Fuel for swimmers before, during and after practices and competitions

Nutrition does not, in itself, improve one’s athletic performance. It is the quality training that is necessary. However, an important part of quality training is good nutrition. Proper fueling before and during practice is necessary for the body to be able to complete the training session. Swimmers do not get faster during practice. Getting faster (the adaptation to training) actually occurs while the body is at rest. Exercise is the stimulus that causes this to happen. Practices are supposed to be hard to challenge the body. The body responds to this training by becoming more efficient. In between practices, when the body is at rest, this adaptation will occur but only if given the proper fuels. Three key factors to fuel for peak performance are always having a full tank of gas, filling up with the most efficient fuel and fueling at the right times.

The primary fuel source for swimmers during training is carbohydrate. Contrary to popular belief, carbohydrates are not fattening. They will get used for energy and not converted to body fat. This carbohydrate fuel comes from glucose in the blood and glycogen, the storage form of carbohydrate in muscle. During high intensity workouts and if glycogen stores become low or depleted, glucose in the blood provides the energy required by the workout. Protein is the last type of fuel to be used by the body during high intensity training or competition. This protein usually comes in the form of muscle protein and therefore, muscle breakdown. Adequate nutrient repletion, most importantly carbohydrate and protein, is essential post-recovery. A high quality diet is also important to ensure a high level of circulating protein, vitamins and minerals to prevent tissue breakdown during and in between swim practices and to maintain hydration to maximize metabolic efficiency.

Daily recommended intake of carbohydrates for a swimmer: 2.5-6.0 grams of carbohydrate per pound of body weight. Therefore, for a **100lb. swimmer: 250-600 grams of carbohydrate** (100lbs. x 2.5 grams = 250 grams and 100lbs. x 6.0 grams = 600 grams) and for a **150lb. swimmer: 375-900grams of carbohydrate** (150lbs. x 2.5grams = 375 grams and 150lbs. x 6.0 grams = 900 grams).

When there is not a nutrition label available, use the food lists below to help you count grams of carbohydrate.

Each portion is approximately 15 grams of carbohydrate

Grains, Breads, Cereals Milk and Yogurt Fruits Vegetables and Beans Sweets and Snack Foods

1oz. bread product 1 cup milk 1 small piece of ½ cup potato, peas or corn ¾ oz. snack food (i.e. pretzels, chips, (i.e. 1 slice bread, ¼ ¾ cup to 1 cup (6 to 8 oz.) fresh fruit ½ cup cooked beans/legumes 4 to 6 crackers) large bagel, 6” tortilla) plain yogurt or yogurt ½ cup canned fruit in (i.e. garbanzo, kidney, or black 1 oz. sweet snack (i.e. 2 small 1/3 cup cooked pasta or rice made with low-calorie own juice beans) sandwich cookies, 5 vanilla wafers) 1 cup soup sweetener 1 cup melon 3 cups raw vegetables 1 Tblsp. sugar or honey ¾ oz. cold cereal\* ½ cup fruit juice 1 ½ cups cooked vegetables ½ cup ice cream ½ cup cooked cereal 2 Tblsp. dried fruit (Small portions of non-starchy 3 cups popcorn 1 cup raspberries vegetables are free.) 1 ¼ cup strawberries \*Serving sizes vary between ½ cup to 1 ½ cup. ¾ cup blackberries,

Check the product’s nutrition label. blueberries

Spread carbohydrate intake over the course of the day with smaller meals and frequent snacks. This keeps the blood sugar levels adequate and stable. Incorporate fat into the day at times that are not close to practice. Fat is necessary, and supplies the fuel for low intensity training but does not contribute much to the training session or immediately after the workout for recovery and replenishing stores.

It is extremely important to eat some carbohydrate before morning practice. An unfueled swimmer risks developing low blood glucose levels, as well as poor performance/feeling sluggish due to the decreased ability to focus and increased perceived exertion (the workout will feel harder than it really is!)

For pre-competition meal, choose foods that contain no more than 2 grams of fat per serving. Eating meals and snacks that are high in protein and/or fat (fat increases satiety or fullness and therefore, delays the emptying time of the stomach and take longer to digest) shortly before exercise, can cause gastrointestinal problems such as stomach pain, vomiting, heartburn, bloating, gas, feeling of heaviness of food and cramping. An intense training session or competitive race may especially cause cramping. The physiological explanation is that normally the heart pumps a lot of blood to your stomach to aid in digestion. During intense exercise, the heart will pump blood to the muscles and shunt the blood supply away from the abdominal area therefore, not allowing the stomach to digest the food properly. Without a blood supply, the stomach muscles suffer from a lack of oxygen and like any muscle without oxygen, develops cramps.

Pre-race meals should be low in fat and high in digestible carbohydrates. The meal should be eaten 3-4 hours before an event. It should provide 1.5-2.0 grams of carbohydrate per pound of body weight (i.e. 150 grams for 100lb. swimmer). Eggs are not a good breakfast food before a swim meet. One egg has 5 grams of fat and less than 1 gram of carbohydrate. A better choice would be a bagel-it has 40 grams of carbohydrate and less than 1 gram of fat plus whole banana, 8oz. low fat or skim milk, 1 cup raisin bran cereal and 4 ounces orange juice would equal approximately 150 grams . Turkey sandwich or bowl of pasta as part of a meal later in the day are good. Of course, if there is a certain meal or snack pattern that a swimmer thinks is a winning combination then they should stay with it.

2-3 hours before an event: Solid foods in the form of carbohydrates can be eaten as there is enough time to digest them before competition. Whole grain bagel with peanut butter, hot or cold cereal with nonfat milk, fig bars, pretzels, nonfat yogurt and fruit like bananas, apples, oranges, peaches or pears are good choices. Be sure to drink plenty of fluids.

One hour before an event: It should provide 0.5 grams per pound of body weight (i.e. 50 grams per 100lb. swimmer). At this point, carbohydrates in liquid form such as sports drinks may be better tolerated. Solids that may be tolerated are low fat crackers or fruits such as oranges, watermelon, cantelope, peaches, pears, applesauce or bananas. Be careful to limit the overall quantity of food eaten. The more that an athlete eats the longer it will take to digest.

Beware of relying on food from swim meet concession stands. These foods tend to be high-fat, high-calorie and do not have the right nutrients for optimal performance. A better option would be to pack a cooler bag from home with healthy snacks. See previous article for list of healthy snacks.

Eat carbohydrate in the form of a carb-electrolyte drink such as Gatorade or Powerade, during workout if workout is 90 minutes or longer. This can benefit performance and delay the onset of fatigue. Gels are also acceptable but don’t let that take the place of adequate hydration.

During exercise, consume 6 to 12oz. of a sports drink (not to be confused with “energy” drinks) with 6-8% carbohydrate concentration every 15-30 minutes during exercise. One gulp is about 2 ounces. Drinks with a concentration greater than 10 percent may cause abdominal cramps, nausea and diarrhea. Use the following calculations to determine the concentration of a fluid. Amount of carbohydrates in one serving (in grams) divided by the liquid volume of one serving (in milliliters) multiplied by 100=percentage of carbohydrate concentration (i.e. 15grams divided by 240ml= 0.625x100=6.25%.

During meets, eat a high carbohydrate/moderate-protein snack immediately after your preliminary race and immediately after your finals race.

A good tip is to keep track of foods that were eaten before, during and after training and competitions and how it affected performance, both mentally and physically. It is not a good idea to try different and new foods before an important competition due to not knowing how they will be tolerated.

The maximum ability to replete glycogen stores is immediately after a workout and lasts for approximately two hours. Carbohydrate and protein should be eaten within the **first 20-30 minutes** of finishing a workout. This enables the body to replenish glycogen stores and repair muscle tissue. This is one of the most important times to eat. Athletes who do, have a distinct advantage over competitors who do not. The recommendation is 0.65grams of carbohydrate per pound of body weight consumed within 30 minutes after exercise. For example, 65grams of carbohydrate is needed for a 100lb. swimmer. Some recovery snack ideas are cereal with milk, fruit and low fat yogurt, pretzel chips and hummus, trail mix, low fat chocolate milk, banana with peanut butter.

