The Good, the Bad, and the Ugly: Enhance Individual Performance with Focused Nutritional Habits

Athletic performance and recovery from training are enhanced by attention to nutrient intake. Optimal nutrition for health and performance includes the identification of both the quantity and quality of food and fluids. These foods and fluids are needed to support regular training and peak performance. As training demands shift during the year, athletes need to adjust their caloric intake and macronutrient distribution while maintaining a high nutrient dense diet. A well rounded diet is essential in supporting their training and competition nutrient needs. The following key points summarize the impacts of training and the energy, nutrient and fluid recommendations for competitive student-athletes as recommended by the American College of Sports Medicine (ACSM) and the American Dietetic Association (ADA). (2)(3)(4)

When exercising, muscles rely on fuel storages from meals eaten in the days before and after competition. Foods eaten on the day of exercise, fuels the brain and the liver as well as helps the muscles perform optimally. This is especially important when exercise is long and intermittent. It is extremely imperative that athletes EAT OFTEN AND DO NOT SKIP MEALS! Eating 2-3 small meals is not enough for athletes. Athletes should be consuming at least 6 small meals for ideal nutritional outcomes. By eating 6 small meals throughout the day, the protein leads to muscle growth and also helps to control the body’s blood sugar levels and recovery from exercise. Athletes should try to stagger their meals so they are eating every 2-3 hours. (5)(6)

Example:  
7 am: Breakfast  
10 am: Snack  
12pm: Lunch  
3pm: Snack  
6pm: Dinner  
9pm: Snack

The Objective of Pre-Exercise Meals Are:

- To maximize liver and glycogen stores to ensure healthy performance outcomes.
- To ensure adequate blood sugar levels and helps decrease the effects of hypoglycemia. (Hypoglycemia- decreased levels of glucose/sugar in the blood, resulting in fatigue, irritability, trembling and hunger.) (1)(3)(6)
- To supply food that is quickly and easily digested.
- To maximize fluid levels, particularly if the risk of dehydration is high. It is proven that athletes who are well hydrated can work-out up to 1/3 longer than those who are not well hydrated. Athletes should drink at least 16 oz of fluid 30-60 minutes before exercise.
- Pre-exercise meals should prevent hunger.
Foods to eat 24-48 hours before a competition:

<table>
<thead>
<tr>
<th>Foods</th>
<th>Foods</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pasta</td>
<td>Wheat, Rice</td>
</tr>
<tr>
<td>Breads</td>
<td>Multigrain, Wheat, Oatmeal</td>
</tr>
<tr>
<td>Potato</td>
<td>Sweet or white, mashed or baked</td>
</tr>
<tr>
<td>Leafy Greens</td>
<td>Lettuce, spinach, kale</td>
</tr>
<tr>
<td>Fruit</td>
<td>Banana, oranges, apples, figs, apricots, mangos, strawberries, blueberries</td>
</tr>
<tr>
<td>Meats</td>
<td>Fish, pork, beef, chicken, turkey</td>
</tr>
<tr>
<td>Protein</td>
<td>Legumes, nuts, tofu, protein bars or shakes, cereals</td>
</tr>
<tr>
<td>Dairy</td>
<td>Cottage cheese, eggs, yogurt, milk</td>
</tr>
<tr>
<td>Fluids</td>
<td>Water, Sports Drinks, Milk: chocolate, soy, almond, rice</td>
</tr>
</tbody>
</table>

**Pre-Game Meal:** This meal should be eaten at least 3-4 hours before the competition if it is a large meal, 2-3 hours before competition for a small meal and 1-2 hours for a snack.
- Limit high amounts of protein and caffeine products. Too much of these substances before competition can cause dehydration due to increase of urine output.
- Eliminate fats and oils because they take too long to digest.
- Do not eat sugary substances like cookies, candy and sodas. They will cause you to burn through your food stores and ultimately “crash”.
- Avoid large amounts of raw vegetables and beans because they can cause increase in indigestion and gas production.

**Foods to avoid:** These foods may cause bloating, stomach pain, dehydration and are slow to digest.
- Foods with high dairy content: whole milk, cream, butter, margarine
- Fast Foods: French fries, onion rings, hash browns, fried eggs, donuts, chicken nuggets
- Protein rich foods: fried rice, fried fish, fried vegetables
- Concentrated sugars: honey, syrup, salad dressings, mayonnaise based salads
- Spicy foods: chili, seasonings, sausage, meatloaf, jalapenos, onions
- Fiber rich foods: bran muffins, select vegetables, cereals
- Coffee, tea, carbonated beverages, alcoholic beverages

