If you want to get Prof. Tim Noakes’ blood temperature up, please express the view that dehydration is the greatest single threat to the health of marathon runners within ear shot of this professor of Exercise and Sport Science at the University of Cape Town.

Noakes, a founder member of the Sport Science Institute of South Africa, is adamant that too many doctors medicalize the condition of marathon athletes who collapse after they cross the finishing line. He points out that the majority of athletes seeking medical care at marathon or ultra marathon races collapse only after they cross the finishing line.

It is difficult to believe that a condition insuffciently serious to prevent the athlete from finishing a marathon, for example, suddenly becomes life-threatening only after the athlete has completed the race, at the very time when the physiology of the athlete is returning to a state of rest.

“When an athlete collapses after the finishing line, 99 % of them need to lie down and put their feet up. My advice is: don’t medicalize the condition, because it causes huge problems.

“If you are not correct in your treatment of such a patient — for example if he is not dehydrated and you give him a litre of fluid and, if there is no reaction, you add another litre — those 2 litres of over hydration is enough to kill him,” he says.

The problem is that marathon athletes back in the pack are often urged to drink as much as possible to prevent dehydration. But, this advice can be bad as it can lead to hyponatraemia severe enough to cause fatalities.

Hyponatraemia is a less than normal concentration of sodium in the blood — usually a complication of excessive water intake. It may lead to confusion, convulsions and collapse.

Noakes says athletes who collapse and require medical attention after completing long distance running events are probably suffering from the sudden onset “of postural hypotension rather than from dehydration”.

Obviously the blood pressure rise very high during activity, but...
Your Sport 2nd Quarter 2007

A long distance runner should drink according to thirst ... no more than 400-800ml per hour

when the athlete stops, the blood pressure might drop precariously low and it cannot be regulated. The athlete might even faint. The only way to treat that, is to get the athlete's legs up and let him rest for two hours.

“The assumption that athletes collapse after exercise because they are suffering from a dehydration-related heat illness has led to the widespread use of intravenous fluids at the first line of treatment for this condition of exercise-associated collapse. There are no clinical trials to show that intravenous fluid therapy is either beneficial or even necessary for the optimum treatment of those athletes who collapse after completing marathon races and who seek medical care as a result,” says Noakes.

The most effective method to increase the blood pressure is to nurse the collapsed athlete in the head down position. Since adopting this technique in two races under his jurisdiction — the Two Oceans Marathon and the Cape Town Ironman Triathlon — they have not used a single intravenous drip in two years, says Noakes.

“We found no evidence that the management of these athletes was compromised in any way as a result of the adoption of this novel treatment method.”

The advice by Noakes to long distance runners is to drink ad libitum no more than between 400 and 800 ml per hour. In layman’s terms it means a long distance runner should drink according to thirst. If the runner is not thirsty, he should not drink, he says. Interestingly, the average weight loss during marathon races in which athletes drink ad libitum, and not as much as possible, is between 2 and 3 kg. It suggests that these athletes intuitively (and accurately) assess their needs for fluid replacement during exercise.

This contrasts to the currently popular dogma that athletes who drink only in response to their thirst, would become sufficiently dehydrated during exercise that their performances would be impaired and their health placed at risk.

Published evidence indicates that rates of fluid intake during running races vary from between 400 and 800 ml per hour. Among those who develop hypotension of exercise, the rates of fluid ingestion during exercise are very much higher and may be as high as 1.5 litres per hour.

“There does not appear to be any reason why elite athletes could be encouraged to increase their rates of fluid intake during marathon racing by drinking as much as possible.

“But perhaps the even more cardinal point is that athletes who run/walk marathon races in four or more hours will have lower rates of both heat production and fluid loss, and must therefore be advised not to drink more than a maximum of 800 ml per hour during such races. He says the results show that higher rates of fluid intake can be fatal if sustained for four or more hours,” he says. The human ancestors evolved in the desert, where they had to chase antelope for between 4 and 6 hours. He says, “We found no evidence that the management of these athletes was compromised in any way as a result of the adoption of this novel treatment method.”

