

Nutrition

Nutrition plays a more important role in athletic success than most people probably realize. Natural athletic skill and diligent training are obviously the most important factors towards success in sports, but poor dietary habits may prevent some athletes from achieving their full potential. Proper nutrition can make a good athlete great and a great athlete superior. Muscle does not grow out of thin air. Energy is not magically produced to fuel workouts or competitive events. Nutrition is a necessary complement to training

The Right Fuels For The Serious Hockey Machine

- Debra Burton, USA Hockey November 2000

Warning! This article is intended for athletes who want maximum energy levels, exceptional performance and the winner's edge.

Athletes who want to be the best they can be know which foods and beverages steal their energy and which give them the extra edge in the heat of competition. The right foods eaten at the right time in the right amount will produce superior energy levels.

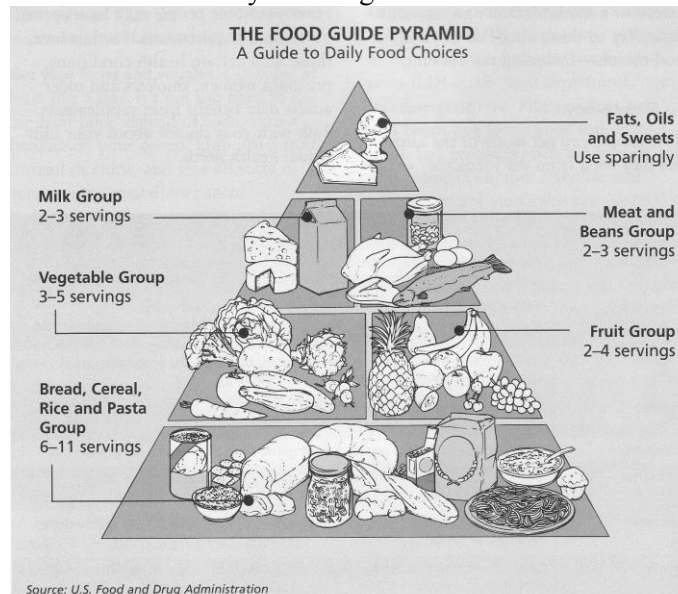
Too often young athletes think they can perform at their best when they eat foods that would make a couch potato proud. Let's face it, if you consume Twinkies and Coke, then you will have a Twinkies and Coke body.

You can't expect your undernourished, junk food-fueled hockey body to perform at its highest level, heal quickly from injuries, fight sickness and exhaustion, obtain maximum strength, or do anything spectacular for any period of time when it's not being fed as a hard-working machine. It's like trying to win a game with skates that have dull blades.

Eating the right foods should be taken just as seriously as intense weight lifting, consistent sleep, and hard work in practices.

Nutrition – general

- Food Pyramid Guide
 - Read it – Post it on your refrigerator



- You should consume about 2200 Calories per day

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- Athletes should get about
 - 65% of their calories from Carbohydrates.
 - For lasting energy, eat foods that are high in complex carbohydrates. Some of the best are potatoes, brown rice, oatmeal, grape nuts, whole-wheat pancakes and winter squash.
 - 15-20% of their calories from Proteins
 - Eat a small amount of high quality protein that is low in fat and easy to digest including tuna, turkey breast, eggs, and low-fat, low-sugar yogurt.
 - 25% (maximum) of their calories from Fats
- Water – drink water all the time. 80-100 ounces per day. Make sure you drink plenty of water before, during and after a game or practice.
- Do not skip Breakfast. Your body will have gone 18 hours without nutrients.
- It is best to try to eat as many small meals as possible. Five to six small meals spaced about 3 - 4 hours apart are ideal.
- Find the healthy foods you like and eat them more often
- Combine/Mix healthy foods with foods that you like
- Tip: Eat all of your food slowly – you will feel “full” so you can stop eating - if you eat fast, you tend to over-eat, which will increase your calories
- A varied well balanced diet will provide all the vitamins and minerals you need. (Excess supplements will not improve performance.)

