



# Fit For the Game

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## Preface

The soccer-playing season has arrived and coaches and athletes are talking about nutrition and fitness as part of their training regimen. As a pediatric nurse with a love for the game; parents and players frequently ask me what can be done to improve performance on the field from a nutritional point of view. I am also asked many questions about the effects of exercise and how the body works. Players are looking for the “edge” that can be obtained by eating food (s), which enhance and support increased demands upon the body during training and competition. They are also looking to obtain improved “fitness for the game,” which goes hand in hand with quality food choices and a focused training program.

What do athletes need to know about nutrition? As Douglas W. Brown, M.D. Team Physician to the U.S. Women’s national team identifies, “Players need practical and scientifically valid understanding of key nutritional principles. As disciplined and dedicated as players are in many aspects of their lives, they are also products of their homes, their previous experiences, and their culture. Virtually all players have some ideas of nutrition, some valid and some questionable. The goal is to educate athletes on how to achieve the “edge” that optimal nutrition and hydration can give a player. Athletic success is not a miracle. It is the result of talent, hard training, and plenty of preparation before competition. Athletes who look for miracles instead of a sensible diet and training program can hurt their bodies and their performance.”

To better understand the impact of nutrition and fitness upon the athlete, this series will focus on 4 key areas to understanding the relationship between exercise and nutrition.

- The first area explains the concept of exercise by identifying how the body works and reasons why the body needs nutritional fuel,
- Second is the role of nutrients to optimize training and game play,
- Third is the role of hydration, and
- Fourth is nutritional myths and examining the nutritional concerns for the female athlete.

## Part 1

There are many goals to exercise. These include building a stronger heart, longer endurance, faster pace, successful competition, stronger muscles, stronger bones, enhanced body image, greater flexibility, better coordination, clearer thinking and happier moods. The following is a summary of the physiological effects upon the body as we exercise. All of these goals are important in helping the soccer player achieve his/her personal best in training and competition. As you read through these goals and the physiological response of the body to exercise, you will see that the healthiness and capabilities of the body are dependent upon the food (nutrition) it is nourished with along with focused training (exercise) of the body.



### **Stronger Heart**

- Strengthening of the heart requires continuous exercise maintaining a beat of 120 beats/min X10 minutes and repeating a minimum of 2x/week.
- Sustained elevation of heart rate is called endurance or aerobic exercise.
- Endurance training causes enlargement of the heart and strengthening of the heart muscle.
- Strengthening of the heart leads to cardiac fitness.
- As a person becomes fit, the heart rate returns to normal sooner after completing exercise.
- Muscles have an increased amount of enzymes enabling removal of lactic acid.
- Lactic acid is the breakdown product resulting from an oxygen deficit.
- Oxygen uptake is the amount of oxygen the body uses to perform given work.
- Maximum oxygen uptake is the maximum amount of oxygen taken in by the body, delivered to the muscles, and used.
- Maximum oxygen intake correlates with the fastest pace at which a person can exercise.
- *Anaerobic Threshold* is that level of exercise above which a person begins to accumulate significant amounts of lactic acid in the bloodstream. Lactic acid accumulates whenever too little oxygen is delivered to the muscles to do the work they are doing.
- Regular training teaches the body to deliver more oxygen to the muscles. The anaerobic threshold rises with conditioning.
- This means...that an athlete will be able to work harder before incurring an oxygen debt, delaying the point at which the athlete begins to accumulate lactic acid.

### **Longer Endurance**

- In order to exercise a longer period of time, sugar must be stored as a source of energy in muscles.
- Sugar is stored in muscles in the form of glycogen.
- The more glycogen stored in muscles, the longer a person can exercise.
- Muscles, which have been depleted of glycogen, will refill after eating carbohydrate rich food.



### **Faster Pace**

- In order to run at a faster pace, an athlete must teach his/her body to...

