Do not over hydrate

Dangers of marathon running

Fatalities do occur in marathons. The worldwide average is one fatality for every 3 million marathon km run. It doesn't sound high and indeed it isn't. However with 50,000 runners cover 42 km each in the New York marathon that adds up to 2 million km. So New York can expect two fatalities every 3 years.

However, if I were to line up 3 million runners and get them to run just one km each, the chances are that one of them would die from some reason not related to running a km.

The overwhelming majority of marathon fatalities (>90%) are due to a previously undetected heart condition. Marathon conditions place extra strain on the heart which causes the defective heart to fail. Warmer or humid conditions place even more strain on the heart as it has to work that much harder to keep the body cool, resulting in a higher frequency of fatalities.

However, some fatalities do occur related to de-hydration, heat stroke and over hydration. Of these, over hydration is by far the highest risk.

Back ground.

Prior to the 1960s runners paid little attention to hydration. It was almost considered to be unsporting to take on board water during an endurance event. Then a study revealed that runners at the end of a race who had lost most weight, through de-hydration had the highest core body temperature. It was incorrectly assumed that dehydration caused hyperthermia, (That is increase in body temperature). In the extreme, if body temperature rises above 42c, hyperthermia can result in heatstroke and death. The advice to runners changed to "Drink everything in sight." "Don't wait until you are thirsty" As always it took runners a while to catch on but by the 1980s everyone was drinking to excess.

The body temperature rises during exercise. The body's natural method of dealing with this is to sweat. As sweat evaporates from the surface of the body it takes heat out of the body. This leads to de-hydration. So, dehydration is a result of hyperthermia, not the cause of it. It is important to take on water to replace lost fluid.

By the 1980s a new problem was observed, Hyponatremia. That is low sodium concentrations in the blood. It is extremely dangerous and has been linked to many fatalities. A study of a sample of runners in the Boston marathon found that 1 in 8 had hyponatremia. The cause was found to be due to over hydration. The blood sodium level becomes diluted due to over hydration.

Advice has now changed to "Drink according to your thirst" "Do not drink more than 800 to 1000ml per hour" "Drink small amounts frequently, say 200ml every 15 minutes.

Heat Stroke

Heat Stroke is almost non-existent amongst runners. This is because, long before your body temperature reaches danger levels you will find it too hard to run. If you stop running or collapse your body will start to cool down. However, if the body's natural cooling mechanism has been upset due to taking sports enhancing drugs or medication

(including anti-inflammatory drugs) then heat stroke can occur. The treatment is to cool the body down as quickly as possible. Submersing the body cold water or fanning the body is recommended. If it is sunny then get some shade over the body, but do not move the body. This can be fatal. If the runner is vomiting then turn the body onto its side so that the runner doesn't choke on the vomit.

Dehydration

Dehydration is best treated by giving the runner water to drink, if they are conscious and able to take it. Otherwise the standard procedure is to apply an intravenous drip.

Over Hydration, Hyponatremia

This is by far the most dangerous condition for runners. It is the dilution of sodium levels in the body due to taking in too much fluid. Those most at risk are small runners and slower runners.

Small runners lose body heat due to radiation at a far greater rate than larger runners. Hence they sweat less and dehydrate less. So they do not need to take on so much water during an event.

Slower runners dehydrate less than faster runners and hence do not need to take on so much water. Also there is the danger that because they are out on the course for longer they may drink more.

The symptoms of Hyponatremia are very similar to dehydration or heat stroke. Hence it is often wrongly diagnosed and treated with a regular intravenous drip, which can be fatal. The correct treatment is to apply a drip of at least 3% sodium content. A person suffering from Hyponatremia may well vomit clear fluid.

More information

I have placed a pdf file on the web site which has more detailed information including recommendations from the top marathon sites. Unfortunately Dubai Marathon advice is not in touch with latest thinking.

