What is Athletic Speed?

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Many people think of speed in terms of how quickly they can get from the couch to the kitchen and back to the couch before a commercial break ends. To an athlete (a true athlete, not the casual gym-goer), speed refers to the amount of time it takes for his/her body to move from one point to another using the most time- and energy-efficient means the body will allow. The simple method for calculating speed is speed = distance/time. Basically, your speed is determined by how much distance you cover divided by the time it takes you to cover that distance. The shorter the time it takes to cover a certain distance, the greater the speed output.

There are different types of speed involved in athletics, depending on the biomechanics and bioenergetics required of the sport. Some sports, such as the 100-meter sprint in track in field, require linear speed as the primary modality of movement. In this case, the athlete must focus solely on moving from point A to point B in the fastest way possible – a straight line. This is accomplished by increasing stride length (the amount of force one can put into the ground to, in a sense, launch himself with each step) and stride frequency (the rate at which the legs turnover, like pistons in an engine).

Many sports require multi-directional speed, meaning the athlete must be able to accelerate, decelerate, stop, and change path in various directions. This mode of speed requires strength, stability, and explosiveness throughout the entire body. The combination of stride length and stride frequency plays a very important role in this method of movement, but these are not the only components. When sprinting in a multi-directional fashion, the body must be able to stop the momentum created by linear sprinting and to quickly plant one or both feet to move explosively in another direction. One primary determinant for success in most athletic sporting events is the ability of the athlete(s) to explosively start, slow down, stop, and redirect quicker than his/her/their opponent(s).

Knowing these components, how then can we train speed? Some say speed is a genetic trait, so you either have it or you do not. This is a true statement…to an extent. Some people are born with a predisposition to Type II fast twitch muscle fibers, the desired pennation of those cells (muscles that contract quickly need a straight arrangement of fibers), and the tendon and ligament strength/tension necessary to rapidly and repeatedly apply force to the ground. For those athletes who are not "genetic freaks," can we train them to get faster? The answer is "Yes, we can!"

There are many ways to train for improved speed, but the first place to start (and to continue visiting consistently) is the weight room. Speed is strength. If you want to get faster, you have to get stronger. There is no way around that. Indeed, an increased volume of sprint drills will help you with your mechanics, speed endurance (lactic acid buffering), and confidence as an athlete; but above all else, an athlete must get stronger to move faster. We learn in physics that force = mass x acceleration. Therefore, in order to produce more force, you must be able to accelerate your mass at a faster rate. Some football linemen tend to get discouraged by their mass gains early on in their collegiate football careers because they feel they are not getting faster due to increased body weight. But if you show up your first day of training weighing 240 lbs running a 4.9-second 40-yard dash, and after a year of training your bodyweight is up to 270 lbs and you are still running a 4.9; you have improved. An athlete with 270 lbs of mass moving at a rate of 4.9 seconds per 40 yards is carrying a lot more force and ability to wreak havoc than a 240-lb. athlete covering the same area of ground in the same amount of time. If your mass increases and your acceleration remains the same, you are producing more force according to our knowledge of physics. The only way this happens is if you have gained strength. Plain and simple, the best way to move faster is to get stronger.

To sum it all up from a physics perspective:
If…
work = force x distance, and…
force = mass x acceleration, then…
work = mass x acceleration x distance.
And if…
power = work/time, and…
speed = distance/time, then…

…in a nutshell, your work must be able to accelerate your mass over a certain distance in a shorter amount of time if you are to enhance your power output, thus improving your speed.

Join us next time as we will discuss the 40-yard dash, its components, and how to nail a good time.

Stay strong and Finish First!
Charleston Speed Academy