



Fueling for Performance: The Role of Training and Competition Nutrition

It is not possible to correct a nutritional deficiency or inadequacy over a short period of time, so how a skater eats most of the time is critical to success.

Before a competition, the period prior to a competition can be divided into two stages. During the five to seven days prior to an important competition when the volume of training may taper down, skaters should be consuming a relatively high carbohydrate diet (about 60 to 65% of total calories) as well as plenty of fluids. This strategy will assure that muscles have an opportunity to maximize glycogen storage (needed for the repetitive jumps and spins skaters do) and that hydration is at its peak coming into the competition. For the period immediately before competition, the goal is to finish the last meal approximately two hours before going to the competition venue. This meal should be low in fat and high in carbohydrates, and it should be relatively small (no more than 800 calories). About 90 minutes before the competition skaters should consume 12 to 16 ounces of sports beverage over a 15 to 20 minute period. This strategy 'primes the pump' to help fluids leave the stomach quickly during exercise. Once this large volume of fluids is consumed, skaters should sip on a sports beverage (2 to 3 ounces every 15 to 20 minutes) to sustain blood sugar and hydration level. Athletes should avoid drinking large volumes of fluids at any single time as the competition approaches. As much as possible, the same strategy should be followed before training sessions so that the skater is well-practiced in following this protocol in preparation for competition.

During training and competition, the primary nutritional goals are to sustain the hydration state, maintain blood sugar, and limit muscle glycogen depletion through the provision of a small amount of carbohydrate via sports drinks. Skating competition, of course, prohibits any beverage consumption during the period while the skater is on-ice. However, skating competition often requires that the skater spend long periods of time at the arena, waiting to skate. Skaters should take full advantage of this by treating it as an opportunity to assure blood sugar is maintained through the periodic consumption of sports beverages (1 or 2 sips of beverage, every 15 to 20 minutes). Skaters should avoid, however, the consumption of large fluid volumes or food during the 90-minute period preceding the time they skate. This takes practice to achieve correctly, as most skaters are accustomed to waiting until the thirst sensation occurs to drink a relatively large volume of fluid. Learning to 'sip' on a small amount of fluid at fixed intervals takes practice. During on-ice training skaters should avoid drinking water and should, instead, consume a sports drink following the same strategy. Have a bottle of sports beverage on the rail and, periodically, have a small sip during practice to sustain blood sugar.

After exercise, the effect of depleting both fluids and glycogen. When glycogen storage is lowered, a glycogen-synthesizing enzyme (glycogen synthetase) is elevated. This enzyme is at its peak immediately following exercise, so athletes should try to consume 200 to 400 calories of carbohydrate with some protein to take advantage of this enzyme. This will enable the skater to replenish the glycogen (the main muscle fuel for high intensity jumps and spins) used during competition or practice. Athletes who have difficulty eating solid foods immediately following activity should consider consuming high-carbohydrate meal-replacement beverages. There is some evidence that a combination of carbohydrate and protein enables less muscle soreness if consumed post-exercise. Fluids should be consumed with sufficient volume to return the athlete to the pre-exercise weight. Clear urine is a good sign that the hydration state has returned to normal, while persistently dark urine is a sign that the athlete is not well hydrated.

KEY POINTS:

BEFORE

The goal of the pre-competition period is to enter the competition well hydrated, with muscle glycogen stores full, and blood sugar normal. Any strategy that deviates from this goal will detract from optimal performance.

✓ *The pre-competition meal should be relatively small, high in carbohydrates, and low in fat, and should be consumed with plenty of water.*

✓ *The foods consumed during the pre-competition meal should be familiar, low in fiber, high in starch, and known to be well tolerated.*

✓ *Once the pre-competition meal is consumed, the athlete should sip a sports beverage to sustain hydration and blood sugar.*

✓ *Water should be consumed with the pre-competition meal, but only sports beverages should be consumed during the period following the pre-competition meal.*

✓ *Avoid solid foods during the 90-minute period preceding competition or training.*

DURING

Low blood sugar is likely to result in mental fatigue, and mental fatigue leads to muscular fatigue even if the muscles have plenty of fuel remaining. Mental fatigue is also responsible for a loss of concentration that is a contributor to the skating errors that often occur during the last half of skating routines.

Also, it is impossible to bring a poor hydration state up to a well-hydrated state after entering the skating venue. Skaters must enter the competition or exercise session in a fully hydrated state.

✓ *Consume carbohydrate- and sodium-containing sports beverages during training.*

✓ *Individualize the amount of fluid consumed during exercise to the amount of sweat lost.*

✓ *Even with minimal sweat losses, consume some sports beverage to help stabilize the blood sugar.*

✓ *Avoid consumption of a large volume of fluid at one time. Rather, practice consuming small amounts frequently.*

AFTER

Exercise results in a loss of both fluids and glycogen. The post-exercise period should be planned to replace both fluids and glycogen.

Muscle recovery is more a function of providing sufficient calories (mainly from carbohydrate and some protein) than protein alone. The focus, therefore, should be on a mixed diet that is high in carbohydrate but includes some protein and a little fat.

✓ *Consume carbohydrate immediately following exercise to take advantage of an enzyme that enables the replacement of the glycogen fuel used during exercise.*

✓ *Plan food and fluid intake to return fluid and glycogen status to pre-exercise levels before initiating another bout of exercise.*

✓ *If you have difficulty consuming solid foods following exercise, consider using one of the many fluid meal-replacement products that are available. These drinks should be high in carbohydrate with moderate levels of protein and some fat.*

Matching Nutrition Strategy With Training Strategy: *A Formula For Success!*

Figure skating requires a great deal of power and skill, and enough endurance to finish strong in a long program. The intensity of today's training and competition requires a nutrition strategy that can optimize muscular and central nervous system fuel to assure that skaters can perform at their conditioned best. The right nutrition plan can help you achieve your competitive goals.

Most skaters know exactly when they need to be at the rink to work with their coach and practice their skills and programs, but few have the same level of planning when it comes to knowing exactly what to eat and drink and when.

Strategically matching when, what, and how much you eat and drink with your on- and off-ice training schedule can help bring competitive success by:

- Assuring optimal mental acuity during training.
- Improving availability of energy nutrients to hard working muscles.
- Sustaining blood volume to maintain sweat rates, nutrient delivery, and metabolic by-product removal from working muscles.
- Improving vitamin and mineral availability to maintain resistance to disease and sustain energy metabolism.
- Reducing muscle soreness and injuries to help you train more effectively.

This series of nutrition handouts is designed to help skaters understand what it takes to match their nutrition habits with their training schedules and ultimately achieve competitive success.

For More Information on Nutrition and Other Sports Medicine & Science Topics, please visit: <http://www.usfigureskating.org/Athletes.asp?id=226>

For sample diets that incorporate a typical training-day schedule, try:
http://www.foodandsport.com/Figure_skater_2500_final.pdf (for smaller skaters)
http://www.foodandsport.com/Figure_skater_3500.pdf (for bigger skaters)

Substitute food lists for these diet plans can be found on the following URL:
http://www.foodandsport.com/Food_Energy_Servings.pdf

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