



Hydration and Nutrition

Hydration

Water is the most essential component of the human body as it provides an important role in the function of cells. Important functions of water include transportation of nutrients, elimination of waste products, regulation and maintenance of body temperature through sweating, maintenance of blood circulation and pressure, lubrication of joints and body tissues, and facilitation of digestion. More than half of the human body is composed of water, and it is impossible to sustain life without it.

Water Loss

Exercise produces an elevation in body temperature, which depends on the intensity and duration of exercise, environmental conditions, clothing worn, and metabolic rate. In order to get rid of the excess heat, your body secretes sweat, which is primarily composed of water and electrolytes such as sodium. The evaporation of sweat is the primary mechanism of heat loss during exercise. Exercise can lead to substantial water and electrolyte loss from sweat leading to dehydration and, in cases of excessive fluid intake, hyponatremia (low sodium in the blood). However, considerable variability exists from person to person with regard to sweat loss. Therefore, the fluid and electrolyte requirements needed for the athlete are variable from person to person as well. If water and electrolytes are not replaced from these losses, the athlete will have a decrease in performance and perhaps an adverse effect on his or her overall health.

Fluid Balance

Thirst is a signal that your body is already in a dehydrated state. It is important to drink before you feel thirsty and to drink throughout the day. Thirst is not a good indicator of hydration and should never be used to monitor hydration status. One way to check your hydration status is to check your weight before and after exercise. The before-exercise measurement is best as a nude weight first thing in the morning after urinating. Comparing your body weight before and after exercise can be used to estimate your sweat loss and your fluid requirements. Any weight loss is likely from fluid loss, so drinking enough to replenish these losses will maintain hydration. The table below shows us that over a one percent loss in body weight indicates dehydration and over five percent indicates serious dehydration. These fluid losses need to be replaced.

% Body Weight Change

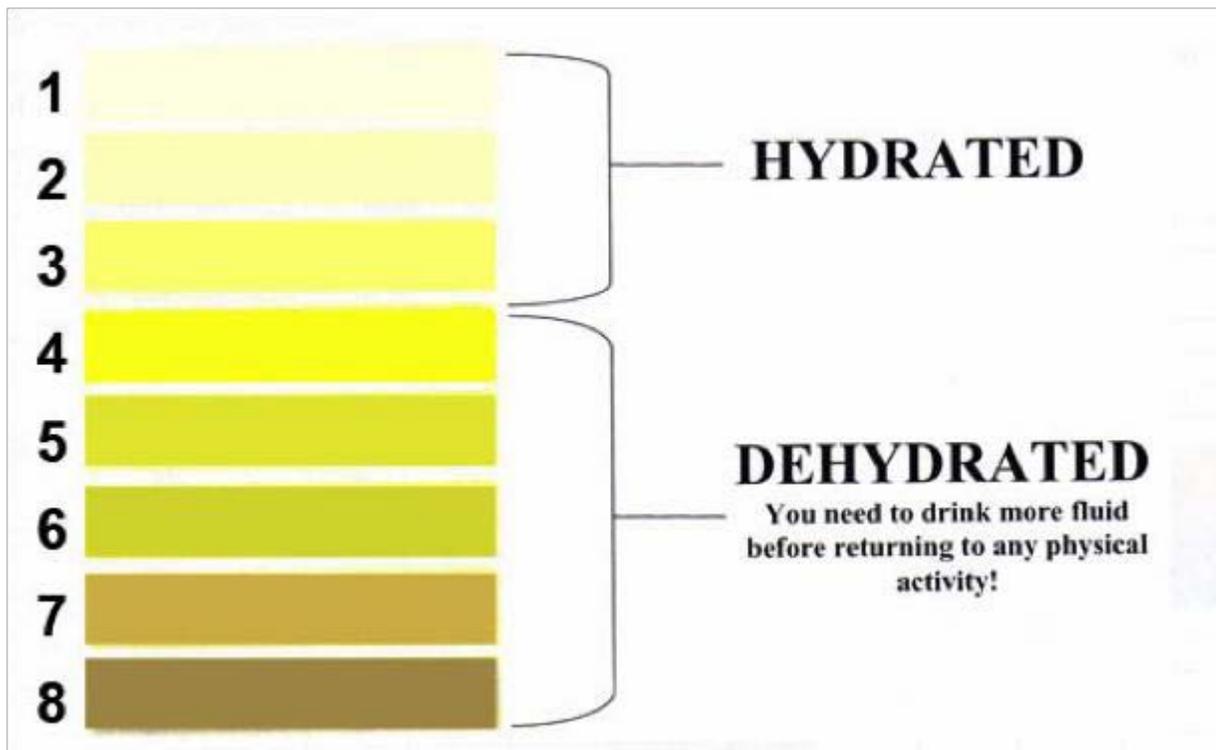
Well Hydrated -1 to +1%

Minimal Dehydration -1 to -3%

Significant Dehydration -3 to -5% Serious

Dehydration > -5%

Another way to check hydration status is the urine color test. A large amount of light-colored urine means you are well hydrated. The darker the color, the more dehydrated you are.



Dehydration

Dehydration is the loss of fluids and salts essential to maintain normal body function. Dehydration occurs when the body loses more fluids than it takes in.