- Move muscles faster, tolerate discomfort of lactic acid accumulation, and remove lactic acid faster.
- This is accomplished by...
- Interval training (long intervals are fast laps of 2+ minutes which teach toleration of discomfort that accompanies a high level of lactic acid).
- Long intervals teach a body to eliminate lactic acid quicker.
- High levels of lactic acid tire an athlete quickly.
- Short intervals are fast laps that last a maximum of 30 seconds each. Short interval-training teaches..
- The brain to coordinate muscles at a faster pace.
- Very little lactic acid accumulates.

***Words of Advice....it is important for athletes to alternate hard and easy days of training, it is better to exercise lightly, than not at all. Improvement in pace is seen when interval training once/twice a week and not on consecutive days. Every time an athlete exercises vigorously, muscles become slightly injured and it takes 48 hours to recover. Athletes should also listen to their body to avoid "overuse" injuries.***



### **Successful Competition**

- Successful competition is achieved through the athlete setting a personal goal (this goal cannot be selected for an athlete or achieved by an athlete through his/her parents, coach or trainer.)
- Successful competition involves a commitment of spirit and time.
- Successful competition involves mental focus on the goal.
- Athletes must be physically and nutritionally fit and skilled to accomplish their goal.

### **Stronger Muscles**

- To strengthen muscles, the muscles must contract against resistance.
- Exercise without resistance does not give strong muscles.
- Muscle is made up of string like fibers.
- A small percentage of total fibers are used in the entire muscle.
- Weight lifting will help in developing stronger muscles.
- Weight lifting should not be initiated by an athlete without the guidance and instruction of a professional and personal trainer who is knowledgeable in the effects of weight lifting upon the body to achieve personal goals. Inappropriate technique can cause muscle damage.
- There are 3 basic muscle contractions, which each serve a purpose in developing strong muscles.

***Muscle biopsy's in soccer players have shown conclusively that less well trained athletes run out of muscle glycogen well before the typical match is over. The best time to replenish glycogen stores is within 2 hours after exercise. The body is efficient at this time. If carbohydrates are eaten, they convert quickly to glycogen.***

### **Stronger Bones**

- All people should strive to have thick, strong bones because such bones are less likely to break.
- Bones have a natural tendency to get thinner and weaker as we get older.

- Bone thinning (osteoporosis) is a serious health hazard for all aging people and females.
- Bones will get thinner at an earlier age if sedentary, by smoking cigarettes and consuming inadequate amount of dietary calcium.
- Bones, which are exercised, will become thicker and stronger with adequate intake of dietary calcium.
- Regular exercise will strengthen bones.



### **Enhanced Body Image**

- Each individual defines the standard of attractiveness.
- Females are at a natural disadvantage as the effect of estrogen within the body alters distribution of fat in the body.
- Historically, social programming of women has discouraged women from exercising.
- Some women mistakenly assume that their muscles have gotten larger with exercise, when in reality there is increased visibility of muscles due to shredding of fat layers covering the muscles.
- Starvation is not the trick to obtaining well-defined and shapely muscles.
- It is important for the athlete to learn what his/her body needs and how to take care of it. This can be a trial and error process for some athletes.

### **Greater Flexibility**

- Flexibility determines how far an athlete can bend and stretch muscles without tearing them.
- Flexibility helps to prevent injuries by decreasing tension on the muscles.
- Flexibility can help to reduce muscle soreness and enhance certain types of athletic performance.
- Flexibility can be improved by slow, deliberate stretching.
- It is safest and wisest to stretch when muscles are warm.
- Women are more likely than men to injure themselves.
- The inequity of flexibility is that men are taught to get into shape before exercising, whereas women in shape by exercising.
- Warming up and stretching are very different parts of conditioning.

***An athlete must become familiar with his/her own body and the effect of exercise and training upon their body in order to achieve personal goals.***



### **Happier Moods**

- Exercise causes the brain and other parts of the body to produce several chemicals that promote feelings of pleasure and well being.
- For unknown reasons...there is a sense of well being emanating from knowing that new goals have been set and achieved.

## Part 2 Nutrition

**“Your training diet is more important than your game day diet.” Kristine L. Clark Ph. D.**

Fit for the game, part one focused on the goals of exercise, how the body works and the dependency the body has on food as nutritional fuel. Diet is the single most important factor influencing an athlete’s performance.

