

# Nutrition

## Fact Sheet

### Fueling the School-Aged Athlete – Vitamins and Minerals

Vitamins and minerals are especially important to support growth and physical activity for school-aged athletes. Vitamins and minerals are needed to

- regulate energy pathways;
- facilitate fluid balance;
- assist nerve impulse transition and muscle contraction; and
- maintain and build blood, bone, and other tissues.

Research indicates school-aged athletes are often getting enough vitamins and minerals to meet daily requirements, especially when compared to their non-active peers (Croll et al., 2006; Kern, 2006; Petrie, Stover, & Horswill, 2004). Athletes typically consume more food to meet their energy needs and consequently get plenty of vitamins and minerals (McDowall, 2007). However, for many school-aged children and adolescents, iron, calcium, and vitamin D intake can be deficient. Because of their role in growth, health, and physical performance, these nutrients are especially important for school-aged athletes.



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## A Special Focus on Iron

Nutrition experts recommend periodic iron screening followed by dietary strategies to increase iron intake and absorption when needed because some athletes may be low in iron (Meyer, O'Connor, & Shirreffs, 2007). An inadequate intake of iron can deplete iron stores and have a negative effect on health, mental reasoning, behavior, immune function, and physical performance (McArdle, Katch, & Katch, 2008; Meyer et al., 2007). Adequate iron stores are needed to

- replace iron lost in sweat,
- make oxygen carrying proteins in the blood and muscle,
- replace red blood cells damaged when feet strike the ground during running,
- replace menstrual losses, and
- expand blood volume during growth spurts.

Adolescents, females in particular, may have a higher risk for poor iron status. Inadequate intake and low iron stores can be a concern for female athletes (Meyer et al., 2007; Rodenberg & Gustafson, 2007) especially gymnasts (D'Alessandro et al., 2007). Other studies have found low iron stores in adolescent endurance athletes and a progressive decline in iron status during their competitive season (Petrie et al., 2004).



### Practices That Contribute to Low Iron Stores

- Poor energy intake
- Avoiding meats, poultry, and fish
- Vegetarian diets that contain less absorbable types of iron
- Increased iron loss from sweat, feces, urine, and menstrual blood
- Increased red cell destruction in endurance athletes and long-distance runners

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## Tips for Boosting Iron

- Eat foods with the easily absorbed form of iron found in meat, fish, or poultry.
- Eat enriched breads and cereals.
- Enhance iron absorption by eating iron-rich foods and vitamin C-rich foods at the same meal – drink a glass of orange juice with a roast beef sandwich or eat beef, bean, and tomato chili.
- Avoid drinking tea and coffee with meals because they contain substances that decrease iron absorption.
- Cook with iron utensils and cookware since iron is taken up by food cooked in iron cookware.



Eating iron-rich foods will help school-aged athletes build adequate iron stores. Low iron stores can impact performance, but taking iron supplements when a deficiency is not present will not improve performance (McArdle et al., 2008; Rodenberg & Gustafson, 2007). Too much iron can be toxic, and even a moderate iron overload has been linked to heart disease, arthritis, and other health problems (McArdle et al., 2008, Rodenberg & Gustafson, 2007). The need for iron supplementation should be medically determined and supervised.

## Calcium for Bones

All school-aged children and adolescents need calcium for

- muscle contraction,
- bone formation,
- bone strength, and
- future bone health.



Unfortunately, most American children do not even meet the MyPyramid recommendations for the dairy group (3 cups), and milk consumption tends to decrease as they grow into young adults (American Dietetic Association [ADA], 2008). Several studies have found low calcium intake among adolescent female athletes, especially pre-teen and teen gymnasts (Croll et al., 2006; D'Alessandro et al. 2007; Soric, Misigoj-Durakovic, & Pedisic, 2008).

For school-aged athletes, low calcium intake has been associated with poor bone development and stress fractures during competition and training (Meyer et al., 2007; Petrie et al., 2004). Calcium intake and physical activity during childhood and adolescence are critical for building bone mass (Habash, 2006; Meyer et. al., 2007).