Boston Marathon advice

II. HYDRATION, DEHYDRATION AND HYPONATREMIA

The B.A.A. and the Boston Marathon medical team have provided each registered runner with a brochure, which accompanies this Welcome Booklet. The brochure, entitled "The Right Way to Hydrate for a Marathon," has been developed by the American Medical Athletic Association and offers important information relevant to athletes of all abilities. However, it is important for runners to be aware that there are many risks involved in running a marathon. Also, it must be understood that a runner's susceptibility to a particular risk will depend on a number of different factors, including factors unique to the individual runner. In addition, medical knowledge and medical therapies relating to long distance running are continuing to evolve and develop. For instance, one of the risks which is receiving attention is hyponatremia, and there are studies which indicate that females and those taking nonsteroidal anti-inflammatory drugs (such as Advil, Motrin, Aleve, ibuprofen, naproxen etc.) may be particularly susceptible to this risk. Unfortunately, no one study is definitive or comprehensive. Therefore, the B.A.A. and the Boston Marathon medical team urge all

participants to read publicly available materials and to educate themselves fully about the medical risks associated with running a marathon as well as professional recommendations about training, nutrition, hydration and injury-prevention. For further information, you might visit websites such as that of the American Running Association at www.americanrunning.org and the many "Running-Related Brochures" and "Fitness Links" referred to there, consult leading professional publications on these subjects, and consult your own physician.

American Running Association Advice

How often should you Drink Fluids?

Thirst is a good indicator of your fluid needs in many instances, but heat conditions warrant pre-run hydration.

Drink at least 450 mls of water or a combo of sports drink and water an hour before a run

Drink another 100 to 200 mls oz 15min to 30min pre-run

Post-run hydration: drink enough fluids to regain lost weight in sweat. It is good idea to figure out one's sweat rate by weighing yourself sans clothing (nude) pre-run and again after a run. Drink the amount of lost weight after a run. Don't overdrink and monitor your urine or pee color.

Electrolyte replacement: water and a sports drink with a 6% solution of carbohydrates can help bring back lost electrolytes.

New York Marathon Advice

Drink for thirst.

This simple advice from the International Marathon Medical Directors Association takes the guesswork out of hydration in training and on race day. The best gauge of your hydration status is your own individual sense of whether or not you're thirsty. If you feel thirsty while running or racing, have 100 to 200 mls of fluid (preferably a sports drink that has some sodium in it such as Gatorade Endurance Formula) at an aid station or whenever you feel that you need it. If you aren't thirsty, don't feel compelled to drink. If you can't use thirst as a guide, drink no more than a cup (8 ounces) of fluid every 15 to 20 minutes. Do not overdrink. Overhydrating can lead to a dangerous condition known as hyponatremia (low blood sodium); this condition can lead to nausea, fatigue, vomiting, weakness, sleepiness, and -- in the most severe instances -- seizures, coma, and death. To make sure that you're starting your runs and races well-hydrated, check the color of your urine: It should be pale yellow, like lemonade. Dark-colored urine (like tea) indicates dehydration, and very pale or clear urine indicates that you're overhydrated. In training, weigh yourself before and after your runs to get a sense of how much to drink to replace the fluids lost. Recognize

that you will need to drink more during exercise in warm, humid weather than on a cool, dry day.

Avoid NSAIDS (non-steroidal anti-inflammatory drugs) starting 24 hours before your race.
These drugs, which include ibuprofen and naproxen sodium, limit blood flow to the kidneys, causing serious risk of hyponatremia. You can start taking them again six hours after the race. Acetaminophen is a safe alternative before and during the race.

London Marathon

Fluid lost in sweat must be replaced, otherwise your body will become dehydrated (short of water) and less efficient. Alcoholic drinks and drinks containing caffeine – such as tea and coffee – can be dehydrating. Take plenty of non-alcoholic drinks with you when you run, especially when training in hot weather. Drink enough to keep your urine a pale straw colour. Also, drink plenty of liquids after training – especially after long runs – and practise drinking during longer training runs. You could also try drinking sports energy drinks in training to see if you like them.

Drink plenty of fluids and preferably no alcohol in the two days before a race. DO NOT drink excessively before, during or after a race, as you may get hyponatraemia (see 'Drinking Safely' below).

Drinking on a race day
Start a race well hydrated by drinking up to half a pint (250ml) of water or sports drink in the half hour before the start. Do not be greedy and take extra drinking water from drinks stations during the race to pour over yourself, as you may be depriving slower runners of much needed drinks. Only take water if you need a drink. If it is hot, additional water will be provided and showers will usually be set up on the race course – so use these to cool yourself, rather than using drinking water.

DRINKING SAFELY

A balancing act
Drinking too little can lead to problems, as you will always need to replace some of the fluid you lose as sweat. On the other hand, drinking too much can be very dangerous and lead to hyponatraemia (water intoxication), fits, and in some cases death. Drink when you feel the need and DO NOT gulp large volumes of fluids before, during or after a race.