“When you are young, you believe you are invincible, and you think eating right really doesn’t matter. It does. Taking care of your body and giving it what it needs is a habit worth starting right now.”

Douglas W. Brown, M.D.



### **So...what is food?**

Everything a person eats is made up of the same basic building blocks that makes up the body. The sugar found in fruits and candies, “glucose” is the same “glucose” that circulates in your bloodstream. A protein found in steak, “lysine” is the same “lysine” found in your muscles. The body cannot absorb food that is eaten until the food is broken down into its basic components. Food components include:

- Carbohydrates in simple sugars and sugars in combinations.
- Proteins are basic structural materials from plants/animals. The protein building block is amino acids; which contain the mineral nitrogen.
- Fats are greasy to the touch and insoluble in water. Fats are composed of monoglycerides, glycerol and fatty acids.
- Vitamins are parts of chemicals called enzymes that help reactions to proceed.
- Minerals are basic elements found in the soil. The body needs minerals and each has a specific function in the body. For example...sodium regulates the distribution of water in the body, potassium helps to prevent muscles from overheating. Water comprises half of a persons body weight. Most of the blood volume is water. Some foods contain water, but you have to drink fluids to supply your body with enough water. Water is lost with perspiration. When this happens, more fluid is needed.
- It is a nutritional myth that athletic performance can be improved by eating a high protein diet, large doses of vitamins, salt tablets and drinking no water during competition. (Nutritional myths will be discussed in part 4.)

### **What recommendations should be made to athletes for adequate nutrition?**

According to Kristine Clark, 50-60% of the diet should be made up of carbohydrate food sources, 15-20% protein choices and fat choices, less than 30%.

It is essential for athletes to eat a diet high in carbohydrate throughout the season for energy and to train and compete. Carbohydrates serve as the primary energy fuel for intensity exercise, such as the demands placed upon a soccer player during training and games. The reason for eating a high carbohydrate diet is because at rest, muscles burn mostly fat. During exercise, muscles burn fat and sugar. The harder the athlete exercises, the greater the percentage of sugar the muscle burns. Protein is not a major of source of energy during exercise, although it plays an important role in the health of the body, as does fat. The role of carbohydrates is an important concept for soccer players to understand, because the length of time a person can exercise is dependent of how much sugar, glycogen are stored in the muscle and how long it can be kept in the

muscle. If carbohydrate intake is low, the formation of glycogen is low. Low carbohydrate diets have been found to compromise reserves for vigorous exercise and daily training. Athletes can increase their endurance by eating well-balanced, nutritionally sound meals. Skipping meals is damaging. The timing of meals can make a difference along with nutritious food choices. Carbohydrates are important because when exercising, an athlete draws on energy stored as carbohydrate in the muscles. Carbohydrates take the least amount of time to pass through the stomach. Sources of carbohydrates include...cereal, bread, pasta, rice, muffins, rolls and grain products. All fruits and vegetables are a source of carbohydrate along with yogurt, milk shakes and ice cream. Soccer Player's also need to eat adequate amounts of protein choices 15-20% and keep fat choices to less than 30%.



### **What about pre-competition meals?**

The purpose of a pre-competition meal is not to supply extra energy for competition. Energy from the pre-competition meal will not reach the muscles in time to help performance. The purpose is to keep the athlete from feeling hungry before and during the event. This will enhance physical comfort and mental alertness! The pre-competition meal should be eaten at least 3-4 hours before the event. Eating high sugar foods such as candy and soft drinks may hurt performance by producing low blood sugar, although they are also a carbohydrate choice. Food choices should be nutritious, mostly high in carbohydrates and low in fats. No foods, even carbohydrate foods should be eaten an hour or less before competition. Competing with food in the stomach may cause an upset stomach. It is imperative that the athlete drink plenty of cool water. There are some concerns regarding pre competition meals. High protein foods such as low fat dairy foods and lean meats may take longer to digest. It is better to avoid fatty foods such as fried foods, hamburgers, sausage, lunchmeat and peanut butter. If chosen, they should be kept in small amounts and foods mostly high in carbohydrates should be eaten. Cakes, pies, cookies, soft drinks are high in carbohydrates but low in other nutrients. These are okay to eat occasionally.

