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### **Speed and Power in CrossFit Kids**

Speed can be defined as the rate at which a person or object moves. It is the distance an object travels divided by the time it takes to travel that distance. As a function of the ten general physical skills, speed is "the ability to minimize the time cycle of a repeated movement" (Glassman). Conventional wisdom tells us that each of us is born with a genetic potential for speed. Natural ability for speed is governed by inherited muscular make up. To be a world class sprinter, one must be born a world class sprinter. However, this does not preclude the development of speed. Increases in speed are possible through neurological and muscular changes.

Each of us is born with a specific makeup of three types of skeletal muscle fiber. The percentage present of each type of fiber is as unique as the individual. Slow twitch fibers (Type I) utilize oxygen (aerobic) to produce energy and fuel activity. They fire slowly and, so, fatigue at a slower rate. This is useful for prolonged physical endeavors. In sport, a marathoner or a long distance swimmer would benefit from slow twitch fibers. Fast twitch fibers are able to metabolize anaerobically to create fuel, allow for short bursts of energy and fatigue more quickly. There are two types of fast twitch muscles. Type IIa muscle fibers, also known as intermediate fast-twitch fibers, use both anaerobic and aerobic metabolism. Type IIa muscle fibers are important, because they can take on the properties of both slow twitch and fast twitch fibers and therefore can accommodate a wide array of activities. Type IIb muscle fibers use anaerobic metabolism exclusively, have the highest rate of contraction and fatigue within a few seconds. Type IIb fast twitch muscle fibers are able to produce the most speed and are

beneficial during such events as a sprint or a one-rep-max effort in weightlifting. The ability to produce a "speedy" movement is directly related to the number of fast twitch muscles in the skeletal system.

Numerous scientists have demonstrated that the phenotype of mammalian skeletal muscle can be altered. From rats to cats and ultimately humans, laboratories across the world have investigated and proven that muscle fiber types can be changed. This means the capacity for speed can be altered by increasing those muscle fiber types (fast twitch) that are responsible for high velocity movements, e.g. those that allow us to minimize time cycles. These changes are brought about through training and practice. Significantly, endurance training and high energy intermittent training have been shown to decrease Type IIb fibers.

We really didn't need a scientist to point this out. Look at a successful marathon runner and you'll likely see a gaunt individual, no body fat and very little muscle, not the picture of health. And intermittent training produces a host of problems, the least of which may be a lack of speed. "The cost of regular extended aerobic training is decreased speed, power, and strength" (Glassman). CrossFit avoids the pitfalls of a specialized program by constantly varying the stimuli, hitting every aspect of fitness, aerobic/anaerobic, fast twitch/slow twitch. You name it, it's there. Through consistent and diverse training, muscles can develop and change while adapting to handle the stress of exercise.

Speed offers an important illustration of CrossFit efficiency and efficacy in its correlation with the other general physical skills, an interdependence that cannot be ignored. Increased speed is only possible through adequate development of the other skills. At the same time, excellence in the other skills often depends upon increases in speed. Without proper neuromuscular development and sufficiently improved heart and lung capacities, speed cannot increase. By the same token, speed plays an integral role in almost every athletic endeavor. By training each of the general physical skills, we enhance our ability to perform in any given area.

One obvious example of this relationship is the short distance runner for whom speed is only part of the picture. If we look at studies of sprinters, we observe that their abilities to cross the finish line first are rooted not only in their God-given talents but in their abilities to successfully master and maintain proper technique. This becomes important when, after a few seconds of maximum output, the sprinter begins to experience symptoms of fatigue. Then the runner must rely on neuromuscular coordination, the ability to process oxygen and the strength to continue to push screaming muscles in order to shave off precious hundredths of a second. An accomplished sprinter will have trained all the general physical skills. "Sprinters have enormous physical potential due to their metabolic competency across anaerobic and aerobic pathways and because of the speed, power, and total conditioning that sprinting demands" (Glassman).

Olympic and power lifters further demonstrate the crossover of the general physical skills. Here again, we see that no one aspect of training will foster success. For many, weightlifting brings to mind images of muscle-bound men in singlets pushing up ridiculous amounts of weight. In reality, it is not solely the size of the muscle that matters. It is the type of muscle available for use coupled with the athlete's ability to move the weight with speed. The capacity to lift weight is rooted in power, a combination of strength and speed. No lifter worth his salt will neglect speed training.

Rare is the activity in daily life or sport that requires we move in only one direction at a fixed rate of speed or interval of time. Gains in speed, or any health or fitness goal for that matter require a broad spectrum of applications. It is the interplay of the general physical skills that allows CrossFit to consistently pump out finely tuned, high performance professionals, homemakers and student athletes.

### **Speed 101 for Kids**

Coach Glassman defines speed as "the ability to minimize the time cycle of a repeated movement." What does he mean? Speed is a measurement of the rate at which a person or object moves. In CrossFit, we are always trying to move faster. Run faster,

throw the ball faster, move the weight faster. Speed is one of the factors that determine how quickly you will get your workouts done. It also gives you the ability to catch your brother when he's tagged you "it," throw the ball across home plate or play dodgeball.

Not all of us are born fast. Each individual has three types of muscle fibers that carry out different jobs in the body. Slow twitch fibers help you complete longer distance or longer timed events. Fast twitch fibers allow you to move faster but can only keep working for short periods of time. The more fast twitch muscle fibers you have, the faster you will be.

