Team CdLS Saratoga Palio ½ Marathon & 5K Training

Tips for the Week of 8-15-2011

There are **6** weeks to go before the Saratoga Palio Half Marathon & 5K.
It's another build week.

Next week is a rest week. Some of you are getting close to maximum training distances for the weekend long run. These runs have become high-stress workouts, and should be followed the next day by rest or a low-stress workout.

An old proverb from India says that "Only mad dogs and Englishmen go out in the noonday sun". An appropriate paraphrase could be, "Only dedicated ½ marathoners will go for a training run on a hot, humid day". We've been hammered this summer with these hot and humid days and there are likely to be more. Play it safe by slowing down, running shorter distances, running indoors on the treadmill, and running at cooler times late in the day. And most importantly - stay hydrated! This hot weather training will hopefully pay off on a much cooler October morning.

Tips from the Experts for Peak Performance in a Hot & Humid Environment (a great article…that applies to ½ Marathoners as well)

This document was prepared for coaches and athletes of the Canadian National Cycling Team who took part in the Olympic Games held in Atlanta. Its purpose was twofold: (i) to create an awareness of the negative impact on performance that is generally associated with prolonged exercise in a hot and humid environment, and (ii) to suggest practical strategies aimed at reducing the risk of counter-performance under these conditions. This text is the result of an extensive review of the scientific literature on the subject, as well as the practical experience of the author. It contains recommendations which are primarily applicable to high performance athletes, and which are based on the physiological adaptations which occur in these subjects in response to intense and prolonged training programs. However, because the information it contains can be of interest to athletes and coaches in sports other than cycling, it was considered appropriate to share it with the sport community at large.

At the Atlanta Games, Canadian cyclists won a total of five medals.

Towards Atlanta

The Canadian Cycling Association, Sport Science Program identified a need for updated information on training and racing in hot and humid climate conditions in preparation for the 1996 Atlanta Olympic Games. The objective of the article, Towards Atlanta is to educate Canadian athletes and coaches on adapting and staying cool in the hostile environment of the Atlanta Games.

Guy Thibault, Ph.D., Direction des sports, Québec, is an exercise physiologist, a member of the Sport Science Committee, and renowned author of numerous works in the area of athlete development and preparation. Guy volunteered to research and prepare this article

for the National Team in an effort to provide the best opportunity for success. The Canadian Cycling Association sends a special note of thanks to Guy for the professional contribution to the National Team's Olympic performance.

The mean July temperature in Atlanta is 20 - 35°C and humidity ranges from 70 - 98%. These conditions require a unique approach to adapt to the heat and to find the perfect performance state for each individual.

Coping with the heat in a cycling event is not only a matter of talent, fitness and motivation it is also a matter of knowledge. Here are tips to better your performance in your Olympic event(s) and in any other races, in the heat and humidity.

Numerous scientific studies have shown that some of these tips lead to significant performance improvements, especially in events lasting more than an hour. Riders who choose not to use these tips will experience a sub-par performance and suffer much more from the climatic factors, during the event(s).

Heat Acclimation Period

Train (and compete) in a hot and humid environment for at least two weeks in the final month preceding the Olympic games.

Many scientific studies have demonstrated that heat acclimation (or heat acclimatization) enhances the athlete's capacity to dissipate heat during intense exercise in the heat and, in doing so, increases endurance performance. Hence, the negative effects of a hot climate can be significantly reduced by the process of heat acclimation. In fact, the physiological and psychological advantages of a training camp in a hot and humid environment before a long distance event are enormous.

The major adaptation which occurs during training in a hot climate is an expansion of plasma volume, which allows the athlete to send more blood to the skin and therefore increase cooling, resulting in an attenuated rise in the core temperature and a decrease in perceived exertion. During the process of heat acclimation, most of the physiological adaptation takes place and appears to plateau within 14 days. The athletes who produce the highest sweat rate are those who trained for longer than a period of 14 days in a hot and humid environment.

It should be underlined that several investigations indicate that heat cramps are less likely to appear among heat acclimatized individuals.

Recover well between training sessions during the heat acclimation phase.
Intermittent exposure to cold during the heat acclimation period does not decrease the adaptation rate. Use the air conditioner to get a good night of sleep. However, avoid extended periods of exposure to cold.
Adjust training velocity according to the environmental heat.
Monitor your resting and training heart rate. When it is hot, train at a slower velocity eliciting a heart rate not much higher than the one you would have under cooler conditions.

