

# Nutrition: The Competitor's Edge

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TNT Training Program

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## Carbohydrates - The Competitive Edge

Carbohydrates have gotten a bad rap... they are loved yet shunned by many. However, carbohydrates are necessary for peak athletic performance since they provide a fairly quick source of energy for working muscles.

Carbohydrates are stored as “glycogen” in the liver to help maintain blood sugar levels and in the muscles to help provide energy during physical activity. About 2000 calories worth of carbohydrate can be stored as glycogen, or enough energy to run about 20 miles. When glycogen levels are low and the muscles have to rely on fat, an inefficient fuel source, extreme fatigue sets in, leading to a phenomenon described as “hitting the wall.” This can be avoided by:

- Eating high carbohydrate foods regularly throughout each day,
- Eating carbohydrate-rich foods and beverages during exercise for quick energy, thus “sparing” muscle glycogen,
- Eating a high carbohydrate, moderate protein meal and/or snack post-exercise to help replenish glycogen stores and facilitate muscle repair.

A quick glance at “MyPyramid” at [www.mypyramid.gov](http://www.mypyramid.gov) indicates that most of the food groups include carbohydrate-rich sources: fruits, vegetables, grains (including breads and cereals), beans and legumes (part of the meat group), and some dairy products (milk and yogurt in particular). Although athletes vary in the amount of total calories they should consume daily to support lean body mass, physical activity, growth and development (as in the case of children and teens), most athletes’ diets should consist of at least 55-65% carbohydrate, 10-15% protein, and no more than 30% fat.

Following are some meal and snack ideas to help you reach your peak performance level. With a little planning, you can go a long way. Just be sure to experiment with pre-exercise foods and beverages during training and not on game or race day! Stick with what has been “tried and true” for you.

### Breakfast

- Shredded wheat or bran cereal topped with sliced banana and nonfat milk
- Hot cooked oatmeal topped with blueberries, chopped walnuts, and soy milk
- Fresh fruit salad topped with nonfat yogurt and low fat granola
- Low fat bran muffin, apple slices, and coffee with milk
- Raisin bagel or toast, poached egg, and fresh orange wedges

### Snack

- Granola bar
- Fresh fruit
- Low fat yogurt
- Trail mix with dried fruit, nuts, seeds, and cereal

### Lunch

- Vegetable-bean soup with whole grain baguette
- Turkey and cheese sandwich on whole wheat bread
- Slice of vegetable pizza with tossed salad
- Veggie burger or single hamburger with fruit salad
- Cold pasta salad loaded with veggies, tuna, and vinaigrette dressing

### Snack

- Carrots and oat bran pretzels dipped in hummus
- Baked tortilla chips with melted cheese (reduced fat) and salsa
- Peanut butter on whole wheat crackers or graham crackers
- Turkey and/or cheese slices wrapped in lettuce leaves

### Dinner (include something from each group listed):

*Protein source:* fish, poultry, lean meat, or vegetarian meat-alternative

*Whole grain:* wheat pasta, quinoa, couscous, brown rice, or bulgur

*Vegetables:* at least one dark green or orange

### Snack

- Fig Newton cookies and nonfat milk
- Pudding or tapioca
- Frozen yogurt
- Low fat popcorn

### **References:**

MyPyramid: Food intake patterns. U.S. Department of Agriculture, Center for Nutrition Policy and Promotion, April 2005. Available at: [www.mypyramid.gov](http://www.mypyramid.gov) .

## Protein Power

Protein is commonly associated with strength, and strength with meat. Protein is an important nutrient, but it only one of many nutrients needed by the body to maintain good health.

### ***Protein Role Play***

One of the key features of proteins is their versatility. Following are some of the roles that proteins play in the body:

- *As Building Materials* – matrix and collagen – for most body structures including bone, teeth, muscle, and skin.
- *As Enzymes* – some break down substances (as in digestion), others build substances (such as bone), transform one substance into another (amino acids into glucose), or act as catalysts speeding up reactions.
- *As Hormones* – examples are insulin, growth hormone, or thyroid hormone.
- *As Fluid Balance Regulators* – maintain the proper amounts of fluid inside the cells, outside the cells, between the cells, and within the blood vessels.
- *As Acid-Base Regulators* – help maintain the balance between acids and bases within the body fluids.
- *As Antibodies* – giant proteins that are produced in response to viruses, designed specifically to fight them, thus, defending the body against diseases.