**Healthy tips for post game and recovery foods:**

**Carbohydrates and Proteins:**
Carbohydrates are required to replenish liver and glycogen stores and to prevent low blood sugar (hypoglycemia) during training and performance. Carbohydrate intake has been well documented to have a positive impact on adaptation to training, performance and improved immune function. (6) Carbohydrates should be consumed on a daily intake of between 5-7 grams of carbohydrate per kilogram of body weight per day is advised. (6) As
training intensity and/or volume increase, carbohydrate need may easily exceed 10 grams of carbohydrate per kilogram of body weight. Athletes should begin to think about fueling for their next athletic activity immediately following their exercise bout. Recovery carbohydrate, to replace glycogen stores, can be calculated based on 1-1.2 grams of carbohydrate per kilogram of body weight. They should be consumed immediately following training sessions >90 minutes or high intensity for shorter duration training sessions. If you consume carbohydrates within 2 hours following training, these additional carbohydrates will help continue glycogen repletion. (6)(3)(4)

Post exercise nutrition should be consumed at least 30 minutes after exercise. Protein and carbohydrate consumption after exercise is crucial for a speedy recovery and enhanced performances. Carbohydrates are essential sources of energy for ideal muscle contractions. Quality carbohydrates are crucial. Whole grains like spelt, wheat, quinoa, starchy vegetables like sweet potatoes, legumes like hummus and beans are all great sources for these carbohydrates. (6)

It is important to choose high quality, lean proteins. Lean proteins are recommended because many of our protein stores come with high quantities of fat. High fat amounts do not allow our body to absorb the “healthy, beneficial and needed lean protein”. The best sources for lean protein are: whey protein that can be put in smoothies or shakes, eggs, grass fed beef and fish. If you are a vegetarian or vegan it is important you find ways to ingest protein in tofu, seitan, tempeh, rice and beans. (5)

Proteins help to strengthen red blood cells, rebuild and repair the body tissues as well as help keep your immune system strong. In addition to these lean proteins, do not neglect fats. Fats are a major energy contributor and are stored in muscle as triglycerides. These triglycerides are used during activity. Dietary intake is suggested to be between 20-35 percent of total daily caloric intake. (6)(1)

Vitamins and Minerals:

Vitamins and minerals are key for healthy metabolism. Vitamins and minerals help with providing your body with a safe balance of nutrients like iron, calcium, sodium, vitamin A, B, C, D, folate and potassium. These vitamins and minerals play a vital role in performance by helping to build a strong immune system, strong bones as well as help deliver oxygen into the blood. It is recommended that athletes take a multivitamin daily to get the essential vitamins they need. Vitamin C, a healing and antioxidant nutrient will promote more efficient post exercise recovery and reduce muscle soreness. After exercise, consuming slightly diluted juice or water are your best choices. Note also that alcohol and caffeine are diuretics, causing more water loss and greater dehydration. (1)(3)(6)

It is very important to get at least 3 servings of vegetables and 2 servings of fruits a day. Vegetables and fruits are excellent sources of fiber and muscle energy. A variety of nutrients, are important and can be found in vegetables and fruits. Potassium (K+) replacement foods are crucial to the optimal performance of an athlete. Here are some delicious ideas to get the nutrients you need. Try eating the following fruit: cantaloupe, honeydew melon, banana, raisins, oranges, orange juice and pears. Consume delicious vegetables like: tomato Juice,
sliced tomato, sweet potato with the skin, avocado, and potato with the skin, asparagus, cooked pumpkin, mushrooms, and Brussels sprouts.

Some veggies and fruits key to performance are: cantaloupes, bananas, kiwis, apples, oranges, leafy vegetables, peppers, carrots, peas, beans, squash, sweet potatoes and beets. Try to eat a natural array of colored fruits and vegetables so you are assured of receiving many beneficial vitamins and minerals to keep your body’s immune system strong. These vitamins and minerals help to break down food so your body can used these foods as energy. This energy serves as a fuel, powering your body to perform at its best. Make sure this is a colorful rainbow on your plate. (1)(2)(4)

Foods that MUST be avoided and limited!

Limit your intake of Trans Fats and “hydrogenated” or “partially hydrogenated” oils and fats. These fats raise your bad cholesterol (LDL) and lower your good cholesterol (HDL). These fats are present in so many foods: Fig Newtons, salad dressings, Wheat Thin crackers, granola bars, cereals and most processed foods.

Empty calories and refined foods are “EMPTY FOODS”. An example of a refined food is white flour. It was once a nutritious whole grain, which has been stripped of all of its nutrients and vitamins and is a reduced white flour product. Sports drinks, gels, jelly sport beans are also refined foods. Refined Sugars are empty calories and can strip you of the healthy carbohydrates that you can find in natural fruit sugars or natural sweeteners that aid in maximum performance. Consume sweets and dairy in moderation. (4)(5)

HYDRATION GUIDELINES:

About 60% of a person’s body weight is composed of water. Adequate supplies of water are needed for energy production. Water aids in digestion and decreases dehydration. When the body burns fuel for energy, it uses water to keep itself from overheating. Because most people replace only 50% of water and electrolytes lost by sweating, it is important to consume 8-10 8oz. glasses of water throughout the day. Fluids must be replaced before, during and after exercise. It is difficult to completely replace all of the water lost during exercise. Generally speaking, while exercising individuals lose between 0.5 and 1.5 liters of sweat in 1 hour of exercise. In the majority of cases, the average person is dehydrated when he/she has finished exercising. If possible keep a water bottle filled with you on the field, in the class room, in your dorm room and an arm’s length away. (1)(2)(5)(6)

