



Essentiality of Hydration in Sports

Dr. A. Praveen

Assistant Professor, Department of Physical Education and Sports,
Pondicherry University, Kalapet, Puducherry-605014

KEYWORDS

Sports Nutrition relates to nutrition philosophies to sport by targeting better sports performance. Three factors determine the success in sports namely – hereditary, training and nutrition. Genomic traits cannot be altered. A major tool to improve athletic performance is specialized exercise training and proper nutrition is an important component of the total training program. Increased Macro and micronutrients and calories are the major essential nutrients needed by athletes and fitness enthusiasts. Therefore, it is vital to discover and evaluate these increased nutritional needs of athletes before, during, and after competition for achieving ideal sports performance.

Studies suggest that dehydration caused because of exercise can have an adverse impact on exercise performance, and fluid balance restoration should be met after exercise. It is correspondingly acknowledged that after exercise muscle glycogen must be replenished if subsequent performance is not to be negatively affected. By drinking enough amounts of sport drinks these roles are ideally met. Though, achieving muscle glycogen restoration by taking solid food, restoration of hydration status cannot be achieved. There is evidence that performance can be improved by drinking during exercise, provided that the exercise is of adequate interval for the drink to be emptied from the stomach and absorbed in the intestine. Mostly, consuming an ideally developed electrolyte-carbohydrate 'sports' drink can permit even better exercise performance than drinking plain water than drinking nothing. After exercise it is advisable and essential to drink adequate amount of fluid as well as sodium for proper rehydration. Rehydration will be neither poor nor complete when the body fails to drink electrolytes after exercise. Water is an essential component for the body's good working. Therefore, it is essential to drink adequate water and other fluids to meet the loss of fluids through sweat and urine. Water is mandatory to passage nutrients and gases to cells and to eliminate wastes from cells. It associates joints by acts as a lubricating agent's thereby smooth movement of food through digestive tract could be accomplished. It aids in regulating body temperature. It retains the shapes of cells, integrating the membranes of cells and acts as cushions organs and supports body structures. Body's total water differs with sex, body composition, age, etc. Body water is comprised up of two compartments namely extracellular (water outside the cell contains high percentage of potassium) and intracellular (water inside the cell contains high percentage of sodium and chloride). Regulating these two electrolytes is vital for optimal blood osmolarity. For maintaining this fluid balance the body mechanism is designed accordingly. For example, thirst is caused by a small rise in blood osmolarity. Likewise, the pituitary gland sends out messages which cause the kidneys to reduce the volume of urine 6.6 as regards 80% of the energy is broken down in a hot environment during exercise which is expelled as temperature in energetic muscles. From warm muscle tissue the heat is shifted to the blood, and later it is moved to the skin, where it is dissipated to the environment. The body increases the dissipation of heat to the environment by redirecting cardiac output, regulating skin blood flow and altering the rate of sweat secretion. The temperature of the body's internal

system is potentially inclined if this heat is not removed from the body's core. Thirst alone is not a good indicator for fluid needs. Research demonstrates that the onset of dehydration occurs in 15 minutes of exercise in hot adverse conditions. Gastrointestinal distress can be caused when drinking in a dehydrated state. Athletes may be allowing themselves to become dehydrated because it gives them a stomach ache during a workout. The time requisite for the movement fluid to move from the mouth to the sweat glands not merely comprises uptake at the intestine, but also includes the rate at which fluid empties from the stomach. Factors that increase stomach emptying comprise: carbohydrate content (optimal 6 to 10%), upright (versus seated) posture, low (versus high) exercise intensity and mild (versus hot) environmental temperature. Rapid absorption can be encouraged by a small concentration of carbohydrate, but too much carbohydrate will slow gastric emptying and can result in distress.

Complications of Dehydration

Heat spasms arise as feeble twitching's and advancement to localized contractions of skeletal muscles of the legs, arms, or abdomen. They transpire in one motor unit and rarely involve in whole muscle. They are mostly detected during repetitive, high strength exercise when athlete is under more perspiration. Insufficient fluid intake and loss of sweat mainly ends up in heat exhaustion. The functions of heart is impaired and the supply of blood to the cells are also halted when the loss of fluids are not replenished back to the body. One of the symptoms of dehydration includes Heatstroke (centre carcass hotness above 40°C) is raised during exercise in a hot environment when too much of stress occupied the body to control the body's temperature system otherwise cessation of the functions of the heart. It results from extreme hyperthermia. Failure in the control of temperature homeostasis is a clinical crisis. Therapeutic concern must be attained as early as possible a postponement in healing can be lethal. Surplus arises when the generation of heat surpasses the pace of heat indulgence, still in the existence of excess perspiring. Dysfunction functions of the brain; sweat glands of skin, blood vessel may take place when body's temperature is not regulated. Symptoms and grades at varied levels of loss in body weight due to dehydration are given below:

- ✓ Thirst - one per cent.
- ✓ Polydipsia - two per cent, vague.
- ✓ Hypotonic, oliguria, xerostomia – three percent.
- ✓ Irritation, emotional shakiness, augmented attempt for physical work, flushed skin, impatience, sleepiness, nausea – four per cent.
- ✓ Apathy – five per cent.
- ✓ Dysfunction in exercise, temperature maintainance, high pulse and respiratory rate – six per cent.
- ✓ Cyanosis and artificial breathing with exercise, inclined fatigue, psychological uncertainty – eight per cent.
- ✓ Swollen tongue, hallucination and muscle spasm – ten per cent.
- ✓ Circulatory scarcity, hypovolemia, kidney failure – eleven per cent.
- ✓ Death – fifteen per cent.