A rough drinking guide
Your drinking needs for a race will vary according to your build, your speed and above all the weather, as these affect how much you sweat.

Faster runners (for example, runners who aim to complete marathons in under 3hrs 30mins) on a warm day may need as much as a litre of fluid per hour (two pints). Slower runners should need less – particularly on a cool day – and should not drink more than 500 ml per hour.

There will be frequent water stations on your race route, but YOU DO NOT NEED to drink at each one. Instead, just swallow a mouthful of water occasionally. If you like sports energy drinks, have one of these instead of or as well as water.

After finishing a race, DO NOT drink large amounts of water. You can only rehydrate (replace lost fluids) gradually over the next 24-48 hours. Eat some salty food as well as spacing out your drinks; by doing this you will not get hyponatraemia and will replace the water salt and glycogen lost when running the marathon.

Dubai Marathon Advice (Clearly out of line with current thinking)

Fluids

Fluids lost in sweat must be replaced otherwise your body becomes dehydrated and less efficient. Alcoholic drinks are dehydrating. A pint of beer produces more than a pint of urine; spirits have a worse effect. Take plenty of non-alcoholic drinks, especially before the race and in hot weather. Thirst is a poor guide to how much you need. Drink enough to keep your urine copious and a pale straw colour. Drink plenty of liquids after training, especially long runs, and drink during races, especially in the first half of a marathon. Practice drinking during longer training runs. Drink plenty of fluids and reduce alcohol intake in the two days before the race.

Runners World Advice

As marathoners, we're all exercise scientists to one degree or another. We put a lot of time into our training, but also understand that we need to eat and drink optimally to perform our best. Here's what I'm telling my friends this fall:

1) Don't drink obsessively in the several days before a marathon. Drink when you're thirsty; that will get the job done.

2) Don't take NSAIDs such as aspirin, ibuprofen, or naproxen sodium before, during, or immediately after your race.

3) Weigh yourself before the marathon, and write your weight on the back of your race number. If you need help at the finish line, the marathon medical staff will find this prerace weight very helpful when they attend to you.

4) During the marathon, drink when you're thirsty, understanding that water, sugars, and electrolytes will help you feel and perform your best. But don't force yourself to drink.

5) Be particularly careful if you expect to run over four hours, and if you have an unusually small or large body size. Drink less if you begin to get a queasy, sloshy feeling in your stomach.

6) Drink sports drinks rather than water. But don't expect sports drinks to prevent hyponatremia. They won't.

7) Don't chug fluids immediately after the marathon. This is a time, according to a 2003 London Marathon report, when the risk of hyponatremia can be quite high, as stomach fluids are absorbed into the bloodstream. Nibble on solid foods and sip a

variety of drinks slowly until you feel well recovered.

Happily the word is getting out. After the 2002 hyponatremia deaths at Boston and Marine Corps, the 2003 Boston Marathon had only a six-percent incidence of hyponatremia, and race physicians have told me this figure continues to come down. The London Marathon docs say that "after an educational campaign warning runners of the dangers of excessive drinking," there was only one hyponatremia case at the 2004 London Marathon versus 14 the year before.

As I like to say to my friends, "Run long and healthy."

Running Planet Article.

Do you have a drinking problem? Don't worry; you won't need the 12 step system. I'm talking about drinking too much water during a long race or training run. Yep – I said drinking too much. Over the past 20 years it's been drummed into our heads that we need to drink early, often and in copious quantities. Coaches, the media and even the government have been saying that we should drink as much as tolerable, especially when we are running in the heat. Huge, multi-million dollar businesses have been built on those recommendations. Just look at all of the bottled water, sports drinks and plastic water bottles on stores shelves. There's something that those business that generate millions of dollars in sales on sports hydration don't want you to know. You don't need that much hydration!

That isn't breaking news. The dangers of over drinking have been well known since 1985 when the story of a 46 year old woman, who suffered from hyponatremia during a race, was first reported. The paper entitled "Water intoxication: a possible complication of endurance exercise", told the story of the runner who became ill during the last 20km of the Comrades marathon. Doctors diagnosed the women, who survived the experience, with hyponatremic encephalopathy. The authors of the paper concluded that "…the intake of hypotonic fluids in excess of that required to balance sweat and urine losses may be hazardous in some individuals."

