

Science-Based Policy Statement on Optimal Nutrition for Children Playing Soccer

INTRODUCTION

Soccer is a high intensity sport that requires a combination of power, speed, and endurance that can be sustained throughout a game. In order to fuel their muscles and perform sustained exercise at high level, children must consume adequate calories from carbohydrates, proteins and fats. In order to help meet their nutrient needs, parents and coaches need to guide children to consume lean animal and vegetable protein, whole grain carbohydrates, fruits and vegetables, and low fat dairy ¹. Not only is it important to encourage the consumption of these food groups to meet energy needs, but these healthy food choices also provide the vitamins and minerals that are essential in regulating children’s energy, growth, and repair processes. Finally, it is critical that young players stay hydrated so that performance and heat regulation are not compromised. This paper provides parents and coaches with an overview of the current research on the nutritional needs of youth soccer players and provides practical recommendations for sustained energy and performance.

CALORIC (ENERGY) NEEDS

At this time there is a lack of research on the amount of energy a child expends in various sports ². The number of calories required over a 24-hour day depends on the age of the child and their activity level. We do know that children expend more energy per pound of body mass compared with adults – from 10-25% more ^{2,3}. The younger the child the more this is true. This is due to children having less muscular coordination and economy of movement compared to adults ^{4,5}. Table 1 lists the estimated caloric requirements of sedentary children. Young soccer players may require anywhere from 200-600 calories more per day, depending on the intensity and duration of play ⁶.

Importantly, children playing soccer need to stay in “energy balance” – that means consuming ample calories for proper growth, development, and activity. As in adults, consuming more than they burn will lead to excess weight gain. According to the 2005 Dietary Guidelines from the U.S. Department of Agriculture (USDA) and the Department of Health and Human Services (USDHHS), **ALL** children 2 years and older should get 60 minutes of moderate to vigorous exercise on most, preferably all, days of the week ¹. Caregivers of young soccer players need to recognize that if a child is only playing soccer on a daily basis and not engaged in additional physical activity, he or she might only just be meeting these recommendations. Therefore, some youth soccer players may not necessarily need more calories on a daily basis, but may need to pay more attention to the composition and timing of snacks and meals.

Table 1: Daily Estimated Caloric Intakes for Sedentary Females and Males

	4-8 yrs	9-13 yrs
Kilocalories		
Females	1200	1600
Males	1400	1800

Calorie estimates are based on a sedentary lifestyle. Increased physical activity will require additional calories: by 0 to 200 kcal/day if moderately physically active and by 200 to 400 kcal/day if very physically active. Adapted from the AAP Dietary Recommendations for Children and Adolescents: A Guide for Practitioners, 2005

MACRONUTRIENTS

CARBOHYDRATES

Why Important. Carbohydrates are essential for intense physical activity in sports such as soccer. They are the most readily available source of food energy for exercising muscles. When a child is training or competing, the muscles need energy to perform. The major source of energy for working muscles is glycogen. Glycogen is stored in muscles and the liver and is a starch produced by the body primarily from the glucose found in carbohydrates. Muscle glycogen provides the primary energy source for high intensity, maximal-outburst activity, and is also a significant fuel source for endurance exercise⁷.

Consuming adequate amounts of carbohydrate maintains usual training intensity and promotes rapid recovery. A regular soccer match has been shown to deplete muscle glycogen stores in children by approximately 35% and this gradual depletion parallels time to exhaustion⁸. Carbohydrate consumption pre-exercise stimulates muscle glycogen storage and may help delay fatigue during exercise. Carbohydrate consumption during exercise that lasts more than 60 minutes helps the body maintain blood glucose availability late in exercise⁷. Post-exercise carbohydrates help improve muscle glycogen storage, especially within 30-60 minutes after the activity⁹. (See meal timing section below.)

Carbohydrate Needs. Children should consume 46-65% of their energy as carbohydrates¹⁰. If they are exercising for long durations and at high intensities, it may be beneficial for them to consume amounts at the upper end of this range. Children should eat carbohydrates at each meal with an emphasis on whole grains, fruits and vegetables.

