The Best Way To Warm Up

Dynamic warm-up drills may be the single best way to prevent injuries and improve performance.

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Published October 24, 2014 by Competitor Magazine

As a rule, runners tend to be well informed when it comes to understanding the best ways to stay healthy and avoid injury. Most runners pay close attention to their diet, monitor their weekly mileage, and replace their running shoes at regular intervals. Yet, when a group of nearly 100 experienced recreational runners were recently asked to name the most common cause for running-related injuries, the overwhelming majority of them cited “failure to stretch regularly” as the most common cause of running injuries (1). The authors of this study were concerned because the runners seemed to be unaware of the overwhelming body of research showing that stretching does not alter injury rates (2,3). To make matters worse, the belief that stretching protects you from injury is becoming even more prevalent (4).

So, with dozens of studies proving that stretching is a waste of time, why do so many experienced runners continue to stretch? To begin with, they may be right. While researchers are quick to point out that conventional static stretching is useless, Daniel Pereles and colleagues recently proved that runners intuitively know whether or not they should stretch (5). These authors randomly assigned 2,729 recreational runners to either a stretching or a non-stretching pre-run routine. Not surprisingly, there was no significant difference in injury rates between the runners who stretched versus the runners who didn’t stretch (which is typical of all studies on stretching). However, if a runner who routinely stretched was assigned to the non-stretch protocol, he/she was nearly twice as likely to sustain a running injury. Because of the number of participants, this single study proves that if you feel that stretching reduces your risk of injury, you should continue to stretch in spite of what experts tell you.

The somewhat surprising outcome associated with Daniel Pereles’s stretching study may have something to do with an inherent flaw in the way studies evaluating stretching and injury prevention are designed. Because of time constraints and compliance issues, almost every study on stretching has evaluated outcomes over a short period of time (usually less than 12 weeks). While research has shown that flexible people are less prone to exercise-induced muscle damage (6), other studies suggest that stretching for less than 3 months does not convert a stiff muscle into a flexible muscle. In fact, some great research proves that when stretched for just a few weeks, muscles respond by temporarily lengthening with no change in the muscles architecture (7).

In order to physically lengthen muscles, some experts suggest it is necessary to stretch for four to six months. In theory, when a muscle is repeatedly stretched for several months, cellular changes take place within the muscle allowing for a permanent increase in flexibility. Animal studies have shown that the increased flexibility associated with repeat stretching results from a lengthening of the connective tissue envelope surrounding the muscle fibers (the perimysium) and/or an increased number of sarcomeres being added to the ends of the muscle fibers (8) (Fig. 1). Apparently, converting a stiff muscle to a loose muscle is a long-term commitment.
Rather than spending months attempting to convert your stiff muscles into flexible muscles (with no guarantee that this will actually change your potential for being injured), the easiest way to avoid injury is to increase your body temperature prior to running (9). One of the few sports to take advantage of this research is professional football. Look at the sidelines of any NFL game and you’ll see players riding stationary bicycles prior to going out on the field. Because most runners do not have access to a stationary bike before they begin their routine run, the simplest way to increase your body temperature is to initially run with a slow jog. Slow running with a high cadence and a short stride length significantly decreases impact forces while your muscles gradually warm up. Since older runners tend to be stiffer, the length of time you spend warming up is age-dependent: 30 to 40-year-old runners should consider warming up for 5 to 10 minutes, while the 50 and older group should run slowly for up to 15 minutes.

Another way to increase your body temperature is with active dynamic running drills (Fig. 2). Popular with elite and sub-elite runners, these drills allow you to slowly warm up your muscles and can even improve performance. A recent study found that compared to a control group, runners who performed 14 repetitions of each of the exercises listed in figure 2 had a 6% improvement in running endurance and a 3% increase in 3 km race performance (10). This research suggests that regardless of whether or not you incorporate static stretching, dynamic warm-up drills may be the single best way to prevent injuries and improve performance.

![Fig. 1. The components of a muscle. Reproduced from Injury-Free Running by Michaud.](image)
<table>
<thead>
<tr>
<th>Gluteals</th>
<th>While walking, lift knee toward chest, raising the body on the toes of the opposite leg.</th>
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<tr>
<td>Hamstrings</td>
<td>Walk while swinging your leg forward until a stretch is felt in your hamstrings. Keep your toes pointing towards your knee.</td>
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<tr>
<td>Adductors</td>
<td>While moving forward, raise the trail leg by abducting the hip 90° while keeping the knee flexed. Move as though you were stepping over an object just below waist height.</td>
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<tr>
<td>Gastrocnemius</td>
<td>Tip-toe walking. Move forward while alternating walking on your tiptoes. The aim is to raise your body as high as possible with each step.</td>
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<tr>
<td>Quadriceps</td>
<td>Rapidly kick heels towards buttocks while moving forward.</td>
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<tr>
<td>Abductors</td>
<td>Quickly move sideways alternating one leg in front of the other. Go 15 yards and repeat in opposite direction</td>
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Fig. 2. **Dynamic stretching drills** (10). The abductor, or grapevine drills, were not part of the study but they are important for warming up the hip abductors so I’ve included them in the illustration. Reproduced from Injury-Free Running by Michaud.
References: