# HEALTHY HYDRATION FOR YOUNG ATHLETES

## Ways to Prevent Fluid Loss From Becoming Detrimental

BY HEATHER MANGIERI, RDN, CSSD

As a sports dietitian that specializes in fueling young athletes, I'm asked the same questions over and over again. Parents and coaches want suggestions for what to feed athletes before, during and after activity. While game-day fueling is important, adequate hydration sits at the top of the priority list for young athletes.

There is no easier, effective or more economical way to help performance and protect health than staying hydrated during exercise. Water is the most vital nutrient and plays a key role in how well athletes perform. In adults, a loss of 2 percent body weight in fluids has been shown to have adverse effects on performance.[1] In children, those same negative effects are thought to occur sooner, with just 1 percent decrease in body weight.[1] This is especially true when exercising in hot and humid conditions. The negative side effects associated with dehydration in children leads to decreased endurance and performance by negatively affecting the cardiovascular system, thermoregulation and central fatigue or perceived exhaustion.[1] Poor hydration increases a young athlete's risk for exertional heat illness.[2]

### How Much Water is Enough?

As with nutrients, the Dietary Reference Intakes' (DRI) recommend[3] how much water is needed daily:

| AGE | MALES | FEMALES |
|---|---|---|
| 9-13 | 2.4 liters = 10 cups | 2.1 liters = 9 cups |
| 14-18 | 3.3 liters = 14 cups | 2.3 liters = 10 cups |

Healthy adolescents can generally regulate their fluid intake and avoid dehydration, but active young athletes need to pay closer attention. As with nutrient recommendations, adequate water intakes for athletes are much more researched in adults than in children and adolescents. DRI is a great place to start, but young athletes need more. How much more depends on a lot of things. Intensity and duration of training, environmental conditions (heat/humidity) and equipment (uniform/pads) all play a role in how much fluid is lost during activity. Sweat loss varies from one athlete to another and should also be considered.

Ideally, athletes would be able to drink enough fluid during activity to keep pace with their sweat rate, but unfortunately, that's not always possible. Not all athletes know their sweat rate and may not realize how much fluid they lose when exercising. Maintaining fluid equilibrium during activity is especially difficult for athletes who are heavy sweaters.[4]

One way for athletes to learn how much fluid they lose during activity is to weigh themselves before and after training sessions. Knowing how much fluid is lost during activity will help to individualize a hydration plan. To determine fluid loss, athletic trainers can help young athletes complete this simple formula (Figure 1). Not only will completing the chart help identify youth athletes who may be at increased risk of dehydration, it also shows them how much you prioritize fluid status.

In addition to calculating the fluid losses during activity, athletic trainers can help youth athletes become familiar with evaluating their urine. When possible,

FIGURE 1. FLUID LOSS FORMULA

| | | |
|---|---|---|
| STEP 1 | Weigh nude* immediately before starting exercise | Record Weight= |
| STEP 2 | Keep track of exactly how much fluid is consumed during the exercise session | Record Fluid Consumed= |
| STEP 3 | Weigh nude* immediately after exercise | Record Weight= |
| STEP 4 | Subtract post-exercise weight from pre-exercise weight to determine pounds lost. | Pounds Lost= |
| STEP 5 | Multiply pounds lost X 3 to determine how much fluid to replace after exercise | Cups of fluid to replace losses= |

*While best practice would be a nude weight, it is understandable that this is not always feasible or ethically prudent. In practicality, at least have your athlete weigh themselves in the exact same clothes as to try to account for any potential variable which may cause an error in accuracy. Also, please note, that dry clothes at the start of practice may be "heavier" sweat soaked clothes at the completion of a practice and can also account for an error in measurements.

hang a urine chart in workout areas that is visible for athletes. Also, make sure that young athletes know the general rule of thumb: pale yellow urine (like lemonade) indicates being fairly well-hydrated, while darker yellow (like apple juice) indicates potential dehydration. The more emphasis athletic trainers put on hydration status, the more likely young athletes are to prioritize it.

## Knowing the Signs of Dehydration

Symptoms of dehydration can be vague, but the earlier we educate young athletes on what to look for, the easier it will be for them to identify the signs. Some warning signs include: headache and lightheadedness, noticeable thirst, irritability, nausea, muscle cramping, dark yellow urine, difficulty paying attention, weakness and fatigue resulting in decreased performance.[1]

The most recent hydration recommendations, released in 2011 from the American Academy of Pediatrics,[2] can be found in Figure 2.