Dehydration can lead to:

- Muscle fatigue
- Loss of coordination
- Inability to regulate body temperature
- Heat illness (e.g., cramps, heat exhaustion, heat stroke)
- Decreased energy and athletic performance

Minor to Moderate caffeine intake does not affect hydration status or urine output. Enhancing palatability of a fluid will help to encourage fluid consumption. This can be done with proper flavoring, proper salt (sodium) content and drinking a cooler beverage.

Sports Beverages

Carbohydrates within a sports beverage help to replenish your sugar (glycogen) stores and electrolytes help to accelerate rehydration. Sports beverages for use during prolonged exercise should generally contain four to eight percent carbohydrate, 20-30 meq/L of sodium, and 2-5 meq/L of potassium. The need for carbohydrates and electrolytes within sports beverages increases with prolonged activity. Carbohydrate consumption helps to sustain and improve exercise performance during high-intensity exercise longer than one hour as well as lower-intensity exercise for longer periods. You should ingest one-half to one liter of a sports drink each hour to maintain hydration. Also, sports drinks should not exceed a carbohydrate concentration of eight percent.

Hydration Before Exercise

Check your hydration status before exercise because there is a wide variability in fluid needs for each person.

- Drink 16-20 fluid ounces of water or sports beverage at least four hours before exercise.
- Drink 8-12 fluid ounces of water 10-15 minutes before exercise.

Consuming a beverage with sodium (salt) and/or small meal helps to stimulate thirst and retain fluids.

Hydration During Exercise

- Drink 3-8 fluid ounces of water every 15- 20 minutes when exercising for less than 60 minutes.
- Drink 3-8 fluid ounces of a sports beverage (5-8 percent carbohydrate with electrolytes) every 15-20 minutes when exercising greater than 60 minutes. Do not drink more than one quart/hour during exercise.

Hydration Guidelines After Exercise

Obtain your body weight and check your urine to estimate your fluid losses. The goal is to correct your losses within two hours after exercise.

- Drink 20-24 fluid ounces of water or sports beverage for every one pound lost.

Over Hydration

Over hydration, also called water intoxication, is a condition where the body contains too much water. This can result in behavioral changes, confusion, drowsiness, nausea/vomiting, weight gain, muscle cramps, weakness/paralysis and risk of death. In general, over hydration is treated by limiting your fluid intake and increasing the salt (sodium) that you consume. If over hydration is suspected, you should see your doctor for appropriate lab tests and treatment. You should not consume more than one liter per hour of fluid.

Nutrition

While attending an Academy, recruits are required to bring their own food for the day. HFD has a NO JUNK FOOD POLICY. It is very important to eat and drink healthy throughout the day. Recruits should consume a diet that includes complex carbohydrates, proteins, and fats. Nutrition is just as important as the actual physical training itself. What you take into your body will greatly influence how you are able to perform physically. Remember, what you are eating will be the fuel for the fire that carries your body and mind through the physical fitness training you will be doing. To improve your personal level of fitness, it is important that nutrition play just as an important role in your plan of exercise itself. Recruits are allowed to purchase nutritional food items to leave in the training center break room during the Academy.

Nutritional experts are steadfast in their agreement that a balanced and varied diet can and will meet all of your required nutritional needs. Now, the exact quantity of proteins, fats, and carbohydrates has long been debated...all contingent on which study or publication you read. The most common diet ratio consists of: carbs 45-65%, proteins 10 – 35%, and fats around 20-35% of your daily dietary intake (based on a 2000 calorie per day intake). Obviously, fad diets have a significant impact on these ratios. The underlying goal is that you reduce saturated fats and oils, stick to lean proteins, and reduce simple carbs (sugars and processed foods) in your diet. You should focus on increasing complex carbs (such as whole grains) as these are vital in moderating blood glucose levels and provide needed fiber in your diet. Fiber is key to stabilizing and flushing toxins from your GI system. Both forms (soluble and insoluble) are necessary. In addition, try to increase the amount of fruits and vegetables...most people fall short of the recommended 5 servings a day.

If you are maintaining a healthy weight, eating the right foods, and sticking to a dedicated exercise regimen but seem to have plateaued on your weight loss consider a few factors. Have you been doing the same exercise regimen for some time? If so, increase the frequency, intensity, or time (remember FITT). Evaluate when you are eating. Any heavy foods late at night will predominantly be stored as fat. Are you a twice a day or six times a day eater? Your body processes smaller meals spaced throughout the day better than 1 or 2 large meals and moderates your insulin levels better. Consider your portion size. We typically eat way more than recommended amounts. How often are you eating? If you wish to truly know what your caloric intake is on a daily basis...track everything that you eat. Everything. Several downloadable apps exist that allow you to input daily food consumption and in turn will provide you the calories associated with that food type and amount. You'll be surprised at how much you actually ingest in a day. Taking these simple things in consideration will usually address any slowdown in your weight loss goals.

Keep in mind this is all about long-term, long-lasting health. Exercise, hydration, nutrition, and mental health are vital to maintaining a functional mind and body that can adapt to the daily stresses and challenges a career in the Fire Service brings. If you are motivated and dedicated enough to take on this challenge, you will experience a life changing transformation on your way to joining a profession dedicated to the service of others.

Good luck. Best wishes.

References

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- 8) CSCS, CPS, Rich Meyer *Top 10 exercises for firefighters*.
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