Food Groups:

Vegetable Group (5 servings per day)

- Good choices that are 1 serving: 1/2 cup of raw or cooked vegetables – (broccoli, cabbage, spinach, carrots, sweet potatoes, parsnips, tomatoes, beets, eggplant, cauliflower, green beans), 3/4 cup of vegetable juice
- Hints to eat more veggies:
 - Try to drink V8 in the morning or before dinner
 - Put veggies with stir fry chicken or beef
 - Put veggies on salads
 - Put some (not a lot) of melted cheese or other sauces on it

Whole Grain Group (6-11 servings per day)

- Good choices that are one serving: 1 slice of whole wheat bread (no white bread!), 1 cup of dry cereal, 1/4 cup of granola, 1/2 cup of pasta or rice, 1 tortilla, 1/2 cup of cooked beans, 1/2 bagel, 1/2 cup hot cereal
- Eating slowly is especially beneficial with pasta/spaghetti or other grains

Fruit Group (4 servings per day)

- Good choices that are 1 serving: 1 medium whole fruit, 1/2 cup of canned fruit, 1/4 cup of dried fruit, 1 cup berries, 3/4 cup fruit juice (apple, banana, orange, grapefruit, peach, plum, pear, kiwi, strawberries, blueberries, raspberries, raisins, dates, figs, pineapple)
- Hints to eat more fruits:
 - Put blueberries /raspberries/strawberries/banana slices on your cereal
 - Drink orange juice, apple juice or grape juice instead of pop – NO POP!
 - Have fruit around the house, especially sliced
 - **Eat an apple or your favorite fruit before you eat dinner**

Meat Group (2 servings per day)

- Good choices that are 1 serving: 2-3 ounces (half a chicken breast) of chicken (not fried), any type of fish (tuna, frozen or fresh), 1 cup of cooked beans, 4 tablespoons of peanut butter, 3/4 cup of nuts

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- Hints:
 - Stay away from fast food fries & burgers
 - Try Subway or make your own sandwich – chicken, turkey, tuna and ham are good choices

Milk, Yogurt, Cheese Group (2-3 servings per day)

- Good choices that are 1 serving: 1 cup of skim milk, 1 cup of yogurt, 1/2 cup of cottage cheese

Fat Group (*Sparingly*)

- Add a very small amount of high quality oil to meals, especially extra-virgin olive oil.
- How to Lower Fat content in food:
 - Eat skinless chicken breast, fish or lean red meat
 - Trim fat from meat, remove skin from chicken
 - Bake, broil, poach or steam food, DO NOT FRY!
 - Use skim milk and low fat dairy products
 - Be careful what you put on your food. Use only a small amount of butter, syrup and mayonnaise, or use none at all
 - Make Kraft Mac & Cheese without adding butter and use skim milk
 - Put a little jelly or honey (not a lot) on toast without putting on butter
 - Do not use mayonnaise
 - Use light cream cheese or none at all on bagels
- Hints:
 - Stay away from pop!
 - If you have a choice between 1/2 Snickers bar and 2 bags of jujubes or any high sugar/low fat candy – PICK THE SNICKERS – it will fill you up.
 - 1 teaspoon of sugar is 16 calories & will turn into 4 g of fat
 - 1 tablespoon of sugar is 48 calories & will turn into 12 g of fat

Pre, Post and During Game Nutrition

NOTE: The information below is not limited to games, but applies equally to practices and workouts.

Pre-game Nutrition

A productive game requires adequate energy to maintain intensity.

- Pre-game Meal
 - High Carbohydrate
 - Low Fat
 - Low Protein
 - Plenty of water and juice
 - Eat 5-6 hours before game (if possible) 2-3 hours minimum. High calorie meals take a tremendous amount of energy to digest. Save energy for hockey by eating a smaller meal before a game. This will provide maximum energy for peak performance.
 - Stick with familiar foods
 - Eat easily digestible foods
 - Good pre-game meals may include salads, vegetables, chicken dishes, pasta, rice, potatoes, pizza (hold the pepperoni and sausage), pancakes (hold the syrup), cereals and breads. Then there's the pre-game snack, oftentimes fruit and a bagel.

