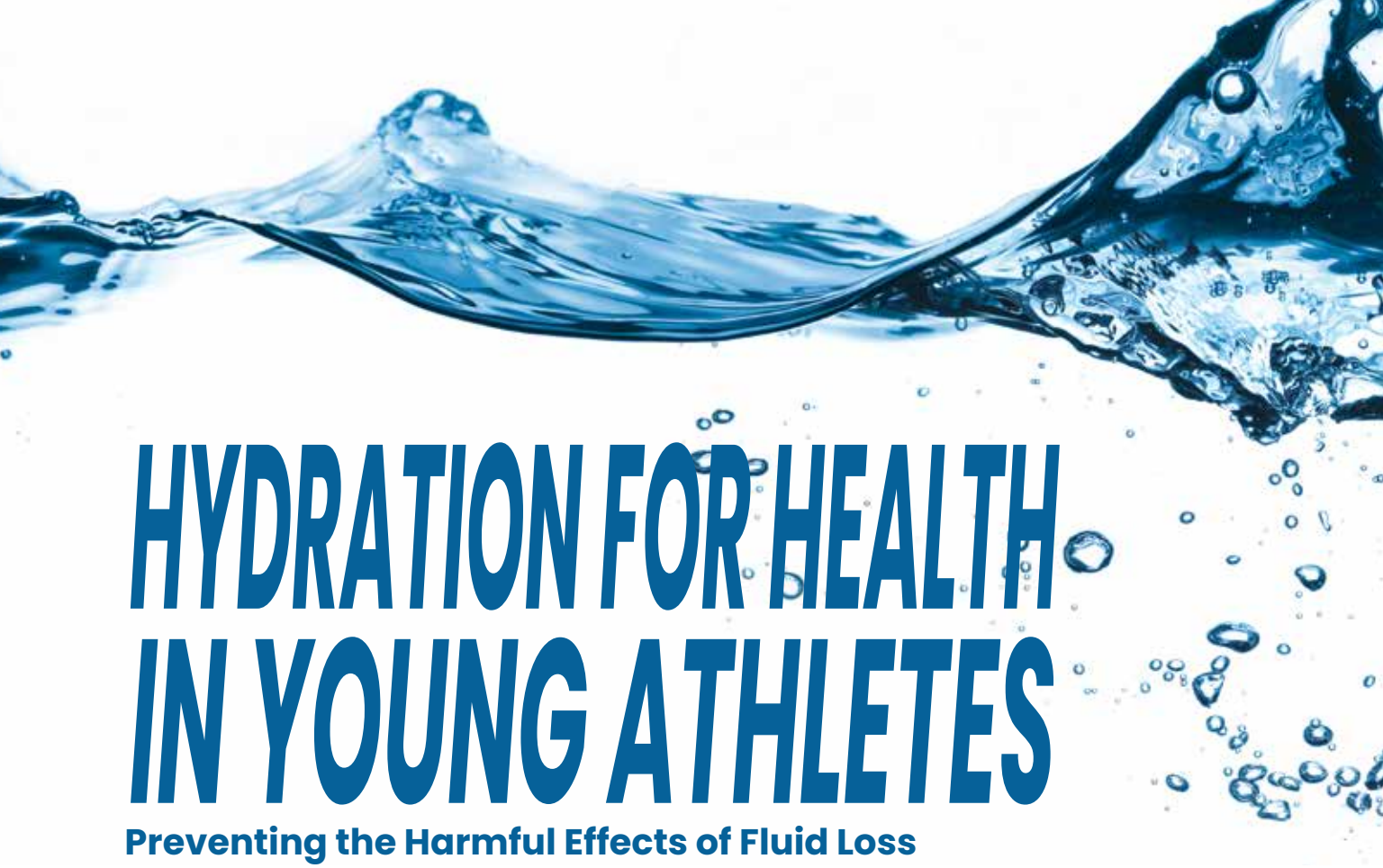


HYDRATION FOR HEALTH IN YOUNG ATHLETES

Preventing the Harmful Effects of Fluid Loss

BY HEATHER MANGIERI, RDN, CSSD

As a sports dietitian who specializes in fueling young athletes, I often hear a familiar set of questions. Parents and coaches want advice on what athletes should eat before, during and after exercise. Although game-day food choices matter, adequate hydration deserves first place on a young athlete's priority list.

Staying hydrated during exercise is one of the simplest, most effective and least costly ways to support performance and safeguard health. Water is our most essential nutrient and strongly influences athletic performance. In adults, losing fluid equal to 2 percent of body weight has been shown to impair performance.[1] Children may experience these effects after a smaller loss - just 1 percent of body weight.[1] This is especially relevant during activity in hot, humid weather. Dehydration reduces children's endurance and performance by disrupting cardiovascular function and temperature control, and by increasing central fatigue or feelings of exhaustion.[1] Inadequate hydration also raises a young athlete's risk of exertional heat illness.[2]

How Much Water Is Needed?

Like other nutrients, water has daily intake recommendations in the Dietary Reference Intakes (DRI):[3]

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

Most healthy adolescents can regulate fluid intake to avoid dehydration, but active young athletes must pay closer attention. As with nutrient guidance, water needs in athletes have been studied far more in adults than in children and teens. DRI values offer a useful starting point, yet young athletes need additional fluid. The amount varies with training intensity and length, weather conditions such as heat and humidity, and equipment such as uniforms and pads. All influence fluid loss during activity. Individual sweat losses also differ and must be taken into account.