### ***How Much Protein Is Enough...How Much Is Too Much?***

- For healthy adults with normal kidney and liver function and assuming adequate total calorie intake, the RDA for protein for adults is 0.8 grams per kilogram of body weight per day. Therefore, a 150-pound person would need about 55 grams of protein per day.
- For power athletes (strength or speed), the recommended protein intake is 1.6-1.7 grams per kilogram, or 109-116 grams per day for a 150-lb. person.
- For endurance athletes, the recommended protein intake is 1.2-1.6 grams per kilogram or 82-109 grams per day for a 150-lb. person.
- Adults in the U.S. eat more protein than they need, on average.
- While athletes require more protein per day (since more protein is used for energy during exercise, muscle repair, etc.), athletes typically eat more food overall, and consequently, eat more protein to meet their higher needs.
- It is recommended that protein needs be met via whole foods as opposed to supplements and protein powders.
- Eating more protein doesn't translate into bigger muscles...exercising at high intensities (via resistance training, etc.) facilitates muscle building during which time glucose (a carbohydrate) is a significant source of energy. Excess protein – over and above a person's overall protein and energy needs – can be converted and stored as fat.

### **Approximate Protein Value of Foods**

- *Grain Group*: ½ cup cereal, grain, pasta, or starchy vegetable; 1 oz. of bread; ¾ to 1 oz. of snack food = 3 grams protein
- *Milk Group*: 1 cup milk or yogurt = 8 grams protein
- *Vegetable group* (non-starchy): ½ cup cooked vegetables or vegetable juice; 1 cup raw vegetables = 2 grams protein
- *Meat and Meat Substitute Group*: 1 ounce of meat, poultry, fish or cheese; ½ cup dried beans; 2 Tbsp. peanut butter = 7 grams protein
- *Fat Group* = negligible protein, except for nuts

### **A Day of Protein – 90-gram Menu Plan**

- Breakfast
  - ½ cup oatmeal – 3 grams
  - 1 banana – 0 grams
  - ½ cup milk – 4 grams
  - 1 slice wheat bread – 3 grams
  - 1 Tbsp. peanut butter – 3 grams
- Snack
  - 1 cup yogurt – 8 grams
  - ½ cup blueberries – 0 grams
- Lunch
  - 1 cup vegetable-bean soup – 14 grams
  - 1 oz. multi-grain roll – 3 grams
  - 1 apple – 0 grams
- Snack
  - 1 cup raw vegetables – 2 grams
  - 2 Tbsp. hummus – 3 grams
- Dinner
  - 4 oz. broiled salmon – 28 grams
  - ½ cup mashed sweet potato – 3 grams
  - 1 cup fresh spinach salad – 2 grams
  - ½ cup pineapple slices – 0 grams
- Snack
  - 1 oz. graham crackers – 3 grams
  - 1 Tbsp. peanut butter – 3 grams
  - 1 cup nonfat milk – 8 grams

### **References:**

Committee on Dietary Reference Intakes. Dietary Reference Intakes for Energy Carbohydrate, Fiber, Fat, Fatty Acids, Cholesterol, Protein, and Amino Acids. Washington, D.C., National Academies Press, 2002.

Position of the American Dietetic Association, Dietitians of Canada, and the American College of Sports Medicine: Nutrition and athletic performance. *J Am Diet Assoc* 2005;100:1543-1556.

## Fats: Some Common Myths

Fats, perhaps more than any other part of the average diet, cause much interest and confusion. Everyone has an opinion on fats-how much to eat, what kind to eat, etc. Here are some of the most common myths about fats and what the truth is regarding each.

### **Myth #1: Eating dietary fat makes you fat.**

Dietary fat does contain more calories per gram (9 calories/gram) than either carbohydrate or protein (4 calories/gram). However, excess intake of calories from any food group will lead to weight gain, if more is eaten than is utilized via physical activity.

### **Myth #2: Limit your fat for optimal health.**

Fat is very important to physical health. It is necessary for the absorption of certain vitamins, including vitamins A, D, E, and K. Fatty acid deficiencies result in:

- Growth retardation
- Reproductive failure
- Skin lesions
- Kidney and liver disorders
- Subtle neurological and vision problems

Triglycerides:

- Provide an energy reserve
- Insulate against extreme temperatures
- Protect the organs against shock
- Help the body to use carbohydrates and protein more efficiently

The national dietary guidelines recommend that 30% of our total calories come from fat. For a person consuming 2000 calories/day, this is 67 grams of fat. No one should consume a diet that contains less than 15% of total calories from fat on a regular basis.