Once acclimated, it is better to do a high intensity training session in the cooler air temperature of early morning than accepting a slower pace in the heat. Low intensity exercise may be performed during the hot mid-day hours.

Monitor, drink and avoid dehydration.

During the heat acclimation period, monitor your loss of body water and drink plenty of fluids during training. Recommended fluids include a glucose polymer solution, sport drink diluted with equivalent volume of water or plain water, no salt added. And, drink a lot between outings, recommendation: glucose polymer solution with a generous portion of table salt or sport drinks with extra salt.

Physiological adaptation to heat is slower if you are dehydrated. During your training in the heat, as in a race in the heat, use every precaution to avoid dehydration.

Heat exhaustion

If dehydration is greater than 3% of body weight, cardiac stroke volume and sweat production are negatively affected. This will hamper the adaptation process. For example, a 67 kg rider who weighs 66 kg after a training session in the heat despite drinking one litre of water (one litre is one kg) has lost close to 3% of body water stores (loss of fat is negligible): 67 - (66 - 1) = 2 and 2/67 = 3%. Severe dehydration, loss of body water greater than 7% of body weight, almost invariably leads to heat exhaustion. Avoid this condition!

During training sessions, get used to drinking a volume of liquid corresponding to the limit of your gastric emptying rate, which is, in ideal conditions, about 900 - 1000 ml (one litre) per hour. This amount is about twice as much as your thirst.

To avoid dehydration, if it is really hot, you will need much more than 1 litre per hour. And, if you rely on thirst as an indicator, it will be too late to rehydrate. Prior to the big race, check how your body reacts to a large intake of fluid.

During the heat acclimation period, you will need to drink large volumes of water. However, avoid sudden increases in water intake. Become progressively used to drinking a lot, before the heat acclimation period. You may need a few weeks to prevent stomach discomfort associated with drinking large volumes.

An athlete who finishes a training session in a state of modest dehydration requires an excess of approximately 1.6 litres of fluid and 1.8 g of sodium (Na^+) to ensure complete re-hydration prior to the next training session. Sodium chloride plays a critical role in re-hydration because of its osmotic properties. It serves to retain fluid in the extracelluar space and to reduce urine production.

It has been shown that ingestion of a carbohydrate-electrolyte beverage (sport drinks) containing sodium following dehydrating exercise provides more complete re-hydration than does the ingestion of plain water or a diet soft drink. Although heat acclimation reduces electrolyte concentration in sweat, it does not eliminate loss via sweating. Riders must, therefore, increase their salt intake after exposure to the heat.

Remember: Use little or no salt during sessions and a generous amount of salt between training sessions. The well-known recommendation to restrict salt consumption does not apply to individuals who must strive to replenish their body water level after dehydration.

When exercising in the heat, intramuscular glycogen utilization is increased compared to exercise in a cooler environment. You must therefore adopt strategies to attenuate the rise in core temperature and ensure appropriate substrate availability to enhance performance during a race in the heat.

Heat acclimation results in a lower carbohydrate utilization while exercising. The rate of utilization is still greater compared to exercising in a cooler environment. You must, therefore, be aware that you may enter your competition with low carbohydrate reserves, if you do not ingest adequate amounts of carbohydrate while acclimating.

Avoid high altitude training in the last few weeks before the event.
There are mainly three reasons why you do not want to stay at high altitude before an event to be held in a hot and humid environment:

1. The air is usually colder at higher altitudes.

2. The air is usually dryer at higher altitudes. And, it has been demonstrated that the ability to perform in a hot and humid environment increases more during training in a hot and humid climate than training in a hot and dry climate.

3. The dry air may provoke dehydration and altitude exposure increases red blood cell count, so that blood thickness may become too high, therefore limiting further performance in a race where you may suffer from dehydration. An increase in blood thickness or blood viscosity can occur following a stay at altitudes above 2000 meters.

Do not use aspirin (or alike) during the heat acclimation period. Aspirin decreases the body's ability to dissipate heat.

Try all the tricks, at least once, prior to the day of your event.
Try them all, and more often than once:

- glycogen overcompensation diet
- high carbohydrate breakfast
- glycerol solution before the event(s)
- pre-cooling strategy
- over hydrating by drinking a fair amount of cold water right before the start
- glucose polymer solution
- "showering"
- frequent drinking of small amounts of a cold solution
- drinking to the limit of your gastric emptying rate
- wet your clothing, sponging, etc.

