Hydration and Athletes

EXTENSION

December 2021

Ashton Greer
Graduate Student and Dietetic Intern

Jill Joyce, PhD, RD
Assistant Professor

Jenni Klufa, MS, RD, LD
Assistant Extension Specialist

Kennedy Kroll
Graduate Student and Dietetic Intern

Gena Wollenberg, PhD, RD, CSSD, LD
Assistant Professor

Oklahoma Cooperative Extension Fact Sheets are also available on our website at: **extension.okstate.edu**

Hydration is important for all athletes. It helps to delay feelings of tiredness. Proper hydration also supports performance. Staying well hydrated is important for athletes who engage in events lasting longer than an hour. Participating in physical activity in extreme hot or cold may increase an athlete's hydration needs.

Dehydration and Nutrient Loss

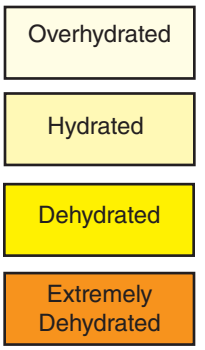
Fluids and nutrients may be lost when athletes exercise for long periods of time. This often occurs when athletes train at a high intensity or in a hot setting. Fluid and nutrient losses can cause an athlete's body functions to be out of balance. This can hurt both health and performance.

Some actions that may lead to a body being out of balance are:

- drinking too much water,
- starting exercise while dehydrated or
- not eating enough nutrients in regular diet.

Hydration Level	*Definition*	*Body Effects*
Moderate Dehydration	2% or more of body weight lost through sweat.	Delay in brain function and exercise performance.
Dehydration	3% to 5% of body weight lost through sweat.	Decreased exercise performance and increased risk of injury.
Overhydrated	Occurs from not eating enough sodium or from drinking too much water.	Headache, vomiting, swollen hands and feet, restlessness, extreme tiredness, confusion or wheezy breathing.

One way to check hydration level is to check the color of urine. Use this urine color chart to check hydration level.



Note: If taking a multivitamin, sometimes urine will be yellow or green for several hours after taking the vitamin. This is due to the vitamin itself. It may not be a sign of hydration level.

Before Exercise

- Start drinking fluid two to four hours before training.
- Drink about 1 ounce per 12.5 pounds of body weight of water or a sports drink. Use the table below for a quick reference of this recommended intake.

Weight in pounds	*Total ounces of water or sports drink two to four hours before exercise*
100	8
125	10
150	12
175	14
200	16
225	18
250	20

During Exercise

An athlete may need sports drinks or snacks that contain specific nutrients. These nutrients are called electrolytes and carbohydrates. The athlete should drink a sports drink that

includes electrolytes and carbohydrates before and during exercise if they:

- will be exercising longer than two hours,
- are a salty sweater (gritty white sweat or a white line on dark cloth) or
- need to drink a lot of water to rehydrate

After Exercise

Athletes should replace the water lost from heavy breathing and sweating during exercise. They should also replace water lost from normal daily activities, like going to the bathroom. The table below is a guide to help athletes replace fluid lost during exercise. It shows the correct amount of water to add to their normal water intake. In addition, consume foods like fruits, vegetables and salted nuts or pretzels to recover electrolytes lost.

Training Level	*Activity Length*	*Extra Fluid Intake*
Light	30 minutes	8 to 16 ounces water per hour of exercise
Moderate	60 minutes	8 to 16 ounces water per hour of exercise
Intense	90 minutes	8 to 16 ounces water plus electrolytes per hour of exercise

References

Position of the American Dietetic Association, Dietitians of Canada, and the American College of Sports Medicine: Nutrition and Athletic Performance 2009

Position of the Academy of Nutrition and Dietetics, Dietitians of Canada, and the American College of Sports Medicine: Nutrition and Athletic Performance 2016

Sports Nutrition: A Handbook for Professionals Ch. 6 Fluid, Electrolytes, and Exercise, 2017 (Not formatted)'

Fluids and Hydration. (n.d.). U.S Anti-Doping Agency (USADA). Retrieved April 21, 2021, from https://www.usada.org/athletes/substances/nutrition/fluids-and-hydration/

Fluid Balance, Hydration, and Athletic Performance. (n.d.). Retrieved April 21, 2021 from https://library.oapen.org/handle/20.500.12657/40082

Oppliger, R. A., & Bartok, C. (2002). Hydration Testing of Athletes. *Sports Medicine*, 32(15), 959-971. https://doi.org/10.2165/00007256-200232150-00001

https://www.eatright.org/fitness/sports-and-performance/hydrate-right/hydrate-right

Baker, L. B. (2017). Sweating Rate and Sweat Sodium Concentration in Athletes: A Review of Methodology and Intra/Interindividual Variability. *Sports Medicine* (Auckland, N.Z.), 47(Suppl 1), 111–128. https://doi.org/10.1007/s40279-017-0691-5

Baker, L. B., Nuccio, R. P., Reimel, A. J., Brown, S. D., Ungaro, C. T., De Chavez, P. J. D., & Barnes, K. A. (2020). Cross-validation of equations to predict whole-body sweat sodium concentration from regional measures during exercise. *Physiological Reports*, 8(15), e14524. https://doi.org/10.14814/phy2.14524

Belval, L. N., Hosokawa, Y., Casa, D. J., Adams, W. M., Armstrong, L. E., Baker, L. B., Burke, L., Cheuvront, S., Chiampas, G., González-Alonso, J., Huggins, R.A., Kavouras, S.A., Lee, E.C., McDermott, B.P., Miller, K., Schlader, Z., Sims, S., Stearns, R.L., Troyanos, C., & Wingo, J. (2019). Practical Hydration Solutions for Sports. *Nutrients*, 11(7). https://doi.org/10.3390/nu11071550

Heffernan, S.M., Horner, K., De Vito, G., & Conway, G.E. (2019). The Role of Mineral and Trace Element Supplementation in Exercise and Athletic Performance: A Systematic Review. *Nutrients*, 11(3). https://doi.org/10.3390/nu11030696

Sawka, M., Burke, L., Eichner, E., Maughan, R., Montain, S., & Stachenfeld, N. (2007). American College of Sports Medicine position stand. Exercise and Fluid Replacement. Medicine and Science in Sports and Exercise, 39, 377–390. https://doi.org/10.1249/mss.0b013e31802ca597

Shirreffs, S. M., & Sawka, M. N. (2011). Fluid and electrolyte needs for training, competition, and recovery. *Journal of Sports Sciences*, 29 Suppl 1, S39-46. https://doi.org/10.1080/02640414.2011.614269

Vitamin and Mineral Needs of Athletes. (n.d.). Retrieved April 22, 2021, from https://www.eatright.org/food/vitamins-and-supplements/types-of-vitamins-and-nutrients/vitamin-needs-of-athletes

Issued in furtherance of Cooperative Extension work, acts of May 8 and June 30, 1914, in cooperation with the U.S. Department of Agriculture, Director of Oklahoma Cooperative Extension Service, Oklahoma State University, Stillwater, Oklahoma. This publication is printed and issued by Oklahoma State University as authorized by the Vice President for Agricultural Programs and has been prepared and distributed at a cost of 20 cents per copy. December 2021 GH.