Science has discovered that the total amount of water lost each day is approximately two liters in sedentary adults in cool environments. Although the daily minimum requirement is about 8-10 cups just to maintain efficient bodily functions, regular exercise and hot/humid weather compounds the need to increase fluid intake. If you are not properly hydrated you may experience dizziness, weakness, fatigue, cramping, and or nausea. It takes approximately 6 hours for the rehydration process to take place. Avoid drinking more than 12 quarts/day. Urine color should be a lemonade color. An apple color means you are dehydrated. The darker the urine color is, the worse the dehydration. Too light of a color indicates being over hydrated and
loss of electrolytes. Furthermore you will experience a decrease in peak performance as a result of dehydration. Try to adhere to these following hydrations recommendations. (1) (2) (5)

- Fluids should be replaced during activity at a rate of 8 -10 oz. every 15 minutes.
- A cool beverage consumed at 50-59 degrees is recommended for quick and optimal performance.(1)(6)
- Water consumption is crucial in decreasing muscle cramping, dehydration, and heat illness.
- The primary concern of rehydration is to replace the body’s potassium that happens with fluid loss. In addition you also want to remember to hydrate more when one increases their protein consumption.
- Replacing fluids allows working muscles more energy and decreases muscle cramping. This fact leads to better performance outcomes. Use hydration products such as water, low fat milk, 100% fruit juices that are cut 50% with water for better digesting.

The goal of “Healthy Nutritional Habits” is to make better, healthier and most importantly “smart” nutritional choices. Remember to consume things that have more nutritional value, less empty calories like caffeine and sugar. Think of the “quality” of consumption, not just the fact that you have to “consume”. Many products that you want to consume might taste better like sports drinks and soda, but they do not provide the nutritional value of the “better/healthier choices”. Sports drinks do provide some beneficial hydration goals and can be consumed on a limited basis. There are many more wholesome, nutritious and economically friendly products that can be consumed beyond sports drinks. Low fat regular and chocolate milk replenish potassium and calcium stores as well as provide healthy sugars and proteins to your body. You will also get the needed small amounts of sugars from the milk and 100% fruit juices that your body will need to achieve its exercise goals. (5)(6)

Pre and Post Exercise Snack and Meal Ideas:

**Snacks:** dried cranberries, mixed nuts, raisins, trail mix, granola or sport bars, yogurt covered pretzels and nuts, M&Ms, skittles, grapes, orange slices, apples or bananas with peanut butter, cheese stick or wedge of cheese on a celery pieces, slice of pizza, crackers and peanut butter, PBJ sandwich, cereal with milk, slice of turkey and cheese, chocolate milk, power gels and sports drinks.

**Breakfast:**
Cereal with banana slices
Toast with jam or peanut butter
8 oz of juice or water

Poached Egg or omelet
Toast with jam or peanut butter
8 oz glass of milk or juice

Pancakes with jam or fruit
½ cup of yogurt with fruit or granola

Lunch:
Turkey, cheese, lettuce and tomato on wheat bread with mustard
Apple, nuts, or granola bar
8 oz. glass of milk, juice or water

Veggie Burger with cheese, lettuce, tomato and condiments
Whole grain bread
½ cup of pretzels, trail mix, yogurt covered raisins or nuts
Banana
8 oz. of milk, juice, water or sports drink

Chicken noodle soup with crackers
Orange slices, apple with peanut butter
1 cup of yogurt with fruit or granola
8 oz. of water or sports drinks

Dinner:
Whole wheat pasta with meat or vegetable sauce
Whole wheat bread
Salad with low calorie dressings such as balsamic vinegar, Italian, fresh lemon juice and olive oil
8 oz. of milk or juice

Chicken and brown rice or quinoa with vegetables
8 oz. of water, milk, sports drinks

Supplementation:

- Please do so at your own risk and know what you are putting into your body.
- The US Dietary Guidelines and experts in performance nutrition recommended athletes focus their food choices on less refined types of carbohydrate as these contain essential micronutrients vital to health and performance. Whole grains, breads, pasta, whole fruits and vegetables are excellent source of high quality carbohydrate.
- Protein requirements are slightly higher in both endurance (1.2-1.4 grams per kilogram body weight) and strength-training student-athletes (1.6-1.7 grams per kilogram body weight) above the typical recommended daily intake (0.8 grams per kilogram body weight). Fortunately, the higher intakes recommended for athletes is easily achieved in a well-balanced diet without the use of additional supplements. (3)(4)(6)
References:

5. Retrieved from: http://www.melanieashmore.com/Articles/Nutrition/Food_and_Athletes_BriX_Talk.PDF
-2009-10 NCAA Banned Drugs and Substances