### **Replenishing glycogen stores**

- The best time for the body to absorb and replenish its glycogen supply is within 2 hours after exercise, whether a training session or competition. The body is especially efficient at this time. This is an ideal time for increased synthesis of glycogen and to hasten the recovery of muscle cells. This means that most athletes are just coming of the soccer field, getting ready to climb into a bus or car for transport back home or to the hotel, and need opportunities to eat food that is easily portable. This includes carbohydrate (CHO) rich food/fluids in bags, boxes or bottles. Examples of great carbohydrate choices for athletes include:
- 1 cup of cold cereal=25 grams CHO,
- 1 banana=31 grams of CHO,
- 1 bagel=31 grams of CHO
- 2 oz of pretzels=43 grams of CHO,
- ½ cup dried fruit=50 grams of CHO,
- 3 pancakes=51 grams of CHO,
- 1 baked potato=51 grams of CHO,
- 1 cup of a high CHO fluid such as Gatorade=50-60 grams of CHO.
- While some players may not feel like eating after exercise, they may be able to tolerate a sports shake or power bar.
- Power bars can be good carbohydrate choices for players. It is important to read the label for carbohydrate content.

Athletes undergoing heavy endurance and training should consume 10 grams carbohydrate/kilogram/per day.



### **What's the big deal about eating breakfast?**

By Nancy Clark, MS, R.D.

"I don't have time," "I'm not hungry in the morning," and "I'm on a diet," are three common excuses for missing breakfast, a very important meal of the day. Unfortunately, athletes who skip breakfast generally train less effectively, suffer needless fatigue, and may perform sub-optimally. They also tend to have trouble concentrating, and work or study less efficiently in the late morning. If you are a breakfast skipper who routinely misses out on this energizing meal, try this experiment: eat breakfast for three consecutive days and observe the obvious energy advantages. You'll quickly discover that breakfast is indeed the meal of champions. Here are some solutions to common breakfast barriers:

*"I don't have time."* You really do have time if you want to. If you can make time to exercise, you can also make time to invest in your exercise program by fueling your muscles. If you won't eat breakfast at home, then eat on the run, a pocket breakfast (bagful of raisins and granola), a pita with cheese, or a yogurt and muffin. You don't need to eat breakfast upon awakening but should do so within three hours of waking.

*"I'm not hungry in the morning."* If you rearrange your current meal patterns, you probably will be hungry. Most often, athletes who lack a morning appetite ate their breakfast at bedtime. Evening snacks can curb one's morning appetite.. and also contribute to weight gain (if you over eat), dietary deficiencies (if you replace a wholesome breakfast with nutritionally poor snacks) and muscular fatigue (if you eat inadequate carbohydrates). The fit in chips, cookies, ice cream and other popular evening snacks do not fuel your muscles. You will better invest in top performance with a carbohydrate rich sports breakfast of enriched and iron fortified cereal, pancakes or bagels.

*"I'm on a diet."* The most successful diet starts with a substantial breakfast rather than end with a huge dinner. Research suggests that you are more likely to burn off calories that you eat during the day in comparison to eating the same calories in the evening. A wholesome, carbohydrate rich breakfast not only fuels your muscles but also prevents you from getting too hungry, at which point you simply "don't care" about what you eat and are likely to blow your diet on junk food and cheat yourself out of the vitamins, minerals and carbohydrates you need for top performance. Remember: you are going to eat the calories eventually, you might as well eat them in the morning to prevent yourself from getting too hungry and overeating. Breakfast invests in losing weight, not gaining fat.

