

Shorten Your Stride to Decrease Injuries

I see many runners in my clinic who have sustained overuse injuries. Their questions almost always boil down to how much rest and rehabilitation they need to recover from the injury and return to running.

But I'm most concerned about why and how the injury occurred in the first place so that whatever caused it can be corrected. Often, there are "biomechanical abnormalities" or external changes that contribute to the injury. Some examples are a new pair of running shoes, increasing speed/distance too quickly, weakness in muscle groups in the legs or hips, or pain in joints that can alter your stride.

A recent study out of the University of British Columbia in Vancouver evaluated *other* factors that may lead to injury. These are the "kinetic risk factors," which are the impact and forces directly related to your running gait.

You might think that the vertical impact of your feet hitting the pavement would cause the greatest risk of injury during a run because the forces upon impact are three to five times your body weight. However, this recent research indicates this may not be the case. Instead, "peak braking forces" are more predictive of injury. Keep reading to learn more about peak braking forces.

The study evaluated 65 novice female runners and divided them into three groups based on their kinetic/running forces. The runners participated in a 15-week half-marathon training program and were required to report any pain or injuries sustained during the program. There were 22 injuries reported with the majority being from the knee to the foot. The most common complaint was medial tibial stress syndrome, or shin splints.

The goal of the study was to evaluate if there was a kinetic variable that could predict if an injury would occur during the training program. The conclusion was that high peak braking forces have a higher injury rate than any of the other kinetic variables in the research. The group with the highest peak braking forces had eight times the injury rate of the group with the lowest peak braking forces and five times the injury rate of the group with moderate peak braking forces.

So what is peak braking force? Peak braking force can be a little complicated to understand. It has nothing to do with stopping. Rather, peak braking force is the initial impact of the foot on the ground, which forces the body forward horizontally. It is like slamming on the brakes in a moving vehicle, which propels your body forward. The same thing occurs during the phases of running. Once you initially impact the ground, the rest of your body wants to move forward if it were not for the muscles in your body that provide stability. The bones in the body are made to withstand vertical and compressive forces, but not created to withstand the horizontal forces associated with peak braking force. Physiologically, it makes sense that the injury rates would increase as the forces transmitted horizontally during peak braking force also increase

What does this mean to you? Based on the research, one easy way to decrease injury rates is to shorten your running stride. If you decrease your stride length, you increase the vertical impact force and decrease the peak braking force. You can also increase your cadence, which will in turn decrease your running stride.

If you are a runner who is prone to repetitive running injuries, having your gait evaluated is a great idea. Peak braking forces of your running gait may be a possible cause of pain and injury. The most important factor to remember is to monitor any pain or injuries and address them quickly so that they do not progress into more serious conditions.

There are many physical therapists/running specialists that can evaluate your gait to determine if alterations would maximize your performance and decrease injuries.

If you are experiencing any pain or orthopedic issues as you are training, please do not hesitate to reach out to one of our sports medicine physicians at Spectrum Health Orthopedics at (616)267-8860. You can also find more information about our orthopedic program and providers on our website at <https://www.spectrumhealth.org/patient-care/orthopedics>.