Whole Grains. At least half of the grains a child consumes should be whole grains which are full of nutrients and fiber¹. Children 4-8 years of age should have a daily dietary fiber intake of 25 g and 9-13 year olds should consume 31 g and 26 g, respectively¹⁰. Unfortunately, the Average Dietary Fiber intake for children 2-5 years old is 11.4 g/day and for children 6-11 years old is 13.1 g/day¹¹. These low fiber intakes may reflect low intakes of whole grains, fruits, and vegetables and further emphasize a need to focus on these food groups.

Fruits and Vegetables. Many people may think of carbohydrates as bread and rice, however, some of the most important carbohydrates in our diet come from colorful fruits and vegetables. Not only do fruits and vegetables fuel the body for exercise, they are also excellent sources of vitamins A and C, phytochemicals, and fiber. Children should consume at least 5 fruits and vegetables per day^{1, 6}. However, 63% of children 2 to 9 years of age are not consuming the recommended number of servings of fruits, and 78% are not consuming the recommended number of servings for vegetables. Children, on average, are only consuming 2.0 fruits and 2.2 vegetables per day¹². These low intakes are associated with inadequate intakes of vitamin A, vitamin C, and dietary fiber, in addition to high intakes of total fat and saturated fat¹³.

Children should strive to consume a variety of vegetables and the majority of servings of fruit should come from whole fruit (fresh, frozen, canned, dried) rather than fruit juice^{6, 14}. Increased fruit juice intake is associated with excess adiposity (body fat) gains, whereas increased consumption of whole fruits is associated with reduced adiposity gains¹⁵. Reasons for this may include that fruit juice is high in calories and not as filling as whole fruit which can lead to over consumption. The American Academy of Pediatrics recommends that for children ages 1 to 6, intake of fruit juice should be limited to four to six ounces per day. Children between the ages of 7 and 18 should consume no more than between eight and twelve ounces of juice a day^{6, 14}. If 100% fruit juice is provided in these appropriate amounts, it can be a healthy part of a child's diet.

High glycemic index foods. The glycemic index or load of an individual food or a meal is a measure of how quickly it causes blood sugar levels to rise and fall. A food, snack or a meal that has a relatively high glycemic index or load WILL NOT provide lasting energy. The fiber, protein, fat, and simple sugar content all impact the glycemic index of a food, snack, or meal. Examples of high glycemic index foods include simple and refined sugars such as candy, white bread, and white rice. Children should be consuming snacks and meals that contain a relatively low glycemic load right before activity/training. For example, a breakfast that includes whole grain cereal and milk is likely to help sustain blood sugar and will help children better maintain blood sugar levels throughout the morning. Studies have shown that this maintains cognitive performance, reduces excess calorie intakes at lunch, and helps with exercise performance later in the day ^{16, 17}. Table 2 lists some ideal foods for children to consume prior to activity

High fructose corn syrup. High fructose corn syrup is a form of corn syrup which has undergone enzymatic processing that increases its fructose content. It is comparable to table sugar (sucrose) in sweetness and is used by food manufacturers as a useful alternative to sucrose in soft drinks and other processed foods. Beverages with high fructose corn syrup, sweets, and other sweetened foods that provide little or no nutrients should be avoided. Consumption of these foods is negatively associated with diet quality in children and can contribute to excessive energy intakes ^{6, 14}. In addition, most of these products have a high glycemic index, which would cause children’s blood sugar to spike and then fall during a soccer game and lead to fatigue.

Table 2a: Soccer Friendly Carbohydrate Choices: Best Choices for Sustained Energy

Whole Wheat	Beans/Peas	Starchy Vegetables
Pasta Rice Bread Pita Tortillas English muffins Bagels Cereals Oatmeal	Dried beans and peas Black beans Kidney beans Garbanzo beans Lentils	Squash and zucchini Eggplant Corn Carrots Green beans/peas Potatoes with skin
Vegetables		Fruit
Broccoli Spinach / collard greens Mushrooms Romaine lettuce Tomatoes Peppers		Apples Bananas Grapes Nectarines / peaches Oranges / grapefruit Peaches Plums

Table 2a: Soccer Unfriendly Carbohydrate Choices: Keep Intake Low

Breads	Vegetables	Fruits
Muffins Biscuits Cinnamon rolls Coffee cake Croissants Danish pastries Doughnuts Pies	“Corn” chips Onion rings French fries Potato chips Vegetables cooked in butter Vegetables in creamy sauce	Coconut Fruit pastries Fruit canned in syrup High Sugar “Fruit” juices Fruit salad with creamy sauce

PROTEIN

Why Important. The majority of our body’s protein is in muscle tissue. Dietary protein is critical for building and repairing the body’s cells and in boosting the immune system. Protein does provide energy but its contribution as a fuel source is minimal (~5%) during extremely prolonged exercise which is not common in children ¹⁸.

