

*MAXIMIZING YOUR SPORT PERFORMANCE THROUGH NUTRITION*

*Canadian Birkie / Taylor Nutrition*



## Maximizing Your Sport Performance Through Nutrition

Cross-country skiing stands out as one of the most physically and mentally demanding sports globally. Individuals burn a tremendous amount of energy due to the demanding technique and stamina required to cross-country ski. Therefore, taking in enough nutrients becomes crucial to maintain energy levels and reduce risk of injury during training and racing. Fuelling with the right foods will allow you to take your sport performance to the next level and increase your ability to race safer and faster.

### Understanding the Power of Glycogen

Glycogen is the storage form of carbohydrates. Glycogen breaks down into sugar or glucose to help fuel our muscles during intense and prolonged exercise. Individuals store glycogen in their liver and muscles. While you are sleeping, the liver uses this glycogen to release sugar into the blood to help support brain and organ activity. As a result, in the morning it is important to consume breakfast with carbohydrate to “break-the-fast” and replenish glycogen stores that were used up overnight.

If athletes are not optimizing carbohydrate intake throughout the day to build glycogen stores, they will experience fatigue, low energy and increase their risk of injury during activity. Have you ever experienced a drop in energy while active or racing? This loss of energy is due to a drop in blood sugar levels as your glycogen levels becomes depleted. This is also known as “hitting a wall” or “bonking”. This is why it is essential for athletes to consume carbohydrates throughout the day to help build and replenish their glycogen stores.

### Carb-Loading: What is it? And Why is it Important?

Carb-loading means to “load” up with carbohydrates. Carb-loading helps to build your glycogen stores in your muscles up to twice their normal resting levels<sup>1</sup>. This allows your muscles to be “plush” or full with glycogen during your race to optimize sport performance. Also, as your training load decreases going into a race, your glycogen stores are not depleting as fast as they would be if you were training at a high intensity.

Carb-loading is best achieved when you prioritize carbohydrate intake during the week leading up to your competition<sup>1</sup>. It does not always mean eating more than you usually would or only eating carbohydrates, it means prioritizing carbohydrate foods over foods rich in fat and fiber.

As you increase your carbs, you might notice some slight weight gain<sup>1</sup>. Don’t worry, most of this is fluid and this means your carb-loading is working. For every 1 gram of carbohydrate stored, 3 grams of water are also stored.

### How Does an Athlete Carbohydrate Load?

If you are unfamiliar with carb-loading, start by increasing your carbohydrate intake in the mornings 36 to 48 hours before your race and slowly reduce your intake throughout the day to avoid feeling bloated, heavy or full before bed<sup>1</sup>. The week leading up to the race, stick to foods

that you have trained with to enhance your chances of success and to minimize any gastrointestinal distress<sup>2</sup>.

Here are some tips for carb-loading during the days leading up to your race:

- Choose thick bagels over bread
- Choose large pitas or naan over whole grain wraps or tortillas
- Include carbohydrate-rich condiments such as jam, honey or maple syrup
- Increase your servings of carbohydrates, such as rice or pasta, at meals by a few tablespoons or ½ cup
- Add 1 cup of chocolate milk or 1 cup of 100% fruit juice to 1-2 meals
- Include carbohydrate-rich snacks between breakfast, lunch and dinner such as:
  - bananas
  - dried fruit
  - fig bars
  - chocolate milk
- Add juice, additional fruit or dried fruit, honey or maple syrup to your smoothies

### Sample Fueling Ideas The Day Before Your Race

The day before your race, continue to carb-load by reducing fiber, fat and optimizing carbohydrate-rich meals and snacks. It is also beneficial to include sodium or salt-rich foods, especially if you are a heavy sweater. Examples of salty foods include salted pretzels, crackers, soy sauce, pickles and mustard.

- Your day might look like<sup>2</sup>:
  - **Breakfast – Big meal (Low in protein and fat)**
    - Pancakes or waffles + 1 Tbsp of honey or maple syrup **PLUS**
    - Scrambled eggs or lean sausage or 2 Tbsp of nut butter **PLUS**
    - ¾ cup low fat Greek yogurt + fruit of choice **PLUS**
    - 1 ½ cups of 100% fruit juice
  - **Morning Snack**
    - Apple sauce + crackers + cheese
  - **Lunch – Moderate meal (Low in fiber and fat)**
    - Lean meat sandwich or meat alternative on sourdough bread **PLUS**
    - 1 to 2 servings of salty pita chips or salty pretzels **PLUS**
    - Fruit of choice
  - **Afternoon Snack**
    - Banana + crackers + jam and nut butter
  - **Dinner – Light meal (minimal fiber and fat)**
    - 1.5 to 2 cups of rice with soy sauce or pasta and marinara sauce with palm-size portion (4-6 oz) of lean meat or meat alternative (such as tofu)
    - Bowl of vegetable soup or cooked vegetables
  - **Evening Snack**
    - Reduced fat blueberry muffin

Try to avoid overeating on carbohydrates the night before your race<sup>2</sup>. This may leave you feeling sluggish and heavy on race morning. Aim to have your last meal around 6:00-7:00 pm the day before your race.

### Fueling and Hydration Strategies the Day of the Race

On race day, aim to eat breakfast 2-3 hours before your race if possible<sup>2</sup>. Try to consume a complete meal with a small amount of lean protein. Our goal is to get in around 2-3 g of carbohydrate/kg of body weight and 12 to 16 oz of fluid. If you don't have an appetite, aim to get in fluids and easily digestible carbs such as crackers or low fiber, dry cereal. Remember, what you ate the day before will also help fuel your race!

Here are some examples of what a breakfast meal could look like<sup>2</sup>:

- Bagel + jam + nut butter + banana + 100% juice + water **OR**
- Low fiber oatmeal (avoid steel-cut oats) + grapes or banana + honey + low fat Greek yogurt + 100% juice + water **OR**
- 12-16 oz sports drink + 2 slices of toast + jam + nut butter + fruit sauce or banana

About 30-45 minutes before your race, top up your carbs and hydration. Aim for ~30-60 grams of carbohydrate and additional fluid<sup>2</sup>. This could look like:

- 12 oz sports drink + 1 energy bar or chews **OR**
- 30 grams of sport chews or fruit gummies + water **OR**
- 2 rice cakes + 1 tbsp nut butter + 1 tbsp honey + large banana + water **OR**
- 2 Tbsp of maple syrup + water

Hydration is extremely important, especially for endurance athletes in cold weather<sup>3</sup>. In cold weather, you might not feel as thirsty; however, wearing heavier clothing increases energy expenditure and body water is lost through water vapour when you breathe. Low blood sugar and dehydration reduce an athlete's ability to think and react quickly. This is when accidents or injuries occur. Even a 2% drop in hydration can make you slower and reduce your endurance and agility. Therefore, hydrate in the morning before your race to set yourself up for success.

## Sports Drink, Fluid & Electrolyte Recommendations

When you sweat during exercise, you lose important electrolytes such as sodium, potassium, calcium and magnesium. These electrolytes play a crucial role in maintaining the balance of fluids in your body, helping your muscles contract and assisting in recovery after working out. It's vital to replenish these electrolytes to enhance performance and optimize recovery. Aim to use sports drinks, gels and chews to help replenish glucose, electrolytes and fluid lost when you train and race.

### When exercising for up to 2.5 hours you want to have the following per hour:

- 30-60 grams of carbohydrate + 250-1,000 mg of sodium + 1 litre of water<sup>3</sup>

### When exercising for more than 2.5 hours, you want to have the following per hour:

- 60-90 grams of carbohydrate + 400-1,000 mg of sodium + 1 litre of water<sup>3</sup>

### Over the course of the race:

- Aim to have 5 to 8 gulps of water or sports drink every 15 minutes<sup>4</sup>. Carry your sports drink in an insulated water bottle to prevent it from freezing or warm it up before hitting the course.

Consider using Gatorade™ powder or Scratch™ sports drink mixes as they are a convenient source of sodium, carbohydrate, and fluid. Salt Stick Capsules™ are also an easy, light and convenient source of sodium to have in your pouch to consume every hour with some fluid.

(Please see TABLE 1)

## How to Fuel for Recovery Post-Race

Post-race recovery nutrition is just as important as pre-race nutrition! Athletes need to replenish energy stores, promote repair of muscle tissues, and consume nutrients that support overall quick recovery. Additionally, adequate hydration is essential for proper post-race/post-exercise recovery. Fluids can transport nutrients to cells to replenish muscle glycogen and reduce soreness.

