Speed Free Report!

Speed Myth #1: More Muscle or bodyweight will make you slower

If you talk to just about any trainer, coach, or athlete this day in age they will tell you that you need to get as lean and light as possible to run faster. However, what kind of body types will you immediately witness when you watch some of the fastest men or women in the world run the 100 meter dash at the Olympics? Let me show you.

(Photo courtesy of Erik van Leeuwen)

Ok now do these guys look light? No. And have you ever observed an elite sprinter or an extremely fast athlete who weighed 140 lbs? In a majority of cases the answer is no. So why is everyone either looking to get lighter or advocating it? The truth is that there are reasons why these guys are big and fast and why you should be looking to mimic their physique as best as possible. The NFL scouting combine is another great example of physical demonstrations of elite acceleration and speed at rather high and ironic bodyweights. When we analyze the science though, it should be of no surprise why size correlates with speed. First, when we add positive muscle mass we increase our muscles' strength potential. I've heard figures anywhere from 2-5 lbs. per 1 lb. of muscle, according to old Soviet training literature, and other authorities on training. I don't think it matters too much what the number is exactly. What's important is that the real world evidence of gaining size would at least support the fact that the strength and power gains become greater than the actual muscle gained. What does that mean? It means that our relative strength or strength to bodyweight ratio potential increases considerably. Here is an example below. I will use 3 lbs. of strength per 1 lb. of muscle in this scenario.

Bigger Athlete	**Smaller Athlete:**
135 lbs. of leg mass	**75 lbs. of leg mass**
405 lbs. of strength potential	**225 lbs. of strength potential**
Difference=270 lbs.	**150 lbs.**

So you can see the large difference between the individual with more leg muscle in their legs versus their smaller counterpart in terms of force production potential. It's a no brainer, and one of many useful tips for increasing your speed. Please note that the extra gravity through increased weight gain will be negative if you do not capitalize off of it and do your absolute best to maximize your lower body strength.

Another reason why you want to become bigger is because research supports it. In a study from 2005 in *The Journal of Experimental Biology*, researchers took 45 of the fastest male and female sprinters from 1999-2013, and assessed their physical composition. [1] More specifically, they examined 100 meter runners all the way up to 10,000 meter runners in both the female and male categories. They concluded that bigger athletes were better suited for sprinting, while smaller and lighter body_types were more conducive to long distance type running. Also, ground forces produced from the 100 meter group was up to 2.5 times their bodyweight, according to the study.

Speed Myth #2: You do not need strength to run faster

I've already briefly shared with you the value that carrying more muscle mass has for sprinting. Strength is no different. We can just apply simple Physics here to make a strong case for strength as an essential training tool to improve running speed. F=MXA. I'm sure you've all seen this standard equation at some point, and it has huge application in the context of speed development. What it means is that the more force or strength you can apply into the ground at a given bodyweight, the faster you will accelerate. It's almost that simple. The direction in which we apply force, and the rate we apply force are also very important elements, but raw and robust strength levels are going to be essential and very influential in how fast you currently are, and how fast you can become.

Now, let's look at a few popular studies to help solidify the need for higher levels of strength for improved sprint performance. The first study was performed in 2009 and was found in the *Journal of Strength and Conditioning Research*. This study involved 17 Division 1-AA collegiate football players. Each player performed a 1 rep maximum squat with 70 degrees of knee bend. Within the next week a 5, 10, and 40 yard dash time was taken for each participant utilizing electronic timing measures. The researchers concluded that there was a very strong correlation between 10 and 40 yard dash times, and a strong correlation across 5 yards. Subjects of the study were divided into 2 groups. Those that squatted 2.10 x their bodyweight or more, and those that squatted 1.90 x their bodyweight and less. The former had significantly lower sprint times in comparison with the weaker group. [2]

The second study I found was also located in the *Journal of Strength and Conditioning Research* and was published in 2012. This study contained an introduction that mentioned previous research had expressed a relationship between maximal squat strength and sprint performance. This study aimed to test

that theory once more. Nineteen professional rugby players were tested in the back squat for 1 rep, and 5, 10, and 20 meter dash at the onset of the study. Next, each player was put through a strength mesocycle (one month) and power mesocycle. After that period of time, both absolute and relative strength levels had increased considerably, as well as performance across all 3 distances. Pre-strength levels were at an average of 1.78 x bw before the mesocycle, and 2.05 afterwards. 5 meter performance average was 1.05 seconds before and .097 after. 10 meter was 1.78 before and 1.65 after, and 20 meter was 3.03 and 2.85 before and after. [3]

The third study comes from Mann and is called "Kinetic Trends in Elite Sprinters. [4] Mann and his team of researchers filmed a series of male and female sprinters at various competitions to assess them biomechanically. What they found during their analysis was that horizontal velocity is key for maximal speed and that is best satisfied with both strength and technical proficiency in sprinting.

