Welcome to another Ironmate Special Edition from British Elite cyclist Roy Chamberlain.

Roy has been racing as an elite rider for 20 years; he has represented Great Britain on numerous occasions and spent 2 -years racing semi- pro in France. With a BSc in Sports Science he is well qualified to educate us on the art of cycling.

RACING UP HILLS

How to judge your pace and a session to increase your uphill cycling speed

In an attempt to lose as little time as possible a common error of dealing with an uphill is to dig in too hard until the summit. This high effort type of approach is OK for short hills of up to a couple of hundred metres in length and if you have a decent descent on which to recover, but anything longer will need a bit more thought.

The Theory

Digging too deep is not the most efficient way of getting up hills in a triathlon or time trail. If we think about the whole event, we can safely say going into the `red' during the race is detrimental to the overall performance (except of course the wind-up to the finish when you throw caution to the wind and go for it).
If at any point of the race we dig too deep too much lactic acid accumulates in our exercising muscles resulting in an inability of our muscles to work optimally. In order for the lactic acid to be buffered (by the alkaline bi-carbonate) and be dissipated away from the exercising muscles we must follow any over-exertion with period of easing off.

Now if we relate this physiological principle to riding over hills we can see that digging in too deep is not the best way to ride hills in an event. Ideally as we begin climbing we should expect our heart rate to increase only a little from that when riding on the flat. The sensation of effort should be the same as when riding on the flat. Any small increases in heart rate (+5%) are a result of the heart to beating faster to supply oxygenated blood to the muscles of the upper body as we get out of the saddle or start to pull on the bars. Start the hill in control and gradually build up the effort so as you crest the hill you are ready to go back up the gears and start to gradually increase your speed. If the hill is followed by a big descent you can dig in a bit more towards the summit so any small increases in lactic acid can be buffered and dissipated on the way down.

To assist the removal of lactic acid from the legs don't forget to keep pedalling on the way down -slow pedalling is better for recovery than just free- wheeling.

If there is not descent immediately after the hill then it's important that you climb in control and not to over cook it. If you misjudge the pace the time lost over the top of the hill can be huge if you're still floundering on the little gears instead of powering away

Over the years, I have had the privilege to watch the world's elite cyclists tackle hilly time trails. One of the striking features of their style is how in-control they are while climbing; no lung bursting efforts, no over gearing, just a flowing style and when they reach the top away they go, back up the gears and back to riding at 30 mph plus!

At this point I must also stress that there are other factors that affect the speed at which you can go up hills, mainly body and bike weight. Now I don't want anyone turning anorexic on me, the ins & outs of weight loss are very individual and beyond the realms of this article. However I will briefly mention that according to the laws of physics the lighter we and our bike are, the less `load' we

have opposing the force of gravity.

As I outlined above the triathlon effort is, depending on distance done at or below the anaerobic threshold. A threshold whereby the amount of lactic acid produced does not impair the contractile ability of your exercising muscles. Basically if you go over the `threshold' you're going to have to slow down at some point because it's too painful to continue. Conversely if you are competing at an intensity, which is well below your threshold, you aren't going fast enough!

The best way to improve the speed at which this threshold occurs is to integrate intervals of 4 to 6 minutes at intensity just above the threshold. By stressing the body in this way the body adapts by improving the muscles' capacity to buffer and remove lactic acid away from the exercising muscles enabling you to continue cycling at an intensity that would formally have been intolerable.

The Session

Find a hill that has a flat section that takes a least a minute of hard riding to cover before you get to the bottom of the hill. The hill shouldn't be too steep, ideally with a constant gradient of between 1 in 10 (10%) to 1 in 15 (6.6%) and followed by a false flat or flat road that takes a further minute to cover. So if you include the one minute before and one minute after the hill the length of the hill should be anything from two to four minutes of climbing.

The session should follow a good warm up of at least 30 minutes of riding at 75% max heart rate. Ride each one flat out (by imagining that the finish line to the most important race you can think of is over the top of the hill) by starting the effort one minute before the hill. You'll hit the hill with your heart rate elevated then as you start the hill remain seated for the first two thirds then as you are about 250 metres from the summit get out of the saddle change into a bigger gear and go for it. By the time you get to the summit your heart rate will not be far from its max, now you're training!

The end of the effort is a further one-minute of grovelling to the finish. The last minute is where the work is being done to improve your threshold; your muscles are swimming in lactic acid as your vision becomes blurred to get to the finish line that never seems to ever come. Try to keep a tab on the times of each interval and try to improve on your best time.

The recovery is the downhill section to the start; don't forget to keep the pedals turning. The number of repetitions you do will depend on your fitness level and the intensity you are putting in. If these intervals are done correctly you'll struggle to do more than 10.

A good guide is that if your efforts are more than 10% longer than your best time its time to go home as the quality of efforts will not bring on the optimum training benefit and take even longer to recover from. From my experience my second or third efforts are my fastest then I start to get slower as the lactic acid takes effect in reducing the force my muscles can exert on the pedals.

At the end of the session put your hand over your opposite shoulder and pat yourself on the back. Well done! This is a serious session and it should be approached with respect. To get the best results from this session make sure you are rested before and have at least two days recovery afterwards, if you can train the next day you haven't tried hard enough! I also recommend that you only do these sessions after a period of endurance training and have had at least a month of threshold training such as 10-mile time trials.

The positive effect these sessions will have is that the enhanced ability to deal with the lactic acid will result in your uphill cruising speed increasing significantly.

Good Luck