Recovery is the process that restores muscle and liver glycogen, as well as fluids that were lost during exercise. Proper recovery nutrition is crucial to:

- Anyone participating in heavy daily training, or
- Athletes engaging in double session training/practices, or
- Those involved in competitions with multiple events (such as tournament play, meets, etc.)

### Why?

- Hormonal and enzymatic changes that enhance glucose uptake are elevated post-exercise.
- With optimal intake, glycogen replenishes at 5-7% per hour; it can take up to 15-20 hours to completely restore depleted reserves.
- Recovery is necessary for optimal performance in the subsequent event.

### Strategy:

- Aim for 1.0-1.5 grams/kg body weight of carbohydrates immediately following exercise.
- Repeat this every 2 hours for 4-6 hours, or until a large carbohydrate rich meal is available.
- 6-10 grams/kg of carbohydrate should be consumed over 24 hours.

### What About Protein?

Numerous studies have been done to determine whether the addition of protein will enhance muscle glycogen storage. Some studies show a benefit while others do not. Taking in protein does not inhibit glycogen storage. Protein does contribute necessary amino acids for muscle repair. It is essential for athletes to consume adequate protein, so it may be included in recovery snacks, and should be included in recovery meals.

### What Types Of Carbohydrates Are Best?

High Glycemic Index (GI) carbohydrates are those that are able to raise blood glucose levels quickly. They may help in rapidly replenishing glycogen. Understand that this measurement is not a precise one. A food’s effect on blood glucose levels may vary with the amount of food eaten, the way it is processed and how each individual’s system reacts. Not all foods have been tested so GI numbers are not available for many items. Post-exercise it is recommended to try to have foods that fall into the high and moderate categories. It is also important to recognize the practicality, portability and individual tastes and preferences when selecting recovery foods. A list of high, moderate and low glycemic index foods is on the reverse side.
### What Types Of Carbohydrates Are Best? (Cont.)

<table>
<thead>
<tr>
<th>High</th>
<th>Moderate</th>
<th>Low</th>
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<tbody>
<tr>
<td>white or whole wheat bread</td>
<td>white or whole wheat pasta</td>
<td>apples</td>
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<tr>
<td>bagels</td>
<td>oatmeal</td>
<td>grapes</td>
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<td>corn flakes</td>
<td>sweet potatoes</td>
<td>cherries</td>
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<tr>
<td>most crackers</td>
<td>peas</td>
<td>pears</td>
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<tr>
<td>rice cakes</td>
<td>corn</td>
<td>beans:</td>
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<tr>
<td>white or brown rice</td>
<td>oranges</td>
<td>kidney</td>
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<td>white potatoes</td>
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<td>lentils</td>
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<td>beets</td>
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<td>navy</td>
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<td>carrots</td>
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<td>peanuts</td>
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<td>raisins</td>
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<td>milk (cow’s)</td>
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<td>bananas</td>
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<td>watermelon</td>
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<td>orange juice</td>
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</table>

Example of recovery nutrition for a 175 lb. (80 kg.) athlete:

1.0 - 1.5 grams carbohydrate per kg:

1 pint (16 oz.) orange juice and a small box of raisins…….87 grams or
Bagel (4oz.) and 16 oz. Gatorade…………………………...92 grams or
16 oz. Gatorade, fruit flavored yogurt & high carb sports bar, such as a
Clif bar…………………………………………………………. 123 grams

To fully recover, this athlete would need 6-10 gr/kg, within 24 hours, depending on how long and intense his/her exercise was.

Re-hydration is vital for athletes as well. One needs to take in 150% of lost fluids to completely restore balance. It may take up to 6 hours to fully re-hydrate.

Sports drinks containing glucose or glucose polymers are effective for replacing muscle glycogen and assist in re-hydration as well.

### References: