



## Fluid Replacement Controversy: Too Little – Too Much

In 1996 the American College of Sports Medicine ([www.acsm-msse.org](http://www.acsm-msse.org)) position stand on exercise and fluid replacement recommended that during exercise athletes should start drinking early and at regular intervals in an attempt to consume fluids at a rate sufficient to replace all the water lost through sweating (i.e. body weight loss), or consume the maximal amount that can be tolerated.

Since 1996 studies have documented athletes can over drink, leading to water retention, weight gain, and in a few cases death from exercise associated hyponatraemic encephalopathy. Hyponatraemia is water poisoning; there is far too much water and too little sodium in the body. Symptoms associated with hyponatraemia include nausea, vomiting, head aches, cramps, convulsions, leading to coma. A study in 2002 documented that 13% of the Boston Marathon runners suffered from hyponatraemia.

In July 2006 the International Marathon Medical Directors Association ([www.aimsworldrunning.org](http://www.aimsworldrunning.org)) published a position statement “Update Fluid Recommendation”. The IMMDA presents 6 practical recommendations one of which is drinking to thirst will protect the athlete from hazards of both over and under drinking.

This recommendation of “drinking to thirst” is contrary to the common interpretation of the 1996 ACSM guidelines that drinking according to the dictates of thirst leads to “dehydration”, which impairs exercise performance and promotes risk of ill health. Frequently, I have heard the recommendation that you should start drinking early in the race even though you are not thirsty; because in order to stay hydrated you need to drink early and often. Dr. Tim Noakes argues that this practice increases the risk of drinking too much water and slower runners are at greater risk for hyponataemia, as they have more time to consume more water (2007).

In Feb 2007 the ACSM published a replacement position stand on Exercise and Fluid Replacement. The goal of drinking during exercise is to prevent excessive (>2% body weight loss from water deficit) dehydration and excessive changes in electrolyte balance to avert compromised performance. The ACSM no longer recommends that during exercise

athletes should start drinking early and at regular intervals in an attempt to consume fluids at a rate sufficient to replace all the water lost through sweating (i.e. body weight loss), or consume the maximal amount that can be tolerated. The 2007 guidelines recognize that drinking too much fluid can also be dangerous. Athletes should weigh themselves before running and write the results on their race bibs. If anything goes wrong, emergency workers can use the weight information to tell if the patient had consumed too little or too much water. The ACSM cites data that water quenches the sensation of thirst before body fluid replacement is achieved, so thirst should not be the only determinant of how much fluid is consumed.

Dr T Noakes criticizes the 2007 ACSM position stand on Fluid Replacement relative to using body weight as a measure of dehydration. Dr. Noakes suggests body weight is not an accurate measure of body fluid and electrolyte volume during exercise. He suggests that the controller of the balance between body fluid and electrolytes particularly sodium is the thirst mechanism. Dr. Noakes has concluded there is no conclusive evidence that athletes who drink sparingly during exercise develop specific medical conditions and the ability to sweat profusely while exercising in the heat is one of the most important determinants of human evolution. Research by S Schwelnus (2007) found no relationship between dehydration and cramping. During his study athletes measured their levels of electrolytes, body weight changes, and found those who cramped were no different from those who did not cramp. He suggests cramping is likely related to neuromuscular control at the spinal cord level in response to fatiguing exercise.

The bottom line according to Dr. Noakes is drink according to the dictates of your thirst during exercise, and do not ignore thirst. This approach works for every creature on planet earth even the slower runners. According to Dr. Noakes when athletes drink according to thirst, the risk that they will over drink is minimized, and there is no evidence that they are at any significant disadvantage from the 3-5% level of dehydration that develops as a result.

The ACSM and the IMMDA disagree on whether thirst should be the guide regarding fluid replacement, but they agree that considerable variability exists among individuals, and blanket advice to a widely variable population of individuals seeking simple answers is out of place. Athletes should be encouraged to explore, understand, and be flexible to their own needs. Look for multiple signs suggesting dehydration including thirst, body weight, volume and color of urine, and rectal body temperature.