I AM A SLOW-TWITCH RUNNER

I am a typical slow-twitch, (ST)-runner. That my body is mainly comprised of slow-twitch muscle cells are due to my genes. My brother is the same, we build muscle mass quite easy but the muscles we build are rather slow. So, our ST-makeups are due to our genes but also to how we have been training and exercising. Starting with endurance training already as a child and teenager to become a better cross-country skier, I have been an *endurance athlete* for most of my life.

My goal since 2014 is to run 5K under 20 minutes. I am still not there yet. The 5K-distance requires good anaerobic capacity and a powerful running stride, and these are my weaknesses. Even if I want to run fast, I just cannot. Entering the finish line, I am not exhausted, but I can also not run faster during the actual event.

In this article I will try to answer the following questions:

- *What did I try, and how do I work?*
- *What have I learnt about myself from several years of goal-orientated training?*
- *What training improves my running?*
    - *How does my body respond to specific training such as general endurance, long runs, anaerobic work, different kinds of intervals, and strength- and power training?*
- *How will I move forward to become a better runner?*

You as a reader might recognize yourself at some points in my journey. To what extent is though depending a bit on your individual muscular makeup. However, hopefully you learn something about yourself from reading about my learnings. The details about the running workouts that I refer to in this article are further described in the article **"THE RUNNING WORKOUT TOOLBOX"**.

WHAT DID I TRY, AND HOW DO I WORK?

I have no speed and power

Even though I want to give it my all and I want to run faster I am just not able to produce the power needed to go faster. When I was training with a friend of mine some couple of years ago we did 200-meter track intervals indoors. My friend could really hit them, doing a 200-meter all-out, and finishing with times well below 35 seconds. I was eager to run fast, giving the track my all energy, but still finishing with 38 seconds, or above. However, a big difference between me and my friend was in our endurance. My friend would only be able to run 4-5 repetitions before suffering with heavy and fatigued legs, whereas I could repeat my times of 38-40 seconds for 10 repetitions or more. Even if I wanted to run faster on each repetition, I was just not able to produce the power.

In my case it does also not really matter if I just run 1.5K, I still cannot create the power and speed to run many seconds faster per kilometer, compared to when I run 3K or 5K.

"You will see on your average paces for different distances whether you have a trend at being better at the longer or shorter distances. It gives you a hint if you run on speed and power, or more on endurance."
– Science of Running by Steve Magness

So, if I am a ST-runner, then my husband is really the opposite. He is a pure fast-twitch (FT)-runner with great speed and power. Without too much training he will have no problem to run the first kilometer at the same pace as the frontrunners in the event. However, after one kilometer he will have used up his energy and he needs to slow down. His paces per kilometer in a 5K race can vary by 20 seconds and more, from the first kilometer in 3.30 min/km, the second to fourth, in 4.00 min/km, and then when he is rested, he would be able to finish the last kilometer in again 3.30 minutes. I am not able to create that end-kick that my husband can. However, when we run distances above 20 kilometers, where endurance is favored over power and speed, I am able to beat my husband. On these longer distances my husband tends to get cramps.

WHAT DID I LEARN FROM TRAINING FOR THE 5K EVENT?

With specific training for the 5K-event I was able to reduce my time with 45-30 seconds during the first year when I had this goal. In the season of 2013-2014 I reduced my personal best from 21.00 to 20.25. Since 2014, I have not been able to run faster on 5K. I have reached a plateau.

For the last couple of years I would classify myself as a ST-runner on 5K, but a FT-runner on half-marathons and marathons. Based on my results on 5K, being able to run at 20.30 to 21.00 minutes, I should potentially be able to run a half-marathon with an average pace of 4.27-4.33 minutes per kilometer. But during my latest attempts in 2015 and 2016, I could only manage 4.39 minutes per kilometers and still I really fought for receiving a good time. *Why?*

Having a ST-makeup and my previous years of endurance training I adapt and improve with aerobic training. However, the first years when I started to train for the 5K event I was doing a lot of anaerobic work. More or less every week I would run three to five 1000-meter intervals at race pace. I got mentally tough from this work but I also got ill quite often. I would often receive sinus infections. Long intervals maintained at high pace are very taxing for the muscles, and as well the respiratory system. With the high sustained pace, my heart beat reached close to maximum. I got heavy and fatigued legs. The high acidity in my muscles were probably not so beneficial for my aerobic capacity.

I have had a tendency to train very hard one day and then the next day take it really easy. I have missed out on the training in between slow and fast - running at paces which improves my 10K to half marathon speeds. Last year I started to emphasis this kind of training. I wanted to build a better base. Better general endurance to keep injure- and infection free.

Being a ST-runner on 5K, but a FT-runner on half-marathons and longer distances could also be explained by my low mileage over the years. I have not collected the mileage needed for the longer distances, and especially I missed out on regular long runs. I find long runs boring. Being a mother to two small children I do not find the time. My belief has also been that long runs are not so beneficial for me since my previous years of endurance training and my genetic ST-makeup. However, once I run long runs I run them quite hard, and indeed they are beneficial for me. I have a stronger stride the weeks to follow.

HOW SHOULD I TRAIN TO REACH MY GOAL? WHAT DO I NEED TO IMPROVE?