Water homeostasis is achieved when water is consumed correspondingly to the loss of body fluids. Fluid losses through perspiration during profound exercise are about one to two liter per hour liable on power and time, warmth, clamminess etc. It is witnessed that fluid needs are amplified significantly to five to sixteen litre per day for athletes who are highly active and open to hot temperatures,

The body conserves fluid and electrolyte balance with respect to differences in intake and losses of water. When this homeostasis is not regulated the body's function is collapsed. Consequently, deficits in the body fluids can raise the likelihood for declining exercise performance and rising heat injury. The volume of water required to substitute water losses differs from person with respect to the individual's metabolism, temperature, activity level, and hydration status. Athletes should swap body water lost during training/competition using the guideline that one kg of body weight lost equals one liter of water lost. Proper fluid replacement is unconditionally essential. Athletes exercising in a hot environment can drop approximately 30 ml of water every minute. Similarly, the body is only able to absorb similar amount of water every 3 to 4 minutes, hence, resulting in loss of about 500 ml of water every 20 minutes. A 3% loss of body weight in water can decrease the performance levels by 20-30%. Hydration should be prevented to combat this problem. Athletes body weight before and after the event or training session should be recorded. The variances in the body weight are corresponding to the water loss and should be replenished properly.

• Pre-event Hydration

1. About 1500ml – 3000ml of fluid should be consumed by the athletes the day ahead of the event.
2. About 500ml of water should be consumed by the athletes in the interval of one – two hours prior to the event and 600ml of water or other fluids should be taken Ten to fifteen minutes prior to the event.
3. Their bladder must be freed fifteen minutes before the event.
4. During the event athletes should sip cold water as it is absorbed more rapidly and cools the body better than water at room temperature.

• During-event Hydration.

1. Each Ten to fifteen minutes athletes should consume .15 Lt to .25 Lt to regulate fluid homeostasis.
2. Water must be sipped by the athletes rather than gulp.

Table-9 Fluid Replacement Guidelines Interval, quantity & kind of Beverage Prior to action

One to two hours - half Lt ice water

Ten to fifteen minutes – 0.6 Lt Plain cold water, diluted fruit juice, glucose-electrolyte beverage

Through action

During the time of activity performance the athletes should consume clear chilled water, glucose electrolyte drink, diluted fruit juice (150-250 ml) for every 10-15 minutes.

Following action

Begin instantaneously to balance the lost fluids by taking ice water. Hot fluids are suitable when the environment is cool to cold. Thinned fruit juice and drinks enriched with electrolytes and glucose is the better pick when fluids and energy are required instantly. They will also facilitate with stamina exercises lasting longer than 90 minutes.

• Electrolytes

To uphold energy transversely to their membrane of cell and bear electric impulses to other cells, electrolytes, like sodium and potassium, are important. These electrolytes are lost in sweat during physical activity. To meet the loss of electrolyte sports person are advised to drink fresh fruit juices and tender coconut water. Sugarcane juices and Coconut water are an excellent resource for replenishing the electrolytes revealed by Studies conducted by SAI. Performance of sports and activities may be enhanced when the body is supplied with carbohydrate which supports muscle function. Imbalance electrolyte homeostasis and inadequate carbohydrate intake may end up in cardiac arrestment and reduced serum lactate level During exercise the carbohydrate and electrolyte balance leads to low heart rates as well as. Monitoring their own hydration status is important for all the athletes. The athlete must be aware of the symptoms of dehydration, indicators of hydration status and the importance of pre and post body weight measurement. Hefty quantity of especially pale yellow urine will be passed when the athletes fully hydrated these are some of Pee test. Dark yellow urine is an indication of dehydration although vitamin supplements containing riboflavin will colour the urine dark yellow. There will be a considerable loss of water in the body during heavy exercise in such case fluid balance will be critical.

Conclusion

Adequate hydration is indispensable for superior health and performance. Water is the most vital nutrient. Regardless of the climate, fluid intake is important for maintaining hydration. Water has a numerous functions in our body namely circulation of nutrients, the removal of waste and helping to maintain our body temperature constant. Sweating causes the loss of electrolytes and water. Drinking fluids can prevent dehydration and thereby rehydrate an athlete. Sports drinks have the ability to provide fuel, in the form of carbohydrates and eventually replacing electrolytes lost. Carbohydrate is a chief fuel for exercising muscles which will aid water absorption as long as it is at the right concentration. The article has highlighted the significance of apt hydration in an athlete's training domain. In order to guarantee optimum performance and to stay away from any disadvantageous side effects, a cautious notion and appropriate hydration programme is mandatory.

REFERENCES

American College of Sports Medicine. Exercise and Fluid Replacement. Medicine and Science in Sports and Exercise 2007. | Casa dj, Clarkson pm, Roberts wo. American College of Sports Medicine Roundtable on Hydration and Physical Activity: Consensus Statements. Current Sports Medicine Reports. 4: 115-127; 2005. | Nutrition and Hydration Guidelines for Excellence in Sports Performance, www.ils.org | Sports Hydration. www.dietitians.ca |