Protein Needs. The body is constantly breaking down and rebuilding protein, and that translates to the need for a daily intake of protein (and its component amino acids) from foods. It is recommended that children consume between 10-30% of their calories as protein ¹⁰. The daily requirements for protein per unit of body mass are higher for children than adults because of the demands of growth and development of body organs and tissues ². Children 7-10 years old require 1.2 g/kg body weight while adults require 0.8 g/kg body weight ¹⁰. However, these recommendations do not account for increased energy needs of children who exercise above and beyond the current recommendations.

Several factors affect the specific recommendations for protein in physically active individuals of all ages. Among these are diet quality, exercise duration and exercise intensity. Children who exercise intensely have higher protein needs because of the constant repair and building of tissues. Several studies have investigated an optimal protein intake for children who exercise in sports which include intense, intermittent activity such as soccer. The findings confirm an increased need for protein but data are insufficient to make a specific recommendation for active children. Current recommendations range from 1 g/kg body weight to upwards of 1.6 g/kg body weight per day ¹⁹⁻²².

If a child’s exercise energy demands increase suddenly, for example, if he or she is playing in multiple matches per day, food intake needs to increase slightly to compensate for additional calorie and protein needs ²³. Increased energy intake will insure that protein intake is adequate to support growth, especially for repair and development of lean body mass, and at the same time support the body’s increased basic metabolic needs. When energy intake is inadequate protein may be used as a substrate for energy rather than for growth and development ²⁴. Fortunately, most Americans consume sufficient protein. Adequate protein intake is of concern in children consuming inadequate energy and among certain sub-groups like vegetarians and vegans ²⁵.

Protein is found in a large variety of foods besides meat and poultry; eggs, fish, and low fat dairy products are also good sources (Table 3). Dried beans and nuts are excellent sources of high quality protein. Even breads and many vegetables contain protein, just in smaller

quantities. Vegetarian athletes must be mindful in choosing a variety of protein sources to ensure a balanced intake of all essential amino acids ²⁵. In addition to protein, vegetarian athletes need to ensure that their diets contain adequate calcium and iron and vegans need to pay extra attention to vitamin B-12 (see micronutrient section). Vitamin B12 is present only in foods that are fortified or from animal sources (for more info: <http://www.vegetariannutrition.net/links.htm>).

Table 3a: Soccer Friendly Protein Choices: Choose High Quality, Low-Fat Protein

Meat <i>choose baked, roasted, grilled, broiled, poached</i>	Dairy <i>choose 1-2% fat, low fat or non-fat</i>	Vegetarian
Chicken (white best) Turkey (white best) Lean roast beef 85% lean meats Trimmed pork chops Fish Lean baked ham Canned tuna - in water	Milk Dried milk Yogurt Cheese Egg whites Egg substitute	Dried beans and peas Lentils Black beans Kidney beans Chick peas Peanut butter Nuts/Seeds Soy products

Table 3b: Soccer Unfriendly Protein Choices: Choose Less Frequently

Meat	Dairy
Poultry with skin Hot dogs Bacon Sausage Pepperoni Fried meat/fish Processed Meats (bologna, salami)	Whole milk Regular yogurt Regular cheese Butter

FAT

Why Important. Fat is an essential dietary component. It is a primary fuel source for low and moderate intensity exercise. Interestingly, children utilize more fat as an energy substrate than adults do ²⁶. Fat is also important for the absorption of fat-soluble nutrients (vitamins A, D, E, and K) and too little fat in the diet can impact immune function which, in turn, can contribute fatigue and illness ²⁷.

