Medical Advice for enjoying the 2008 Six Foot Track!
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The Six Foot Track poses unique challenges, for those competing, and the support staff! Crossing the finish line (in good shape) to the cheers of the crowd is one of the BEST feelings!

By now you should have done a lot of training, and are looking forwards to tapering in a few weeks' time.

A mental image of the run and breaking up the Track into sections will assist with pacing, and enjoying the event (!)

The start can be hectic, with runners scrambling to get good position before descending the steps to the valley floor. If you are a slower stair descender it is better that you stay towards the back of the pack initially.

Runners should be in single file when descending the stairs. This requires concentration as a stumble or misplaced step can lead to a sprained ankle (or worse). There is ample time to pass others on the wider section on the Megalong Valley.

The first fifteen kilometers to the Cox's river is enjoyable and this can be considered a warm-up prior to the hills! The terrain descends steadily until the river (15.5km).

The section from the Cox's River up to Mini Mini Saddle is the first serious climb and many will be walking this hill- I recommend this for Novices and weaker hill climbers in order to conserve energy at least until the halfway mark. Although the Pluviometer (26km) may be a landmark to reach, there is a still lot of hard work to be done in the steady ascent along the Black Range. One has to climb a further 200m in altitude until the Deviation (34.7km).

Those who complete the course in under 5hrs would have run almost all of the time. Walking is slower, but guarantees a finish (despite a slower time).

The main hills are from Cox's river (15.5km) to Mini Mini Saddle (20km), Alum Creek (22km) to Pluviometer (26km), and a less steep but long section from the Pluviometer to the Deviation (34.7km).

From the Deviation to Kiaora Hill the course undulates until the final descent to Caves House. It is possible to run the rest of the course from here if you haven't exhausted yourself climbing the hills!

The final 5km can be treacherous especially if you have "jelly legs", and tired (and aching) quadriceps muscles. Cramps in the thighs may also hamper your progress down the slippery scree-like descent to Carlottas Arch. Be careful in the last few kilometers as many have fallen here!

Potential problems

Because of the requirements to qualify for the Six Foot Marathon, I expect that (most) runners will have had time to sort out problems associated with running.

I list a few major problems that may slow you down:

Muscle Cramps, or specifically "exercise associated muscle cramps (EAMC)" may occur even in experienced runners.

We need to be sure that we're talking about the same thing- "involuntary, painful, sudden contraction of skeletal muscle", which is usually quadriceps, hamstring or calf muscles. This is not to be confused with a feeling of "muscle tightness" that many runners have.

In a general sense there are many causes of muscle cramps. Generally speaking, if one has recurrent cramps (without running) then one has to exclude causes that may be due to problems of muscle (e.g. muscle enzyme disorders), nerve (e.g. central or peripheral nerve disorders), cardiovascular (e.g. hypertension) or endocrine (hypothyroidism). Medications such as antihypertensives, asthma inhalers, and hormones, such as the oral contraceptive pill have also been implicated in muscle cramps. These factors are *unlikely* to play a role in Six Foot runners.

There have been a few theories about the cause of EAMC:

- Low serum sodium levels. There has been a long-standing belief that depletion of salt through sweating is the cause of this problem. There have been a number of studies in the late 1980's that related EAMC with low sodium concentrations.

- Dehydration. Many years ago it was noted that miners and steamship workers developed muscle cramps. Rapid dehydration (e.g. diarrhoea, or profuse sweating) has also been noted to result in muscle cramps.

- Low calcium or magnesium levels have also been implied in the cause of muscle cramps.

Most runners are aware of the above, and some resort to using salt (sodium), and magnesium supplements, as well as increased drinking to avoid dehydration-related problems.

However some runners still have muscle cramps despite the above precautions.

A recent study by Schwellnus et al (2004) examined 72 runners before and after the Two Oceans Marathon in Cape Town (56km). The authors found no difference in serum (blood) electrolyte concentrations (sodium, potassium, calcium, magnesium) and hydration status explaining EAMC in the 21 runners who developed cramps.

Current theory

In fatigued muscles that are contracting and shortened (e.g. in quadriceps muscles there is increased electrical activity in the muscle resulting in cramping.

The scientific explanation is that there is ***increased stimulation*** from muscle spindles (a specialized muscle structure that provides sensory input about rate and degree of muscle stretch and assists with limitation of muscle stretch), and ***decreased inhibition*** impulses from Golgi tendon organs (a sensory structure at the muscle-tendon junctions that tells the brain about the tension in the muscle, and helps regulate the muscle tension).

It is thought that other factors contributing to EAMC are:

- Older runners
- Faster speeds
- Longer running history
- Irregular stretching
- Family history
- Contraction of muscles that cross two joints (hamstrings, quadriceps, gastrocs)

Cramping also occurs when muscles contract in a shortened position.

Prevention of muscle cramps

At the risk of stating the obvious, **there is no substitute for training**. Because the Six Foot Marathon is on hilly bush terrain often in the heat (high 20's Celsius), these are the conditions under which you should train.

Walking up steep hills may sound absurd but this is good training! Doing **hill repeats** (a 5km hill is good) once or twice a week will also be beneficial.

Regular stretching of the quads, hamstrings, and calf muscles may assist with flexibility, although there is no hard evidence that this prevents EAMC.

