

## How to Climb a Hill on a Bicycle

For those who are beginning to ride bicycles, the problem of climbing hills can create enough discouragement to bring an end to the experiment, and for this reason, I am supplying this simple advice. Please note that this is not racing advice.

There are three factors determining how well one can climb a hill. The first is strength, which is partially due to genes and partially due to training. Basically, it's possible to say that the more hills you climb the easier they will become. The second factor is the gearing, as choosing an appropriate gear makes an enormous difference. A race between a champion cyclist with a single-speed bike and a young woman with a multi-speed bike, sponsored by Velocio, proved this for all times. I have written an article on [gearing and cadence](#) elsewhere that goes into great detail on this subject, so I will just say that the appropriate gear is the most efficient way to get up the hill. If the gearing on the bike is not appropriate for the strength of the rider and the steepness of the hill, then climbing the hill will be very difficult if not impossible. The third factor is the strategy employed to climb the hill, which I will now examine in detail.

There are three kinds of hills or mountains to climb: the convex hill, the even-grade hill, and the concave hill. A convex hill or mountain is steepest near the bottom. Approaching such a mountain by bike, it appears to get lower as you get closer. Limestone mountains and hills are naturally convex. A concave hill is steepest at the top; thus when approaching a mountain of this type, it will appear taller as you get closer. Mountains and hills formed of tough and unerodable material are naturally concave. Note that since a mountain is composed of various layers, a high mountain may change from convex to concave and back again or vice versa. And also note that the road itself will not always follow the terrain; indeed, it may be steepest where the mountain is less steep and wind its way alongside the steepest part of the slope. An even-grade climb probably owes its uniformity to an artificial slope, although some natural slopes have an even grade for long distances.

Finally, we have to consider whether we are climbing an isolated hill, a series of hills, or a mountain, as the strategy must be different for all three.

### How to Climb an Isolated Hill

Let's suppose that we are riding along a level valley floor when we suddenly notice a hill in front of us. How we should react depends on the height of the hill and the type of hill. If it's small, we may want to power over it. If it's a convex hill (steepest at the bottom), it is definitely in our best interest to do so, even if it isn't so small. To power over a small hill or over the steep part of a longer hill, one picks up speed on the flat before reaching the hill. How do you pick up speed? Well, just pushing harder on the pedals will help, but it usually helps too to shift down a notch. Shift down to go faster? Yes, spinning faster,

while it wears you out faster, will produce more power, and power is needed to accelerate. In powering up a hill, it is not only necessary to shift down while climbing, but it is also necessary to shift a little early each time, keeping the legs moving faster (the cadence higher) than if moving at the same speed on level ground.

**A**n important part of shifting down and applying power earlier lies in the timing, and this is something that must be learned from experience. If one applies too much power too early, the hill becomes harder to climb, due to becoming fatigued before reaching the top. If one applies too little power or waits too long, the hill is harder to climb, due to having to labor up it. However, if the right amount of power is applied at just the right time, the hill is much easier, which is why two riders of equal strength and weight won't do equally well on the same hill.

**A**t some point in climbing the hill, it may be necessary to apply even more power to increase speed without shifting down. This may happen where the road is starting to level out, especially near the top. The solution to this problem is to stand up on the pedals, allowing the whole weight of the body to alternate from pedal to pedal. Standing can be very wasteful if done incorrectly and very successful if done well. There is an alternate to standing: when sprinting, I pull on the handlebars rather than standing up; this pulling on the handlebars allows me to push harder on the pedals. If the pedals are still spinning quickly, it makes better sense to pull on the handlebars than to change the gearing and then stand up.

**I**f one is approaching a convex hill, applies power early, and powers over the hill, the speed is much greater than if one simply gears down as one approaches. You may think, but surely this is a tactic for racing alone! But the truth is, I use it often in touring. Sometimes I am crossing a bridge, so I need to keep my speed high, to get off of the narrow bridge as quickly as possible. But I have another strong reason for using these tactics when touring: I can save energy over grinding up the hill. However, the extra weight of the bike and also the fatigue of a long day do create limits to these strategies.