Fat Needs. Children should consume 25-30% energy from fat (and not less than 20%)^{1, 6, 10}. Diets higher in fat may lead to higher calorie intakes and higher body fat accumulation, although available data for children are conflicting ²⁷. Like adults, children should be consuming the majority of their fats from polyunsaturated fatty acids (omega-3 and omega-6 fatty acids) sources such as healthy oils, nuts and fish (Table 4) Children should also consume less than 10% of calories from saturated fatty acids and keep trans fatty acid consumption as low as possible ¹⁰.

The majority of trans fats (also called “partially hydrogenated vegetable oil”) in the average American’s diet comes from processed foods and oils (~80%), while a much smaller percentage

comes from trans fats that occur naturally in food from animal sources. Trans fat content of certain processed foods has declined recently (such as packaged potato chips, crackers and cookies) and is likely to continue to drop as the industry reformulates products¹⁴. On average, U.S. children consume 33.5% of their calories as fat and 12.2% as saturated fat with 3 out of 4 youths consuming excess saturated fat²⁸. High fat intakes in young soccer players may displace the carbohydrates needed for performance and also contribute to excess weight gain.

Table 4. Examples of Soccer Friendly and Unfriendly Fat Sources

Healthy Fat Sources	Unhealthy Fat Sources
Nuts and nut butters Olives Avocados Almonds Walnuts Tuna Salmon Foods cooked with olive or vegetable oils	French fries Chips Doughnuts Commercial/packaged baked goods Foods cooked in coconut or palm oil Cream Butter Fried foods Fatty meats (bacon, sausage, pepperoni, bologna, salami)

MICRONUTRIENTS

Vitamins and minerals are essential for energy metabolism. Intake recommendations vary slightly by age, gender and activity level. Athletes are unlikely to be at increased risk for micronutrient deficiencies if they consume adequate calories and foods of high nutrient quality. However, micronutrient deficiencies are possible in young athletes who restrict their calories, use extreme weight loss methods, eliminate a food group from the diet, or consume a diet of poor nutrient quality¹⁸.

It is essential that children consume adequate amount of vitamins and minerals to ensure optimal growth². Like physically active adults, exercising children will naturally require additional vitamins and minerals to compensate for elevated rates of energy metabolism. For example, the B vitamins are important in energy metabolism, but the increased energy intake that typically occurs with physical activity is sufficient to meet these additional needs. Research indicates that active children come closer to meeting or exceeding daily vitamin and mineral recommendations than their sedentary counterparts²⁴. However, calcium, vitamin D, iron and zinc are especially critical during the adolescent growth spurt and important for exercise metabolism. These nutrients should therefore be emphasized in the diet of youth athletes².

Calcium. Calcium is important for optimal bone health and muscular contraction. It is estimated that nearly 30% of American children do not meet the calcium recommendations of 800 mg/day for 4 to 8 years old and 1300 mg/day for 9 to 13 years old^{29, 30}. In adults, inadequate calcium consumption is associated with low bone mineral density, increased risk of stress fractures and obesity³¹. Without optimal calcium intake, the benefits of exercise seen with physical exercise are compromised³². *Good sources: dairy products (low fat milk, yogurt, cheese), fortified soy milk, beans, tofu, broccoli, kale, almonds*

Vitamin D. Vitamin D is critical for effective calcium absorption and regulation of serum calcium levels²⁹. As a result, vitamin D status is associated with bone and muscle health. Many children have low intakes of vitamin D, often less than 10 µg/day³³. Additionally, without adequate sun exposure during the winter months especially in northern latitudes, children are at

increased risk of poor vitamin D status. *Good sources: fortified low fat milk and soy milk, eggs, fish, fortified cereals and sunlight!*

Iron. Iron carries oxygen to body tissues. With exercise, iron is crucial for the transport of oxygen to working muscles and in producing adequate energy. Poor iron intake may impair muscle metabolism and eventually impact cognitive function. Iron deficiency is seen throughout the world, especially in children²⁴. Iron is most easily absorbed from heme-iron which is found in animal products such as meat. Vegetarians are encouraged to consume adequate vitamin C to optimize iron uptake, which enhances iron absorption from non-meat sources²⁵. Iron absorption is inhibited by coffee, tea, and soft drinks. Children, in particular vegetarian children, should take care to optimize iron intake by replacing soft drinks, for example, with orange juice that is high in vitamin C. *Good sources: lean meats, beans, spinach, tofu, lentils, fortified cereals, dried figs and apricots*