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Maximizing bone-mass gain during growth is an important strategy for decreasing the risk of osteoporosis because bone loss occurs during aging (McArdle et al., 2008). Osteoporosis is a loss of bone mineral that causes porous and brittle bones.

Including lowfat dairy foods at meals and snack time is an easy way for school-aged athletes to get enough calcium as well as other nutrients like vitamin D. Dairy foods are an excellent source of calcium, and they contain factors that enhance calcium absorption. Calcium can also be found in calcium fortified orange juice and soy milk, fish with bones, and green vegetables like broccoli. However, some foods like spinach contain factors that hinder calcium absorption (McArdle et al., 2008).

## Tips for Increasing Calcium Intake

- Jazz up breakfast with granola and lowfat yogurt or oatmeal cooked in milk.
- Try lowfat fruit yogurt on muffins instead of jam.
- Enjoy pizza with lowfat mozzarella cheese.
- Include lowfat cheese on sandwiches.
- Snack on lowfat string cheese.
- Drink a lowfat chocolate milk chug after a work-out.
- Prepare shakes and smoothies with lowfat milk or yogurt.
- Make salad dressing with plain lowfat yogurt or buttermilk.
- Try tofu in Chinese soups and stir-frys.
- Enjoy lowfat pudding or a yogurt and fruit parfait for dessert.
- Eat fish with bones like sardines or canned salmon.
- Sprinkle grated lowfat cheese on salads, soups, and pasta.
- Serve fruits and raw vegetables with lowfat yogurt dip.
- Cook with lowfat milk – use milk instead of water for soups, pancakes, potatoes, instant hot cocoa, or breakfast cereals.







## Vitamin D

Vitamin D contributes to bone health by enhancing calcium absorption and regulating blood calcium levels. Recent findings support the role vitamin D plays in the maintenance of natural immunity and prevention of autoimmune diseases, cancer, and diabetes (American Academy of Pediatrics [AAP], 2008). The vitamin D deficiency disease rickets, caused by an inadequate vitamin D intake and decreased exposure to sunlight, has been reported in the United States (AAP, 2008). Therefore,

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the AAP (2008) recommends school-aged children should consume at least 400 International Units (IU) of vitamin D a day from food; and if not, they should take a 400 IU vitamin D supplement.

There is no evidence to suggest vitamin D requirements are higher for athletes than non-active people. However, more research is needed to find out if athletes with low vitamin D status are at risk of illness or injury and whether vitamin D supplementation can improve training, performance, and overall health (Willis, Peterson, & Larson-Meyer, 2008).

Food Sources of Vitamin D			
Food	Serving Size	Vitamin D (IU)	
Milk, fortified	1 cup	100	
Orange juice, fortified	1 cup	100	
Cereal, fortified	1 cup	40	
Wild salmon	3.5 ounces	981	

- Even though school-aged athletes are engaged in additional exercise and training, recommendations for vitamins and minerals do not increase (Petrie, Stover, & Horswill, 2004).
- Nutrition experts agree an adequate diet containing a variety of healthy foods can supply all the vitamins and minerals school-aged athletes require.

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## For More Information

American Dietetic Association. [www.eatright.org](http://www.eatright.org)

Dairy Foods for Strong Bones and Teeth. [www.nfsmi.org](http://www.nfsmi.org)

Dietary Supplement Fact Sheet: Calcium. [ods.od.nih.gov](http://ods.od.nih.gov)

Eat Smart. Play Hard for Kids. [www.fns.usda.gov](http://www.fns.usda.gov)

Kidnetic. [www.kidnetic.com](http://www.kidnetic.com)

MyPyramid for Kids. [www.mypyramid.gov](http://www.mypyramid.gov)

Milk Matters. [www.nichd.nih.gov](http://www.nichd.nih.gov)

Powerful Bones. Powerful Girls. [www.cdc.gov](http://www.cdc.gov)

President's Council on Physical Fitness and Sports. [www.fitness.gov](http://www.fitness.gov)

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**For more information, contact NFSMI at 800-321-3054 or [www.nfsmi.org](http://www.nfsmi.org).**

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