In 1986 the Journal of the American Medical Association published the personal reports of two doctors who ran in an ultra marathon in Chicago. The participants of that race had been advised to drink between 300 – 360 ml of fluid every 1.5 km. By the end of the event each doctor had consumed over 20 liters of fluid and both suffered from hyponatremia. The report concluded that "While this practice of drinking in excess of thirst may deter the occurrence of dehydration, large intakes of hypotonic fluids, associated with substantial sodium losses, can lead to hyponatremia as it did in the case of these runners."

Another study, published in 1991, looked at the fluid and sodium balance of runners that collapsed during the 1988 Comrades marathon. That investigation came to a similar conclusion "…the hyponatremia of exercise results from fluid retention in subjects who ingest abnormally large fluid volumes during prolonged exercise."

It had become obvious by that point that over drinking causes hyponatremia, but there was little data on whether or not fluid restriction would help prevent the condition. Some New Zealand scientists changed that. The New Zealand researchers found that simply advising the athletes not to over drink and restricting fluid availability on the

course reduced the number of hyponatremia cases during the New Zealand Ironman from 14 in 1997 to only 3 in 1998.

Even the US military got involved in the hydration debate. In 1989 the military issued new hydration guidelines that were in line with the "drink as much as tolerable" philosophy of the time. Their intentions were good; to reduce the risk of heat illness in military personnel, but the results bordered on disaster. Exercise associated hyponatremia (EAH) increased dramatically at that time. Between 1989 and 1996 there were 125 cases of EAH with 6 reported deaths. The US military quickly reacted by changing their guidelines and setting upper limits to fluid intake. Incidence of EAS fell as a result.

With all of that evidence linking over drinking to EAH you would assume that over drinking would no longer be a problem. Has the problem gone away? Nope – it's still around. In some cases the problem is even more wide spread. Why won't the over drinking problem go away? I'm not a big conspiracy theorist, but I do believe that much of the problem lies with the influence of the big money from the bottled water and sports drink business affecting the media. A lot of cash would be on the line if we reduced the amount of fluids we drink on a daily basis.

The commercial influence aside, there is another fairly recent change in marathon running that has had an effect on the incidence of EAH. Twenty years ago most marathon runners were very highly trained and were able to complete a marathon in 3.5 hours or less. Today the marathon has become very popular among less experienced runners and the typical finishing time has become 4.5 to 5 hours. The slower pace combined with longer duration is allowing runners to consume even more fluids and increase the chances of suffering from EAH. In fact, the first confirmed EAH related death during a marathon was during the Valley of the Giants marathon in 1993. There was another death during the 1998 Chicago marathon, one in the 2002 Boston marathon and another in the 2002 Marine Corps marathon. A study conducted at the 2002 Boston marathon showed that a shocking 13 percent of the marathon finishers had signs of EAH.

While EAH can strike any runner that over drinks, there are certain risk factors that seem to be more associated with high risk of EAH. Of course, excess fluid consumption is the primary risk factor, but other factors include; female gender, low body weight, slower pace and use of NSAID's. A study from 2006 conducted by the US Army also suggested that salty sweaters tend to suffer from EAH more easily than those with less salty sweat. This passes the all important common sense test. If you lose more sodium when you sweat you would certainly be more at risk for developing EAH.

Dr. TD Noakes, who has spearheaded much of the research into EAH, has recently identified three biological mechanisms that work in tandem to cause EAH. The mechanisms indentified by Noakes are over drinking, inappropriate ADH secretion (anti diuretic hormone which prevents the production of dilute urine), and a failure of your body to mobilize emergency stores of sodium. Noakes believes that all three of those abnormalities must be present to produce EAH.

Research is continuing in this field and more information on why EAH occurs and how to prevent it will be forthcoming. In the meantime, ignore those recommendations to drink at much as tolerable. You can avoid EAH by drinking only

when thirsty, drink only enough to maintain your sodium balance – not to maintain bodyweight and consume sports drinks instead of plain water.