What's best to eat? Any breakfast is better than no breakfast, but some choices are better than others are. Some simple and easy breakfasts include

- Ready-to-eat cereal with low fat milk, banana and orange juice
- Muffins or bagels with jam, yogurt and dried fruit
- Pancakes, french toast or waffles with syrup, juice and milk
- Pita with 1-2 slices of lowfat cheese, fruit and juice

Some non-traditional breakfast choices include eating a baked potato, crackers, leftover pasta, thick crust pizza, noodle soup;

“When you are training hard, juggling exercise with school, work and social activities plus trying to eat healthfully, you may feel frustrated that you have not time to eat the proverbial “three square meals” every day. Never the less you can maintain a healthful diet. The trick is to eat a variety of wholesome, lowfat foods. The following list of foods is found in a convenience store, sandwich shop or salad bar or can be kept stoked at home. These nourishing choices invest in your health within a moderate to low calorie range, because not one food is nutritionally complete, you need to choose a variety of foods to get a balance of the vitamins, minerals, carbohydrates and proteins necessary for top performance,” Nancy Clark, MS, RD Sports Medicine Systems, Inc.

***List of top sports food choices:***

Lowfat milk, lowfat yogurt, broccoli, spinach, green peppers, tomatoes, V08 Juice, baked potato, oranges and orange juice, bananas, cantaloupe, chicken, turkey, lean beef, fish, tuna, bran cereal, enriched cereal, whole grain bagels, whole grain bread and rolls, thick crust pizza (blot off the grease), air-popped popcorn.

It is important to be a realist when it comes to food choices. An athlete who follows the food guideline pyramid is well on their way to achieving success for competition. The key is “balance” in making quality food choices. My personal belief is that while players would serve their bodies better by drinking water and sports drinks prior/during training/competition...the use of caffeine free soda pop is also a carbohydrate choice. It is sugar laden, thus a carbohydrate choice without the vitamins and minerals. Caffeine provides issues of potential dehydration and leeching calcium from the bones. Eating a candy bar isn't the worst thing a player could do...the sugar provides a combination of carbohydrates and fat, sometimes protein depending on the candy bar but without the vitamins and minerals.

Pizza is a good food choice for athletes as it is a high carbohydrate food with protein and some fat. I wouldn't advocate eating pizza every night however as the main source of nutrition in an athlete's diet.

Anna Bacho, ODP goalie coach has gives the following suggestions when mentoring soccer players about their nutritional needs. She recommends:

- All athletes, regardless of gender keep a nutritional diary, which provides a record of foods eaten and activity after having eaten the food. The player should then evaluate how they felt and what their performance is like in relationship to food eaten.
- Immediately prior to game time is not the time to start with experimenting with new foods, try prior to a practice/training session to evaluate energy and performance.

Obtaining adequate nutrition can be a challenge for players. In today's busy world, it is sometimes easier to go for the “quick fix” of eating and satisfying hunger. Jerry Yonga, coach of the Maplebrook U14BP team encourages his players to follow these guidelines...he calls the guidelines, “Keeping it simple.”

- No pop during the weekend of the tournament until after the tournament ends.
- Drink lots of water (prizes for those who consume the most). Drink until you pee clear.
- Eats lots of carbohydrates: pasta and rice are some suggestions. Cut down on the fast food.
- Parents required to bring oranges for half time and players must eat them all.

In conclusion, as Douglas W. Brown, MD, team physician to the U.S. Women's National Team states, “Performance is directly tied to nutrition. Remember the “no stone unturned” philosophy. If you can gain even a percent or two from good nutrition, that may be the difference between achieving your goals or helping your team. Nutrition is one

more aspect the athlete can control with preparation. It is an essential element in training for excellence.”

### **Part 3 Hydration...the key to maintaining on field performance**

“On field performance is governed by “hydration.” More athletes run out of gas on the field more frequently due to dehydration than due to low muscle glycogen.” Douglas W. Brown, M.D.

What’s the big deal about water? Water makes up 60% of the total body weight of person with 70% of total muscle weight. Water will cool the body and it an important nutrient for athletes. With exercise, the body temperature increases and the athlete sweats, with sweat, the body cools down.