My goal is to run the 5K under 20 minutes, or at least to set a new personal best. To do this I need a more powerful stride but at the same time as I need to become a more efficient runner.

Flat distance running, especially track-running, is very monotone. There is no chance to rest the muscles, the heart, or the lungs the way you can in cross-country skiing or in cross-country running. There you can go full-speed up the hills, on the flats, and then rest your legs a bit once you run downhills. Flat distance running is more static so the muscles has to be trained for this kind of stimuli.

To achieve a powerful stride I have to train all my fiber types. I need to learn how to recruit my intermediate and fast-twitch fibers, and not only my slow-twitch fibers. To become a more efficient runner and to endure longer running events I need to train the slow-twitch and intermediate fibers with aerobic running workouts. My muscles needs to be trained to be more efficient at paces where the muscles still burns sugar with oxygen.

How should I train to become more aerobically efficient?

Slow- and fast tempos are the best workouts for increasing the number of capillaries around slow-twitch and intermediate muscle fibers. The pace on slow- and fast tempos translates into your theoretical marathon- or half-marathon pace. To improve my general endurance, and especially my steady pace, I will try to increase the distance covered at marathon pace. An example of such a workout would be to run 2x3000m at marathon pace with just 1 minute break in between. The goal of this workout is to find a relaxed feeling even though the pace is comfortably hard. This will train my general aerobic capability. When I can run longer segments at ease at the pace required for my goals I have a great base to start from for more emphasis on pure speed.

Another approach to aerobically train the intermediate muscle fibers are through alternation intervals. Alternating two close, but still aerobic speeds, such as 10k and marathon pace is taxing threshold work. My body responds well to this kind of exercise. I will start with alternating my half marathon pace (fast tempo) with my steady pace with the initial aim to sustain a total volume of 8 km (20 rounds around a 400-meter track). I will run 400-800 meters at fast tempo pace (equals my half-marathon pace) and then slow down to my marathon pace for 400-800 meters and then increase the pace again. This will improve my running strength and stamina.

Progression of Alternation Workouts for General Endurance:

- 400m at fast tempo (4.21 min/km) / 800m at steady pace (4.50 min/km)
- 800m at fast tempo (4.21 min/km) / 800m at marathon pace (4.35 min/km)

Progression of Specific Endurance for 5K Event:

- 200m at race pace 4 min/km / 1400m at marathon pace 4.35 min/km
- 800m at race pace 4 min/km / 800m at 4.30 min/km

How should I train to become more powerful?

Strength and power training through running workouts

Theoretically I should be able run 1500-meter in 5.27 minutes if I want to be able to run 5K below 20 minutes. Right now, I can sustain this pace for circa 600 meters. For a more relaxed feeling when running I need first to improve my overall speed and then my speed endurance.

Heavy strength- and power training are useful tools to improve running speed (please see the article **"THE BENEFITS OF HEAVY RESISTANCE-TRAINING FOR RUNNING"** for further details.) When I engage in resistance-training I should focus on a few repetitions but that are done with perfection. This training

target not only my slow-twitch but also my intermediate and fast-twitch fibers. After such workouts my running also feels more bouncy and powerful.

"A ST-runner need workouts that improves his recruitable fiber pool and neuromuscular system. ST runners should rely more on hill sprints, with some occasional flat track sprints, because they are looking more for the fiber recruitment benefits." – Science of Running by Steve Magness

I have developed a workout where I combine resistance-training in the gym with short steep hill sprints and flat. This workout helps to improve my running strength and my running form. First I activate my muscles in the gym with clean-presses, then I run to a steep hill where I do 5-8 sprints that takes me circa 25 seconds. This is followed by 5-8 sprints in a less steep hill, and finished by 5-8 flat sprints. When I push myself to schedule this workout into the calendar I see improvements in my running.

To develop speed endurance I will run 150-200-meter intervals run at 1500-meter pace or below. The idea is to run each repetition fast but still quite relaxed. To reach higher training volume and to really tire the muscles, I will try to run at least 10-12 repetitions. When I have this capacity I can test my speed endurance development with an all-out on 1500 meters. Achieving a personal best here is a good way of testing my racing potential and my shoot for a personal best on 5K ☺.

CONCLUSIONS & SUMMARY:

Since 2014, I am not running any faster on 5K. Still I would claim that my running has improved. I am not as exhausted from running at tempos around 4 min/km. My endurance when running the longer events has improved. I feel a peak in performance after long events worked at threshold pace (15-21.1 km). This work seems to boost my aerobic performance. Usually, I have the same feeling after tempo work, or cruise intervals. The days after such workouts it just feels easy to run fast. This is usually not the case after interval workouts where I run into acidity. So the science seems to hold, I lose my aerobic capacity when I do too much and too long anaerobic workouts. However, I have the feeling that I benefit highly from short bursts of anaerobic work.

REFERENCES & FURTHER READING:

Magness, S. (2014). *The Science of Running – How to find your limit and train to maximize your performance*. Origin Publishing.

Magill, P., Schwartz, T., & Breyer, M. (2014). *Build Your Running Body – A Total-Body Fitness Plan For All Distance Runners, From Milers To Ultramarathoners - Run Further, Faster, And Injury-Free*. The Experiment Publishing, New York.