Maintain hydration during the race. Do not attempt to replace *all* the fluids that (you assume) you have lost during the race. I am wary about being prescriptive about fluid replacement during exercise as there are large variations in sweat rate between individuals and for even the same person.

Taking salt tablets does not guarantee that you will not develop EAMC! It is not possible to be prescriptive on amounts as there is variation in salt intake and sweat rates. There may be a daily variation from 3g to 20g in salt intake, depending largely on personal preference. Similarly sweat rates vary according to intensity of exercise, environmental conditions (heat and humidity), gender, body size, and level of metabolism. During exercise sweat rates have been measured between 0.5L to 2L per hour.

It is very difficult to replace all water and electrolyte lost in sweating by drinking or eating during the run. For example, many runners will find it difficult to replace 1L water in an hour when running in the heat. During moderately intense exercise, blood is diverted from organs (including the stomach) to the skin to allow heat exchange and sweating, and diverted to muscles to allow running. During intense exercise gastric emptying is reduced, and running with a full stomach can lead to abdominal discomfort from the vertical bobbing up and down.

What to do if you have EAMC

- When you have muscle cramps you will be forced to walk!
- Stretch the affected muscle group. Hold the stretch for about 20 seconds.
- Drink as much as thirst dictates.
- Eat a snack (e.g. energy bar/ gel, fruit) while walking.
- If cramps continue despite the above, massage of affected muscle group will help.
- Walk for about 5 minutes before starting to run.
- Jog initially for about 1 km before increasing pace.

Fluid recommendations

I expect that virtually all athletes are aware of the problems related to dehydration, especially when exercising in the heat.

Before sports drinks were available, marathon runners had access to water, soft drink and snacks (e.g. fruit, sweets). Since sports drinks are so widely available, and are present at almost every fun run, marathon or ultra-marathon, this has become the standard fluid replacement for runners.

From a physiological point of view, sports drinks (containing sugar and salt) are recommended for those exercising for more than an hour.

A major sports drink manufacturer recommends that runners should aim to replace about 1L fluid for every hour of running. In 2001 the International Marathon Medical Directors Association (IMMDA) recommended 400-800 mL/h fluid ingestion. This recommendation protects smaller athletes from becoming overhydrated (and hyponatremic), a problem that can be fatal.

It is not the purpose of article to explain hyponatraemia, but this is defined as abnormally low plasma sodium levels as a result of drinking excessive fluid (water and/or sports drink during a marathon). This usually occurs in slower runners who have access to fluids on the course).

Practical recommendations (IMMDA, 2006)

1. Drinking according to thirst is the body's dynamic fluid calculator that protects from over and under drinking.
2. Athletes are advised to understand their individualized fluid needs – for example during a known run and under known ambient conditions (temperature, humidity, wind), note how much you drink. Also take note of body cues such as thirst (indicating under drinking), increased urination or weight gain (indicating overdrinking).
3. Athletes should explore, understand and be flexible to their own fluid and energy (food) needs while training and also during running events.

A practical way of determining fluid loss from sweating:

1. Nude weight before a run (W1).
2. Run for an hour at race pace. Note the temperature and humidity. Note amount of fluid consumed during the hour (F).
3. Do not urinate during the run.
4. Nude weight after run (W2).
5. Sweat loss = W1 – W2 + F.

One should NOT gain weight from drinking fluids during a run! This indicates fluid retention and risks over-diluting the salt in the blood (hyponatremia). This can be fatal!

In a marathon, runners should be able to tolerate 2% fluid loss (1.2 kg in 60kg person; 1.6kg in 80kg). Therefore it should be safe to replace 98% fluid loss in a marathon. For example a four hour marathon runner who sweats at 1L/hr may safely replace 3.92L.

A recent conference on exercise-associated hyponatremia(EAH) identified risk factors for EAH:

- Low body weight
- Females
- Exercise 4 hrs (or more)
- Slow pace
- Race inexperience
- Excessive drinking behavior
- Highly availability of drinking fluids.

If there are a few risk factors, one can prevent EAH by dinking only according to thirst, or by avoiding drinking at a rate more than one's estimated hourly sweat loss. Consuming salty drinks may not prevent EAH, although this may reduce the severity.

Conclusion

For many Six Foot runners, survival is the main objective. From a medical point of view this means maintaining hydration and food (carbohydrate) supply, avoiding cramps, dehydration and heat illness as well as staying on your feet at all times!

The Six Foot Track Marathon is much more than a standard (road) marathon and preparation should be appropriate. Ideally one should train regularly in the heat, learning as much as possible about one's (physiological) response to training. One should work out optimal fluid and feeding strategies during long runs (25-30km), which should be on hilly bush trails. Even walking up long hills is good training!

Despite ones best efforts one could develop problems on race day. Knowing one's limits is essential for survival! If one develops problems such as muscle cramps, vomiting, or extreme fatigue then walking and asking for assistance at an aid station is a sensible option.

There may well be a fine line between pushing *to* one's limits and pushing *beyond* one's limits! It often takes years of experience to read one's body during prolonged exercise, and it is a fantastic feeling when everything is going well. The pace on the day depends a lot on the weather conditions, preparation, and how much one is prepared to suffer!

Happy training and I hope to not meet you in the First Aid Room on Race Day!

References

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