What happens without water? Dehydration. If the athlete starts exercising without enough water or if the athlete sweat loss exceeds fluid intake during practice and games and the water is not replaced, potentially the athlete will become dehydrated. Once the athlete is dehydrated, they can no longer get rid of the heat that builds up in the body. Dehydration of 1 to 2% of body weight can negatively affect performance. Dehydration of > or = to 3% of body weight further disturbs physiologic function, and increases an athlete’s risk of developing an exertional heat illness (heat cramps, heat exhaustion, or heat stroke). When the body’s cooling systems fail or are overwhelmed, core body temperatures can rise to dangerous levels.

Signs and Symptoms of dehydration include headache, cramps, shortness of breath, dizziness, dry mouth, and hallucinations which could potentially lead to deafness, visual problems, swollen tongue and or/kidney failure

Athletes affected by any one of these degrees of heat illness could easily be excluded from participation in sports for the duration of a tournament or game (s) and practice (s).



#### ***Symptoms of heat related illness:***

- Heat cramps: One of the first symptoms of heat stress is muscle cramping due to loss of fluids and salts.
- Heat exhaustion: A severe condition that can occur when body temperature rises to 100 degrees Fahrenheit or higher. Signs include dry, hot skin, paleness, cramps, fatigue, weakens, dizziness, headache, fainting nausea and vomiting.
- Heat stroke: A rare and dangerous condition that includes the symptoms of heat exhaustion plus mental disorientation. It can lead to organ failure and death.

Initial treatment of dehydration includes obtaining a rectal temperature to assess core body temperature, packing the player in ice or an ice bath, and re-hydration with water, or sports drink. (diluted seems to work best with 1/3 water and 2/3 sports drink) Some players require additional IV fluids and hospitalization depending on the severity of their symptoms.

One of the worst cases of dehydration I have witnessed was at an invitational tournament where the referee had consumed inadequate amounts of fluid prior to refereeing a tournament on a hot summer day. Because of hot and humid weather conditions he exerted more energy than usual and progressively began sweating less than usual. His

first symptoms were that of headache and dizziness with increasing shortness of breath. He thought he was coming down with the flu. Unfortunately, the referee suffered the ill effects of dehydration to the point in was unable to walk due to muscle cramping. He was also experiencing hallucinations and his tongue was swollen making it difficult for him to swallow fluids. He was attended to by the paramedics. Treatment included intravenous fluids and being packed in ice after they obtained a rectal temperature to assess his core body temperature, which was over 104 degrees F. He did recover successfully and resumed his referee career a few weeks later with no long-term effects. Some athletes have not been so lucky.

Soccer Players require great mental and physical endurance. Energy stores can be depleted from running up and down the field. Replenishing energy stores is essential, especially after days of training. Competition can take its toll on players. Heat injury can be a serious consequence.

Under typical game conditions, an athlete can lose two liters of fluid-even more if it's hot. If you want to accurately monitor how much water is actually being lost in a practice or match, weigh yourself before and after the game. For every 2 pounds a player loses, they have lost one quart of fluid.

Physiologists have calculated that as little as a two- percent weight loss will impair performance. For example, two percent of 120 pounds=2.4 pounds=almost 1 ½ quarts. Within soccer, there are few opportunities to rehydrate once the match begins, some players play dehydrated. It would make more sense to drink fluid and do whatever can be done, when you can to minimize the problem. The standard recommendation is to drink between six and eight glasses daily. The athlete needs to have a schedule for drinking fluids at a level far beyond the daily requirements.

How can dehydration be avoided? Drink plenty of cool fluids before, during and after practice and games. It is important to not rely on thirst alone as a guide to how much water the athlete's body needs. To ensure proper hydration, athletes should consume approximately 500-600 ml (17 to 20 fluid ounces) of water or a 50% sports drink 2-3 hours before exercise. They should then consume an additional 200-300 ml (7 to 10 fluid ounces) 10-20 minutes before exercise. An athlete should aim for 8-12 oz of fluid every 15 minutes during a practice or game if able. Avoid salt tablets. It is important for athletes to not rely upon thirst as the thirst mechanism kicks in too late and shuts off too early when determining the need for fluids to stay well hydrated. Sports drinks can be a good fluid resource for athletes.



