**Lactate threshold:**

Welcome back !

***Before you read the following, please note that I am NOT a qualified nutritionalist, coach or a personal trainer. The advice below is based on my own experiences as an elite athlete as well as information gathered from respected sources***

You may recall from my last post that I was going to talk to you about some of my experiences as an athlete and how specific training resulted in dramatic improvements over distances from 5k up to marathon.

This post will talk mainly about the importance of improving **lactate threshold** – what is it, why is it important and how do you improve it ?

So, what is lactate threshold ? Having a high lactate threshold is perhaps**the most important physiological variable** for an endurance athlete.

Simply put, it is the point reached during strenuous exercise when the rate of lactate acid production in the body starts to exceed your ability to remove it.

When this happens and you run at a pace faster than your lactate threshold allows, the accumulation of lactate in the muscles and the hydrogen ions associated with lactate start to impair your enzymes (used to produce energy) and your calcium uptake in the muscles therefore inhibiting the ability of your muscles to contract. They simply just wont work !!

The end result, you have to slow down !! The awful feeling of pain and discomfort in your legs when you have run at a pace that you cannot maintain !!

So, it makes sense that if you can improve the factors that allow for lactate acid removal then you can run at a faster pace before reaching lactate threshold and therefore operate at a much higher percentage of your V02 max (I will discuss this later). Essentially you will be able to run faster for longer.

*It’s worth a thought that an athlete with a higher lactate threshold but slightly lower VO2 max (often a benchmark used for aerobic fitness) will outperform an athlete with a higher V02 max but lower lactate threshold when competing in endurance event with all other factors being the same.*

With the correct training (and very importantly the correct training at the correct INTENSITY) physiological adaptions will occur inside your muscles fibres that allow you to run at a higher intensity. The most important of which are an increased size and number of mitochondria in the muscles (these are your little ‘energy factories’ in the muscles that produce energy), increased aerobic enzyme activity and an increase in capillaries around your muscle fibres therefore improving blood (and therefore oxygen) delivery and facilitating waste removal (eg carbon dioxide)

In summary, improving lactate threshold dramatically improves performance !!

**So, what type of training improves lactate threshold ?**

The best way of improving lactate threshold is to run at a pace that is very similar to (or a fraction above) your current lactate threshold pace. This can either be as a continuous effort often known as a ‘tempo’ run or split into a series of long ‘intervals’ at your lactate threshold pace (often referred to as cruise intervals).

Please note, these are **NOT** flat out runs – this is a common mistake and does **NOT** have the maximal desired effect if done too quickly. They should be ‘comfortably hard’.

From a heart rate perspective, lactate threshold occurs somewhere in the region of 80-90% of maximum heart rate but this can be quite variable.

Most of the physiological adaptations that improve lactate threshold will occur maximally when training **AT OR AROUND CURRENT LACTATE THRESHOLD PACE.**

The best way of knowing your lactate threshold pace is to have it tested in a lab. Unfortunately most of us will not have access to such facilities so …….

It’s approximately the pace that you could maintain for 1 hour without slowing. For elite athletes this will be a fraction slower per mile than your half marathon pace. For others, this will be near their 10k pace. It’s important to know your OWN pace as knowing this will maximise your training effect.

If you don’t have it already I would recommend getting the Jack Daniels VDOT training calculation app and it works it out for you based on current race pace for various distances eg . . . .

Below is an example of tempo training paces based on current 5k/Parkrun times.

16 min 5k = 5.34 per mile tempo pace

17 min 5k = 5.53 per mile tempo pace

18 min 5k = 6.13 per mile tempo pace

19 min 5k = 6.33 per mile tempo pace

20 min 5k = 6.52 per mile tempo pace

30 min 5k = 9.45 per mile tempo pace etc etc

So, a typical lactate threshold training session could be as follows ……

15-20 min very easy warm up.

20-40 min tempo run (start with 20 min then build up)

15 min very easy cool down

OR

2-5 REPS OF BETWEEN 5 MIN AND 2 MILES AT THRESHOLD PACE (2-3 Min easy jog recovery between each)

For marathon runners tempo runs seem to work better than split reps as it offers a continuous sustained run whereas shorter distance athletes seem to work better when these sessions are done in intervals as the pace is slightly higher but the short recovery allows the lactate to drop slightly therefore fluctuating slightly either side of your lactate threshold during any given session

**IMPORTANT TIP**: If you are preparing for longer distance races eg marathon then longer tempo runs can be included but I would advise reducing your pace by 5-7 seconds per mile for every mile above 40 mins of running.

**IMPORTANT TIP:**These sessions are fairly tough and you need to allow adequate recovery. I never do more than 2 of these sessions per week in a training phase. Refuel immediately and work out when its best to include these sessions in the week to allow easy runs either side.

**IMPORTANT TIP**: Do NOT be tempted to increase the pace after your first few lactate threshold sessions and seemingly improving fitness. Keep the pace exactly the same for 4 week periods at a time to allow your body to adapt. This will reduce the risk of injury and illness.

My own personal experiences show that this training methodology works. I mentioned in my previous message that my training routine was completely transformed by my coach, Ian Wilson. I recall he suggested that I read several books on running training the most important of which was Daniels Running Formula.

I had a background in Sports Science but this book opened my eyes on how important training paces were.

At the age of 40 (and a bit) I ran my pb for 10k (31 mins 17) - and won the British Masters 10k title. This was the 2ndfastest time in GB for 10k in my age group that year.

These were my key training sessions in the 8-12 weeks leading up to the race.

Session1 ) - 4 x 1 mile at slightly quicker than lactate threshold (2-3 min jog recovery)

Session 2) - 3 x 2 miles at lactate threshold pace (2-3 min jog recovery)

Session 3) - 25-30 mins tempo running at lactate threshold pace

I would do 2 of these in a training week with the 3rd session being the start of the next week and just repeated these sessions week after week. After 4 weeks I would increase my pace but only by a small fraction (for those that are familiar with VDOT training, I increased my VDOT score by 1 for the next 4 week phase of training).

In between I would make up my weekly mileage with very easy runs on 3 days per week and one long run (60mins / 75 mins / 90 mins on a 3 week cycle).

More recently, in a year where my key goal was to win a marathon, I also ran a 5k pb (15.22). 5th on the UK rankings for age 2019. There is no surprise that these type of sessions helped enormously. Interestingly that despite running an average of 4 min 56 per mile for that race NONE of my training sessions were ever quicker than 5.25 per mile. So a combination of long miles for the marathon (improving aerobic capacity and probably mitochondrial activity in the muscles) and training at paces very close to my lactate threshold pace for several months resulted in being quick at shorter distances too !!

Hope this helps.

Happy training everyone

Michael xx

*Please note: I am not a qualified advisor and I do not hold any specific qualifications related to my chosen physical activity. Any advice I give is general guidance and is in my opinion using my previous experience in this activity. If you choose to take the advice, you are adhering to the advice at your own free will, knowingly and voluntarily exposing yourself to all the potential risks associated.*

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