"Pain is a liar." Have you ever heard that phrase? What most people mean by this expression is that pain does not truly tell you where the cause of your problem is located, only where it ended up. This is never truer than when you are talking about knee pain in runners, especially female runners. Knee pain is very common in female runners and can be due to all sorts of inadequacies throughout the knee, hip, foot, or ankle. Let's start by discussing one common cause of knee pain seen in female runners...weak hips and buttocks. Yep, that's right, the buttocks are not just for show—they have a very important function, and a deficit here can lead to pain in the knee.

It is a very well known fact that the male and female body is not architecturally the same. The female pelvis for example is wider than its male counterpart (this is in preparation for potential child birth). This widening of the hips leads to an increase in the "Q angle" of the leg. The "Q angle" is the angle formed at the knee by the femur and the tibia when looking at the front of the body. While this architectural difference between males and females is something one cannot change, there are muscular influences throughout the hips and legs that can be changed with proper training and exercise. Through proper training the female hip and pelvis can function better with less chance of injury to the knees.

Let's look at some of the muscles in this area that influence the knee. One of the largest and most powerful muscles in the human body is the gluteus maximus, which is the biggest of the three gluteal muscles that make up your buttocks. The Gluteus maximus functions chiefly to extend (move back), abduct (move out to the side), externally rotate (turn out) the leg and also helps stabilize the pelvis and lower spine. The gluteus medius and minimus function to abduct and internally rotate (turn in) the leg as well as helping to stabilize the pelvis. This means that these muscles not only help control the movement of the leg, they also help control the pelvis, which is the foundation where many leg muscles are attached. Two of the three gluteal muscles have a direct connection into the infamous Iliotibial tract (also known as the IT band), while all three of them functionally influence the IT Band.

The gluteals nowadays act as a cushion for sitting rather than an explosive lower body muscle used for walking and running (as designed). This lack of use leads to atrophy and weakening of this muscle group. A weakened gluteal area can lead to a pelvis that moves around too much during running which in turn puts more strain onto the hip and thigh muscles that cross the knee. It can also lead to an unstable knee that will drift inward causing increased tension onto the patella and IT Band which causes pain to the knee cap and outside of the knee.

There is another group of hip muscles that are extremely important to the function of the leg—the six external rotators of the hip (they turn the leg outward). These tiny muscles are deep in the hip, extremely difficult to touch, and are rarely talked about in comparison to the bigger, more recognizable gluteal muscles. For all intensive purposes, these are grouped in with the gluteal muscles. This external rotation is needed to counteract the influence of such things as the 'Q Angle' and over-pronation of the feet that both lead to the drifting of the knee inwards. As with the gluteal muscles, weakness in these external rotators can lead to increased pain at the knee. Some of us in the sports medicine field feel that these muscles are as important to the hip as the rotator cuff is to the shoulder. Just as the rotator cuff in the shoulder needs to be strong for the shoulder to function properly, these hip rotators need to be strong in order
Knee Pain

for the rest of the leg to function better.

Recent studies in Germany found that 20 female runners with IT Band syndrome showed significant weakness in the abduction of their involved leg as compared to their healthy leg—and as compared to other non-injured runners. They also reported full pain relief did not occur until strength was improved to their injured leg. Another study done at the University of Delaware showed that in a group of 18 female distance runners with IT Band syndrome all demonstrated an increase in the addiction (inward drift) and internal rotation (turning in) of the involved knee—a situation that can be counter acted by strengthening the muscles that abduct and externally rotate the leg, the glutes and external rotators.

This information should encourage you to re-evaluate your current “nagging knee pain” (if you are unlucky enough to have it) and reconsider if you are doing all you can for it. These IT Band tendinitises, patella tendinitises, patellafemoral syndromes, and chondromalasia problems that you may have are not just tightness issues that need stretching and massage. You need to ensure you have adequate strength in the muscles of the hip or the tightness and pain will just keep coming back.

Also keep in mind that when you are running there is no rest period for your legs; you are always leaping from one foot to the other with a force several times that of your body weight at the point when your knee and foot hit the ground. These two factors will lead to a magnification of any deficit you may have in your legs. Running is a stressful activity for your legs, but with a well-designed auxiliary program of exercises you can lengthen your running career and lessen the pain involved along the way. So yes, you distance runners may need to strength train and “Buns of Steel” could be the answer you are looking for to get rid of your chronic knee pain.

A couple of quick and easy exercises to help strengthen your hips are the single leg bridge and the clamshell. The single leg bridge starts with you lying on your back, feet flat on the ground, knees bent so your heels are under your knees. Pull your right knee into your chest with both hands. While keeping your right knee as close to your chest as possible use your left leg to lift your hips and lower back off the ground. Perform 10-20 repetitions on each leg.

The clamshell starts with you lying on your right side with knees and hips flexed up in front of you (fetal position) right leg on top of left. Keeping your pelvis still and your feet touching, lift your right knee off your left so that your right knee is higher than your right hip. Your legs should resemble a clamshell opening or a book opening. Perform 10-20 repetitions. For these and more great hip strengthening exercises log onto youtube and check out this video at http://www.youtube.com/watch?v=KbOVWfNyG0.

You need to ensure you have adequate strength in the muscles of the hip or the tightness and pain will just keep coming back.

Michael Silva is the founder and president of Foundation Performance in Pawtucket, RI. Michael has been a physical therapist since 1999, an exercise physiologist since 1995 and a strength & conditioning specialist since 1994. He trains and rehabilitates runners of all levels in the New England area. Log onto www.foundationperformance.com to find out more.

Lucas Meyer and Mariko Holbrook

Ever since former Yale steeple great Lucas Meyer surprised himself with a 5th place 1:05:16 showing at the ING Hartford Half Marathon last fall, the med student has been going great guns. Meyer won the Penn Relays Olympic Development 5K in 14:07 and then ran 28:28 for 10,000m at the Penn Relays. Meyer turned back Kenyan Joseph Koech at the Little Rhody USA Track & Field Olympic Trials 10,000m in 20:36. Just a week later he placed second in 34:21 at the Litchfield Hills 7M, the only non-foreign runner in the top eight.

A graduate student could use a free pair of shoes, right? and former Brandeis All American Mariko Holbrook is certainly worthy. Mariko won the Penn Relays Olympic Trials 10,000m in 34:21 and placed second overall at the Breakheart Classic 6K in 20:36. On May 30, Mariko was the top scorer (17:17) for the runner-up BAA squad at Freihofer’s. On June 7 she secured the USATF-NE 5K title at Little Rhody with a 17:25 scamper, placing second overall to BU’s Marisa Ryan.

Each Athlete Receives a Marathon Sports gift certificate.

Marathon Sports

671 Boylston St.  1638 Beacon St.  1654 Mass Ave.  401 Main St.  1344 Washington St.  255 Washington St.
Boston, MA  Brookline, MA  Cambridge, MA  Melrose, MA  St. Norwell, MA  St. Wellesley, MA

New England Runner, July/August 2009  35