What about Sports drinks? The whole science behind the glucose drinks like Gatorade is that the carbohydrates they contain are absorbed very quickly and become usable virtually immediately as energy sources. It is important to balance how much to drink and to how the body feels. It is counter productive to drink so much (sports drink) and water that the body feels bloated and terrible.

Soda pop, and caffeine, why not? Soda pop contains a concentrated amount of sugar. Caffeine depletes the calcium stores within the body, which can be potentially detrimental to female athletes. Caffeine is dehydrating as it is a diuretic and stimulates the production of urine and increases water loss. Side effects of caffeine include nausea, muscle tremor and headache. Soda pop is a poor nutritional source and is not a supplement or alternative to water. This is not to say that drinking all soda pop is bad, it is a matter of making appropriate fluid choices and if chosen, drinking in moderation. The advantage of drinking soda pop is that the sugar converts to glycogen and may better

serve player after the game within the 2-hour window if the athlete absolutely insists that they want to drink soda pop. Some athletes tolerate the soda pop post game by letting it sit open to flatten out the carbonation.

In giving advice to soccer players, the importance of hydration cannot be overemphasized, as dehydration is the leading cause of deteriorating on-field performance. It is important that coaches, managers, parents and player's know the warning signs of dehydration or heat illness: dizziness or lightheadedness, severe cramps, unexplained weakness or nausea, headache or confusion and feeling chilly with tingling arms and goosebumps. Stay cool when possible by minimizing sweating off the field, resting and sleeping in air-conditioning. Warm-up and take breaks in the shade. Plan ahead by making a goal of being well hydrated prior to practice and games.

***Soccer players need to be "well fed," and "well hydrated," and "well trained" to achieve optimum performance during training and games.***

## **Part 4 Nutritional Myths And Helpful Hints For Female Athletes**

In my role as Volunteer Tournament Director with MYSA and parent of two soccer players, I am frequently asked for insight as a Registered Nurse to provide my opinion in following certain types of nutritional advice. The questions that I have found myself paying close attention to start with, "I have heard..." I have found that there is a lot of nutritional advice and practice that isn't always based on sound, scientific principle or theory. Unfortunately, there are a lot of nutritional misperceptions and myths that athletes are exposed to. This section will attempt to highlight a few of the most frequently heard nutrition misperceptions and myths.

***Performance can be improved by eating a high protein diet, taking large doses of vitamins, using salt tablets and drinking no water during competition.***

- A high protein diet can potentially lead to damaged kidneys. The kidneys are unable to store extra protein. Protein is degraded in the liver into organic acids and ammonia and is passed through the kidneys and excreted. There could be potential damage to the kidney tubules.
- Massive doses of vitamins are poisonous. Vitamins have specific functions in the body. When overdone, the functions are exaggerated. Example: consuming too much Vitamin D can lead to the increased absorption of calcium leading to kidney stones and calcium deposits in the muscles.
- Excessive salt intake can lead to thickening and clotting of the blood.
- Drinking NO water during long-term exercise, particularly on a hot day, can cause dehydration and raise body temperature uncontrollably and kill a person if left untreated.

***Myth: Steroids are the best way to develop muscles***

- Steroids can be dangerous. While steroids are powerful drugs that can build muscles, they may have risky side effects. Steroids can stunt growth, cause acne, deepen the voice and alter sex organs.
- Muscle can be built with diet and exercise!

***Myth: Eating honey, sugary foods, and soft drinks will provide a burst of energy***

- The above items do not improve strength or speed. It takes 1-4 hours for the body to digest food.
- Most energy used in competition or practice comes from food eaten days before the event that has been stored in the muscles.

**Myth: Special supplements such as amino acids, bee pollen, ginseng, brewer's yeast and DNA improve performance.**

- There is NO evidence that any of these substances improve athletic performance.
- The above items are expensive and some may be harmful to performance and overall health.
- Performance is best obtained through hydration, good nutritional food and fluid choices, exercise and quality training programs.

