

## **RESOURCE CENTER - Sports Medicine**

*As part of our continuing effort to service and educate our membership, each Thursday the U.S. Soccer Communications Center will send out an informative article from one of its departments. Once a week, you will receive an article/paper/essay that will hopefully enhance your enjoyment and knowledge of the game of soccer - on and off the field.*

This week, we examine what you can do to help your body recover between matches. We also look at the important role that proper foods can play as you prepare your body for the next game.

### **Recovery** ***Preparing For The Next Game***

Some sports are rigidly scheduled like football, which generally plays one game each weekend throughout the season. Other sports, like soccer and basketball have variable days between contests and in tournaments often have only hours between games. The focus in this article is on food choices you can make and how you can best use the time between contests to ensure that your body will be prepared to play in your next game or training session.

Lack of your body's fuel (muscle glycogen) is one of the primary reasons for fatigue in soccer. When muscle glycogen is low, running endurance and speed decline, especially as the game progresses. With three or more days between games, there is enough time to refill the muscle glycogen tank. If there are less than two days between games, and the player doesn't follow some simple guidelines listed below, the player will likely enter the next game with less glycogen, and this means tiring earlier in the game.

There are three main factors that go into rapid recovery of muscle glycogen: food choices, timing of food intake, and the interaction of these two with insulin.

**Food Choices:** Glycogen is a carbohydrate, so it is best to eat carbohydrates (but don't forget protein) during the recovery stages. Nutritionists group carbohydrates according to their glycemic index; i.e. how intensely the carbohydrates stimulate the release of insulin. Foods with a high glycemic index (watermelon, bagel, baked potato, sports drinks) bring about the greatest release of insulin while low glycemic index foods (apple, pear, peanuts) don't lead to a large release of insulin.

**Timing of food intake:** Food choice is important, but so is the time when the food is eaten. The best time to eat and fill the muscles is when you aren't too interested in eating - the first two hours after exercise. During this two-hour period, choose foods with a high glycemic index (sweets, fruits, sports drinks) for the fastest replenishment of muscle glycogen. Protein is also helpful at this stage. Research shows that the largest insulin response comes from a 4:1 mixture of carbohydrates:protein. You should take in one gram of carbohydrate for each pound of your weight. For the 160-pound player, that would be 160 grams of carbohydrate and about 40 grams of protein. Keep fat intake at an absolute minimum. The body doesn't care if the nutrients come as a liquid or as solid food. Most players might not want to eat anything solid or a meal in this two-hour time period and would prefer a liquid 'meal.'

In the next two hour stage (two-four hours after the event), solid food or a meal is likely more palatable. Choose moderate to high glycemic index foods (i.e. grapes, bran muffins), with 60-65% of the calories as carbohydrate, 20-25% fat and the remainder protein. This will help keep the refueling process moving along at a fast pace.

Over the remainder of the 24 hours, choose low to moderate glycemic index foods (ie. pasta, oranges) and try to take in three-to-five grams of carbohydrate per pound of weight. That 160-pound player should take in, over 24 hours, a total of 480-800 grams of carbohydrate. The

calorie proportions should remain the same: with 60-65% of the calories coming from carbohydrates, 20-25% coming from fat, and the remainder from protein.

***Interaction of food choice and timing with insulin:*** Insulin has been prominently mentioned in this article. Some people have called insulin the "master recovery hormone" because it assists in transporting glucose (blood sugar) from the blood into (muscle) cells as well as stimulating the hormones that help make glycogen - just what your body needs during recovery. After exercising the muscle cells are especially sensitive to insulin - meaning more sugar gets into the cells and more glycogen is made. After two or more hours, the insulin sensitivity of the cells declines. This is why it is necessary to eat carbohydrates soon after exercising.

If an insulin response is important after exercise, can the insulin response be boosted? Yes, but the optimal ratio of carbohydrate and protein seems to be 4:1. This can double the insulin response and increase glycogen production by 30%. Protein can come as food or as an amino acid supplement. Arginine is an amino acid that has been studied extensively and seems to be quite good at stimulating the insulin response. Another amino acid, glutamine, can help with tissue repair as well as many aspects of the immune response. Don't overdo the overall protein intake because eating too much protein can slow down the recovery process.

Most players aren't looking to sit down to a meal or eat any solid food in the critical 2-hour period after training/competition. But, there are drinks that can help fulfill your body's needs. The quickest way to get carbs into the blood is from a drink that is sweetened with a glucose polymer (e.g. high fructose corn syrup, maltodextrins) or high glycemic index carbohydrates – i.e. Gatorade. You can minimize damage and speed repair of cells between exercise sessions if extra vitamin C and E and glutamine are ingested.

Anytime you play a game or go through a strenuous training session, it is important that you give your body the best opportunity to recover, so you may be at your best the next time out. Hopefully this article helped you understand how important the right foods at the right time can be to your body. Eating the correct foods – and in the correct proportions - will allow your body to perform at its best in the next game.

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