

Nordic Skiing Marathon Race Nutrition Tips

by Neal Henderson MS, CSCS

Training and racing a cross country ski marathon well is quite a challenging task. In addition to the rigors of actually training for the event, preparing your skis with the right wax, and knowing how to pace yourself appropriately, comes the daunting task of staying fueled and hydrated in one of the world's most energetically demanding sports. Energy expenditure (in terms of Calories per minute) for trained cross country skiers has been shown to be among of highest of any athletes in any sport. This is due to the fact that both the upper and lower body musculature are highly involved in Nordic skiing. Both classical (AKA diagonal stride) and freestyle (AKA skating or skate skiing) styles are contested in cross country ski races, and there is very little difference in the energy demand in both techniques. One of the main differences between the two techniques is that freestyle skiing tends to be a little faster than classical skiing in most situations. A typical cross country ski marathon will be between 40 and 50 kilometers (24.8 and 31 miles) long, and while the top athletes may finish the event in just under 2 hours, most athletes take at least 2-3 hours or more to complete the race.

In racing marathon distance events, the concept of pacing is crucial to your overall performance. When you ski at a moderate pace you might expend between 600 and 800 calories per hour for averaged size men, or 400-600 calories per hour for an averaged size woman, and that energy will come from burning a mix of carbohydrate and fats. As you work harder, energy expenditure will increase to 900-1200 calories per hour for men, and 650-900 calories for women, with the overwhelming majority of it (75-95%) coming from carbohydrate metabolism. This can cause a problem in sustained skiing, as men typically have about 350 to 450 grams of carbohydrate (or 1400-1800 calories) and women typically have 250-350 grams of carbohydrate (or 1000 to 1400 calories) stored and available for use by the muscles IF they have topped off muscle glycogen stores. If you do the math, an athlete might only have about 1.5 hours of stored carbohydrate energy available at the start of a marathon event. This means that taking in fuel during the race is absolutely necessary to maintain race effort for the duration of the event. Also, this brings to light the importance of improving your ability to burn fats as a fuel.

To improve the ability to burn fat as a fuel, you need to increase the amount of mitochondria in the muscle...as it is within the mitochondria that fatty acids and carbohydrates are oxidized - or broken down with oxygen to get energy. This is typically referred to as aerobic metabolism. To improve your body's ability to generate energy from the aerobic system, a high volume of training at relatively easy intensities is required. Some coaches and athletes refer to this type of training as LSD - or long slow distance or Base training. Whatever you call it, training like this is necessary to improve both aerobic capability, as it is to building the musculoskeletal integrity necessary to tolerate more intense training. Years of endurance training continue to improve the aerobic system, and this is why it takes many years of training to reach a peak of endurance capability. So, one of the important things to remember as it relates to cross country ski marathon training is that you need plenty of aerobic training to be able to improve the body's ability to burn fat so that you can make your carbohydrate stores last longer.

Fueling during a cross country ski marathon is challenging in trying to maintain your pace and rhythm and stay on a fueling scheduling. Recommended carbohydrate intake ranges between 30-50 grams per hour for women and smaller men, and 40-80 grams per hour for men and larger women. I do believe that some athletes will be capable of ingesting more than this, but most research shows that absorption of carbohydrate at rates greater than this is unlikely. In addition to the need for carbohydrate, hydration is still a factor in winter endurance sports. Just because you aren't seeing your sweat doesn't mean that you aren't sweating. I recommend skiers to try to establish their fluid losses by doing pre/post ski weight checks, but the general idea of ingesting 16-32 ounces of fluid should be a starting point. Because of the lower temperatures typical of Nordic ski races, a fluid replacement drink with sodium will help keep the fluids from freezing. I am a big fan of using hydration packs while skiing, as it's easy to grab the hose and stick is in your mouth - even with your poles and straps. Using water bottles is a bit more challenging, and

usually requires un-buckling at least one pole strap. As a practical note to help keep a hydration pack hose from freezing, after you finish taking a drink exhale air back into the hose, and blow all of the remaining fluid back into the reservoir. This will minimize the possibility of the hose freezing up completely and blocking your next attempt at a drink, and will also give you a few pre-pressurized sips or gulps the next time you drink.

If your fluid intake isn't helping you reach your total carbohydrate intake goals, I would recommend adding energy gels...or some other non-solid carbohydrate fuel. Beware of taking anything from feed stations - as often it has been sitting in the cold for a while, and might not be able to be eaten in a frozen state. If you are carrying gels, or other energy foods, try to tuck them into your clothing so they are next to your skin...but easily accessible. Putting energy gel packs in your gloves is not recommended - but stuffing them inside the forearm of your outfit is a good idea. Remember to adjust your intake based on not just your goal time - but how long the race is taking you in the early going. One marathon that I did in 2006 resulted in a spectacular bonk over the final 5K...and I lost 5 places in the final 1km! The cause of my unraveling was failing to adjust for the snow conditions which were deteriorating and skipping an unmanned aid station with 10K to go because I wasn't patient enough to stop and fill up my own cup of sports drink. Not stopping for a 30-second nutrition stop ended up costing me several minutes. So, hopefully you can learn from my mistakes!