**Myth: Milk before an event causes "cotton mouth," decrease speed and cuts wind.**

- Cottonmouth is a dryness and discomfort in the mouth. It appears to be due to emotional stress and fluid loss, not drinking milk. Athletes should not restrict their consumption of milk. Milk is a good source of calcium, which is necessary for development of strong bones and teeth.

**What about the use of creatine?** (Creatine is a naturally occurring compound produced by the liver, pancreas and kidneys. It is found in raw meat and fish.)

- There is some evidence that creatine can be beneficial to athletes in certain sports (high intensity, short duration, and anaerobic exercise).
- There can be improvement in strength and power performance
- Creatine enhances the recovery of muscles between bouts of high intensity work.
- Creatine adds stress to the liver and kidneys.
- Creatine is not shown to improve performance in aerobic exercise of greater than 5 minutes.
- There is an upper limit to the amount of creatine that can be stored in the muscle.
- Creatine is associated with weight gain.
- USOC classifies as a nutritional supplement.
- Since there are no long-term studies, *USOC does not endorse or encourage use of creatine.*



**What about the theory of eating a banana on game day?**

- Bananas are a good source of potassium and carbohydrate.
- Bananas are easily digested.
- Bananas are easily portable, they can go anywhere.
- Bananas will assist in decreasing muscle spasms due to potassium contained in them.
- Potatoes are a better source of potassium. However, there are downfalls to easily consuming a potato, as they are not as quick and easy to eat as a banana.

Female soccer player nutritional needs are different from their male counterparts. There are numerous books and articles available which focus on nutritional the needs of female athletes, however for purposes of this article I will focus on 2 critical areas of concern.

Anorexia nervosa and bulimia are two eating disorders found among athletes, especially among females. These are two disorders that coaches, parents and teammates need to be especially aware of and sensitive to. An athlete suspected of an eating disorder should be approached privately by someone he/she trusts to listen, discuss, assess and evaluate the need for professional assistance in addressing and treating the disorder and associated issues. While there are many factors that contribute to eating disorders, parents and coaches should be aware that placing too much emphasis on weight as part of the training regimen may encourage the development of the disorder.

The second area of concern when coaching and training females is adequate calcium intake. Calcium is necessary for normal nerve function, which is necessary to stimulate muscle contraction. Calcium acts as a bridge between 2 muscle proteins, actin and myosin. If calcium is needed and is unavailable, the body takes calcium from the bones to be used. Bones then become weakened and there is an increased risk of stress fracture. Females are also at an increased risk of osteoporosis and experience calcium loss during menses. Female athlete calcium requirements are 1,200 mg/day. Sources of calcium include lowfat milk and yogurt. Additional sources include broccoli, spinach, green peppers, tomatoes, V-8 juice, baked potato, bananas, cantaloupe, oranges and orange juice. Pizza with lowfat cheese is another calcium-rich food choice. Female athletes should plan to choose lowfat dairy products 2-4 times per day. Eating a half of a small melon will satisfy the daily value of calcium. Athletes, especially females should refrain from drinking beverages containing caffeine as the caffeine will leech calcium from the bones in addition to being a contributing factor of decreasing hydration.

The information given in this article is not meant to be all-inclusive. It is an attempt to document some basic down to earth information based on reading, discussion and practice for athletes. Many thanks to the following resources for sharing information with me:

*The body is a marvelous machine that can be fined tuned to obtain all of above goals of exercise with proper nutrition and training.*

**Resources:**

"The Champion Within" by Lauren Gregg  
Complete Sports Medicine Book For Women, Mona Shangold, MD  
"Food Power," National Dairy Council  
Article "Establishing Good Nutrition Habits" by Douglas Brown, MD  
Discussion with Steve Elias, MD  
Discussion with Dr. Mark Tonn, DC  
Children's Hospital and Clinics-Mpls., Nutrition Services Department  
Kristine Clark, Ph.D.  
Jerry Yonga, Coach U14BP Maplebrook  
Dave Halgren, TRSA, Coach and Player Development Director  
Nancy Clark, MS, R.D.  
Anna Bacho, ODP Coach