The fourth study analyzed data and information from the 100 meter races at the 1988 Olympic Games. [5] Researchers recognized that functions of strength at the beginning of a race during the acceleration phase is different than after maximum speed has been attained. Thus, strength training for each phase could utilize a different approach. The concentric or shortnening action of primarily the quadriceps is huge during acceleration. This is an acceleration based program, so this information serves great for this program and this is one of the reasons why squats work so well. Furthermore, eccentric loading or the stretching action was smaller and reserved after longer strides and impacts have been created. Thus, more eccentric and reactive strength work would improve the max speed phase of the sprint. The authors also made mention that exercises such as Drop Jumps would improve eccentric and reactive strength.

Lastly, I would like to discuss some common arguments made against strength training for speed. The 2 most common are that strength training causes injury and it's not specific to sprinting or any other speed based activity.

"Risk of injury is another area of concern for coaches and parents. Many studies have measured the rate of injuries associated with weight training compared with the rate in other sports. For example, a study published in the November/December 2001 issue of the *Journal of American Academy of Orthopaedic Surgeons* cited research showing that in children ages 5 to 14 years, the number of injuries from bicycling was almost 400 percent greater than the number of injuries from weightlifting. There's more.

In a review paper on resistance training for prepubescent and adolescents published in 2002 in *Strength and Conditioning Coach*, author Mark Shillington reported in a screening of sports-related injuries in school aged children that resistance training was the likely cause of only 0.7 percent (or 1,576) of injuries compared with 19 percent for football and 15 percent for baseball." [6]

"The truth is that weight training and competitive lifting sports are among the safest activities an athlete can participate in. This fact is known worldwide. For example, renowned Russian sports scientist Vladimir Zatsiorsky, in his book Science and Practice of Strength Training has this to say about the dangers of weight training. "The risk of injury from a well coached strength training program has been estimated to be about one per 10,000 athlete-exposures, with an athlete exposure

being defined as one athlete taking part in one training session or competition. Compared to tackle football, alpine skiing, baseball pitching, and even sprint running, strength training is almost free of risk." [6]

And to help refute the specificity argument let's look at EMG's from the squatting pattern and sprint pattern and see what the science says.

Back Squat:

In 2002, Caterisano found that as squat depth got deeper, the gluteus maximus becomes more active during the concentric contraction phase of the lift. Muscular contribution shifts from the biceps femoris, vastus medialis and lateralis to the gluteus maximus. This suggests that the gluteus maximus is the prime mover during the concentric phase of the squat, and the other muscles play a secondary role. What this study found is that the hips, especially the glutes are more active then the hamstrings and quads in a back squat movement. [7]

Sprinting:

In 1995, Dr. Wiemann and Tidow utilized EMG testing to see the various skeletal muscle activity levels at the knee and hip. "They conclude that the muscles mainly responsible for forward propulsion in full speed sprinting are the hamstrings, the gluteus maximus and the adductor longus. The hamstrings are singled out as the most important contributors to produce highest speed levels." [8]

So now you clearly see how powerful your hips are in movement and the ironically strong relationship between many movements of the lower body. With all of this in mind, increasing strength potential in these muscles, through now arguably labeled non-specific exercises like deadlifts and squats, will allow us to effectively drive more force into the ground and run faster since these muscle groups will be much stronger. Moreover, the squat and deadlift are more similar to sprinting than we usually give them credit for. This has to deal with "Torque-Angle Curves." Don't worry about the big fancy word. It just means being range of motion specific. If you analyze when we sprint, it is easy to see its specificity. From the landing up until mid-stance, our hips, knees, and ankles will be bent or flexed. Just like with a squat or deadlift. The more force we can drive out of a squat will assist in this phase of the movement!

Speed Myth #3: You have run at high volumes frequently to get faster

Intuitively it makes sense that if you want to get better at something you have to do it frequently. Unfortunately, too much of a good thing can definitely be bad, there are exceptions to every rule, and proper speed training can be very counterintuitive. Speed development is such an exception to that rule. The reason for this is due to physiological limitations of the human body. "Real" high intensity efforts such as maximum effort weightlifting, jump training, Olympic lifting, intense competitions, and sprinting heavily tax our body's Central Nervous System. You can view the Central Nervous System as our body's battery which drives energy into our working muscles and other aspects of our system. It does not have the ability to