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- Pre-game Snack
 - 2-3 hours before game
 - Lighter and more liquid food (yogurt, fruit juice, bananas)
 - No carbohydrates within 60 minutes of the game
 - Good pre-game snacks may include fruit, bagels, pretzels, popcorn (hold the butter), cereals and breads.
- Pre-game Fluids
 - Water is one of the best sources for high energy levels. On the other hand, soda, juice, and coffee will steal your energy.
 - Try to consume 12-24 ounces of water about 2-3 hours before exercise
 - Stop drinking fluids 90 minutes before the game (so kidneys can process excess liquid)
 - Drink one to two cups of water 5-10 minutes before the game
- Foods to **stay away from** before games:
 - High-sugar foods and drinks such as soda, juice, desserts, sugared yogurts and sugar-coated cereals. These foods steal your mental focus.
 - High-fat foods such as pork, hot dogs, fast food items, cheese, chips, salad dressing, mayonnaise, cream cheese and sour cream. These foods will slow you down in your physical endeavors.
 - Hard-to-digest foods such as red meat, beans, nuts and seeds. These are great for after a game or practice when your body needs refueling.

During Game Nutrition

- Drinking plenty of water replenishes valuable fluids lost during the heat of competition. It gives you energy, power and stamina.
- Cold water is preferable. It helps cool the body and leaves the stomach faster.
- Drink **before** you are thirsty – the thirst mechanism is designed to protect us in extreme situations
- Drink throughout the game – between shifts, between periods
- Drink as much as you can without causing stomach discomfort
- Try to consume 6-12 ounces every 15-20 minutes during exercise
- Drinking liquid carbohydrates (6-8% carbohydrate) throughout the game will help ensure enough carbohydrate is available for energy late in the third period – Commercial Sport Drinks work well as long as they are not more than 6-8%

Post-game Nutrition

- Post-game Meal - The most important meal of the day.
 - The 20 minute window after a game (or practice) is crucial – your muscles are most receptive to taking in carbohydrates and storing them as muscle glycogen.
 - Eat and drink in the locker room right away – the sooner the better.
 - Favor simple sugars and easily digestible foods
 - Fruits and juices are the best choices
 - A liquid feeding composed of dextrose and whey protein would also be a great choice.
 - Post-game carbohydrates are more important than pre-game carbohydrates. Ideally, the meal should be high in carbohydrates and moderately high in protein in a 2 to 1 ratio. Carbohydrates will replenish muscle glycogen and protein will help rebuilt muscles.
 - Eat a full meal 1-2 hours after the game – similar to pre-game meal
- Post-game Fluids
 - Best sources are plain water (filtered, bottled or spring)

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- For every pound of weight loss, you need to drink 2 cups of water (some players can lose a couple of pounds during the game)
- Try to consume 24-48 ounces after exercise
- Caffeinated pop slows rehydration and recovery

Good pre- and post-game meals and snacks may include pasta, rice, potatoes, pretzels, popcorn (hold the butter), pizza (hold the pepperoni and sausage), pancakes (hold the syrup), cereals and breads.

Calories, Weight Gain and Weight Loss

- Taken from: Sports Nutrition for MSU Athletes, 2004

Caloric Intake

The most important aspect of any diet is determining the proper amount of calories to consume each day. Eating too few calories will create a negative energy balance and result in weight loss. Eating too many calories will create a positive energy balance and cause weight gain. A maintenance caloric intake should keep bodyweight stable as you are balancing the calories in the food you eat with the amount of calories consumed by daily activities and exercise. In a very basic sense:

Calories Consumed > Calories Burned = Weight Gain

Calories Consumed < Calories Burned = Weight Loss

Calories Consumed = Calories Burned = No Weight Gain/Loss

Although the above equations are rather simplistic, they do give a pretty accurate indication of metabolism. If you eat more energy (food) than energy used (activity), weight gain can be expected. If you eat less energy (food) than energy used (activity), weight loss can be expected.

All people have unique calorie requirements. The amount of lean body weight (muscle), circulating hormones and activity level are the main determinants of calorie needs. A distance runner might have higher calorie requirements than a football lineman due to the greater number of calories consumed during training. You must match your caloric intake to your body and activity level. You may need more calories doing manual labor over summer break than during the school year. You may need fewer calories during the offseason than inseason due to the decrease in training demands. Critically analyze eating habits and changes in body composition throughout the year and take proactive steps to optimize results.

The bottom line: Set your calorie consumption according to your body weight, body composition, and activity level. Lean, active athletes will normally have higher calorie requirements than less active individuals with higher body fat if body weight is equal.

Determining Caloric Intake

Consult Table 1 to estimate your daily calorie requirements. Find your weight in the left-hand column and follow the columns towards the right to determine calorie, protein, carbohydrate, and fat allowances per day. It is very important to accurately consume the amount of protein, carbohydrate, and fat as suggested by Table 1. You may need to record and add together the protein, carbohydrate, and fat content of all foods you eat to ensure you are in the recommended ranges. You will need to read labels or consult a food counts book to determine how many grams of each macronutrient are in a serving size of food. After a few weeks, you should remember portion sizes and macronutrient values for most of the foods you commonly eat. Keep in mind that these suggestions are only rough **estimates**. You need to monitor body weight and body composition to make adjustments in order to reach your individual goals. If you are carrying excess body fat (females >20% body fat) then use the first row corresponding to your weight. If

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you have a body composition with some excess body fat, but relatively lean (females 15-20%) then use the second row corresponding to your weight. If you are quite lean (females <15% body fat) then use the third row corresponding to your weight.

	Body Wt.	Calories	Protein(g)	Carbs(g)	Fat(g)
excess fat	120	1800	99	248	46
some fat		2018	111	277	52
lean		2236	123	307	57

Approximately how many calories are in each nutrient?

Protein = 4 calories per/gram
 Carbohydrates = 4 calories per/gram
 Fat = 9 calories per/gram

It is best to try to eat as many small meals as possible. Five to six small meals spaced about 3 —4 hours apart are ideal. It is important to maintain steady blood sugar levels to prevent hunger and even energy levels. Constant feedings can help to keep amino acids circulating throughout the blood for continuous muscle repair. Several small meals help reduce overfeeding where nutrient overload may cause fat accumulation. Eating several small meals of equal size will also make it easier to eat the proper amount of food each day. You simply need to eat the same portion size of protein, carbohydrate, and fat for each meal. Divide the daily allowance of each macronutrient by the number of meals to be eaten for the day.

Bodyweight _____ lbs.

Calories/day _____ kcal (from Table 1)

g protein/day g (from Table 1) ÷ _____ meals/day = _____ g protein/meal

g carbs/day g (from Table 1) ÷ _____ meals/day = _____ g carbs/meal

g fat/day g (from Table 1) ÷ _____ meals/day = _____ g fat/meal

The bottom line: Use Table 1 as an estimate of your caloric intake. Watch for weight and body composition changes, then make adjustments. Eat small, frequent meals. Learn portion sizes. Memorize macronutrient (protein, carbohydrate, fat) values for common foods.

Weight Gain

If you are having difficulty gaining bodyweight, you are not eating enough calories.... Period. If you cannot gain weight, then eat. If you still cannot gain weight, then eat some more. People with “fast metabolisms” (naturally lean or thin) may need to consume foods with higher caloric and fat value such as whole eggs, whole milk, ice cream, natural peanut butter, etc. For gradual weight gain, increase calories on Table 1 by 250—500 kcal/day and take notice of changes in bodyweight and body composition. The bottom line: Eat, eat, eat.

Weight Loss

Although body fat is a vast resource for energy, excess body fat impairs performance in most sports. Unwanted body fat means unwanted weight, which can hinder speed and quickness. Left unrecognized, high body fat levels now could lead to obesity in the future. Obesity can cause numerous health problems including cardiovascular disease. Body composition should be controlled throughout the year, but especially near the competitive season. We prioritize speed in our strength and conditioning program, thus we would like all athletes to have a safe, healthy, and lean body composition relative to their sport and position.

Weight loss should be accomplished gradually. Restriction of calories impairs strength and size gains to some extent due to lack of consuming building blocks for muscle growth and adequate energy substrates. Weight loss should be targeted at 1-2 pounds per week. Weight loss greater than this rate may signal losses of lean muscle mass which will hinder performance and further

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fat loss. Start by reducing calories on Chart 1 by 250-500 kcal/day over 1-2 weeks. Adjustments (increase or decrease) can be made to your caloric intake after observing your progress.

An increase in activity, such as moderate cardiovascular exercise, will consume additional calories to accelerate fat loss. Be sure to coordinate exercise volume and caloric intake so you are eating enough food to sustain strength and maintain lean body mass. Cardiovascular exercise performed early in the morning on an empty stomach or immediately following strength training workouts may increase the rate of fat loss as muscle glycogen will be depleted, forcing the body to use fat as energy.

