

ART101

exercise physiology series

REHYDRATION AND FLUID REPLACEMENT AFTER EXERCISE

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Most people who exercise are aware of the need to drink water but pay little attention to the process of rehydrating the body after exercise. Future performance will suffer if the body does not recover and become fully hydrated before the next exercise session. Performing activity in the summer heat leaves the body more vulnerable to dehydration and more serious heat stress illnesses. This article presents a series of facts about rehydration and fluid replacement after exercise.

REHYDRATION FACTS

- ♣ Complete restoration of fluid balance after exercise is an important part of the recovery process and is more important in hot and humid conditions.

- ♣ Whether a person is performing weight training, aerobics, or high intensity activity, the physical activity becomes more difficult without adequate rehydration. A study conducted by Galloway & Maughan (1995) demonstrated that endurance time on a cycle ergometer could be sustained at a given intensity for 92 minutes at a temperature of 11 C (52F) but was reduced to 83 minutes when the temperature increased to 21 C (70F) and further reduced to only 51 minutes when the temperature was increased to 30 C (86F).

- ♣ The primary reason to replace fluids is to maintain blood plasma volume so that circulation and sweating can progress normally. Body temperature is then regulated, and other body processes can occur normally. Fatigue and headache are two common signs that the body is not adequately rehydrated and is in a negative fluid balance.

- ♣ It can take as long as 8 - 24 hours after exercise to fully rehydrate the body. Rehydration can be facilitated by the type and quantity of fluids ingested.

- ♣ Changes in body weight can indicate how much fluid is lost during activity. If the body weight before activity is compared with the body weight after activity, the level of rehydration will be indicated. The average sedentary individual needs 2 liter of water per day, but if that person is active or exercises on a hot and humid day the amount could increase to 4-15 liters depending on the size of the individual and the duration and intensity of the exercise.

♣ To rehydrate, fluids must be consumed in a volume greater than the fluid lost in sweat and urine production. During exercise recovery, there is an ongoing loss of water because the kidneys must continue to form urine. If the fluid loss through urine is high, the body will remain dehydrated. The body must retain the ingested fluid. Studies show that less urine is produced when moderate amounts of sodium are included in the fluid consumed. As the kidneys restore equilibrium the sodium is lost in the urine.

♣ Plain water is **not the best fluid** to replace the water lost as sweat during exercise. Rehydration after exercise requires not only replacement of fluids but also replacement of electrolytes, primarily sodium. Sodium keeps the plasma levels elevated because it is the major ion of extracellular fluid. Potassium is important to a lesser degree and aids in the retention of water in the intracellular space. A moderately high electrolyte solution works better than a low electrolyte concentration.

♣ Consuming water with food will rehydrate the body faster than water alone but slower than a moderately high electrolyte solution. Two common potassium rich foods are citrus and bananas.

♣ Combining foods that contain higher levels of electrolytes seem to reduce urine loss thus increase rehydration. The inclusion of other ions in the foods seems to assist with water retention. Small amounts of carbohydrates can improve the intestinal uptake of sodium and water and will improve absorption.

♣ Drinks intended for rehydration should have a slightly greater number of electrolytes than drinks formulated for use during the activity. A glucose drink is more important during activity. Water is best absorbed during activity in a solution of 6-7% carbohydrate, which is used as fuel.

♣ Soft drinks, which are commonly used after exercise, contain only traces of sodium and are unsuitable for rehydration. Coffee and tea, which contain caffeine are diuretic and will remove fluid from the body and slow rehydration.

♣ There is no evidence that consuming sodium during exercise improves performance.

♣ Many products marketed as energy drinks are not suitable for rehydration. Most contain high concentrations of caffeine, carbohydrates, protein, and herbal additives. Caffeine causes dehydration and is not effective for rehydration. **High concentrations** of carbohydrates will result in slowed absorption of fluid into the blood and increased urination. This causes depletion of the body's water resources thus slowing rehydration rate. Herbal additives are not regulated, and some herbs can have serious negative side effects for some individuals. Ephedrine and Kava are two examples of questionable herbs that can cause gastrointestinal distress.

♣ Also, the body needs to replace carbohydrates lost during activity. The American Dietetic Association recommends that 50-75 grams of carbohydrate be consumed within 15 - 30 minutes after exercise. Energy drinks are an expensive source of carbohydrate. You would need to consume many 8-ounce servings to meet that recommendation.

Of course, water and any fluid will rehydrate the body, but the methods discussed in this article can **increase rehydration recovery time**. This is critical to proper physiological functioning particularly if another bout of activity will immediately follow (i.e., teaching classes within several hours of each other). Glycogen recovery requires consumption of carbohydrates, which may reduce rehydration rate. Therefore, the individual must determine their immediate priority and follow the appropriate guidelines for their needs.

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ART101 QUIZ

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- 1 - The primary reason to replace fluids is to maintain blood plasma volume.
- 2 - Fatigue and headache are two common signs that the body is not rehydrated.
- 3 - It can take as long as 8 - 24 hours after exercise to fully rehydrate the body.
- 4 - Rehydration can be facilitated by the type and quantity of fluids ingested.
- 5 - Changes in body weight can indicate how much fluid is lost during activity.
- 6 - Plain water is **the best** fluid to quickly replace fluid loss.
- 7 - Rehydration after exercise requires replacement of fluids and electrolytes.
- 8 - Coffees and teas contain caffeine, which are diuretic, and will slow rehydration.
- 9 - High concentrations of carbohydrates will result in slowed absorption of fluid.
- 10 - Water will rehydrate the body, but methods can increase rehydration recovery time.