Hyponatremia Spinal Health

1998 saw a record number of DNF's ('Did Not Finish') at Ironman Canada (an 'Ironman' is a triathlon consisting of a 2.4 mile swim, 112 mile bike, and 26.2 mile run). Approximately 250 athletes - well-trained Ironman athletes - didn't reach the finish line. The primary cause was attributed to dehydration and hyponatremia - as was evidenced by the number of IV bags the medical team went through. Granted, it was hotter than usual and the headwinds that plagued the cyclists for 2/3 of the bike course made for longer bike splits, but what did these unfortunate DNFers do wrong that cut their day short and landed them in the Medical tent?

At the Ironman level, everyone knows the importance of hydration. Just count the number of porta-potties in a transition area and the number of athletes in line and you'll agree that no one forgot to drink in the days leading up to a race. But that's not enough in a race the length of Ironman. You need to understand the importance of sodium and it's relationship with water in order to prevent a trip to the medical tent at your next ultra-distance race.

Hyponatremia means 'low concentration of sodium in the blood'. Sodium is an important electrolyte (an element with an electrical charge - in this case Sodium is positive and represented as Na+) which plays a role in water balance and muscle contraction. Sodium is required to draw water through permeable membranes in the body and thereby distribute fluid throughout the body. When you sweat, you lose water and salt, and salt is made up of sodium and chloride and is represented as NaCl, so lots of sweating means you are depleting your sodium stores in the body. If your sodium levels in the blood get too low (hyponatremia) you will no longer be able to move water across permeable membranes and you will become dehydrated - even if you are drinking enough water. You can drink all the water you want, but if you don't have the sodium present to move it from the gut to the bloodstream, you don't stand a chance.

A common complaint among Ironman athletes is that they get off the bike, after hydrating regularly throughout the ride, and they feel bloated, their abdomen is swollen, and they have an upset stomach. It's a good guess that they didn't take in enough salt and now all that water/sports drink has pooled in their stomach and they are going to have to run/walk with a watermelon in their gut until they're offered chicken soup broth - which is quite salty - at which point they'll begin to feel like running again. Don't laugh, I read about this happening to some poor souls every year. So what went wrong? Don't sports drinks have sodium in them? We need to look at a few numbers in order to answer these questions.

1. Sweat contains between 2.25 and 3.4 grams of salt per litre, and in a long race an athlete could easily lose 1 litre per hour. In a 12 hour race, that adds up to between 27 and 41 grams of salt.
2. While everyone is different, a general rule of thumb is that you should try to ingest 1 gram of sodium per hour during a long event. You should also increase your sodium intake in the days leading up to the race. Aim for between 10-25 grams of salt per day pre-race.

3. To ingest 1 gram of sodium from sports drinks alone, you would have to drink 2.18 litres of Gatorade. You can't drink that much per hour for the duration of an Ironman race.

So, even if you drink sports drinks during a hot race it is very likely that you will sweat out more salt than you can replace. You will need to replace salt specifically. This can be accomplished by either eating salty foods or taking salt tablets. There are pros and cons to both: **Salty Foods** will taste good and the fact that you are 'tasting' the salt will help to trigger a thirst response which will make you drink more. But, you will need to eat a lot of salty food to get in enough sodium. One gram of Sodium equals 2.5 grams of table salt. Now, one tablespoon of salt weighs about 6.6 grams, so you will need less than half a tablespoon (per hour), but if you are trying to ingest that from pretzels or crackers, that's a lot of food you'll have to carry. On the other hand, **Salt Tablets** are convenient little 'pills' made up of sodium and chloride (some electrolyte tablets may have other ingredients, but basic salt tablets are just table salt) which are easy to carry and ingest. But, because they don't stimulate a thirst response you will have to make sure that you are drinking enough during the race. The nice part about ingesting salt while you race is that it allows you to drink plain water for a change from the sports drink of the day. That can be a welcome relief on a hot day because you can wash your face, head, etc. and the water is often colder than the sports drink because it doesn't have to be mixed ahead of time.

There are a couple of other important things to remember when discussing hyponatremia:

- The signs and symptoms of hyponatremia include bloating, upset stomach, nausea, headaches, cramps, disorientation, slurred speech and confusion. Untreated, hyponatremia and dehydration can lead to collapse, convulsions, and sometimes even death.
- It is possible to become hyponatremic without sweating out all your salt. Over-hydration in a cooler climate can cause low sodium concentrations in the blood. This has happened to athletes at Ironman New Zealand where the weather can often be on the cool side. Some athletes actually consume too much water which dilutes the sodium in their system thereby causing hyponatremia. Remember, it is the concentration of sodium that we are concerned with, not the absolute amount.
- Medication such as Aspirin (ASA), Ibuprofen, Non-Steroidal Anti-Inflammatories (NSAIDs), and Tylenol (Acetaminophen) interfere with kidney function and may contribute to hyponatremia. Taking such medication while racing is simply foolish.