The bottom line: Try to maintain a lean body composition required by your sport and position. Gradually decrease calories by 250-500 to strive for a maximum of 1-2 pounds of fat loss per week. Perform moderate amounts of cardiovascular exercise. Do not stay on a calorie-restricted diet indefinitely.

Weight

- Managing Your Weight
 - Establish tolerable, enjoyable and stable eating and exercise programs
 - Focus on small gains and benefits to health and well being initially
 - Establish maintainable goals
 - Make a lifetime commitment to a healthy lifestyle that includes exercise, food choices and stress management
 - De-emphasize food as a central focus

Eating Disorders

- Anorexia Nervosa – excessive preoccupation with food, self-starvation and/or extreme exercising to achieve weight loss
- Bulimia Nervosa – binge eating followed by inappropriate compensating measures taken to prevent weight gain.
- Binge Eating Disorder – binge eating without the excessive measures to lose the weight gained.

Why do we need Proteins, Carbohydrates, Fats & Supplements

- Taken from: Sports Nutrition for MSU Athletes, 2004

Protein

Proteins in foods provide amino acids and nitrogen necessary to sustain life. Proteins play many different roles in the body, but protein's role in muscle growth is our primary concern. Muscle fibers are made of protein, which is composed of chains of amino acids. Strength training causes damage to muscle fibers so dietary protein's needed to repair the muscle fibers in order for them to become bigger and stronger. This simplified model suggests that consuming more protein would lead to more muscle. Yes and no. Strength training athletes do need more protein than sedentary people, but research suggests that about 0.8 grams of protein per pound of body weight is all that is needed to provide maximal recovery from a workout. More than this amount does not increase muscle growth, but can be stored as fat just as all unused calories. Muscle magazines (who usually are trying to sell their own protein supplements) often suggest much higher protein intakes, but our recommendations come from SCIENTIFIC STUDIES.

Good protein sources: eggs (1 yolk: 2 whites), skinless chicken breast, lean red meat, cottage cheese, turkey breast, tuna, salmon, white fish, protein powders (whey, milk, egg) **See Table 3 for details**

The bottom line: Consume about 0.8 gram of lean protein per pound of bodyweight throughout the day to aid in muscle recovery and growth.

Carbohydrates

Carbohydrates have a Jekyll/Hyde personality. Carbohydrates are the major source of energy used by the body. However, overconsumption of carbohydrates can quickly lead to fat gain. Athletes must consume carbohydrates in large quantities to meet the energy demands of training and competition, but food choices and timing of meals is crucial. There are no bad carbohydrates, just *mistimed* carbohydrates.

Carbohydrates are commonly referred to as “simple sugars” or “starches”. Glucose (dextrose) would be considered the “simplest” carbohydrate source. Glucose is the form of carbohydrate that is carried through the blood stream to be delivered to cells. All carbohydrates are broken down into glucose before they are used for energy. Simple sugars enter the blood stream quicker than starches. Simple sugars cause a large rise in insulin and quick uptake of glucose but the energy is short lived resulting in a “sugar crash”. Starches allow for a smaller release of energy and slower glucose uptake for a longer, sustained delivery of energy.

Simple sugars →	↑↑↑ insulin	↑↑↑ glucose uptake
Starches →	↑ insulin	↑ glucose uptake

Glucose uptake by muscle cells is highly desired. Glucose is stored in muscles as glycogen to be used for energy in the future. Muscle glycogen is the primary source of energy used during exercise. After exercise, muscle glycogen is often exhausted so a simple sugar would be useful to quickly replenish glycogen stores. During other times of the day when muscle are filled with glycogen, consuming simple sugars might cause fat cells to take up glucose to be stored as fat. In other words, try to limit simple sugars to post workout and eat complex carbohydrates throughout the day.

Simple Sugars: dextrose, sport drinks, sweetened cereals, white bread, mashed potatoes, white rice **See Table 3 for details**

Starches: beans, most fruits, yams, oatmeal, whole wheat bread, sweet potatoes, brown rice, whole wheat pasta **See Table 3 for details**

The bottom line: Try to limit simple sugars to post workout and eat starches throughout the day.