Zinc. Zinc is a mineral important for the synthesis, repair, and growth of muscle tissue. It is also necessary as an enzymatic cofactor in energy production. Children appear to be meeting the current zinc intake recommendations probably because so many foods are fortified with it³⁴. *Good sources: lean meats, beans, cheese, whole grains, fortified breakfast cereals*

HYDRATION

Why important. Proper hydration is critical in maintaining adequate fluid balance which works to sustain normal cardiovascular and thermoregulatory functioning. These functions are critical for exercise performance and to ward off fatigue. It is especially important that active children consume adequate fluids because their physiological thermal regulation is more fragile than in an adult. Children are more sensitive to extreme temperatures (high heat and/or humidity) than adults in part due to their higher surface area to body mass ratio and thus absorb more heat^{35,36}. In addition, they are less able to thermoregulate because they sweat less during physical activity and produce more metabolic heat per body mass unit³⁷. This reduces a child's ability to transfer excess heat from their working muscles to the skin via sweat loss. As a result, children become dehydrated more quickly than adults and are more susceptible to heat stress.

Dehydration impacts muscle strength, endurance, and coordination. It may lead to muscle cramps, exhaustion and even heat stroke³⁵. Research indicates that losses as small as 1 or 2% of body weight will negatively impact athletic performance in adults^{38,39}. In children, it is not yet clear at what physiological level fluid loss will impact a child's athletic performance but dehydration performance losses are expected to be similar to adults. One study has shown that a 1% decrease in body weight from exercise-induced sweating decreases endurance in children⁴⁰.

Fluid Needs. Children should be encouraged to drink fluids throughout the day. It is important that an adult monitor a child's fluid intake because young athletes do not instinctively drink enough to replace water losses³⁷. Children commonly underestimate their fluid needs with exercise lasting more than 30 minutes². Thirst is a poor indicator of hydration status and by the time an athlete drinks due to thirst, they are likely already dehydrated.

Regular water is the best source of fluid for rehydration during events lasting less than one hour. However, research indicates that young athletes are more likely to consume between 45-50% more fluid when it is flavored and served at a moderately cool temperature^{41,42}. Sports drinks or diluted fruit juice work well for this purpose. Consuming a sports beverage is especially encouraged with prolonged exercise lasting for 60 minutes or more as it has been shown to help sustain sprint capacity and motor skills late in exercise^{43,44}. Sports drinks are also more readily

absorbed than regular water or 100% fruit juices. Soft drinks are also not absorbed as well as sports drinks and water and should also be avoided due to their caffeine and caloric content.

The Institute of Medicine recommends that children 4 to 8 years old drink 7.5 cups of fluid per day, while 9 to 13 year olds should drink 10 cups of fluid per day. These recommendations do not account for additional physical activity^{46, 47}. Others have found that an adequate intake of fluid for children is in the range of 1.01-1.05 ml of fluid per kcal of energy expended per day (for example, if a child needs 1500 kcal per day, they would require approximately 1.5 L or approximately 6.5 cups per day)⁴⁸. It is estimated that fluid needs may increase above baseline by 2-4 cups per day for an exercising child, especially in hot and humid environments²⁴.

Caffeine and Sodium. Beverages that contain caffeine (soda, coffee drinks) as well as foods that are high in sodium (salt) should be avoided in the training diet because they promote dehydration. Increased soft drink consumption has been found to replace more nutrient dense drinks such as milk and fruit juice that have a better place in an athlete's diet⁴⁵. Caffeine is a diuretic and some individuals experience tremors as well as anxiety with caffeine intake. One study found that a moderate dose of caffeine (5 mg/kg of body weight) did not impact exercise and energy metabolism (oxygen consumption or respiratory exchange ratio) in young children during low to moderately intense exercise⁴⁹. However, this moderate intake of caffeine did reduce heart rate and raise blood pressure in the young study participants.