You want to ensure you have carbohydrate and protein in your post- recovery meal/snack to guarantee optimal post-recovery fuelling. If you are not having a meal right away, aim to fuel with a post-recovery snack 30 minutes to 1 hour after activity.

### Protein

Protein consumed post-workout promotes muscle tissue repair. Your goal should be to consume a meal or snack with a minimum of 20 grams of protein after exercise. Most athletes require 0.3 to 0.4 grams of protein per kilogram of body weight.

## Carbohydrate

Carbohydrates consumed post-work maximize glycogen synthesis and replenish the stores you used throughout your activity. Most athletes require 1.0 to 1.2 grams of carbohydrate per kilogram of body weight.

### Post-Race Snack Examples:

- Smoothie with Greek yogurt or whey protein isolate + frozen fruit + milk **OR**
- Cottage cheese + fruit **OR**
- 2+ cups of chocolate milk **OR**
- Bagel with peanut butter/jam or meat/cheese + milk + fruit **OR**
- Beef Jerky + fruit + 1 bagel with honey **OR**
- Flavoured Greek yogurt + 1 tbsp nut butter + banana **OR**

### Post-Race Meal Examples:

- 1.5-2+ cups of rice + 4-5 oz of grilled chicken + 2 cups of vegetables/fruit **OR**
- 3-4 medium to large pancakes + 3 scrambled eggs + lean turkey sausages + Greek yogurt + 1 cup of juice

Good luck with your race! And remember it's always best to connect with a sports performance dietitian to fine tune your nutrient needs.

**TABLE 1**

Please see the table below to determine which sodium replacements for those who are competing for more than 1.5 hours. Additionally, all of the below products should be consumed with fluid to help clear from stomach.

Gels	Brand	Sodium (mg)	Carbohydrate (g)	Needed Per Hour
	Go Isotonic SIS Raspberry <sup>TM</sup>	118 (per gel)	22	2
	Salted Watermelon Gu <sup>TM</sup>	125 (per gel)	23	2
	Base Performance <sup>TM</sup>	270 (per gel)	29	1
	Huma <sup>TM</sup>	280 (per gel)	23	1
<b>Mixes</b>	Gatorade Powder <sup>TM</sup>	190 (per 3 scoops)	33	1
	Biosteel <sup>TM</sup>	140 (per scoop)	1	2 scoops + 30-60 g carbs
	Salt Stick Caps <sup>TM</sup>	215 (per capsule)	0	1.5 capsules + carbs
	Endurolytes Extreme <sup>TM</sup>	300 (per tablet)	0	1 cap + carbs
	Nuun <sup>TM</sup>	300 (per tablet)	4	1 packet + carbs
	Nuun Endurance <sup>TM</sup>	380 (per packet)	16	1 packet + carbs
	Liquid IV <sup>TM</sup>	510 (per packet)	0	1 packet + carbs
	Skratch <sup>TM</sup>	380 (per scoop)	19	1.5
	Skratch High Sodium <sup>TM</sup>	1720 mg (per packet)	17	1.5
	Re-lyte Hydration Flavoured <sup>TM</sup>	810 (per scoop)	0	+ carbs

	Re-Lyte Hydration Unflavoured ™	1000 mg (per scoop)	0	+carbs
<b>Chews</b>	Probar Bolt Energy Chews ™	100 (per 12 chews)	23	1
	Clif Bloks Salted Watermelon ™	100 (per 3 chews)	24	1
	Salt Stick Fastchews ™	100 (per 2 chews)	2	+carbs

### Resources

1. Coleman, A. (n.d.). How to carb load before your next race. *Precision Fuel & Hydration*. <https://www.precisionhydration.com/performance-advice/nutrition/how-to-carb-load-before-a-race/#authorbio>
2. Kitchen, S. (2023). Fueling for Your First Triathlon. *Race Smart; Performance Nutrition and Coaching*. <https://www.racesmart.com/blog/2023/07/fueling-for-your-first-triathlon/>
2. Sumbal, M. (2018). Essential Sports Nutrition. *A Guide to Optimal Performance for Every Active Person*. Rockridge Pres.
4. Tarnopolsky, M. Bibala, M. Jeukendrup, A. Phillips, S. (2006). Nutritional needs of elite endurance athletes. Part 1: Carbohydrate and fluid requirements. *European Journal of Sport Science*. <https://doi.org/10.1080/17461390500076741>