Never do something, on race day, if you haven't tried it at least once before.

It should be underlined that training in the heat not only improves your ability to perform better in the heat, it also increases your cycling efficiency by a greater amount than training in cooler conditions. Heat acclimation is therefore advantageous for your preparation for long distance events done in any environmental conditions.

The week before the event.
Avoid staying for more than one day in a cool or dry climate.
Although the adaptation to heat is rapid, so is its loss. Up to 50% of the gains of adaptation may disappear within 6 to 7 days of non-exposure to heat. If you are required to stay in a cooler environment for more than one day after heat acclimation, wear extra clothes during your training sessions. Do not overdo it, as it may rapidly increase your body temperature to an unsafe level without warning.

Observe a shorter taper phase.
Before any race, it is wise to taper off by gradually decreasing your training volume, by as much as 60%, while conserving a fair amount of high intensity efforts (interval training sessions). The (small) decrease in fitness during the taper phase is largely compensated by a substantial diminution in fatigue level, so that a peak performance can occur. The taper in a hot climate, should be shorter. The decrease in plasma volume during a taper phase is a bigger concern in preparation for a race where heat stress will be a critical factor, than for an event to be held in cooler conditions. This is why it may be wise to shorten the duration of your taper phase before your event(s). For example: taper for 5 days instead of 7 days.

Make sure your muscle and liver glycogen stores are replenished.
Since your metabolism will rely much more on carbohydrates (and less on lipids) during a race in hot weather, you may want to do a glycogen overloading diet by eating more food containing mainly carbohydrates in the final four days before the event: potatoes, bread, rice, cereals, pasta, etc., and reduce fat intake. You may also want to have a hearty breakfast and drink plenty of a glucose polymer solution between breakfast and the final hour before the start.

Before and between your events.
Avoid the heat, stay in the shade and favor body cooling.
Begin your event(s) fully hydrated, avoid the heat as much as possible and do not stand or walk for a long period of time.

If it is sunny, use water based sunscreen, no oil based sunscreen. Avoid oily massage substances as it could hamper your ability to dissipate heat through sweat evaporation.

Stop shaving 4 to 5 days before the big event(s) since short leg hairs may limit the quantity of water dripping from the skin. Only sweat evaporating on the surface of the skin can help the body to cool, dripping sweat is pure loss.

Use the "pre-cooling strategy".

Pre-cooling consists of lowering your body temperature to below normal levels right before an event to be held in hot temperature. To do so, take a long cold shower and stop when you have shivered for about 2 minutes.

After the pre-cooling period, your body temperature will rise approximately at the same rate as other riders, but it will start at a lower point and take longer to reach the critical temperature. This means that when the body temperature of most of the other riders will reach a critical level (above 40°C), yours will still be below. The purpose is to postpone the moment of overheating and its consequences.

Ingest a glycerol solution approximately two hours before the race.
Recent investigations have shown that the ingestion of a glycerol solution can be considered as a mean to provoke "hyper-hydration". It may provide a cardiovascular and thermoregulatory advantage during exercise in the heat. Glycerol is slowly cleared by metabolism from the body water and has a high osmotic effect. Glycerol molecules retain body water and decrease urine output, so that it enables you to conserve more water during the ensuing effort.

The transient state of hyper-hydration provoked by the ingestion of glycerol has positive physiological effects: expanded plasma volume, lower heart rate, lower rectal temperature, etc. which leads to an improved performance in a long distance event in the heat.

Glycerol is now commercialized in the USA under the name Glycerate™, but Glycerine, which can be purchased over the counter in any drugstore (it is usually used to relieve mild skin abrasion) is in fact pure glycerol.

To prepare a glycerol solution, mix 20 volumes of water with one volume of glycerol (glycerine). When trying hyper-hydration with glycerol, you may want to start with a more diluted solution, for example: 30 volumes of water for one volume of glycerol. You should drink the glycerol solution in the last 2 hours before the start of the race.

It is unlikely that glycerol solutions ingested during exercise will promote improvements in cardiovascular or thermoregulatory functions, if only because ingestion of glycerol during exercise does not allow time for the glycerol to be distributed throughout the body fluid compartments. It is better to drink a glucose polymer solution that will provide you with water and a convenient energy source during the race.

Most athletes will not suffer any side effects from the ingestion of a glycerol solution, but the potential side effects can range from mild sensations of bloating and lightheadedness, to more severe symptoms of headaches, dizziness, nausea, and vomiting. You may want to discuss drinking a glycerol solution before a training session and race with your coach, your physician and your exercise physiologist.

