Foot Focus

Runners tend to be particularly weak in the following four muscles, according to Matt Ferguson of Progressive Health Innovations:

1. **Dorsiflexors** (muscles on front of shin)
2. **Toe flexors** (muscles under arch of foot)
3. **Evertors** (muscles that cross outside of ankle joint)
4. **Toe extensors** (muscles on top of foot)

Above ❯❯ Kevin Shaw of Simon Fraser University's basketball team, tests the ankle-strengthening device developed by Matt Ferguson (left) and Rick Hall.

Foot Factors

It's a myth that all runners have strong feet. A few simple exercises can correct muscle imbalances.

By **Alex Hutchinson**

If there's one group of muscles that runners shouldn't have to worry about, it's the ones in their feet. After all, you push off the pavement about 100,000 times during a typical one-hour run, an impressive workout by any definition. There's a problem, though: your foot is highly complex, with 10 different muscles and nearly 100 tendons and ligaments, each pulling in slightly different directions. In conventional running shoes, however, you only need two muscles – the tibialis anterior (shin) and the triceps surae (calf) – to move forward in a straight line.

"Most runners think they have very strong feet," says Matt Ferguson, the president of Vancouver-based Progressive Health Innovations. "And they do – but only for one motion."

Foot strength has recently emerged as a hot topic, with the rise of barefoot running. "There's much discussion of the 'fact' that barefoot strengthens and traditional shoes weaken the foot," notes Asics biomechanics researcher Simon Bartold. But though it's true that running without shoes forces your foot to use more of the muscles in your foot and ankle, the basic running motion remains the same. That means that your "plantar flexion" motion (pointing your toes toward the floor) gets stronger, but other motions, like dorsiflexion (pointing your toes upward) and lateral motion remain weak and underdeveloped.

The question is: does this matter? Ferguson's company has been studying the question with researchers at the University of British Columbia and McGill University, using the Ankle Foot Maximizer (AFX) that the company invented as an all-in-one foot and ankle strengthener. Most recently, a study with the UBC basketball team found that a 12-week strengthening program improved vertical jump and dynamic balance.

For runners, it's well established that many common overuse injuries are linked to weakness in the foot and ankle. The first line of defence against Achilles tendon problems is strengthening the calf muscles using eccentric contractions. For shin splints, it's weakness in the muscles around the shin that is thought to be a key risk factor, and strengthening those muscles is a common rehab technique. Ferguson has also found that plantar fasciitis can sometimes be alleviated by working on a variety of foot and ankle muscles, including your toe flexors and plantar flexors.

> Incorporating some barefoot or minimalist running into your routine can help strengthen weak foot muscles.

So what's the best way to strengthen your feet? Incorporating some barefoot or minimalist running into your routine, even for just five minutes a few times a week, is a start. Similarly, playing sports that require lateral motion, like soccer or basketball, will tax otherwise unused muscles. For a more focused approach, Ferguson's AFX is a versatile tool that can target virtually any muscle in the foot or ankle with variable resistance for either concentric or eccentric contractions. You can also use simple methods like elastic Thera-Bands to provide resistance – or even the old-fashioned method of putting a can of soup into a thick sock, and tying it around your foot as resistance for toe raises. R

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