Processed Foods. Another important dietary issue for young athletes is the general increased consumption of processed foods which includes fast foods and snack foods such as chips⁵⁰. Not only are these foods typically high in calories, but they often contain excess sodium which may impact fluid balance. A staggering 68% of children are estimated to consume sodium in excess. Children between 4 and 8 years old should consume less than 1900 mg/day of sodium and children between 9 and 13 years old less than 2200 mg/day⁴⁷. In addition, processed foods and fast foods often contain unhealthy trans fats are not nutrient dense and do not contribute to a healthy and energizing diet. Children should keep consumption of these types of foods to a minimum.

PRACTICAL GUIDELINES FOR FUELING FOR EXERCISE

Not only is it important that children who exercise eat a healthy, well-balanced diet, but it is equally as important that meals and snacks are appropriately timed to optimize exercise performance and recovery. Below are some helpful guidelines for young soccer players to get energized for action!

Pre-Exercise

Goals. A pre-exercise meal will serve to “top off the gas tank” - it increases energy stores before a game or practice. This meal ensures that a child is comfortable and does not feel too hungry or too full. Pre-exercise is also the time to hydrate!

Composition. A high carbohydrate low-fat meal or snack that is easily digested should be consumed before exercise. Fatty or high fiber meals or snacks should be avoided because they delay stomach emptying and may cause cramping. Moreover, food that is just sitting in the stomach does not benefit the working muscles. Whether it is a light meal or a snack, it should contain a moderate amount of protein (~10-25%), just enough to satisfy hunger. Also, children should AVOID consuming refined and simple sugars (candy, sodas, white bread, white rice, etc.), which cause blood sugar levels to spike and then rapidly fall zapping energy levels.

Timing. If a game or practice is in the morning, a healthy breakfast is critical for performance. For very early morning practices or matches, make sure a child has a high carbohydrate meal the night before. Then in the morning, the child should have a snack that is low in fat and fiber an hour or two prior to soccer rather than a full breakfast. If a child is playing soccer after school, the timing of lunch and an afternoon snack is equally as important. Often school lunch can be served quite early in the day. By the time school gets out, a child likely needs a snack to fuel his/her body for a workout. Healthy small meals and snacks throughout the day (~every 3 hours) help keep the body energized for activity.

A child can consume a normal meal (~400 kcal) approximately 3-4 hours before or a small snack (~200 kcals) approximately 1-2 hours before playing soccer. The closer a child eats to a workout, the fewer calories they should eat in order to allow appropriate digestion and to avoid stomach upset. A light workout can be preceded with a light snack, but more lead-time should be left for intense workouts. Approximately 100-200 calories 30 minutes to one hour prior to exercise should be fine for most children. Some good examples of pre-exercise snack ideas are listed in Table 5.

Table 5.

Pre-Exercise Snack Ideas	
(~100-300 calories; calories depend on portion size)	
For Morning Events	For Afternoon/Evening Events
Whole grain pretzels	Half cup raisins and peanuts
Half wheat bagel with jam	Hummus, carrot sticks and pita
Fresh fruit	Whole wheat crackers
Popcorn	Animal crackers with low-fat yogurt
Cereal/fruit bar	Dried fruit

Hydration. Children need to work on drinking water throughout the day. A light urine color is indicative of adequate hydration. As a rule of thumb, children should drink 8-10 oz of fluid about 30 minutes prior to a game or practice in addition to regular consumption. This pre-exercise hydration is very important if the exercise is early in the morning and the child has not drunk any fluid during the night.

During Exercise

Goals. The goal during exercise is to sustain energy levels and hydration. Dehydration has a particularly strong effect on performance in “stop and go” sports like soccer ².

Composition. Carbohydrate-electrolyte beverages (sports drinks) are a good choice during activities lasting longer than 60 minutes. They have been shown to improve performance and the flavor encourages children to drink more. Cooling drinks also increases palatability on hot days. Sports drinks are designed with 6-8% sugar which is quickly absorbed and they also replace electrolytes that are lost in sweat. (Recall that sports drinks/diluted fruit juices are more readily absorbed than water and water is better absorbed than soda and 100% fruit juices. Soda and 100% fruit juices should be avoided during exercise. Their high sugar and caffeine content may cause stomach upset.) A good option is to have both water and a sports drink available at the field and to have children alternate between the two. Children can also eat hydrating fruit snacks like orange slices, melon, and cantaloupe during breaks or half time.

