Sports Nutrition for Young Athletes

Why nutrient deficiencies can spell defeat for kids who compete in sports.

More and more young athletes are seeking personal fitness trainers for specialized workouts. As part of their training, we strive to help these young people become stronger and better able to withstand the rigors of sports competition. But physical training is only one part of the equation; young athletes also need to learn why proper nutrition is vital to optimizing their sports performance.

Nutrient needs are higher during adolescence than at any other time in the life cycle (Covello et al. 2006). Even kids not engaged in sports need the proper mix of vitamins, carbohydrates, healthy fats and protein. Among young athletes, many are deficient in some of the key nutrients that should be fueling their workouts.

Although it is outside your scope of practice as a fitness professional to make specific dietary recommendations, you can educate young athletes about sound nutrition choices that will help them win—both on and off the field.

How Nutrition Affects Kids’ Performance

While proper nutrition is important for all athletes, it is of particular concern for young, growing bodies that compete in sports. IDEAA contributing editor Lorna A. Bell-Wilson, PhD, RD, is a certified specialist in sports dietetics who is based in Arlington, Massachusetts. She says that an inadequate diet can result in a young athlete getting insufficient fuel for workouts, leaving deficiencies that can lead to illness or fatigue; suffering a decrement in bone growth and maintenance; and not achieving proper muscle growth. According to Bell-Wilson, nutrient deficiencies will negatively affect the youngster’s growth and his or her ability to compete in a chosen sport.

Maintaining the appropriate balance between energy and protein intake is critical for the growth and development of young athletes. Despite the recent public attention given to the benefits of healthy eating, many young athletes remain undernourished (and undereducated!). Self-reported dietary intakes often reveal that an increasing number of children have energy, carbohydrate and certain micronutrient intakes below the recom-
exercised. If glucose from carbohydrates is not available for use as fuel during physical activity, the body will instead use protein (muscle) stores for energy. However, the body would much rather use carbohydrate or fat for fuel.

Proper intake of calcium is needed to support bone growth, increase bone mass and aid in nerve impulses and muscle contraction (Thompson & Manore 2006). Inadequate calcium intake can lead to decreased bone mass, which can increase the risk for stress fractures and other bone-related injuries.

Both vitamin B₁₂ and folate are critical components of energy metabolism and blood health (Thompson & Manore 2006). Both these nutrients are vital for amino acid metabolism (think "the building blocks of proteins"). A deficiency in vitamin B₁₂ and folate can lead to fatigue, muscle aches, apathy and loss of cognitive function for an athlete.

While iron is vital for oxygen-carrying capacity, it is also a major player in the energy metabolism of carbohydrates, protein and fats. This is why young athletes who are deficient in iron (i.e., have iron-deficiency anemia) may experience fatigue, compromised immune function and impaired cognitive reasoning during exercise. Iron intake is especially critical for prepubertal and menstruating female athletes.

Although iron deficiency is a worldwide problem, there is such a thing as too much iron. Young athletes who take iron supplements can build up toxic levels of this mineral. That’s why iron supplement recommendations should always come from a physician or a registered dietitian (RD).

Fluids

Maintaining the proper fluid balance is critical for this population. In addition to the risk of causing a heat-related illness, dehydration can lead to fatigue during exercise. Altered fluid status can be a bigger risk for kids than for adult athletes for two reasons: (1) children experience greater heat stress and heat accumulation during exercise, and (2) children have a greater ratio of surface area to body mass and absorb heat more readily than do adults (Potts, Stover & Morris 2004).

Signs of dehydration in children include, but are not limited to, the following:
- dry skin
- small volume of urine
- muscle cramps
- reduced sweating
- increased heart rate
- headaches
- nausea

Child and adolescent athletes should replenish lost hydration stores during and after a competition or a heavy workout. Weighing an athlete before and after an exercise bout allows you to gauge how much fluid needs replacing; the general rule of thumb is 16–24 ounces of liquid per every pound lost (Neveu-Fulenza 2003). Be aware that children do not instinctively drink enough fluids to replace lost stores, and thirst does not always indicate when the body needs more fluids.

During activities lasting less than 60 minutes, water is all that is needed to hydrate young athletes. However, during

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<th>Adequate Intakes of Commonly Deficient Micronutrients</th>
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<td>The following recommendations for children and adolescents are in accordance with those set by the Institute of Medicine National Academies Food and Nutrition Board (2006):</td>
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<td>Calcium (Ca)</td>
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<td>all children 4–11 years</td>
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AE: Adequate intake; DR: Dietary Reference Intakes; UL: Upper Limit; mg/d: milligrams per day; mcg/d: micrograms per day.
longer activities, sports beverages that provide 8%–10% carbohydrate will help
subhydrate and replenish electrolyte stores in young athletes. It helps that kids like
the flavoring of sports beverages, which means they will drink more of them with-
out prodding (Nevins-Folino 2003).

