

# Why Hill Training?

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## ***Benefits and Science.***

Hills provide resistance, therefore increasing the intensity of training, which results in increased strength. Increased strength can improve speed on the track, road and cross-country and also decreases the possibility of injuries. Uphill running can be used to increase form by concentrating on a relaxed style. On the other hand, downhill running can teach relaxation and improve leg speed and stride.

Running hard uphill will work the muscles of your calves, quads, hamstrings, and the all-important butt muscles and hip flexors. You will also discover that your arms will get a good workout as you use them to help power your body against the pull of gravity. By running hilly courses you will enable your body to adapt to a new level. And by running a specific hill interval workout, you will be fine-tuning these adaptations even further.

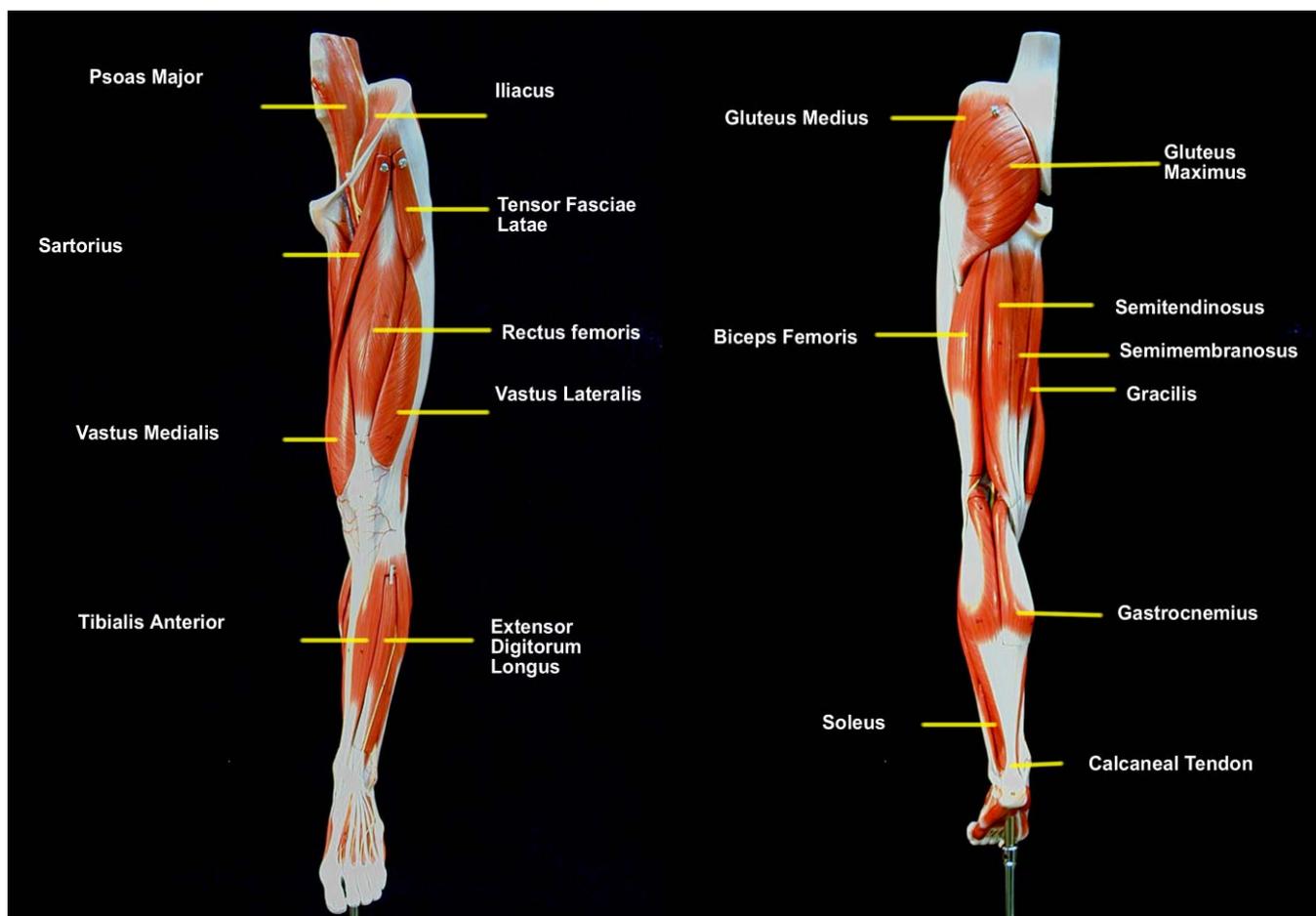
### Physiologically speaking, hill running will:

Increase your aerobic capacity thus enabling you to use less oxygen over increasingly longer distances.