“The first IMMDA guidelines were written by Prof. Tim Noakes in 2001. In brief:

GUIDELINE # 1: Be very careful to make accurate diagnoses, so that the treatment plan can be optimally effective rather than inappropriate.

GUIDELINE # 2: Considerable individual difference in responsiveness exists for tolerable fluid ingestion during exercise. The optimum rates of fluid ingestion during exercise depend on a number of individual and environmental factors. Hence it is neither correct nor safe to provide a blanket recommendation for all athletes during exercise.

GUIDELINE # 3: A diagnosis of heat illness should be reserved only for those patients who have clear evidence of heat stroke and the successful treatment of which requires active whole body cooling.

Since the Two Oceans Marathon successfully adopted Prof. Tim Noakes’ methods, they have not used a drip for treatment.

Oceans Marathon and the Cape Town Ironman Triathlon — they have not used a single intravenous drip in two years, says Noakes.

It is normal to lose a small amount of bodyweight during a marathon race — body weight will not equilibrate over the next 24 hours through the consumption of sodium and fluids with meals. A weight loss of more than 2% or any weight gain are warning signs that justify immediate medical consultation and indicate that you are drinking improperly.

Try to drink to thirst. New scientific evidence says that thirst will actually protect athletes from the hazards of both over-and under-drinking by providing real time feedback on internal fluid balance. If you are not thirsty, try to refrain from drinking. Do not feel compelled to drink at every fluid station nor follow the cues of other runners — their fluid needs are probably very different from your own.

Always defer to physiologic cues to increase fluid intake (thirst, concentrated dark urine, weight loss or decrease fluid consumption (dilated or clear urinination, bloating, weight gain) while participating. The first IMMDA guidelines were written by Prof. Tim Noakes in 2001. In brief:

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When athletes run long distances, they need to take 20 grams of carbohydrates every hour, says Noakes. He, Bruce Fordyce and Bernard Rose were the first to develop so-called Leprin squoosies in the 1980’s. They are still produced today.

US sports nutritionist Steve Born advised Caterina 'During exercise all carbohydrates are equivalent — there is no one that is better. We have researched this for 20 years’ — Tim Noakes.

He says simple sugar-based drinks or gels have a very dilutely calorically weak concentration in order to be digested with any efficiency. A simple sugar-based product used at a properly mixed concentration cannot provide adequate calories to sustain energy production.

Born also supports the view of many manufacturers of nutritional supplements that complex carbohydrates are the wisest choice for endurance athletes, as they allow one’s digestive system to rapidly and efficiently process a greater volume of calories, providing steady energy. He also says that it is important to take protein supplements during prolonged exercise.

The protein burned by muscle can be prevented by increasing the energy intake during exercise. The body is designed in this way — if you burn a few hundred grams of muscle during very prolonged exercise.

But if you have tens of kilograms of protein in muscle, the effect is irrelevant. You will reconstitute that protein as soon as you eat after exercise.”

Hydration

International guidelines for fluid intake during strenuous exercise

If the rectal temperature is not elevated above 40 – 41°C so that the patient recovers fully with the use of whole body cooling, then a diagnosis of heat illness cannot be sustained and an alternate diagnosis must be entertained.

GUIDELINE # 1: Consideration be given to collapse and requires medical attention after completing long distance running events are probably suffering more from the sudden onset of postural hypotension than from dehydration.

GUIDELINE # 2: The added carbohydrate and electrolytes speed absorption of fluids and have the added benefit of fuel (energy) and electrolytes. There is actually decreased benefit to watering down or diluting sports drinks with water. Drinking too much or too little can be of risk to health and performance. Hyponatremia (low blood sodium) is due to abnormal fluid retention (from overdrinking) and dehydration (due to net fluid losses from underdrinking) are conditions easily understood by you and your individual body needs. Body weight, gender, climate, sweat rate are just a few variables that individualize your needs.

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Adjust the rate of fluid intake to race pace: slower race pace = slower drinking rate; maximum intake of 500 ml/hr for runners with greater than 5 hour finishing rates. Weight monitoring is also important. If you gain weight during your work-out or event, you are drinking too much!