

The Big Hurt: **Why Running is Painful and** **What You Can Do About It**

This cautionary tale, dear reader, is shocking but true. I ask only that you gather your loved ones and hold them close as you read my anguished words. And after, as you dab at wet eyes, you will nod with agreement that it would be impossible for all but the most depraved mind to fabricate such a frightful event. This sad case involves one dearer to me than any other, a person of such character and standing that . . . ah, what is the use of this charade, for *I* am the hapless victim. For me to claim that this episode was an impulsive escapade springing from youthful folly would be nothing but a bald lie. Because, as you well know, I am firmly ensconced in mid-life, even though I regularly feign an adolescent energy by singing along with Lady Gaga and driving like Justin Bieber.

But enough of this; on to my story . . .

One glorious summer day a few years back, I was headed to Vancouver's North Shore to run the trails and slopes around Grouse Mountain, Mecca for local trail runners. I avoided the mob of Lulufied awesomeness on the Grouse Grind and instead headed east along the Baden-Powell trail, eventually running up the rather cruel "Cut" ski slope to the top of the mountain. But once there, I saw that hordes of tourists and "Grinders" had created a long wait for the gondola ride to the bottom of the mountain. I decided to run down.

So down and down I went, retracing my path up. Arriving back at the parking lot my legs were tired and sore, but nothing I hadn't experienced before. The next morning, however, I awoke to something quite peculiar: as I rolled out of bed and took to my feet, my legs, painful and tender, nearly buckled as they tried to support

me. Alarmed by this feebleness I returned to my bed, where a thousand bleak scenarios ricocheted around my mind. I was gripped by the kind of dread one feels when they realize their body is under attack by those ghastly, multi-word afflictions that, seemingly overnight, ambush the hale and hearty. In my mind's eye a dark future beckoned, and all that was visible down life's narrow and ever-shortening corridor was a wasteland of respirators, 24-hour care, and specialists who shake their heads grimly as they speak in whispers to everyone but you.

But after several minutes my rational mind elbowed its way back and the hysteria abated. It was then that I recalled the previous day's misadventure and realized, blessedly, that my present condition was not going to be one of *those* things. What this was, in comparison, was really quite prosaic: it was my introduction, rather my *re*-introduction, to the world of eccentric muscle contractions and delayed onset muscle soreness, a painful world that all athletes, runners in particular, inhabit. I've been a visitor to this place many times in the past, as no doubt have you, but it's always jarring to return and have our bodies remind us, in their own way, that none of us are exempt from the sometimes harsh rules of physiology and bio-mechanics.

We certainly don't need to run down a mountain, throw a javelin, or fast-pitch a softball to discover eccentric contractions. They occur routinely in everyone, athlete or not. But because of the demands that athletes place on their bodies, eccentric contractions can be more frequent and intense, and their after-effects far more debilitating. So what are eccentric muscle contractions and what can be done, if anything, to lessen their after-effects?

Acting on orders from the nervous system, the body uses three types of skeletal muscle contraction to achieve its goals: isometric, concentric, eccentric. The concentric contraction, where the muscle shortens or contracts, is how we typically think our muscles work all the time, but this is not the case. Have a look . . .

Isometric: muscle does not change length as it fires
Concentric: muscle shortens as it fires
Eccentric: muscle lengthens as it fires

To wrap your minds around this it might be helpful to think of muscles functioning much like the gas pedal and brakes on a car. The concentric contraction (muscle shortens) is like stepping on the gas pedal; it creates force to move or accelerate the musculoskeletal system. The eccentric contraction (muscle lengthens) does the opposite: it acts as a brake to slow and stabilize the body and store elastic energy. Remember, the essence of an eccentric contraction is that the muscle *lengthens* as it fires. And, as Shakespeare wrote, there's the rub . . . or in our case, the pain.

The problem is that the biomechanical process at the heart of an eccentric contraction is quite violent. Enormous negative, or oppositional, forces are applied to the working muscles to slow (or brake) them, causing them to pull apart with every stride. There is substantial evidence that eccentric contractions cause damage to the muscle, which is why they increase the risk of muscle and tendon injuries and inflammation, and cause pain for the athlete who hasn't specifically prepared for them.

The “day after” pain we feel is called delayed onset muscle soreness, or DOMS. The symptoms of DOMS can range from muscle tenderness to intense, debilitating pain that peaks 24 to 48 hours after the exercise and usually subsides within 96 hours. DOMS is common after a race or when runners initiate new, unfamiliar types of training, or even when re-introducing specific training that our muscles have “forgotten.” This could include faster interval or speed training, long runs, and yes, even downhill running. All can be painful if done for the first time or for the first time in a while.

To add insult to injury, the pain from DOMS is also accompanied by an acute loss of strength that can continue for several days after the exercise, even outlasting the soreness from DOMS. This loss of strength is substantially greater than that found in other types of muscle contractions and takes longer to recuperate from.

A side note: For those who hope to run the Boston Marathon someday, prepare well. Boston's insidious nature reveals itself in the first 4 miles, during which the course loses about 310 feet of elevation; by 16 miles, the course loses another 120 feet, for a total to that point of 430 feet. "So what's wrong with that?" you may ask. Well, maybe nothing, or possibly a great deal. Because of the strength-sapping nature of eccentric contractions, runners whose legs are not "calloused" for downhill running can feel substantially weakened by the time they reach the Newton hills, beginning at about 16 miles, and the notorious Heartbreak Hill at roughly 20 miles. Their legs, feeling wobbly due to the substantial downhill running in the first half of the course, not to mention the exhaustion of running that far, can often feel exceedingly fatigued in the race's later stages, much more than on a flatter course.

But fear not, a solution is at hand. Researchers have shown that "muscle damage need not be an obligatory response following high-force eccentric contractions" (LaStayo et al). In other words, if we prepare the body for eccentric work, we can do a great deal to substantially diminish or eliminate their nasty side effects. Even better, "inoculation" to eccentric contractions occurs rapidly.

The irony is that the original cause of the damage and pain is what we use to inoculate against further pain and suffering. This is no different than getting a flu shot, where a watered-down version of the virus itself is used to build an immunity to the specific strain of flu. We introduce the "new," more specific eccentric work, whether it's faster interval training, downhill running, or long runs, and build immunity by applying the eccentric stimulus progressively and repeatedly. The protective adaptation occurs quickly, with the

effects being felt within 24 to 48 hours of the initial exposure to the damaging eccentric bout (Lindstedt et al).

What's important to remember is that it doesn't matter how long you've been running or how much experience you have, if you're new to a specific type of training, or you haven't done that type of training in a while, progress slowly. If you're training for a hilly trail race, don't run down the side of a mountain the first time out.

Armed with this information, we can train with a better understanding of why running hurts, and what we need to do to reduce the effect eccentric contractions have on our body.

If you loved this article, you'll also love my 3-day runner's yoga certificate program to be held in Vancouver over the Remembrance Day weekend (November 9, 10 & 11) and in Halifax, N.S. on October 26 & 27. Tons of information and great yoga practices that will make you weep with gratitude. Go to mikedennisonyoga.com for information.