Ideally, athletes could drink enough during exercise to match the rate at which they sweat. In reality, this is not always possible. Many do not know their sweat rate or recognize how much fluid they lose in training. Matching fluid intake to losses during exercise is particularly challenging for athletes who sweat heavily.[4]

Athletes can estimate fluid lost during exercise by weighing themselves before and after training. These measurements help shape an individual hydration plan. Athletic trainers can guide young athletes through the simple fluid-loss calculation in Figure 1. Completing the chart can identify youth athletes who may be at greater risk of dehydration, while also showing them how much importance you place on monitoring hydration.

Along with estimating fluid loss during exercise, athletic trainers can teach young athletes how to assess their urine. Whenever possible,

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FIGURE 1. CALCULATING FLUID LOSS

STEP 1	Weigh without clothing* just before you begin exercising	Weight recorded =
STEP 2	Measure the exact amount of fluid you drink during the exercise session	Fluid consumed =
STEP 3	Weigh nude* directly after exercise	Weight recorded =
STEP 4	Subtract weight after exercise from the starting weight to find pounds lost.	Pounds lost =
STEP 5	Multiply pounds lost by 3 to find the fluid needed to replace losses after exercise	Cups needed to replace fluid losses =

* Weighing without clothing is the preferred measurement method, but it may not be practical or ethically appropriate. At a minimum, have the athlete wear exactly the same clothing for both weigh-ins to reduce variables that could affect accuracy. Remember that clothing dry at the start of practice may weigh more after absorbing sweat, which can also cause measurement error.

place a urine-color chart where athletes can easily see it in their workout area. Teach the basic guide: pale yellow urine, similar to lemonade, usually indicates adequate hydration; darker yellow, like apple juice, can signal dehydration. The more attention athletic trainers give to hydration, the more likely young athletes are to make it a priority.

Recognizing Dehydration

Dehydration symptoms may be hard to identify. Teaching young athletes what to watch for early makes it easier for them to recognize trouble. Possible warning signs include headache, lightheadedness, clear thirst, irritability, nausea, muscle cramps, dark yellow urine, difficulty focusing, weakness and fatigue that lead to poorer performance.[1]

Figure 2 presents the American Academy of Pediatrics' most recent hydration recommendations, issued in 2011.[2]

Discussing Hydration With Teens

The American Academy of Pediatrics urges teaching children and teens why hydration matters. As the public face of the sports medicine team, athletic trainers help young athletes understand its value. Yet simply telling them to drink is not enough.

Cleary and colleagues studied adolescent athletes' hydration status and habits before and after a single educational session, and compared the results with a prescribed hydration intervention.[5] One education session alone did not change the young athletes' hydration habits. In contrast, individualized hydration instructions for adolescents improved fluid intake. The findings show why advice to drink more must be backed by practical guidance: teens need to be shown how to put it into practice.

Alongside reminders to drink during activity, help adolescent athletes create their own hydration schedule. Planned fluid intake builds a habit of drinking at regular points throughout the day. The sample schedule below offers a simple starting guide. Use it to explain the purpose of a drinking plan, then ask athletes to adjust the times as their school, work and training schedules change:

TIME OF DAY	FLUID TO DRINK
6:30 a.m. (on waking)	8 ounces of water
8:30 a.m. (or between classes)	4 ounces
10:30 a.m. (or between classes)	4 ounces
Noon (at 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
At practice	Fluid breaks: about 4-12 ounces every 15 minutes
After practice	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 at a water fountain are roughly 4 ounces of fluid	

When Fluid Needs Increase

Some conditions increase fluid needs. Athletes competing in extreme weather, wearing heavy equipment or performing at altitude need to monitor drinking closely. Recent illness, particularly fever or gastrointestinal problems, may also raise fluid requirements, as can medications or a known medical condition. To protect all young athletes, athletic trainers should keep water or other suitable drinks easily accessible. Throughout practices and events, athletes need regular chances to drink and replace the fluid they lose through sweat.

Water or Sports Drinks?

Another frequent question is whether water alone meets an athlete's needs or a sports drink would be useful. That decision depends on the individual, the intensity and duration of activity, and the setting in which it takes place. When used for the right purpose, sports drinks can benefit young athletes.

Sweating removes electrolytes, particularly sodium and chloride. Both water and these electrolytes must be replaced to prevent a fluid imbalance. Besides its important role in maintaining fluid balance, sufficient sodium may help prevent muscle cramps and support a healthy hydration status.

Water often meets hydration needs, while sports drinks can help replenish electrolytes. Electrolyte supplementation may support exercise lasting more than one hour, higher-intensity activity, or repeated same-day exercise sessions that produce greater sweat losses. This matters especially for athletes with high sweat rates or very salty sweat.[2]

Sports drinks deliver fluid, energy as carbohydrate, and electrolytes to make up for losses during and after exercise. At other times throughout the day, water is the drink to choose.

Every young athlete has the same hydration goal: avoid dehydration and perform at their best. Healthy hydration is the first priority when creating a plan to improve performance.

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FIGURE 2. AMERICAN ACADEMY OF PEDIATRICS HYDRATION GUIDANCE

Make fluids easy to obtain and encourage regular drinking before, during and after activity. Replace sweat losses and maintain adequate hydration while taking care not to overdrink.
If children begin activity well hydrated, encourage them to drink while exercising to limit the body-water losses caused by sweating. - Ages 9-12: 3-5 ounces every 20 minutes - Older athletes: Up to 34-50 ounces an hour (9-13 ounces every 15 minutes)
Measuring body weight before and after activity helps determine each athlete's individual rehydration needs.
Drinks supplemented with electrolytes, especially sodium, may be appropriate for prolonged activity (at least 1 hour), repeated same-day strenuous exercise, sports participation and hot weather.
Teach children and adolescents the benefits of adequate hydration.
Youth sports governing bodies, tournament directors and other organizers should allow at least two hours of rest and recovery between same-day contests in warm or hot weather, so athletes have time to recover and rehydrate.

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