**B**ut what about a concave hill, which is steepest at the top? Then it makes no sense to rush the bottom of the hill. Climb at a steady pace, save your energy, and gear down as you reach the steeper part. On the steep part of a small hill, there are two choices: to keep gearing down or to stand up. I let the size of the hill mainly determine my choice, although other factors, such as the direction and force of the wind, are very important. On a small hill, it's generally less difficult and will produce a higher average speed to stand to take the hill. One problem with standing to take a hill is that it's very awkward to shift up or down while standing, so it is necessary to learn how to judge the correct gear before standing up.

**A** small, even-grade hill is a little less complicated than the other two. If it is steep, you may want to rush the lower part. Since the correct gear choice is the same from bottom to top, it won't be necessary to adjust your gearing once you reach a steady speed.

## A Series of Hills

One problem with climbing hills is that all the energy put into climbing a hill is lost in the descent on the other side. However, if the hills are close enough together, particularly if they are convex hills (steepest near the bottom), then part of the power (and sometimes most of the power) used to climb one can be transferred to the other. I call this roller-coastering when this transfer is so successful that I fly over the second hill.

After crossing the first hill, I accelerate to speed, then put my hands on the drop portion of the bar and tuck my head in, and allow gravity to increase my speed. At the bottom, as my speed falls low enough to pedal again -- about 25 to 35 mph -- I start pedaling again, giving it all I got, and continue upward, gradually shifting downward as necessary, but keeping the gear low and the legs spinning fast. Of course, it's important not to overdo this effort, or one can run out of steam before reaching the top. But if done correctly, the energy applied to climbing the first hill is applied to climbing the second, and one is much less tired than one would be from climbing at a slower rate.

On one magical day back in the 60's, I faced a long series of steep, convex hills, one after another, but I also had a good tailwind. The tailwind would give me a boost as I was slowing near the top, and as a result, my speed never dropped below 15 mph. As I was hitting 35 mph at the bottom of the hills, I wonder what my average speed must have been. It was probably higher than if I had been on level ground with the same tailwind, although I was working harder too.

If the hills in the series are far enough apart or are concave (steepest at the top), then the gain is not as good. However, one should accelerate at the top and then use the drops or pedal on the lower and flatter part of the slope going down to preserve as much speed as possible. I find that a fairly high speed can be maintained going downhill on a shallow slope without much effort once it has been achieved on the steeper slope. This higher downhill speed will improve the day's average speed and may be helpful getting up the next climb as well. As all speed will be lost before the steep part commences, one can only gear down and trudge up, as I explain next.

## Climbing a Mountain

Whether mountains are in series or isolated makes little difference as any speed applied at the base will only carry one a small part of the way to the top. As a result, the strategy of climbing a mountain is completely different.

In mountain climbing, pacing is most important. If you try to climb a mountain too quickly, you will tire before the end. In a race, of course, it is absolutely essential to not stop. However, in touring, you may wish to climb at a higher speed than you can maintain for the entire climb and then stop for a rest break. Besides running out of

energy, there are two common reasons for needing a rest: 1) to cool off, and 2) to let the heart rate drop. It can be important to rest if either of these occurs, as they can both be dangerous. I find that walking gives me a great way to rest and climb at the same time. By walking a bit, I give my heart a chance to recover while still requiring it to work some. Likewise, walking can be cooler when the body has become too hot. In this regard, I often plan to start walking when I reach the shade of some trees, as bicycling in the hot sun is usually cooler than walking in the hot sun. Having some really low gears on the bike (see my article on gearing) can really help on a mountain climb because otherwise you might be forced to push harder than you are prepared to do.

**S**ome cyclists tell me that they hate hills and mountains and find them unpleasant. But, even though I am not especially powerful, I like to plan my trips in the mountains because I enjoy the scenery and the woods. I am always careful to never let myself get too tired or too hungry, as that leads to frustration. It's better to stop and enjoy the view than to get frustrated on a mountainside. Learning to climb hills and mountains opens up whole worlds of cycling possibilities. By Ken Kiefer [www.kenkiefer.com](http://www.kenkiefer.com)