Be sure to adequately hydrate after a workout or race. Drink 3 cups of fluid for each pound of body weight lost during training or competition.

Protein intake is also crucial in recovery snacks to repair and rebuild muscle tissue. Carbohydrates also help protein to get into the muscles by increasing the production of the powerful anabolic hormone insulin. 10-20 grams of protein is recommended immediately after training. Milk, Greek yogurt and cottage cheese are high in protein.

Eat another post-workout snack **45 minutes to 1 hour** later. This is critical to maximizing recovery.

Eat a main meal **within 2 hours** of finishing the workout if this is possible (although you might be sleeping if the practice was in the evening). Some good bedtime snacks are toast with peanut butter, cereal with milk and banana, cheese and crackers, low fat greek yogurt and fruit, or turkey sandwich. You may feel like going to sleep at the end of a long day of training or competition or you may feel like taking a nap after a morning training session or swim meet but don’t skip a meal or snack at this time. Also, no matter how hungry you are, don’t binge on junk food.

Eat again at **4 hours** after the exercise.

Fluid replacement tips:

Adequate hydration is important for maximizing metabolic efficiency. Water maintains proper blood volumes and cell hydration to allow the body to access the nutrients it needs when it needs them.

Water helps to maintain proper blood volume levels for transporting glucose, oxygen and fats to working muscles and carries away metabolic waste products such as carbon dioxide and lactic acid. When the body is dehydrated, the amount of blood pumped with each heart beat decreases and the heart will try to compensate by increasing it’s heart rate. Nevertheless, exercising muscles do not receive enough oxygen. Fatigue occurs and athletic performance suffers. Water also helps the kidney make urine to eliminate metabolic waste products such as ammonia and urea. Water is necessary for sweat production. Water absorbs the heat from your muscles and dissipates it through sweat to cool your body. Water is also part of saliva and gastric secretions to help in digesting food. Water also aids in lubricating joints and cushions organs and tissues.

Keep a bottle of fluid nearby during practice and drink between repeats and sets.

Do not rely on thirst as an indicator to drink fluids. By the time you are thirsty, you are already dehydrated, possibly with 2% of body weight fluid loss.

Choose water or a sports drink that tastes good, stimulates fluid absorption in the body to maintain proper fluid balance in the body and provide energy to working muscles.

Avoid carbonated drinks which can cause stomach bloating and may decrease fluid intake.

Avoid caffeine-filled beverages. They are diuretics which causes fluid loss. Check the color of your urine. Dark-colored urine may indicate dehydration and thus, the need to drink more fluid. Urine should be pale yellow and not have a strong odor.

All of this information is pointless if these foods are not available for consumption. Behavior modification and habit development is key. Preparing and consuming healthy foods can be a challenge with busy schedules and limited time. Swimmers who skip meals or rely on fast or convenience-type foods will run out of gas, swim poorly and not recover properly for the next swim.

A plan of action has to be in place. With busy lifestyles, sometimes as much as 3 plans are needed to ensure that one plan is followed. For example, (for that 20-30 minute post-recovery snack) plan A: pack snack cooler bag of healthy snacks; if no time, plan B will be to eat something non-perishable kept in the car like a box of graham crackers or dry cereal; if plan B fails, then plan C would be to immediately go to grocery store or restaurant “take-out” on the car ride home and buy a healthy snack such as a bagel, piece of fruit, yogurt or chocolate milk.

One of the main focuses to take from all of this information is to remember the “4 times for fast times”

4 times that you should eat before practice or competition:

1. 3-4 hours before
2. 2-3 hours before
3. 1 hour before
4. During practice or in between races

4 times to eat after practice or competition:

1. First 20-30 minutes after
2. Then 45 minutes-1 hour after
3. Within 2 hours after
4. 4 hours after

Make every meal, snack and beverage count by planning ahead for success!