It doesn't seem fair that some people get to be fast, while others of us are not. But I have good news for you. It is possible to increase the number of fast twitch fibers in your body. While I cannot promise that you'll be winning ribbons in the hundred meter dash, I can guarantee that consistently completing CrossFit Kids workouts will help you develop speed. CrossFit workouts help your muscles develop and change and become better able to handle the stress of a workout.

Here is a workout that emphasizes speed. Notice that only one part of the drill involves running.

Big Dawgs:

3 Rounds

10 Power Cleans, 55#

10 Broad Jumps

100 M Hill Sprint

The Porch:

3 Rounds

10 Power Cleans, 35-45#

10 Broad Jumps

100 M Hill Sprint

Pack:

3 rounds

10 Power Cleans, 15-20#

10 Broad Jumps

100 M Hill Sprint

Puppies:

3 rounds

10 Power Cleans, 5-10#

10 Broad Jumps

100 M Hill Sprint

The things you do in daily life and sports require you to move in many directions, at many different speeds and at different intervals of time. CrossFit makes it easier for you to accomplish these things by conditioning your body and mind through constantly changing workouts that challenge you in every possible way. More speed, more strength, the ability to run a mile, all of these are within your reach if you continue to faithfully work to the best of your ability. Exercise is fun, and it can change every part of your life.

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## Power in CrossFit Kids

Power is one of two general physical skills that have equal requirements for both training and practice. Power is defined as "the ability of a muscular unit or combination of muscular units to apply maximum force in minimum time" (Glassman).

Power can be quantified using the equation:

$$\text{Power} = (\text{Force} \times \text{Distance}) / \text{Time}$$

Work = Force X Distance. It is the inclusion of the metric "**time**" that gives us power. A standard pull up and a kipping pull up involve the same amount of "work" however the kipping pull up takes less time, thus more power is produced. The smaller the unit of time (faster speeds), the greater the quotient. That is, "as time goes down, power goes up" (Glassman). We can then conclude that increased speed leads to greater power, regardless of the load. By the same token, increased force provides for a greater dividend and naturally to an increased quotient, which means that gains in strength (the

ability to apply force) should lead to improvements in power. Still, the most effective function of power combines strength and speed. Practically speaking, "How much can you move, and how fast can you move it?" (Rippetoe & Kilgore)

Developing power requires the application of vertical and horizontal movements wherein each individual repetition will "overcome resistances by a high speed of contraction" (Sefcik). Some of the most effective tools in the development of power are Olympic lifts such as the clean and jerk and the snatch. Here we find that simply pulling the weight is not enough. Successful completion of these movements demands that strength be coupled with bar speed, allowing the individual to move under the bar rather than muscling the weight into position. Lack of speed causes the movement of the bar to stop short of overhead, leading to a failed lift. Likewise no amount of speed can compensate for an inability to handle heavy loads, e.g. if it's too heavy, moving it faster won't likely get the bar overhead. Combined strength and speed, acquired through repeated exposure to the lifts, is mandatory for successful Olympic lifting. This is far more effective than the standard gym routine, say a bicep curl, because it increases the distance the weight is moved, the speed at which it is moved and how much weight can be moved.

Functional movements (pretty much everything we do in CrossFit Kids) are unique in their ability to express power, from box jumps, in which body weight is being explosively moved, to thrusters which become laborious, nigh impossible, without sufficient bar speed. As noted above, compare standard and kipping pull ups. If an individual completes a set of standard pull ups followed by the same number of kipping pull ups, the load and distance moved would be identical. However, kipping pull ups generate more power due to the amount of time it takes to complete them (remember "as time goes down, power goes up"). This means the kipping pull ups place a greater physical demand on the individual and, as such, are more effective. Strength is important. Speed is essential. But power is the metric that we seek. We want our kids to move bigger loads, longer distances, FASTER! In the quest for fitness, power trumps.

## **Power for Kids**

Power is a combination of how strong you are and how fast you can move. What that means is the more weight you move and the faster you move it, the more powerful you are. Each CrossFit workout you complete requires you to use power. Say the WOD calls for wall ball. In order to successfully complete the movement, you must push the ball upward with sufficient strength and speed to cause it move away from your body and toward the target. Otherwise, the ball will end up at your feet (or possibly in your face). What if the workout includes squats? Then you have to (1) move your body

weight in a quick and controlled downward motion to below parallel and (2) bring it back to upright, with your hips fully extended. This movement would not be possible without the muscle strength and speed necessary to lower your body and get back up without falling.

Have you ever played basketball? What helped you get the ball through the hoop? Power. You threw the ball with sufficient strength and speed to get it to drop through the net. What about when you were on the swings and you realized the faster and harder you pumped your legs, the higher the swing would fly? The swing went higher, because you used more power.

Every day you use power to complete common tasks. When your mom asks for your help putting a box overhead, you use power to move the box onto the shelf. The difference between power and strength is that power is faster. You wouldn't slowly lift the box to the shelf using only your strength, because you would have to hold it longer and the box would start to feel really heavy. Instead, you would push the box up with as much force as quickly as possible, hoisting it up there in a hurry so it wouldn't begin to feel too heavy and cause you to drop it. You may remember a time when you used this type of movement to get a toy into the top of your closet or on a shelf in the garage. You were using power.