Fats

Fats are necessary for energy, steroid hormone production, cell membrane structure, and fat-soluble vitamins. Fats are not evil, but consumption should be limited. Fat “tags” along with almost all foods especially dairy and meat products. You will probably not need to make an effort to consume more fat. Try to limit saturated fats and concentrate on monounsaturated and polyunsaturated fats.

Fats: cold oils (olive, flax, canola, safflower, sunflower, sesame), olives, natural peanut butter, nuts

The bottom line: Do not eliminate fats, but try to avoid saturated fats.

Supplements

Dietary supplements are just what their name implies, supplementary to your diet. There are no magic pills. You do not need to consume supplements if you are consuming adequate nutrition through whole foods. However, supplements are often a convenient way to consume nutrients. Be very careful when buying supplements as most sales people have little knowledge of the products they sell beyond what they read in magazines. Just as with muscle magazines, they are trying to sell you a product. The FDA has very loose laws concerning dietary supplements so many of the

claims made by manufacturers and sales people are exaggerations or blatant lies. Please educate yourself or ask for **qualified** help.

The bottom line: You do NOT need supplements for optimal athletic performance. A carefully planned diet consisting of whole foods can provide all nutrients necessary to achieve maximal benefits from our strength and conditioning programs. Supplements can provide convenient sources of calories if there are gaps in your diet. Carbohydrate and protein supplements for post workout nutrition would be the most beneficial supplements to quickly provide nutrients to muscle cells for enhanced recovery.

Fluids:

Cold Water is the Best Medicine for Fluid Replacement

- Alan B. Ashare, M.D., USA Hockey October 1997

A frequent topic of discussion in athletics revolves around fluid replacement – is it necessary for athletes to drink fluids during exercise, or will doing so cause an athlete to “drag”? So goes the debate, but the reality is that restricting fluids during exercise could actually cause a decrease in an athlete’s performance and could result in serious medical problems. Some investigators have found that drinking fluids before and during exercise can actually improve an athlete’s performance.

Fluid replacement is a very important performance component for athletes. An 18-year-old who is **not** vigorously exercising needs approximately 2.5 quarts of replacement water every day.

During exercise, an athlete’s body produces a large amount of heat internally. As the core temperature of the body rises, the body dissipates this additional heat by perspiring. Players also lose additional water during exercise by exhaling air from the lungs. The body can react very unfavorably to fluid loss and an athlete can experience early muscle fatigue, loss of coordination, irritability and an inability to perform at an appropriate level if he/she becomes dehydrated.

How, when and with what should this fluid be replaced?

Water replacement should start before a game or practice, continue during the activity, and include post-activity hydration.

Plain water, preferably cold, is the best fluid replacement. Water leaves the stomach much faster than drinks containing glucose (sugar), such as soft drinks or sports drinks, and cold water leaves the stomach faster than warm water and will decrease bloating.

Water is a must during games and practices. Players should have their own water bottles to reduce the risk of spreading communicable disease, and the water bottles should be stored in a tray or receptacle that prevents them from falling on the floor and becoming contaminated.

Contrary to the widely held belief, drinking water before a game or practice, even cold water, will not cause cramps. In fact, there is a good possibility that cramps can result from dehydration due to drinking too little water.

The American College of Sports Medicine recommends drinking about two glasses (17 ounces) of fluid two hours before a scheduled game or practice. During exercise, athletes should start drinking early and at regular intervals in an attempt to consume fluids at a rate sufficient to replace the water lost through sweating and exhaled air. In a practice this could be two to four ounces (a half glass) of water every five to ten minutes, or, in a game, two to four ounces after every shift.

Lifestyle

Maximizing your athletic potential requires consistency in all aspects of your life. Training and nutrition are important aspects to improving performance, but other lifestyle choices can affect your progress.

Sleep: Muscles grow during recovery, not during training sessions. You must rest your body in order to prepare for the next workout. You should make every effort to get the traditional eight hours of sleep per night. Some people require slightly less sleep, while others require more sleep. Restful sleep aids in mental recovery as well as recovery for muscles.

Breakfast: You must consume breakfast every day. Although beneficial, sleep provides approximately eight hours of fasting for the body. Muscles become depleted of glycogen and amino acids during periods of fasting, so you must quickly consume carbohydrates and protein to aid in recovery upon waking.