Drink a last sip of cold water just before the start of the race.
To further increase your hydration level, fill your stomach so that gastric emptying during the early stages of the race will be enhanced. Your sweat rate will be increased if this final sip is cold.

Take note that the following factors may decrease your ability to dissipate heat:

- recent plane flight (due to dehydration induced by dry cabin air)
- sleep loss
- acute or chronic illness, i.e. diabetes, asthma, diarrhea; substrate depletion (glucose, glycogen)
- recent alcohol or caffeine ingestion
- dehydration
- drug use i.e. diuretics, pseudoephedrine and beta-blockers
- inappropriate clothing
- wearing dark clothes
- long hair.

During the race: road and cross-country.
Drink frequently and more than your thirst commands.
Drink a palatable, cold, and low concentration of carbohydrate solution.

The loss of body water during a grueling race in heat and humidity far exceeds the body's maximum water absorption rate: 3 litres plus per hour in highly fit and heat adapted athletes. Absorption is never above one litre per hour and since even a slight dehydration provokes noticeable decrements in performance, the rider should use every possible trick to bring the largest amount of water into his/her bloodstream.

Moreover, in an event lasting more than an hour, muscle and liver glycogen stores may not be sufficient. Therefore, the rider needs to ingest not only water, but also some form of carbohydrate. To further complicate things, the rate of gastric emptying is decreased when the water contains a large amount of carbohydrate or salt. In fact, if the concentration of a solution exceeds a certain level (corresponding to the concentration of most of the commercial sport drinks), a shift of water from the circulating blood to the stomach may occur, which leads to gastric discomfort.

The rate of gastric emptying refers to the volume of what you drink that leaves the stomach to enter the bloodstream, per hour. Scientific studies show that the rate of gastric emptying of a carbohydrate solution is at the highest level (900 ml to one litre per hour) when:

- glucose is in the form of a polymer;
- the glucose polymer concentration is no more than 60 g/litres, that is roughly one quarter cup or 4 tablespoons per litre, or 3 tablespoons per 650 ml bottle;
- the stomach is already filled with water; this is an important factor. You should drink plenty of water before the start and never go too long before drinking again.

- the solution is palatable which means it's pleasant to drink;
- the solution is cold (5 to 10°C).

Drink right from the start of the race and drink something you like, drink often and in small quantities, for example: add lemon juice if you like that taste. It has been proven that drinking a small volume of water every 5 minutes has a better effect on performance than drinking twice as much every 10 minutes during a cycling trial in the heat.

Another advantage of drinking at regular intervals is that the act of drinking stimulates heat loss by maintaining sweat rate, as long as the solution is cold.

Do not wait until you are thirsty: the feeling of thirst always comes too late. Remember that a rider who drinks spontaneously, without making a specific effort to drink more than thirst commands, drinks only half the volume of water lost through sweat during the event.

Ideally, the temperature of the solution you drink should be about 5 to 10°C, but make sure you can tolerate cold drinks while riding at high intensity.

Consider using a camelback or a triathlete device that brings water from an expansible reservoir fitted under your seat post to your mouth with a tube.

Never ingest salt tablets nor salt pills, whether it is table salt (NaCl) or potassium (K+) during the race. It can only decrease your performance and it can be hazardous to your health. Sodium chloride (NaCl) and potassium are lost when sweating, but the sweat's concentration in Na+, Cl- and in K+ ions is lower than in the body fluids so that the body becomes more concentrated in salts when dehydrated, not less concentrated. Ingesting extra NaCl or extra K+ would increase body fluids salt concentration, which should be avoided.

Shower and sponge.
You may want to have two sets of bottles:

one with the glucose polymer solution

one with pure cold water to occasionally shower to rid your body of the salt that will dry on your skin on downhills or head winds. Salt on your skin hampers your ability to dissipate heat by the sweat evaporation mechanism.
Sponge occasionally, on the other hand, do not shower too often. The evaporation of natural sweat has a slightly greater cooling effect than the evaporation of pure water. Avoid wetting your cycling shorts at the early stages of the race, as it may eventually feel uncomfortable.

Look for the shade and favor blood circulation, as well as air circulation
When possible, during the race, ride in the shade. Occasionally lift your trunk and your arms to increase the venous return. This action will help the blood pooled on the skin's surface of the arm to circulate towards your heart. If possible, avoid dark clothes and wear a well-ventilated helmet with little contact to your skin.