### **Myth #3: Choosing a low-fat or fat-free food is always best.**

Food manufacturers need to add additional ingredients to a low-fat or fat-free food to make up for the loss of palatability attributable to fat. The added ingredient is usually sugar, a naturally fat-free food. Fat also imparts many sensory qualities to food, such as smoothness, and chemicals or additives often are added to low-fat or fat-free foods to impart similar qualities to the food. Fat free does not mean calorie free. In fact, many of these foods contain more calories than their traditional alternatives. Fat has a great deal to do with satiety; so, a person eating a diet that is extremely low in fat is unlikely to feel satisfied for very long after eating.

**Myth #4: All fats are equal.**

Omega-3 fatty acids reduce the risk of death from sudden heart attack. Other research has shown that omega-3 fatty acids possibly may lead to prevention and/or improvement of chronic diseases, especially cardiovascular diseases, colorectal and breast cancer, rheumatoid arthritis, and diabetes. Omega-3 fatty acids also are required for normal conception, growth, and development of an embryo. Some studies have shown that omega-3 acids may help to prevent mental illness, particularly depression, schizophrenia, attention-deficit hyperactivity disorder, dyslexia, personality disorder, depression, and bipolar disorder.

Omega-3 fatty acids are found in:

- Salmon
- Herring
- Anchovies
- Tuna
- Flaxseed
- Canola oil
- Olive oil
- Peanut oil
- Soy nuts
- Walnuts
- Butternuts (similar to walnuts)

**Myth #5: Any food that is high in fat is also high in cholesterol.**

Many high-fat foods are sometimes still low in cholesterol. Cholesterol is a waxy, fatlike substance that is only found in animal foods. For instance, vegetable oil contains fat, but not cholesterol. It is important to remember that cholesterol from food does not increase blood cholesterol as much as saturated fat does.

## Exercise: The Pre-Workout Meal

Everyone seems to have an opinion about what to eat before exercise. The following guidelines are based on current nutrition research and strong empirical data. For the majority of exercisers, those who perform cardiovascular or strength training as physical activity for an average of 35-90 minutes, a most days a week, the most important thing is overall good nutrition.

A simple pre-exercise snack with plenty of water should fuel the body sufficiently. The best pre-workout meal is one that works best for the individual and is not digested too rapidly.

Try these ideas:

- A banana with 1 tablespoon of peanut butter
- Low-fat yogurt and a piece of fruit
- Oatmeal made with skim milk and fruit
- Trail mix with nuts and fruit
- Granola with low-fat milk and fruit
- A smoothie made with low-fat yogurt, fresh fruit, and wheat germ or flax meal

Exercisers or athletes in training may require a more substantial meal or snack to optimize performance. The best pre-workout meal for athletes is one that is full of nutritious and wholesome foods, but, most importantly, it is one that is tried and true for them.

### Pre-workout meal tips

The following are some ideas that you may want to try:

- Choose high-carbohydrate, low-fat foods - whole-grain, high-fiber foods, consumed 1 hour prior to exercise, are ideal; some examples include:
  - Breads
  - Cereals
  - Muffins
  - Yogurt
  - Oatmeal
  - Beans
  - Crackers
- Avoid high-fat protein sources, such as fried meats, cheese, and hamburgers, because they take longer to empty from the stomach and may contribute to a sluggish or nauseated feeling
- Take time to digest your pre-workout meal - the blood used to digest foods in the stomach is required in the muscles for exercise; so, food will remain in the digestive tract longer if improper time for digestion is allowed
- Eat familiar foods prior to competitions and intense practices

### Reference

Clark N. *Sports Nutrition Guidebook*. 3rd ed. Brookline, MA: Human Kinetics; 2003.

## **Exercise: The Post-Workout Meal**

Recovering from exercise is an important part of the athlete's routine. Post-workout foods and drinks can affect recovery by affecting fatigue, repletion of glycogen stores, and preparation for future bouts of exercise.

For the recreational exerciser, one who exercises 3-4 days/week, overall good nutrition is most important for maintenance of glycogen stores, and so muscles will have enough time to rest and recover between workouts. For the more vigorous exerciser, one who exercises multiple times/day, performs competitively, or is in training for a sport, refueling muscle glycogen stores and assisting the body in recovery is of utmost importance.

