Shoe Shopping by Richard Beauchamp

After Frankie bought her new running shoes from her neighbourhood sporting goods store, she set out on her 10K training run. Forty minutes into her run that old nagging knee pain returned. She thought that the new shoes would have helped with her knee pain—she had been advised by the salesperson that she required motion-control shoes.

She had a lot of questions after this advice: "What went wrong?" "Why didn't the motion control shoes help my knee pain?" "Was I given the wrong advice from the staff at that sporting goods store?" "Did I really need to change my shoes in the first place?" "And what about orthotics, anyway?"

First of all, decisions to buy new shoes to treat any injury must be approached with caution. Buying new running shoes can be a big financial investment, sometimes with very limited rewards. Knee pains, foot pains and other injuries should be accurately diagnosed, if possible, before a decision to change shoes is made.

Let's review some of the terms used in describing foot types. Everyone's foot size and shape is unique. Since the foot absorbs several times one's body weight when running, it has to provide efficient and comfortable mechanics. Toddlers who have just begun walking generally have flat feet. The arch of the foot doesn't develop fully until late childhood. If poor arch formation occurs, then terms such as flat feet, fallen arches or pronation are used. If an exaggerated arch develops for whatever reason, then the terms cavus or supination are used. There are, of course, variations of the extent of either pronation or supination that occur. Hereditary factors are usually responsible for one of these general foot types, but occasionally a particular foot type can be acquired through injury or diseases. Shoe wear does not influence the development of either of these two foot types.

Shoe selections are often based on the premise that your foot has a particular or unique shape. It is very difficult to classify a runner as having a pronated, supinated or neutral foot just by analyzing the stance position. Even observing the tread and shoe wear is often misleading. I once made the mistake of advising a parent on the need for orthotics for her son's feet, based on an assessment of his shoe wear. She quickly informed me that the shoes her son was wearing had been handed down from his older brother!

Most shoes show heel wear on the outer edge of the heel at the back. You might think this wear indicates that the wearer is a supinator. However, most people are pronators. The heel wear on a shoe is only an indicator of hind foot position at initial heel strike, not an indicator of what happens to the foot after heel strike as the runner advances over the shoe. Normally, following heel strike the foot pronates slightly to act as a shock absorber. In order to then propel the runner up and forward, the foot has to supinate and become a relatively rigid lever arm to improve its efficiency. Therefore, everyone's running style includes both pronation and supination. The extremes of these two events are what determine the need for specialized shoe.

Excessive pronation results in the foot being somewhat "sloppy" and inefficient. These runners probably do best with a motion control shoe, which prevents the exaggerated pronation and maintains the foot in a slightly supinated position to improve its efficiency. Excessive supinators have a more rigid foot and cannot absorb forces well, thereby leading to injuries further up the leg. These runners require a shoe that provides more cushioning than support. If you happen to have the "perfect" foot then a neutral shoe is for you. Having a "perfect" foot may also be the only prerequisite to go barefoot running, as some runners are known to do.

If simple observation of the foot and shoe is not entirely indicative of foot pathology, then what is? Probably the most accurate method is some form of plantar pressure measurement. This reading can often give valuable

About Richard

Richard Beauchamp is a runner as well as an orthopedic surgeon. His running career has spanned about 10 years and involved seven marathons. His orthopedic surgery career extends over 25 years. He is the medical director of the Shriner's Gait Lab at the Sunny Hill Health Centre in Vancouver and a clinical professor in the Department of Orthopaedics at the University of British Columbia. He runs out of the Alma Running Room along with his wife and "cookie maker" Dorothy.

information about the dynamic (in motion) foot position rather than static (standing still) information one sees just with normal foot stance. Frankie, however, claims that she also had a foot-scanning test done once before and the same advice was given about her shoe requirements.

What should she do now?

Running shoes for someone of Frankie's running calibre should always be purchased through a facility that can properly assess and advise on the most appropriate footwear. General sporting goods stores usually do not have the experienced staff members or stock available to provide these features.

In conducting foot analyses, one or even two foot scans are probably not indicative of the true position of the foot during at least 90% of the running cycle. Many trial scans should be done if the runner is having a hard time finding the right shoe, such as Frankie is experiencing. Once several running trials have been conducted, an average profile can be deduced in an attempt to reflect her "usual" foot position. Frankie should visit a store that specializes in running shoes and have a more thorough foot scan or visual gait analysis done. Most runners, fortunately, do not require extensive foot assessments like Frankie does. Visual analysis by a specialized shoe fitter is usually appropriate.

What about the popular push for barefoot running?(1) Or five-finger shoes? Would that be her answer? It has been shown that barefoot running does decrease the pressure on one's heel and encourage forefoot landing. However, shoes provide other benefits than just when one's foot strikes the ground. Shock absorption, skin and bone protection, insulation and health issues are also very important reasons for appropriate shoe wear.

Do the shoes have to cost the runner an arm and a leg? No, running shoes should not be exorbitantly expensive (they should cost in the $150 range). A recent study in the British Journal of Sports Medicine implied that "cheaper" shoes were better than expensive shoes in preventing injuries.(2) There were some valid points in that study that analyzed treadmill running and the rate of injuries, etc. How many runners do a 10K race on the treadmill? However, one can't conclude that cheaper shoes are better. This study's conclusion failed also to include the importance of durability of wear, consistency of the product and structure of the shoe.

The actual cause of Frankie's knee pain should be determined by consultation with her medical provider. Frankie also has to realize that there are many other causes for her knee pain than her type of running shoe, and she may have to accept other methods of treatment rather than shoe replacement. This might include physiotherapy, training modifications, medical therapy (anti-inflammatories, either oral or topical) and yes, even orthotics!

Why buy new shoes?
1.Old ones worn out
2.Injury
3.Keeping up with the Jones's

References:

1. *Canadian Medical Association Journal,* 2011; 183 (1)
2. *British Journal of Sports Medicine,* 2007; 0, 1-5