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What goes up must come down
Up does not always equal down: Downhill Running

Many are the runners who plan routes to avoid hills. My wife used to think nothing of running several extra miles to run around a hill rather than run over it. Running hills is hard work and it hurts.

Recent research suggests that running down the hill is more injurious than running up the hill. Investigators measured ground reaction forces during downhill and uphill running. They used a special treadmill which allowed running level and at 3, 6 and 9 degrees of downhill. There was a force plate in the treadmill which measured the amount of force under the various conditions.

Not surprisingly, because of the increased gravitational forces, there are greater forces transmitted to the legs during downhill running. What was somewhat surprising was the magnitude of the difference. Normal impact forces increased 54% above level running and parallel braking forces increased by 73%. The investigator concluded that downhill running substantially increases the probability of overuse injury. Novice runners are at significantly greater risk as they often are overweight and the magnitudes of the ground reaction forces are magnified. Novice runners should seek to run around hills and on the level until they have developed basic conditioning and strength.

It is well accepted that downhill running is the culprit when it comes to delayed onset muscle soreness. Runners who have had the pleasure of running the first 17 miles of the Boston Marathon, which is basically all downhill, remember well the sore thigh muscles which occur after the marathon. Controlled scientific studies have validated that eccentric muscle contractions (lengthening muscle contractions), which occur with downhill running, lead to delayed onset muscle soreness.

It takes more work to go up hill and the energy saving coming downhill is less than the increased energy expended required for going up hill. Runners do not maintain constant energy expenditure when racing on hilly courses. Lactate accumulates on an up hill stage even though pace decreases. On the up hill, you may feel as though your effort is a 7 minutes per mile pace but in reality you are progressing at 9 minutes per mile. Running pace will increase on the downhill but not enough to maintain a constant oxygen consumption rate. This means time lost going

up hill can never be fully regained by running downhill. Distance running performance is slower on hilly race courses than flat courses even when the start and finish are at the same elevation, resulting in equal amounts of uphill and downhill running. This creates a challenge if your goal is to race at a steady pace. Running hills requires more work.

Speed increases running downhill because of increased stride length and increased cadence. Some coaches suggest this is a desired training technique to practice and to learn a faster cadence. Other coaches advocate doing repeat up hill runs in an effort to increase the intensity of the workout and to strengthen the muscles in the leg while avoiding the damaging effects of downhill running. Sebastian Coe, who held the 1500 meter world record, used to do intervals up hill and his dad would drive him back to the bottom.

Correct Form for Downhill Running:

It is important to have correct form when running downhill. Stride length should increase to take advantage of gravity pushing you downhill. The increased stride length needs to come from the hip joint, reaching out. A common mistake is to reach out from the knee joint in order to lengthen the stride while running downhill and to strike the ground heel first. As with running on level, it is wise to avoid striking the ground with the heel first: it is better to strike the ground with the entire surface of the foot. It can be a bit of a challenge to keep the stride relatively short with a fast turnover rate and to strike the ground with the entire surface of the foot. When the foot strikes the ground, the knee should be slightly bent allowing the knee to attenuate some of the high ground reaction forces. Avoid landing with a thud. This sends tremendous shock all the way up to your spine. Stay erect and avoid leaning backwards. The trunk should be perpendicular to the slope of the hill which likely means a slight forward lean. The arms should be held away from the body for balance on steep down hills.

Run down hill as if you sneaking up behind someone. Keep you feet under you and the foot fall as quiet as possible. Bend the knees more than normal. Hold your rear end down and slightly protruding. Look at the ground in front of you.

The key to downhill running is control. If you go too fast, you burn excess energy and risk falling or straining the body. If you go too slow, consciously leaning back or braking as many beginners do, you'll place a severe strain on the legs and lose time in races. Running up or down hill, it's important to hold yourself together and to stay relaxed while maintaining control of your movement.

As wife has come to realize, hills can be an opportunity. She and her friend Molly now look forward to "Molly's Midweek Masochistic Hill Run" along Riverside drive.