Use nasal strips (?)
In certain sports, some athletes use nasal strips. It has been demonstrated that its use during exercise in the heat lowers the increase in sinus temperature, if the breathing is done through the nose. Try using nasal strips during training. Since most riders breath through the mouth rather than through the nose, it is not sure whether nasal strips will make a difference for cyclists.

Conclusion
The Canadian Cycling Association hopes that this information will help each National Team Member in their effort at the Atlanta Games. The text is a little drier than the humidity which you will be competing, however take the time to read and understand the importance of hydration, and to follow the tips recommended.

This article has been made available by Guy Thibault, along with his professional service or guidance through an extended invitation to contact him for assistance before or after the Games.

To your personal best!

Interesting information……no?

Quality versus Quantity

Some of you (Experienced and Veteran ½ Marathoners only) could end up with 35 to 40 miles or more per week by late summer/early fall. At this point in our training, most of you are probably in the high-teens/mid-twenties for weekly mileage and a few of you may have already reached 30 miles per week. With the greater weekly mileage comes a greater risk of injury from over-training.

Higher weekly mileage does play a factor in achieving **optimal** race performance. However, you can still run a successful ½ marathon on 25 to 30 miles per week. The critical (quality) workouts are the weekend long runs, mid-week pace runs, and to some extent, the mid-week speed workouts for you veterans. You need to complete these workouts for a successful ½ marathon. However, you can substitute cross-training, strength workouts, or rest days for some of the other (quantity) runs. By doing so, your weekly mileage will peak in the low to mid-thirties, but you will not be taking on the greater risk of injury. If you're looking for that optimal race and your body can take it, go for the extra miles. But unless you've been running for several years and have built up a significant base, stick with the lower weekly mileage. Also, if you're feeling like an injury is looming, then absolutely go the lower mileage route.

First Timers

Your goal is to finish your first ½ marathon. Your finishing time should not be a major concern. If you started the program with a 10-mile per week base, then ~15 weeks later you will peak around 25 miles for your single highest weekly mileage. This is a sufficient base for completing the ½ marathon at a slow, comfortable pace.

Suggested Week 5 Training Schedules

Below are suggested workout schedules for the three types of **½ Marathon** runners for this week.

Week 5	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	
Type of Runner	**8/15/11**	**8/16/11**	**8/17/11**	**8/18/11**	**8/19/11**	**8/20/11**	**8/21/11**	**Total Weekly Miles**
1st Timer, Novice Runner	3 Miles Easy	Rest	3 Miles Easy	3 Miles Easy	Rest	9 Miles Easy	Rest or Cross Train	18
2nd Timer	Strength & 3 Miles Easy	3 Miles Easy	Rest	4 Miles Easy	Strength & 2 Miles Easy	11 Miles Easy	Rest or Cross Train	23
Experienced ½ Marathoner	Strength & 3 Miles Easy	3 Miles Easy	Rest	5 Miles Easy	Strength & 2 Miles Easy	12 Miles Easy	Rest or Cross Train	25

Below is my suggested workout schedule for the **5K** runners for this week.

Week 5	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday	
Type of Runner	**8/15/11**	**8/16/11**	**8/17/11**	**8/18/11**	**8/19/11**	**8/20/11**	**8/21/11**	**Total Weekly Miles**
5K Runners	**45** min. run **Easy** or Rest	Cross Train	**45** min. run **Easy** or Rest	Cross Train	**Rest**	**60** min. run **Easy**	Cross Train	13-15

Experienced & Veteran 1/2 Marathoners

This week is the final scheduled hill workout for the year. Big bummer right? ☺ Like three weeks ago, the workout is 1/4 mile hill repeats. The only difference will be that you can increase the number of hill repeats, if your weekly mileage (base) has also increased.

The number of hill repeats you do is dependent on your weekly mileage.

20 Miles or less: 4 hills
20 - 25 Miles: 6-8 hills
More than 25 miles: 8-10 hills

You should run 5K pace up the hill and jog down (in a serpentine **(~)** fashion to minimize the pounding on your knees). The workout is continuous running. When you reach the bottom of the hill, you go right into the next uphill repeat. Include a 1/2 to 3/4 mile at an easy pace for the warm up and cool down. Run the hills in sets of 2, taking a 3-minute water break between sets.

Enjoy & stay hydrated!

Coach Marc