### **Repletion of fluid loss**

Repletion of fluid loss is the most essential part of recovering after a hard bout of exercise. Replacement of water lost through sweating and promotion of water balance are best managed by drinking water throughout the workout, as well as after exercise is completed. Good choices include:

- Water
- Juices
- High-water-content fruit
  - Watermelon
  - Grapes
  - Oranges
- High-carbohydrate sports drinks

### **Repletion of muscle glycogen stores**

To best promote repletion of muscle glycogen stores, consume carbohydrate-rich foods within 15 minutes after the workout has ended. Athletes should aim for 1 gram (g) of carbohydrate for every 2 pounds (lb) of body weight/hour.

Protein repletion after a serious workout is less of a key player in the recovery diet, but a little protein can enhance glycogen replacement initially after exercise. The American diet is ubiquitous in protein, and added protein is not essential in the post-workout routine.

### **Repletion of sodium, potassium, and electrolytes**

Repletion of sodium, potassium, and electrolytes (sometimes lost through sweating) is easy to do through foods. Supplementation generally is not recommended. The following are common recovery foods, which are high in essential electrolytes:

- Potatoes
- Yogurt
- Orange juice
- Bananas
- Cheese

## Supplements and Sports

Athletes are always seeking ways to enhance their performance, making them better, stronger, faster, and more powerful than before. To this end, some athletes turn to supplements for a competitive edge. However, athletes should keep in mind that if it sounds too good to be true, then it usually is! Following are some key points to remember when considering any type of nutritional, dietary, or herbal supplement.

- The manufacturing of dietary supplements in the U.S. is not standardized and does not undergo rigorous testing and screening as it does for medicines and other drugs. Therefore, the safety, efficacy, and purity of dietary supplements are not regulated, and the concentration of active ingredients (and whether they are contained in the preparation at all) is inconsistent.
- Supplements that contain vitamins, caffeine, creatine, and protein powder are generally safe when taken in recommended amounts, but may be harmful when taken in large doses for an extended period of time.
- Energy drinks that contain herbs, amino acids, protein, and other substances, usually contain them in such small amounts that they are unlikely to have any noticeable effect (positive or negative) on athletic performance. However, they may contribute to the inefficient absorption of fluid and nutrients from the intestine, leading to gastrointestinal distress, which may impair performance.
- Supplements that have a USP (United States Pharmacopoeia) label have passed tests for dissolution, disintegration, potency, and purity. In addition, nationally known food and drug manufacturers are often trustworthy sources of supplements since they generally produce them using the strict quality control measures they already have in place.
- Many supplements can negatively impact hydration status, which is a sure-fire way to hinder athletic performance.
- The best way to achieve peak athletic performance is with a sound training program and good nutrition and hydration. Supplements will not provide a “quick fix” to performance problems.
- Athletes using any medications (prescription or over-the-counter) should avoid any product that contains herbs due to possible drug interactions.
- If there is no Nutrition Facts or Supplement Facts panel on the label, then do not buy the product.
- Avoid the product if the evidence for claims is non-existent, incomplete, or unsubstantiated! You can investigate evidence for claims, product testing, and safety from third-party, independent labs such as Consumer Lab ([www.consumerlab.com](http://www.consumerlab.com)).
- If it sounds too good to be true, it probably is...and taking it may even jeopardize your health and your life!

### References:

GSSI. Risky Dietary Supplements. Gatorade Sports Science Institute, Sports Science Exchange Roundtable 48: Vol 13 (2002), No. 2.  
Kundrat S. Herbs and Athletes. Gatorade Sports Science Institute, Sports Science Exchange 96: Vol 18 (2005), No. 1.

## Fiber Basics

### Why is Fiber Important?

- Fiber is a substance found only in plants, such as fruits, vegetables, and grains.
- It's an important part of our daily diet because it helps keep us "regular" and prevents constipation.
- Foods that are high in fiber can help in the treatment of constipation, hemorrhoids, diverticulitis, and irritable bowel syndrome.
- Fiber has also been found to play a role in helping protect against certain diseases like diabetes, heart disease, and cancer.

### How Much Fiber Does a Person Need Each Day?

- An easy rule of thumb for children ages 3 to 18 is to add "5" to their age in years - so if a child is 7 years old, they need *at least*  $7 + 5 = 12$  grams of fiber each day.
- For adults, the range of fiber intake is 25 - 30 grams per day with an "upper limit" maximum of 35 grams per day.

