The Science of the 100-Meter Dash (and How To Get Faster)

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As an ex-collegiate track athlete, I was OK but never a bona fide champion.

After I learned more about training, I realized the reason why I never was the "it" guy. And it's more than just genetics.

It's important to go beyond simple cues like "eyes down the track" and "knees up." You need to understand the science and focus on the little things to truly run fast—something I didn't do.

Read on to learn about the science of the 100-meter dash and how to improve your speed with technique and workout tips. Remember, Rome wasn't built in a day, so be patient and you'll be breaking 11 seconds in no time.

Don't Reach

The 100-meter dash is an all-out race, and you'll have no gas in your tank when you're finished. When you're exerting all of your effort, it's tempting to do what "feels" the strongest and stray away from perfect technique. This often manifests itself by "reaching," or attempting to cover too much ground with your stride.

The Science

Exceeding a 90-degree knee bend with your forward foot will cause you to overstride. Your front foot will absorb your forward momentum and your stride frequency will decrease, causing you to slow down.

This is especially important during the drive phase, when your body is close to the ground. Watch footage of 100-meter dash finals and you'll notice that 90 percent of hamstring injuries occur in the first 10 to 20 strides. Why? Because the runners try to transition too early, placing excess stress on their hamstrings.

The Fix

Your hips, knees and ankles should never exceed a 90-degree angle. This allows for a perfect combination of stride frequency and stride length without sacrificing power. To help achieve this, step downward, and not forward, with your front foot.

Dorsiflex

You've got to have strong calves because they are key for stride power. Oftentimes, sprinters forget about the muscles on the shin, which are critical for maintaining dorsiflexion (i.e., flexing the foot toward the shin) in the off-the-ground foot during your stride. Once again, it's all about efficiency. Your foot position can either speed you up or restrict you from easy forward movement.

The Science

If your toes drop, you'll strike the ground toe first and "chip" into the track. You'll absorb your forward momentum, increasing stress to your knees and ankles. Sprinting will take much more energy, causing you to potentially run out of gas during a race.

A dorsiflexed foot allows you to "paw" at the ground. Your stride will feel like a wheel. Efficient, fast and smooth.

The Fix

Personally, dorsiflexion was very difficult for me, and it took me about two years to master. However, these exercises will help you perfect the technique by strengthening the muscles on the front of your shins.

Toe Raises

Place a dumbbell across your foot.
Raise your toes into the air as high as possible.
Lower to the ground and repeat for the specified number of reps.
Sets/Reps: 4x30 each leg
Heel Walks

Walk on your heels with short strides for the specified distance.
Sets/Distance: 8x20 meters
Train the Backside of Your Body

The Squat is usually the go-to exercise for sprinters. There's nothing wrong with that at all. In my opinion, it is the most important exercise. However, if you have muscular imbalances, the Squat might not be the best option—because you need to work your posterior chain (i.e., the muscles in the backside of your body).

The Science

There's a firing sequence that happens in your posterior chain when you sprint. Your glutes start the movement, then your hamstrings engage, and finally your low-back muscles on the opposite side of your striding leg fire.

If your glutes are inactive, your hamstrings or low back are forced to compensate, creating a recipe for an injury.

The Fix

Some glute-dominant work is welcome, so you should incorporate these movements into your sprinting weight program.

Conventional and Romanian Deadlifts
Glute Hamstring Raises and Eccentric Glute Hamstring Raises
Barbell Hip Thrusts
Single-Leg Glute Bridges

http://www.stack.com/a/100-meter-dash