To summarize, when preparing for an Ironman it is important to practice salt replacement while training, to increase your salt intake in the days leading up to the race, to drink an amount of fluids which is appropriate to the race climate, and to ingest salt during the race if the day is hot. Follow these simple guidelines and hopefully you'll never see the inside of the medical tent.

The following was taken from the Runner's World website:

South African sports medicine expert Tim Noakes, author of the widely respected "The Lore of Running," practically "invented" athletic hyponatremia. His studies and observations at the 54-mile Comrades Marathon led him to realize that some runners were actually drinking too much water during long, slow endurance events, and that this could bring on a dangerous medical condition. Hyponatremia has recently been discussed more often in the context of 26-mile marathons, with the medical director of the Rock 'n' Roll Marathon stating that the RnR race might have seen as many as 12 cases of hyponatremia. Noakes discussed hyponatremia with Runner's World Daily shortly after returning home to Cape Town from a lecture at Harvard Medical School.

Runner's World Daily: What is hyponatremia and what are its physical effects?

Tim Noakes: Hyponatremia means a reduced blood sodium concentration. When the sodium level falls below 129 mmol per liter, it creates, in mild cases, a general clouding of consciousness not unlike the slowing of brain function that occurs in drunkenness. This is caused by swelling of the brain that results from the general state of fluid overload. In more severe cases, the athlete lapses into unconsciousness, develops epileptic-like seizures and may stop breathing or suffer cardiac arrest. Fluid overload of the lungs may produce pulmonary edema that leads to shortness of breath and coughing up blood-stained sputum. In Ironman triathletes suffering from hyponatremia, I have observed gross swelling of the hands and forearms.

RWD: How and why do distance runners get hyponatremia?

TN: By drinking too much fluid during very prolonged exercise. We usually find that athletes who develop the condition drink between 1,000 and 1,500 ml per hour [between one and one and a half quarts] during exercise but sweat at much lower rates, perhaps 700-1,000ml per hour. As a result they develop a progressive fluid overload.

RWD: Who gets it most commonly and in what kinds of events?

TN: Women are at much greater risk than men for reasons that we don't yet understand. I think it is purely a size effect; women are smaller and more likely to develop a fluid overload simply because it takes less fluid for small people to become overloaded. Alternatively, it is clear that a big part of the problem is the inability of the athlete to excrete the excess fluid perhaps because of high levels of fluid-retaining hormones. It may be that woman have larger amounts of these hormones, the nature of which remain uncertain.

RWD: How can marathoners make sure they are getting enough fluids but not so much as to be at risk for hyponatremia?

TN: You have to drink a lot for a long time to develop a fluid overload. If runners are drinking less than 1 liter per hour, they are unlikely to develop the condition. Since you need to keep drinking for 5 to 6 hours or more, only very slow marathon runners and ultradistance endurance athletes are at risk.

The best thing for athletes to do is to weigh themselves before and after a hard training workout to determine their usual sweat rate. Then they can plan their fluid intake during a race accordingly.

RWD: How can runners or medical personnel spot hyponatremia in another athlete?

TN: Aside from some medical conditions that are usually well recognized, there are really only two conditions specific to sport that cause an altered level of consciousness during prolonged exercise: heat stroke and hyponatremia. Measuring body temperature is the first step in the differential diagnosis. If the body temperature is above 42 degrees Centigrade, the diagnosis is heatstroke, and the athlete must be placed in an ice-water bath for 5-10 minutes to lower his or her body temperature. If the temperature is normal [i.e., 38-40 degrees Centigrade], then the most likely diagnosis is hyponatremia. The diagnosis can be confirmed by measuring the blood sodium content, and obtaining a result below 129 mmol per liter.

RWD: What should be done for a stricken runner?

TN: The best treatment of the hyponatremia of exercise is masterful inactivity. Given time, the body will start to get rid of the fluid excess by increasing urine production. Full correction of hyponatremia requires that the athlete gradually ingest some salt over the next 10 to 12 hours. If medical help is available, the physicians may choose to manage the condition by using a urine-producing drug [a diuretic] and replacing the lost salt with a very concentrated [3 percent] salt solution given intravenously at a very slow rate [less than 50 ml of fluid per hour].