Improve your running economy that enables you to use less oxygen to run at a faster pace.

Increase your stamina that enables you to run farther at a given pace.

Builds strength in your gluteals (buttock), quadriceps (front of thigh), gastrocnemius (upper calf), and soleus (lower calf) muscles.



## **Biomechanically speaking, hill running will:**

Improves your stride length (from uphill running) and your stride frequency (from downhill running).

Increases your ankle flexion that enables you to "pop" off the ground more quickly, so that you can spend less time on the ground and more time in the air.

Teaches you how to run relaxed.

The rather obvious benefit of hill workouts is that they make you better at running hills. Even better, you will see benefits on the flats, too. The muscle groups you use to overcome hills are virtually the same as those you use for sprinting, so hill work enhances your speed by building strength. This strengthening effect is supplemented by the fact that hill workouts help increase both the frequency and length of your stride -- you get even faster. As a final added bonus, hill training also strengthens the muscles around your knees, helping to reduce knee injuries.



Those who run on hills have also been shown to be less likely to lose fitness when they take time off from training.

Many scientists believe that hill training can improve the elasticity of muscles, tendons and ligaments, allowing these tissues to carry out more work with less effort and fatigue.

## ***Technique.***

Technique is the most important part to running hills successfully. When approaching the hill the runner should consider it as an opportunity to relax, change pace, and use different muscles. The head should be upward, looking forward, which keeps the body perpendicular to the ground for best traction. If you bend your head and lean forward, you are constricting the flow of oxygen to your lungs at the very time when your heart needs it most.

Strides need to be short and quick to reduce energy waste and increase efficiency. Hills should be run at a comfortable pace and not at the same speed as on the flat. When reaching the top of a hill don't slow down, run over the crest and quickly resume the previous pace from the flats.

Running hills well is all about rhythm; if you let the hill break up your rhythm you will slow dramatically. But if you make the proper adjustments and maintain your cadence you'll make molehills out of the mountains. Here's how:

Concentrate on keeping good form and increase the rhythm of your arms slightly as you near the crest of the hill and push over it.

Shorten your stride accordingly as the hill gets steeper. Keep your chest out and breathing relaxed. Think of the power coming from your legs, strong and efficient.

Take "baby steps" if necessary, and try to keep the same turnover rhythm as on the flat.

You should use a light, "ankle-flicking" push-off with each step, not an explosive motion.



Your posture should be upright (don't lean forward or back); head, shoulders and hips should form a straight line over the feet.

If your breathing begins to quicken, this means you're either going too fast, over striding or bounding too far off the ground.

The key is to maintain the same effort as you go up the hill. Your speed will slow slightly and increase again as you reach the crest. Keep the same effort at the crest and run past the top.

Run "through" the top of the hill. That is, don't crest the hill and immediately slow down or pull back on your effort. Rather, accelerate gradually into the downhill. Gravity is now on your side.

Running downhill is completely different to running uphill. The skill, technique, and attitude are opposite. Downhill running also needs practice to condition your body to the intense pounding and faster speed of running. Downhill strides are a great way of increasing speed. The secret is to let gravity do all the work by tilting forward and letting the hill carry you down. . To efficiently use this momentum, the runner should lengthen his or her stride, trying to keep the hips over the feet.

When running downhill the runner must lean slightly forward using the arms for balance. Not only will this increase speed, but also minimize pounding by getting off the heels of your feet. Holding back downhill just slows you down and wastes the effort you just put in running uphill. As the downhill gets steeper and your speed faster, raise your knees and widen the length of your stride to cope with the increased speed. For better balance raise your elbows up and out in a free falling motion. To improve cushioning for the shock absorbency, try to land on the front of your feet and not on the heels.



The key to efficient downhill running is to stay in control. When you start, keep your stride slightly shortened and let your turnover increase. When you feel in control, gradually lengthen your stride. If you start to run out of control when descending, shorten your stride until you feel you are back in control again. Once this begins to feel natural, the increase in speed is very noticeable.