### What Else Should I know?

- **It is VERY IMPORTANT to take in enough liquids when eating a diet high in fiber.** Otherwise the constipation may occur!
- Also remember to increase the amount of fiber in the diet slowly so you do not develop a crampy, bloated stomach.

### High Fiber Ideas

- Try "old fashioned" oatmeal (not the instant kind). You can mix in recipes or make homemade oatmeal raisin cookies.
- Whenever possible, pick whole grain breads, pastas, and rice over their white counterparts.
- Choose vegetables with higher fiber content such as peas, corn, potatoes, broccoli, spinach, dried beans (for dips, soups, burritos etc). Aim for at least 3 servings per day (1 serving =  $\frac{1}{4}$  cup for young children)
- Examples of fruits with higher fiber content include prunes, apricots, plums, raisins, cantaloupe, blueberries, and apples (with skin). Goal for day is 2 - 3 servings per day ( $\frac{1}{2}$  cup or 1 small piece)

## Hydration for Exercise

Dehydration is counterproductive to enhancing athletic performance. Minor dehydration impairs concentration, coordination, and reaction time, reduces stamina and compromises the body's ability to resist disease. Dehydration of muscle of only 3% can cause about 10% loss of contractile strength and 8% loss of speed. In order to keep from becoming dehydrated, it is important to drink plenty of fluids (ideally water) before, during, and after intense periods of exercise. The only imperfect mechanism in the body is the thirst mechanism. Once you are thirsty you are *already* dehydrated - it is too late!!

Here are some important guidelines:

- You need to drink at least half of your body weight in ounces of water per day. So, if you weigh 150 pounds – you must drink at LEAST 75 oz of water per day. 1 L = 33 oz
- The best rehydration fluid is *cold* water. If your event or training last longer than an 90 minutes or you are in an extreme environment (hot, humid), choose a Gatorade or similar product. Gatorade provides *fuel and electrolytes* to *optimize performance* during intense exercise! Drink 16-32 oz of Gatorade per hour during these conditions.
- Avoid drinking anything with a lot of caffeine or alcohol because they may increase urine production which will in turn increase dehydration.
- Heavy training athletes use over 2 gallons (8 quarts) of water per day.

### PERFORMANCE POINTS

PRE-EVENT: recommended that individuals drink 16 oz (2 cups) of fluid about 2 hours before exercise to promote adequate hydration and allow time for excretion of excess water

IMMEDIATELY BEFORE EVENT: drink another 6-8 oz of water

DURING EVENT: exercisers should start drinking early and at regular intervals in an attempt to replace all the water lost through sweating. It's recommended that the athlete drinks 8 oz (1 cup) every 10-15 minutes. If the event is longer than 90 minutes, Gatorade or other sports drink should be used instead of water. 16-32 oz of Gatorade should be consumed in these conditions.

POST EVENT REHYDRATION: recommended that individuals drink 2 cups (16 oz.) for every pound lost during the duration of exercise.

## Portion Control

Eating a varied diet full of foods from all the food groups is crucial in guaranteeing you are providing your body with everything it needs for optimal performance.

Understanding proper portions is a critical component in not only making sure you are getting in adequate nutrition but it is also key in weight management and weight loss.

Take this quick quiz to see where you stand on food portions.....you just may be surprised!

1. A serving of hard cheese is the size of:
  - a. The tip of your thumb
  - b. Three dominoes
  - c. Two hard candies
  
2. How many green grapes are in a serving?
  - a. 5
  - b. 15
  - c. 30
  
3. What does a serving of pancakes look like?
  - a. One 4" pancake
  - b. One 6" pancake
  - c. Two 5" pancakes
  
4. How many strawberries are in a serving?
  - a. 10
  - b. 8
  - c. 5
  
5. How many baby carrots are in a serving?
  - a. 6
  - b. 10
  - c. 15
  
6. How many French fries are in a serving?
  - a. 10
  - b. 20
  - c. 30
  
7. A serving of fish most closely looks like:
  - a. A deck of cards
  - b. A checkbook
  - c. A candy bar

8. A serving of ice cream most closely resembles:
- a. A tennis ball
  - b. An egg
  - c. A light bulb

**Answers**

- 1. **b.** Three dominoes
- 2. **b.** 15 green grapes
- 3. **a.** One 4" pancake
- 4. **c.** 5 strawberries
- 5. **a.** 6 baby carrots
- 6. **a.** 10 French fries
- 7. **b.** A checkbook
- 8. **a.** A tennis ball