Add a Little Intensity: Hill Repeats

Why Every Runner Should Add This Workout to Their Plan

We all have our favorite workouts, and today I'm going to break down for you one of mine, and reveal the physiological underpinnings that make it such a goldmine.

Being fast at any endurance sport comes down to how well the athlete has forced their body to adapt. Some factors, like VO2 max, have a genetic limit that is reached after a relatively short period of time (around 20 weeks in this case.) When coaches talk about ways to become stronger, faster, better runners, we talk about lactate threshold, capillary density, and economy. Basically, what we want to achieve as runners is

- The most efficient use of our muscles and their energy supply
- The most effective clearing of blood lactate
- The strongest cardiovascular and circulatory systems delivering maximal oxygen

Of course, there is no one workout that targets all components of our bodies simultaneously. The workout I'm going to present today yields significant improvement in the capacity of our heart to move blood (and therefor oxygen), induces a rapid rate of capillary and mitochondria growth in intermediate-twitch muscles fibers, and reinforces nervous system messaging and recruitment. First, let's break down the workout. Then we'll attack the jargon.

Hill Repeats are a favorite of mine for their "bang for the buck" status. Less painful than 5k or 10k pace workouts and short enough to fit into the average lunch break, these repeats pack a powerful punch. How can you get started?

I always recommend to my athletes a minimum of 15 minutes of warm up before repeats, and 10 of cool down after. Many seasoned runners will prefer more. When you're ready to start the repeats, first find a hill with proper steepness. It should be a challenge, but should allow you to maintain good stride form. Choose your number and length of repetitions from the following options:

- 10-15 repetitions of 30 seconds, with 60-90 seconds rest
- 6-8 repetitions of 60 seconds, with 2-3 minutes rest
- 4-6 repetitions of 90 seconds, with 4-5 minutes rest

Judge your pace by feel. It should FEEL a bit faster than a 3k, but your speed will be slower than actual 3k pace because you will be running uphill. Run your first repetition at this pace for your chosen duration, mark the spot you reached on the hill, and for every subsequent repeat ignore the watch (you read that right) and just run to the spot you marked. Jog back to the start.

This workout can be done up to three times per month. You should NOT run to failure in this workout. After your last repetition, you should feel as though you could run one or two more at that pace.

Pushing it will only negate the benefits. Trust me, I see far more athletes training too hard than too easy.

If you just want the workout, no science, then you can stop reading here. Otherwise, read on for some physiology jargon!

As mentioned above, this workout is great for increasing the amount of blood your heart can pump in one beat, referred to as “stroke volume.” The surprising part is that it’s the RECOVERY between repeats that causes the greatest adaptation. When you rest between repetitions, your heart rate drops quickly, but your rate of blood flow is slower to catch on. This forces more blood into the heart’s ventricles, temporarily manufacturing an increased stroke volume. With repetition, the heart adapts until this increased volume becomes the standard. How cool is that!?

Increased blood flow means more oxygen to your muscles, if it can get to the right place. After a workout like Hill Repeats, capillary density increases around muscles that were recruited (used) during the workout, allowing increased oxygen delivery to these muscles. Capillary adaptation occurs only around the recruited muscles, meaning swimming, skiing, or biking won’t build capillaries in our running muscles.

It’s the job of mitochondria to use the oxygen to make our main source of aerobic energy, ATP (adenosine triphosphate.) In response to increased demand, mitochondria will grow or replicate, but during this process of adaptation they are out of commission for ATP production. This is one reason you may feel sluggish as many as ten days after a hard workout.

And the last bit of jargon for today: nervous system recruitment! On a basic level, when you run, your nervous system must coordinate the timing and velocity of contraction for all the muscles controlling your various joints. No small job! Short repetitions such as Hill Repeats increase signal strength across neurons, increasing the force of contraction, and powering a stronger stride. Voila!

Wow, a lot goes into a simple workout…and there is so much more an athlete or coach can factor in when designing a workout or training plan. So when you’re out running your next workout you can ponder the myriad ways you are using all of your body’s systems. Then go chat your coach up about physiology. They’ll be impressed!