

# Everything You Need To Know About Hill Training

Hill running is a tough but fantastically effective fitness booster. And you know, it can even be fun...

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If you happen to live in a landscape dotted with tors, pikes and braes, then won't have much choice about mastering the art of hill running. In fact, your perception of running up – and down – hills is likely to be different from that shared by the majority of the running population.

That would be that hills are the enemy. They're an obstacle, standing in the way of fast times, a burden to be endured, a muscle-sapping, lung-bursting exercise in pain.

Of course most of this is true. Hills are tough and challenging. They break your rhythm, make it harder to run a fast time and put an immense strain on your body.

But hills are good for you and they're good for your running. Training on hills improves leg-muscle strength, quickens your stride, expands stride length, develops your cardiovascular system, enhances your running economy and can even protect your leg muscles against soreness. In short, hill running will make you a stronger, faster and healthier runner. What's more, the benefits are relatively quick to take effect. In as little as six weeks of regular hill training you can expect a significant improvement in your muscle power and speed.

## **Why hill running works**

Runners today increasingly understand the importance of combining strength work with regular running. It strengthens tendons and ligaments, reduces the risk of injury and improves overall running form. The problem is that most runners tend to do the majority of their strength-specific work in the gym, through squats, leg extensions or arm and shoulder presses. While these exercises do increase strength and muscular power, they do it in isolation of your running, focusing on individual joints and small sets of muscles.

Hill sessions, in contrast, force the muscles in your hips, legs, ankles and feet to contract in a coordinated fashion while supporting your full body weight, just as they have to during normal running. In addition, on uphill sections your muscles contract more powerfully than usual because they are forced to overcome gravity to move you up the hill. The result is more power, which in turn leads to longer, faster running strides.

## **Science of hills**

Much of the science supporting hill training was carried out in Sweden, initially at the Karolinska Institute. One major study carried out on marathon runners discovered that after 12 weeks of twice-weekly hill sessions, the athletes' running economy had

improved by three per cent. Although the subjects were trained runners, that improvement would still have helped them clip as much as two minutes off a 10-mile time or six minutes off a marathon.

Other research, carried out by Dr Bengt Saltin, discovered that runners who trained on hills have much higher concentrations of aerobic enzymes – the chemicals which allow your muscles to function at high intensity for long periods without fatigue – in their quadriceps muscles than those who did all their running on flat terrain. Heightened aerobic power in your quads gives you improved knee lift while running and also accelerates each leg forward more quickly as you run, which improves your speed.

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

### **Going Up**

It is the moment all runners dread. You turn the corner and right in front of you is a big, imposing hill. But don't wince, focus. Shift gears both mentally and physically and prepare to attack the hill; don't let it attack you. 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:

- As you start uphill, shorten your stride. Don't try to maintain the pace you were running on the flat.
- You are aiming for equal effort going up as well as down, not equal pace. Trying to maintain the pace you were running on the flat will leave you exhausted later in the race or session.
- Take 'baby steps' if necessary and try to keep the same turnover rhythm that you had on the flat ground.
- Your posture should be upright – don't lean forward or back – your head, shoulders and back should form a straight line over the feet. Keep your feet low to the ground.
- If your breathing begins to quicken it means that you're either going too fast, over-striding or bounding too far off the ground as you run.
- Use a light, ankle-flicking push-off with each step, not an explosive motion, which will waste energy. If the hill is long or the gradient increases, keep shortening your stride to maintain a smooth and efficient breathing pattern. If the gradient decreases, extend your stride again. Try to maintain the same steady effort and breathing throughout.
- In a race, or when you're training on a undulating course, run through the top of the hill. Don't crest the hill and immediately slow down or pull back on your effort.
- Accelerate gradually into the downhill.

## **Coming Down**

Most runners make one or two obvious mistakes when running downhill. They either sprint, which causes severe muscle soreness later on, or they're so hesitant to surrender to gravity that they're constantly braking, which fatigues the quadriceps muscles. The optimum pace is somewhere in between. Try not to let your feet slap on the ground when you are running downhill. Step lightly and don't reach out with your feet. Slapping can be a sign of weak muscles in the shin area, in which case you need to strengthen them. To help your downhill technique, follow these simple tips:

- Try to visualise gravity pulling you down the hill.
- Try to maintain an upright body posture, keeping your torso perpendicular to the horizontal.
- Keep your feet close to the ground for maximum control, and land lightly.
- As you increase your pace, emphasise quicker turnover rather than longer strides, though your strides can be slightly longer than normal.
- 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.

## **Key Hill Sessions**

Running hills is like doing speedwork, in effort if not in outright speed. It is hard on your body, so don't do more than one of the following sessions per week.

