

Two Main Reasons for Knee Injuries in Runners

Physical Therapy in Corpus Christi for Running

Why is it that most running injuries occur at the knee or in the lower leg? Is there some common factor that might be involved? The authors of this study set out to look for some answers to these questions. They didn't do a study themselves of runners. Instead they turned to the literature and did a search of all the published articles on running injuries.

Research studies like this are possible now that everything is contained within an electronic database. Four of the most well-respected electronic databases (e.g., MEDLINE, EMBASE, PsychoInfo, CINAHL) were accessed for information on risk factors for overuse running injuries.

By doing a search with words like running, injury, mechanics, and knee, they were able to find 283 articles on running injuries published between 1980 and 2008. They narrowed the search down by looking for running injuries in long-distance runners who ran at least 20 kilometers (12 miles) each week. The athletes were recreational or competitive runners (not elite runners). They had been running at least one year (most much longer).

After analyzing the evidence, what they found was that there are two main reasons for overuse running injuries. The first is foot position called pronation. This describes an ankle that is angled inward and a foot that is flat (collapsed arch).

With a flattened arch, when the foot strikes the ground, the (flat) arch absorbs some of the shock that the heel would normally absorb in a foot and ankle that has a more normal alignment. If this misalignment occurs over and over with each stride, it can lead to foot pain as well as knee pain. Some runners develop pain up the front of the lower leg (shins) as a result of this transfer of energy on impact. This condition is called shin splints.

Studies have shown that a small amount of foot pronation during mid-stance (when weight is on the foot) works to the runner's advantage. But too much for too long in the stance cycle and problems develop. If the foot and ankle don't roll back away from the pronated position, there isn't a rigid enough column of support to allow for toe-off in the propulsion cycle. The tibia (lower leg bone) tries to compensate by rotating. The risk of injury goes up with the large twisting force placed on the lower leg.

Exactly how much pronation is too much remains unknown. This isn't surprising since we really don't even know what normal physiologic foot pronation is during unloaded (foot off the floor) and loaded positions (foot in contact with the floor).

Several studies have tried to look at this variable. So far, there isn't agreement across the studies to show a cause-and-effect relationship between 'X' amount of foot pronation and injury. It seems there were just too many factors (e.g., running with shoes, running barefoot, having a prior running injury, position of the heel and rearfoot) that interfered with getting consistent results.

The second common risk factor in overuse running injuries of the knee involves the hip-stabilizing muscles. Weakness of the gluteus medius and other muscles that control hip internal rotation and abduction (moving the leg away from the body) play a big role in knee injuries.

When these muscles don't stabilize the hip, the leg pulls into internal rotation. As the foot hits the ground, too much internal rotation increases the force placed on the arch and midfoot. The result is to transfer load through the foot and ankle up the lower leg to the knee. Multiple studies have shown the relationship of weak hip muscles to knee injuries. Even a small loss of hip abduction and external rotation due to weakness can affect the biomechanics of the lower leg.

Normally, as the hip moves toward the midline, the iliotibial band functions as a passive restraint system to hold the leg in a more neutral position. The iliotibial band is a long fibrous band of connective tissue along the outside of the hip. It goes from the pelvis to the tibia (lower leg bone).

Some of the hip muscles join together with the iliotibial band. When a runner with weak hip stabilizers runs, the iliotibial band gets overworked and they can end up with knee pain and/or iliotibial band syndrome (ITBS). ITBS is a painful lateral thigh from friction of the band against the muscle, bursa, and bone.

The authors conclude that the majority of overuse running injuries are caused by two basic problems: abnormal foot pronation mechanics and weak hip-stabilizer muscles. Armed with this knowledge, runners can be screened for these problems and start on a special rehab program before injuries develop from overtraining. If this theory is correct, rehab should reduce the large number of knee injuries that occur in runners.

Reference: Reed Ferber PhD, et al. Suspected Mechanisms in the Cause of Overuse Running Injuries: A Clinical Review. In Sports Health. May/June 2009. Vol. 1. No. 3. Pp. 242-246.