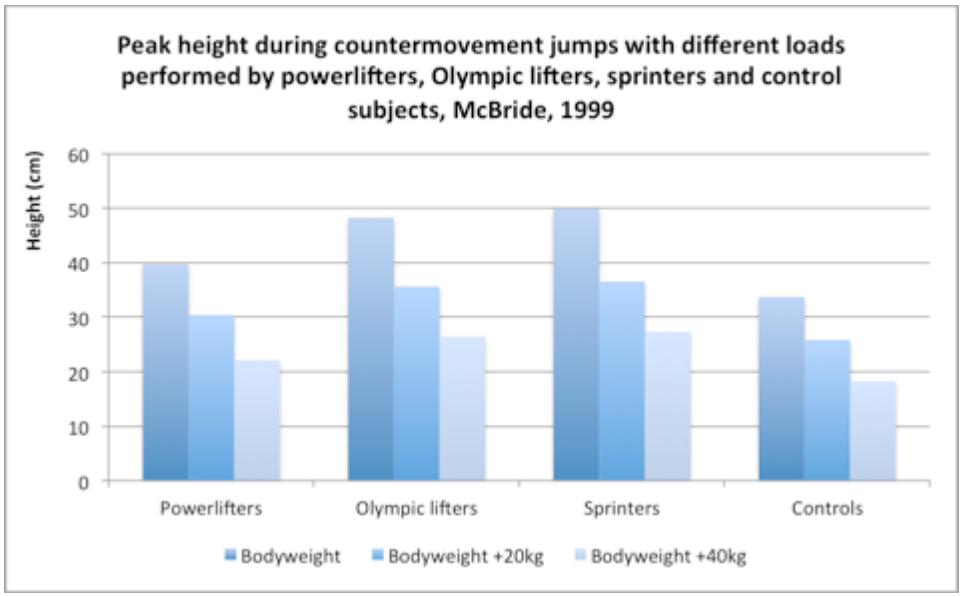
adapt and store more energy, like our muscles can, and as we improve it fatigues more easily. The nature of these activities will suppress this system, and we will not perform as well if we do it too often. This is especially true if you are significantly fast and strong already. Thus, careful manipulation and scheduling of all training related variables (recovery periods, intensities, frequency, sets, reps) become imperative for favorable development and adaptation which leads to greater speed. A common mistake made by many is that they sprint too often. Not only does this increase injury risk, but it does not allow a sufficient window for recovery so the body can actually improve and restore itself in order to let us operate at our maximum capacity when the time comes. If you would like to know more about this, check out my article "11 essential rules to athletic program design" at my website www.renospeedschool.com to ensure you are not sprinting too often. There are a few studies that support limiting the quantity of conditioning and sprinting to improve speed performance. [9, 10, 11]

Speed myth #4: Sprinting technique is the most important factor for speed

http://www.youtube.com/watch?v=WwmLEzitBaQ

I break this down for you in this YouTube video, so check that out if you would rather watch a video on it than read about it. Contrary to popular belief, POWER is absolutely the master regulator of speed, without a shadow of a doubt. For those that are unsure, power is a product of speed x strength. In other words, the person who can generate the most force the fastest will have better power output. In the *Journal of Biomechanics* in 2012, Miller found that the main predictor and limiting factor of sprinting speed was power. [12]

Here is a particular study taken from the renown *Journal of Strength and Conditioning Research* that unbiasedly supports this statement. [13] The study was performed in 1999 by Mcbride and his team of colleagues. The study involved a control group, and a series of powerlifters, sprinters, and Olympic lifters. Researchers wanted to measure relative power ratio's (bodyweight to power), and absolute power measures from all of the participants in each group. Subjects performed a vertical jump, a smith machine squat, and a smith machine squat jump. The results showed that the sprinters had the highest relative power (power to bodyweight ratio) and best vertical jump height, while the Olympic lifters generated the highest total power output, and powerlifters had the highest levels of absolute strength. Surprisingly though, sprinters and olympic lifters did possess similar levels of strength in this particular study. What was most convincing about this study was how much more total power the 3 achieved relative to the control group, indicating a very strong need for power. It was dramatically higher in the 3 types of athletes, and indicates just how important this skill is to general athletic performance, and in the case of this report, Speed! Here is one of the charts of the study that shows sprinters as having the highest level of power output in the vertical jump test.



(Chart courtesy of Strength and Conditioning Research.com)

And here are 2 more to close the deal. First, Morin and his colleagues examined a series of sprinters from different skill levels, including 9 non-sprinters, 3 French national-level sprinters, and a world class sprinter. [14] The world class sprinter was Christophe LeMaitre, who is the fastest European ever to date! The conclusion of the study was that Lemaitre's Power output, especially in the horizontal direction, was the difference maker in his elite times comparative to slower runners. Also, they did mention that vertical force at top speed correlated significantly, although horizontal force was more important.

Beneke examined Usain Bolt's past performances in the 100 meter dash to see what gives him the edge in competition in *The Journal of Biomechanics* in 2010. [15] He identified that the reason Bolt is superior is primarily due to the fact that he is able to maximize his position on the Force-Velocity Curve and generate more power into the ground than any of his competitors!

Technique is absolutely important, but takes a backseat to power. To illustrate this point, consider an NFL athlete who is extremely fast, but exhibits pitiful sprinting technique. He can get away with this deficiency because he possesses so much power, which still enables him to blaze on the field. On the other hand, take a young athlete you runs pretty and demonstrates proper form according to his trainers and coaches but he goes nowhere. It's because he has no horsepower.

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