### **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.

## Indoor Hills

If you are reading this in Lincolnshire or Holland, don't worry, you can make your own hills with a treadmill. Again, warm up with 10 minutes of easy running, then set the treadmill to a one per cent gradient and the speed to 10-15 seconds per mile slower than your current 10K race pace. Run at this pace for five minutes then increase the gradient to five per cent and run for two more minutes at the same pace. This should force your heart rate up by 10-15 per cent, increase your oxygen consumption by 25 per cent and quicken your breathing by 35 per cent. Run easily for five minutes and then try to repeat the interval. Over time you can force yourself up to four seven-minute intervals (five minutes at one per cent, two at five per cent) and reduce your recovery to three or four minutes.

**Benefit** Conditions you to attack on hills and makes you an explosive hill runner.

## 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

Most people's idea of hill running is only half the story. 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 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.

## **Hill-Running Answers**

### **Why don't I have the leg strength to run well on hills?**

This is rather like asking why you don't have the speed to run fast. At the moment you may not have the leg strength to run on hills, but that is probably because you don't train on hills, and hence suffer when you meet them in races. If you want to change this – and you can – then you have to start integrating regular hill sessions in your training programme. All improvements in training are relative to your individual capabilities. No one is suggesting that you will suddenly become a fell-running champion, but if you train on hills, your body will adapt and you will have the leg strength to run them.

### **Are there any psychological tricks to make hill running any easier?**

Consistent training isn't a psychological trick, but it is your best weapon in the battle against hills. It gives you the confidence that you have the physical capabilities and the technique to defeat any hill in a race. Try to take on hills in training that are steeper and more demanding than anything you will face in a race. Once you realise that there is a stride small enough to tackle the steepest of hills and that you can maintain your breathing and form on the hills, then the slopes just become another part of the course. Other little tricks that work include trying to visualise a slight decline rather than incline when you're going uphill – this works better on gentler slopes – or focusing on other runners rather than the hill. With the latter, give yourself targets to pick off as you go up a slope. You'll be surprised how many people you catch if you maintain a steady cadence and rhythm.

### **I live in a flat-as-a-pancake part of the country – can I duplicate the effort of hill running by running up stairs in a building?**

Many runners who can't find hills in their natural environment turn to treadmills to simulate hill sessions. This would be the ideal approach, but if that isn't an option then stairs or steps can be useful. Try to ensure that you climb for at least 45 seconds in each 'hill' interval – which means three or four floors of an office building – and if you need to make the session harder, bound up the stairs two or three steps at a time.

### **Is there any benefit in running up gentle inclines quickly, or should all hill training be done on 'real' hills?**

Training on steep hills prepares your legs for running on steep hills. Since the hills you

face in races are likely to vary, the ones you tackle in training should also vary. Even gentle inclines require a slightly different technique and more effort than running on the flat. It is a useful skill to practice, although obviously you should be doing longer, faster sessions on the easier slopes. Ideally you should try to do a hill session that includes a variety of gradients, both up- and downhill.

### **How should I approach a race that starts with a climb?**

In short, with caution. Firstly you should ensure that you have warmed up thoroughly before the race begins, so that your first running steps of the day are not an uphill slog. Always take that first hill cautiously. Overdoing the pace early on can release lactic acid into your muscles, which will really hurt your efforts during the remaining miles. Save your hill attacks for the second half of the course. By then, you'll be pumping lots of oxygen to your leg muscles, and the weeks of hill training you have been doing prior to the race will pay off.

### **Can I use hills for speed training as well as for strength training?**

Truth is, they are one and the same, which is why training on hills is often called speedwork in disguise. You don't have to run fast to work hard when you are running hills, and they certainly condition your legs for the kind of fatigue you can expect in a race. Hills are also a good session to do on your own because the hill ensures that you get enough of a challenge out of the session. Remember, however, that hills are a complement to conventional speedwork; they are not a total replacement. The only way to run fast in races is to run fast in training. While hills may help you develop the leg muscles and respiratory system to cope with serious speed, you still have to condition the rest of your body to fast running.

### **Can downhill training really help prevent injuries?**

Definitely. Most hill-related injuries, both minor and major, occur on the downhill sections of a course, when gravity is working with you and the full weight of your body is pounding through your joints and muscles. Practising downhill running during training forces your quadriceps muscles to contract 'eccentrically' – minimising the soreness which often follows a hard, hilly section – and will also condition the ligaments and tendons in your knees and ankles to the strain of moving fast downhill. You can feel these benefits with as little as 15 minutes of downhill running per month.

### **Why does my heart rate always skyrocket when I start running hills in a race?**

Probably because you are running the hills much too hard. Most runners try to run too hard on the way up, are spent by the time they reach the peak, and have to take a breather on the descent. Your goal should be to maintain equal effort both up and down the hill, and on level ground. With a heart-rate monitor you have the perfect tool to gauge this accurately. Your heart rate will rise slightly as you climb the hill when compared with racing on the flat, but it shouldn't jump up dramatically. If that happens, it is a sure sign that you are trying to hold your pace rather than your effort.