION**

The athletes' pure acceleration is measured over the first eight to 10 strides after leaving the blocks or the crouched start. The success of the athletes this pure acceleration phase is dependent on power to body weight ratio measured at low speed, and the ability to utilize neuro-muscular pathways to apply force at the start to the blocks or the ground if using a crouched start. After the athlete escapes the starting position, he will produce an increase in stride length of between 10-15% of his stride length each time he makes ground contact during this pure acceleration phase. His acceleration pattern is somewhat dependent on his specific strength and power as well as the neuro-efficiency of the force application to the ground in terms of magnitude and direction, the goal, however, is to project the center of mass upward and forward to optimize the efficient stride length through this pure acceleration pattern.

### **KEY POINTS TO REMEMBER**

- Pure Acceleration is achieved in the first 8-10 strides
- In the first 5 yards/meters, 45% of the athlete's maximum velocity is achieved
- In the first 10 yards/meters, 75% of the athlete's maximum velocity is achieved
- Maximum Velocity is achieved in 4-5 seconds (50-60 yards/meters)

My objective when developing a great athlete centers around helping the athlete develop his *balance, rhythm, agility, power, and flexibility* thru a variety of drills. Great body *balance, strength and flexibility* equally on both their right and left side of the body are imperative for an athlete to be great. Many athletes will naturally have these qualities on one side of the body, but not on the other side. And as a result they are more prone to athletic injuries on that side of the body because it tends to be weak, awkward, or poorly flexible. Being weak on one side causes the athlete not to reach his/her full athletic potential.

I have developed several products that support a coach's efforts to build a successful team. I encourage you to invest in one of them. They work for all levels - high school, junior high, club coaches and individuals who work with young athletes.

1. The World Class "All-Sports" Speed Training Book & DVD "Package" includes a 12 week "Cookbook" Speed program with drills demonstrated a lecture
2. World Class "Elite" Hurdle Training Program Book & DVD "Package"
3. "Essential" Relay Techniques Program Book & DVD or Video "Package"
4. Coach Silvey's-Oregon Training Program" year "Cookbook"
5. Coach Silvey's -Texas Tech Training Program year "Cookbook"

These items can be found on the website: **[SSEproducts.com](http://SSEproducts.com)**

*As a proven coach with over 25 years of experience at the high school, junior college and university level, Steve Silvey is considered an expert in speed development.*

- **Part of 28 National "TEAM" Championships while at Arkansas & Blinn College**
- **35 Olympians (15 Medalists)**
- **26 World Championships (17 Medalists)**
- **Elite Performances of: 4.17-40 Yards, 9.96-100 Meters & 20.25-200 Meters**

### **INTERESTED IN A SPEED CAMP AT YOUR SCHOOL?**

The World Class "All-Sports" SPEED Development Training Staff is available to come to your site for a 2 or 3 Day Speed Camp to help your athletes. These camps can be done on a Weekend, Holiday-Vacation period or summer, please contact: **Coach Steve Silvey at: [WCspeed@Hotmail.com](mailto:WCspeed@Hotmail.com)**

I wish you well with increasing your teams speed!