## ***Errors.***

**Attacking the uphill:** A quick ticket to oxygen debt.

**Over striding uphill:** Remember that the muscles of the legs are major pumps for the blood supply of oxygen and fuel while running. A short quick stride helps supply more fuel and oxygen than a long slow & one uphill. This is the same reason that it is more efficient to use low gears and a fast cadence when riding a bicycle uphill rather than high gears and a slow cadence.

**Looking at your feet:** Maintain your posture uphill and downhill by looking into the distance. Hunching over or looking at your feet will tense up your muscles and hinder your breathing and balance.

**Resting or holding back on the downhill:** If you do not accelerate on the downhill, you will lose the opportunity to get something for nothing.

If you don't believe this, try running downhill with a pulse rate monitor and notice how much faster you can run at the same pulse rate than on the flat.

A sure sign that you are holding back is the sound of "popping" from your feet as you run downhill. Work on increasing stride length and using your arm swing for balance.



**Not thinking ahead:** Look ahead for variations in the slope up or down and adapt to them immediately. If you have to wait until you are tying up from lactic acid uphill or hearing the "popping feet" downhill to change your form, it's too late and you have already wasted energy.

## **Hill Sessions.**

**Hill Intervals:** This is the most basic and yet one of the most beneficial of sessions. Warm up with a 10- to 15-minute run and then do a set of intervals on a steep slope – it can be anywhere from 30 to 250 metres long. On the uphill section try to run at an intensity that is slightly harder than your best 5K race pace. Jog back to the foot of the hill and, when you've recovered, run hard up the hill again. Start with four or five intervals and gradually build up. You can increase the severity of this session by increasing the number of intervals and/or reducing the recovery time. **Benefit:** Boosts leg-muscle power, giving you quicker, longer strides.

**Hard Hills:** For this session you need an undulating loop which includes a variety of climbs and descents, rather than a single slope. After a warm-up, start to run continuously over the rolling terrain at slightly less than 10K pace. Try to attack the hills on the climbs, building gradually to 10K race pace. Stay relaxed, balanced and under control on the downhill sections. Even if you have to loop around and double back on the same hills, try to find a route where you are constantly climbing or descending. **Benefit:** Increases leg-muscle power, improves the fatigue-resistance of your muscles and prepares your legs for harder sessions and races.

**Bounding up Hills:** After a thorough warm-up, 'bound' up the same hill you use for your intervals. As you run up the hill, spring from foot to foot with an exaggerated vertical body motion, bringing your knees up high and stretching the Achilles tendons fully as your feet hit the ground. To do this, land on your toes with each foot-strike and rock back onto your heel before springing upwards and forwards again. Start with four or five repetitions. To recover, jog easily down the slope. **Benefit:** Enhances the strength and elasticity of your muscles, tendons and ligaments and makes you a more efficient runner.

**Group Hills:** One of the problems of training with any mixed-ability group is balancing the effort and recovery of each person. That's especially the case on hills. To train effectively as a group, set off together on a moderate climb (between 50-100 metres from top to bottom). When the fastest person in the group reaches the summit of the hill, everyone turns around and jogs back to its foot, ideally reaching it at the same time. The goal if you are new to hills is to start gently and to gradually improve your position on the slope with each interval. Those running at the front should run the session as a basic hill interval session. **Benefit:** Combines all the physical benefits of hills in a more motivating and competitive group environment.

**Downhill Hills:** Hill sessions usually concentrate on running up hills rather than down, the implication being that downhill running is the easy part and requires no practice. In truth, efficient downhill running is a skill that will save you just as many seconds in a race as efficient uphill running. Start on a gentle slope with a stretch of flat terrain at the base. After 10 minutes of jogging, ease into the descent with a short (50-metre) burst. Build up over time to as much as 300-400 metres downhill.

Focus on your technique and try to go with the natural pace of the hill, but under control. Don't sprint down, and try to avoid the opposite situation, where you try to brake with feet and quads. You can either focus specifically on the downhill section, in which case jog or run/walk back up the slope, or combine it with another hill session (Kenyan Hills) and take your recovery at the base. Ideally, though, you should do your downhill training on a rolling course where you can naturally practice the transition from uphill to downhill running. Running down after a hard climb, rather than taking a breather, is one of the key skills of hill running.

**Benefits:** Conditions your legs against delayed onset muscle soreness, optimises your performance on hills.

**Note:** You should have a good base level of fitness before you start on any rigorous exercise training schedule. If in doubt, consult your doctor or take an appropriate medical test.