Timing. Children should be encouraged to drink fluids beginning early during a practice or a game, at breaks and at half time, especially if they were not rotated out in the first half. Each child should have his or her own personal water bottle and should drink 5-9 ounces (5 ounces for a player weighing less than 90 pounds, 9 ounces for a player weighing more than 90 pounds) every 15-20 minutes during prolonged exercise even if they do not report thirst ³⁵.

Post-Exercise/Recovery

Goals. After exercise, all athletes need carbohydrates and fluids to replace glycogen and water losses during the exercise. Additionally, healthy foods and fluids assist in the recovery and repair of a child’s growing body. What children eat after exercise is important not only for multiple events in one day, but also to their performance the next day!!

Composition and Timing. A high carbohydrate diet aids in recovery by restoring muscle glycogen. Children should consume a carbohydrate snack with some protein within 30-60 minutes post-exercise. Muscles store more glycogen immediately after exercise than they do later ⁵¹. Table 6 lists some ideas for healthy snacks to consume in the hour following exercise. These snacks are high in carbohydrates, but lower in fat and fiber, so that the sugars in them will readily enter the blood stream to replenish and sustain lost stores.

Follow the snack an hour or two later with a high carbohydrate meal that also contains lean protein (limit fast-foods, fried and processed foods). Table 7 offers some meal choice ideas for a healthy and energized soccer day. Children should also drink 10-20 oz of fluid after practice or a match (preferably water, sports drink, diluted fruit juice) and should continue to drink water regularly until bedtime.

Table 6.

Post-Exercise Snack Ideas (~100-300 calories; calories depend on portion size)	
For Morning Events	For Afternoon/Evening Events
Bagel with low-fat cream cheese/jelly	Pretzels and low fat milk
Low-fat yogurt with granola	Sports bar and sports drink
Fruit smoothie with low-fat yogurt	Trail mix
Applesauce and string cheese	Apple and peanut butter
Cereal bar and low-fat milk	Banana and low-fat yogurt

CONCLUSION

Soccer is an intense stop and go sport where energy balance and proper hydration are important for sustained performance. Healthy energy sources for young children should include consuming a wide variety of healthy fruits and vegetables, whole grains, lean meats and proteins, and low-fat dairy throughout the day. The energy derived from these foods will not only fuel the young players through the recommended 60 minutes of daily vigorous activity, but will also optimize their soccer performance and provide the necessary nutrition for proper growth and development.

Helpful links:

- Major League Soccer
 - <http://www.mlssnet.com>
- Tufts University Children in Balance
 - <http://www.tufts.edu/Nutrition/childreninbalance/>
- MyPyramid for Kids
 - http://www.mypyramid.gov/kids/index_print.html
- National Dairy Council
 - <http://www.nutritionexplorations.org/kids/main.asp>
- Dole “5 a Day”
 - <http://www.dole5aday.com/>
- National Eating Disorder Association (NEDA)
 - <http://www.nationaleatingdisorders.org/>
- Vegetarian Website
 - <http://www.vegetariannutrition.net/links.htm>

Table 7. Healthy “Soccer Day” Food Choices

Breakfast
<ul style="list-style-type: none">• Cereal with low-fat milk• Whole-grain toast/bagels• Pancakes• Waffles• Orange Juice• Fruit• Yogurt
Lunch
<ul style="list-style-type: none">• Fruit• Low-fat sandwiches with whole grain bread/rolls<ul style="list-style-type: none">○ Turkey○ Ham○ Roast Beef○ Hummus○ Peanut Butter
Dinner
<ul style="list-style-type: none">• Lean meat (turkey, chicken, pork) or fish• Beans (black, pinto, kidney, garbanzo)• Potatoes (try baked with veggies and plain yogurt instead of sour cream)• Pasta (preferably whole grain with low-fat** sauces)• Rice (preferably brown)• Vegetables (go for color!)• Salads (without too much salad dressing!)• Fruit
Snacks
<ul style="list-style-type: none">• Frozen yogurt• Yogurt• Pretzels• Fruit• Cereal• Trail mix (without too much candy!)• Granola, fruit, or energy bars

***low-fat means food sources normally lower in fat, not manufactured “low-fat” products which may be very high in sugar and calories*

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