Carbohydrates
Starch carbohydrates are the preferred fuel for athletic performance, approxi-
mately 55% of a young athlete’s total daily calories should come from carbo-
hydrate (Nevins-Folino 2003). Carbohydrate needs are based on body weight and intensity of activity. The American Diabetic Association (ADA) has set the
following daily recommendations for young athletes (Nevins-Folino 2003):
• 3–6 g carbohydrate/kilogram body weight for exercise
• 1.7 g carbohydrate/kilogram body weight for pre-event refueling

Protein
An essential part of a young athlete’s diet, protein is responsible for building,
maintaining and repairing muscle and other body tissue (Nevins-Folino 2003). It should
be noted that inadequate calorie intake will cause a protein imbalance even if the
athlete consumes the recommended daily allowance (RDA) of protein (Thompson
1998). Young athletes need to consume enough calories each day to maintain body
weight and keep protein stores in balance. While it has been suggested that adult
athletes may need more protein per pound of body weight than adults who are
not athletes, additional protein needs have not been specifically evaluated for
younger athletes. However, the ADA has issued the following daily recommenda-
tions (Nevins-Folino 2003):
• Athletes who have just begun a training program require 1.0–1.3 g/kg of protein.
• Athletes who participate in endurance sports require 1.2–1.4 g/kg.
• Vegetarian and vegan athletes should be counseled to ensure that adequate intake or protein is consumed from plant sources.

Athletes need to consume sufficient calories each day to maintain protein balance.
A word of caution: consuming an over-abundance of protein can lead to dehydra-
tion, weight gain and calcium loss. It is critical that young athletes monitor their
daily protein intake, because this population is already at risk for calcium deficiency.

Fat
Fat is an essential fuel for young athletes who engage in light- to moderate-intensity
exercise or in endurance events. Although carbohydrates are the preferred fuel for
adult athletes, healthy fats may be a better choice for children who engage in sports
(Monton-Stegger & Williams 2007). This could be due to the higher rate at which fat
oxidizes in the young body; the faster the fat is broken down, the quicker it can be
used as fuel for exercise (Monton-Stegger & Williams 2007). Keep in mind, however,
that kids who compete are usually trying to build muscle mass and may not want
to add any fat to their diet. Teach them that healthy fats are a far better choice than but-
ter, animal fat or lard.

Below are some easy-to-follow guidelines for young athletes on daily con-
sumption of fats:
• It is important that young athletes obtain an average of 20%–30% of their calories from fat; clients can achieve this even with low-fat foods (but not fruit and vegetable) (Nevins-Folino 2003).
• Young athletes should aim to significantly lower the amount of saturated and trans fats in their diet.
• The best choices for young athletes are
healthy fats from plant sources (e.g.,
cashews or olives) and
these clients should limit their intake of unhealthy saturated fats found in fried and processed foods.

Kids Will Be Kids
Young athletes are often grossly misinformation about sports nutrition and
very easily influenced by outsiders, especially their peers. They also rely heavily
on the Internet and other media for information (Thompson 1998). Another obstacle that young athletes face is finding the time to fuel their bodies properly.

With the rigor of school, work, practice and competition, time and access to
quality nutrition are often limited.

While some athletes need only a few dietary tweaks, others require great care to
improve their nutrition and subsequent performance. That’s when it is best to em-
ploy the help of an RD who is an expert in sports dietetics or sports nutrition. Look
for an RD who is credentialed as a certified specialist in sports dietetics (CSSD).
You can find a local sports dietitian through the ADA’s practice group, SCAN,

As a fitness professional, you can and should help young athletes understand the
role that proper nutrition plays in sports performance. Kids need to know exactly
why it is essential that they fuel their bodies with the nutrients and fluids that will
help them succeed in their chosen sports. It is critical that all athletes—young and
old—make nutrition a top priority if they want to win at sports and life.

References
Croft, J.K., et al. 2006. Athletes involved in weight-
terred and power sport have lower rates of eating
disorders than non-sport-involved adolescents. Journal of the American Diabetic Associa-
tion 186, 789–97.
Manual for Professionals (4th ed.). Champaign, IL:
Sports Nutrition and Wellness Foundation, Chicago American Dietetic Associ-
tion.
for Energy, Carbohydrate, Fat, Fiber, Water, Pro-
eins, Vitamins, and Minerals: The essential guide-
to nutritional adequacy. Washington, DC: The Na-
Food and Nutrition Board. 2002/2005. Dietary Reference
Intakes for energy, carbohydrate, fat, fiber, pros-
eins, vitamins, and minerals: The essential guide-
to nutritional adequacy. Washington, DC: The Na-
Freedman, D.S. 2003. Primary care for adolescents and
young adults. Journal of the American Dietetic
Association 106, 717–19.
Monton-Stegger, S., & Williams, C.A. 2007. Carbohydrate
intake considerations for young athletes. Journal of
Sports Science and Medicine 6, 342–03.
Nutrition (4th ed.). The PedoTRIC Nutrition Pro-
cess Group, Chicago American Dietetic Association.
Nutritional concerns for the child and adolescent
International Journal of Sport Nutrition 8, 190–94.
Publishers.