## Talking to Teens about Hydration

Notice the recommendation from the American Academy of Pediatrics to educate children and adolescents on the importance of getting adequate hydration. As the face of the sports medicine team, athletic trainers play a key role in helping youth athletes understand why hydration is important. But telling them they need to drink is not enough.

A study by Cleary and colleagues assessed the hydration status and behaviors of adolescent athletes both before and after a one-time education intervention, then compared it to a prescribed hydration intervention.[5] The outcome showed that a one-time education session alone was not enough to change hydration behaviors of the young athletes, but prescribing individualized hydration protocols for adolescents improved their fluid intake. This study supports the need to go above and beyond simply telling teenagers they should drink more fluid. They need to be shown how to do it.

In addition to encouraging athletes to drink during activity, helping adolescent athletes develop their own hydration schedule is also useful. Scheduling fluid intake will help athletes get in the habit of drinking at regular times throughout the day. The following is an example of a basic fluid hydration schedule. Use this as a guide to help athletes understand the purpose, but have them tailor the times to their school, work and training schedule changes:

| TIME OF DAY | FLUID INTAKE |
|---|---|
| 6:30 AM (wake up) | Drink 8 ounces of water |
| 8:30 a.m. (or between classes) | 4 ounces |
| 10:30 a.m. (or between classes) | 4 ounces |
| Noon (with lunch) | 4 ounces |
| 1:30 p.m. (or between classes) | 4 ounces |
| 2:30 p.m. (after school) | 8 ounces |
| 3:30 p.m. (or before practice) | 8 ounces |
| During practice | Drink breaks—about 4-12 ounces every 15 minutes |
| After practice | Drink 8-16 ounces of fluid |
| 7:30 p.m. | 8 ounces of fluid |
| 9:30 p.m. | 8 ounces of fluid |
| Tip: 4 big gulps from the drinking fountain is about 4 ounces of fluid | |

## Special Considerations

Certain situations and conditions may require additional fluids. Athletes competing in extreme weather conditions, wearing heavy equipment or competing at altitude will need to pay extra attention to fluid intake. Recent illness, especially if it involved gastrointestinal distress or fever, athletes taking medications or an athlete with a known medical condition also may require additional fluids. For the safety of all youth athletes, athletic trainers should have water or other appropriate fluids readily available, and athletes should be given regular opportunities throughout practice and events to hydrate and offset sweat losses.

## Sports Drink vs. Water

Another common question is whether water is enough or should sports drinks be considered. The answer depends on the individual athlete, the intensity and duration of activity and the conditions in which the activity is occurring. When used properly, sports drinks can be beneficial for youth athletes.

As athletes perspire, they lose electrolytes, especially sodium and chloride. In addition to water, those electrolytes need to be replaced to prevent fluid imbalance. In addition to its role in maintaining fluid balance, adequate sodium may help prevent muscle cramping and help maintain hydration status.

Although water is often sufficient to maintain adequate hydration, a sports beverage can help replace electrolytes. Activity of longer duration (more than one hour), higher intensity and/or repeated same-day exercise sessions that result in a greater sweat loss can be supported by electrolyte supplementation. This is especially true for athletes who have high sweat rates or are salty sweaters.[2]

The purpose of a sports drink is to provide fluid, fuel (as carbohydrates) and electrolytes to offset the losses that occur during and after activity. For other times of the day, water is the beverage to drink.

The goal of hydration is the same for all youth athletes: prevent dehydration and optimize performance. Maintaining a healthy hydration status is the first priority when putting a performance plan in place.

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FIGURE 2. AMERICAN ACADEMY OF PEDIATRICS HYDRATION RECOMMENDATIONS

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|---|
| Provide and promote consumption of readily accessible fluids at regular intervals before, during and after activity to offset sweat loss and maintain adequate hydration while avoiding overdrinking. |
| Encourage children to drink during activity to minimize sweat induced body-water deficits during exercise as long as pre-activity hydration status is good.<br>-9 to 12 years: 3-5 ounces every 20 minutes<br>-Older athletes: Up to 34-50 ounces per hour (9-13 ounces every 15 minutes) |
| Pre- and post-activity body weight measurements can provide more information for individual rehydration needs. |
| Electrolyte-supplemented beverages that emphasize sodium may be warranted during long duration (≥1 hour), repeated same-day sessions of strenuous exercise, sports participation and hot weather. |
| Educate children and adolescents of the merits of ample hydration. |
| Youth sports governing bodies, tournament directors and other event administrators should provide adequate rest and recovery periods of two or more hours between same day contests in warm to hot weather to allow sufficient recovery and rehydration. |

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