RWD: What should not be done to a runner with hyponatremia?

TN: Athletes with an altered level of consciousness should never be given intravenous fluids until it has been determined that the individual is not suffering from hyponatremia. We need more people to understand that the mild levels of dehydration experienced by modern marathoners does not cause loss of consciousness. Giving fluid to hyponatremic athletes will, at best, worsen the condition and delay recovery. At worst, it may produce respiratory and or cardiac arrest as a result of a sudden worsening of the brain swelling.

Post-Script (by Dr. Mark Steckel)

You'll notice that this interview discussed hyponatremia - low sodium or salt levels. It is the primary concern in ultradistance events where the athlete has been sweating. No mention was made of hypokalemia - or low potassium levels. This is because low sodium is the main culprit in these types of dyhydration/electrolyte imbalances. In some Ironman races, like Ironman New Zealand, the medical staff warns against drinking too much water. This is because the weather is typically cooler and therefore sweat rates are lower and drinking too much will decrease the concentration of blood sodium - giving the same effect as if the athlete had sweat out too much salt.

It should be noted that drinking sports drinks that have electrolytes added to them will delay the onset of hyponatremia because you are adding back some of the lost salt, however in ultra events this still may not be enough therefore replacement via salt tablets may also be required.

Conclusion - know your body, have a feel for your own sweat rate, and replace lost sodium with sodium chloride (NaCl) tablets in ultra events and in the days preceding and following the event. Sodium chloride tablets are more important than electrolyte tablets (which may contain potassium and other minerals along with sodium) because your main concern is with avoiding hyponatremia.

Marathon victim died from drinking too MUCH water

Last updated at 10:37am on 24.04.07

David Rogers, 22, who died after drinking too much water during the London Marathon

A 22-year-old man died after completing his first London Marathon because he drank too much water.

David Rogers collapsed at the end of the race and died yesterday in Charing Cross Hospital.

Today it emerged the fitness instructor from Milton Keynes died from hyponatraemia, or water intoxication.

This is when there is so much water in the body that it dilutes vital minerals such as sodium down to dangerous levels. It can lead to confusion, headaches and a fatal swelling of the brain.

In 2003 St Thomas' Hospital treated 14 runners for the condition.

The marathon on Sunday was the hottest in the event's 27-year history. Temperatures peaked at 23.5C, with "radiated heat" from the road reaching 27.5C.

Rogers' death came as race organisers faced criticism over water supplies running out at certain parts of the course, despite temperatures nudging 75F (23.5C).

As thousands were treated for heat-related illnesses and dehydration, sports experts called for the event to be held earlier in the year when temperatures are lower.

However Dr Sanjay Sharma, Medical Director of the marathon, said he did not believe the cause of Rogers' death was heat related.

A London Marathon spokeswoman said every care was taken to ensure runners were fit to compete.

More than 600 runners failed to complete the 26.2 mile course - including long-distance running legend Haile Gebrselassie who pulled out after 19 miles - as the unseasonable heat took its toll.

Mr Rogers, who finished the race in 3hr 30mins, was the ninth runner to die since the first London Marathon in 1981.

Scroll down for more ...

The start of the London Marathon

His father, Chris Rogers, 52, paid tribute to "a happy-go-lucky lad who brought happiness to everyone".

Mr Rogers, of Westoning near Bedford, and his wife, Sarah, saw their son at Tower Bridge when he was "ecstatic", but at the end of the race learned he had been taken to hospital.

One medical expert said: "Ironically, hyponatraemia is more dangerous than dehydration."

A spokesman for the race said: "There were 27,600 bottles of waters on those stations on the latter half of the course. Some water stations did run out, even though we had brought in extra water."

Gordon Trevett, of the Department of Exercise and Health Sciences at Bristol University, said the event should be held earlier in the year as the sweltering weather put runners' health under greater strain.

He said: "I think it would be a good idea to move the marathon forward so competitors can run in lower temperatures."

But London Marathon chief executive Nick Bitel said the event would continue to be held at the same time of year.

He said: "Some people think the marathon should be later in the year so they can train in warm weather, and some people like to train in summer and think that a winter marathon would be better. We think we are at the right time of year."