HANDOUTS

PERFORMANCE NUTRITION FOR SNOWSPORT - Rebecca Dent, 2009

Introduction

Nutrition is fundamental for optimal performance and health for athletes, recreational participants, coaches and instructors.
An athlete or recreational participant who is adequately fuelled and hydrated will be guaranteed to improve their performance, increase quality of training and competition, exercise for longer, maximise recovery, reduce the risk of injury and illness and get more enjoyment out of the day.
Performance nutrition starts with eating a well balanced diet for good health and optimal performance. Eating a well balanced diet means all meals and snacks on carbohydrate based foods, including a serving of lean protein with each meal, eating 5+ portions of fruit and vegetables every day and maintaining good hydration by drinking regularly. Providing the body with enough energy, protein, fat, vitamins, minerals and fluid it needs.

Physiological Requirements of Snow Sport

Skiing and snowboarding are considered to be power sports that require anaerobic and aerobic endurance, muscle strength, flexibility, balance, agility, co-ordination, control and concentration.
When training, competing and recreational skiing/snowboarding extends for hours and consecutive days energy, nutrient and fluid demands are going to be high.
Sub optimal levels of energy fluid and nutrients are likely to impair all of the above physiological needs.

Environmental Effects of Cold and Altitude

Living and performing in the cold and at altitude increases the need for energy and fluids compared to at sea level.
With a reduction in temperature and increase in height physiological adaptations are required in order for the body to cope with the surrounding environment and maintain homeostasis (normal day to day functioning of the body). It can take up to a few weeks to fully acclimatise to this environment.
The effects of living and training in the cold and at altitude;

- Increase in energy requirements.
- Increased reliance on carbohydrate as energy.
- Increased reliance on blood sugars to provide this energy.
- Increase in fluid requirements.
- Suppression of thirst and reluctance to drink cold drinks.
- Suppression of appetite.
- Additional requirement for vitamins and minerals to provide antioxidants to cope with increased stress caused by cold and altitude.
- Access and availability of food and fluids.
- Add this to the demands of sustaining training, competition and daily exercise nutrition for optimal performance can become challenging without a nutritional strategy which involves planning, preparation and organisation.

Nutrition

Carbohydrate is the main energy supply for the brain, body and the exercising muscles. Carbohydrate is stored in the muscles, liver and blood ready to use for exercise, but the body only has a limited amount of storage space for carbohydrate equivalent to approximately 2 hours exercise, therefore carbohydrate stores need to be topped up regularly.

The aim of a nutritional strategy is to make sure the muscles and liver are well stocked before exercise. Energy levels are then topped up during exercise to maintain blood glucose (carbohydrate) levels and supplement the muscles with energy in addition to providing the brain with its only source of fuel.

The more carbohydrate available in the body the longer you can skilfully ski or snowboard one run after another and the faster you can go.

To make sure the athlete is getting enough energy it is important to eat frequent meals and snacks that are high in carbohydrates throughout the day. The more you exercise the more you need to eat.

High Carbohydrate Based Foods e.g.: Breads, breakfast cereals, pasta, egg noodles, cous cous, rice, potatoes and crackers.

High Carbohydrate based snacks e.g.: Fruit, cereal bars, fruit loaf/buns, sweet breads, malt loaf, plain sweet biscuits, pancakes, scones, flapjack, bowl of cereal, toast, jelly sweets, milk, smoothies, fruit juice, sports drinks.
It is important to consider the timing of your meals and snacks and the type of carbohydrate consumed to allow the food to be digested and for the energy to become available for exercise.

Nutrition for Training: Snow and Land
Before
2-4 hours
Have a high carbohydrate, low fat meal based on complex carbohydrates *e.g. Breakfast cereal, wholegrain toast with banana and honey, sandwich with lean meat and salad, jacket potato with beans, chilli with rice, tomato based pasta dish (see table for more examples).*
1-2 hours

High carbohydrate based snack *e.g. bowl of cereal, toast + banana, fruit salad and yoghurt, cereal bar and smoothie, soup with roll, ham sandwich.*

30-60minutes

Eat a carbohydrate based snack that is easy to digest if it has been longer than 2hours since your last meal *e.g. Ripe banana, white bread jam sandwich, bowl of frosties, cereal bar, fruit juice, sports drink, milk, smoothie, low fat milkshake (see table for more examples).*

During (Exercise > 1 hour)
Consume an easy to digested carbohydrate snack *e.g. cereal bar, banana, dried fruit, sports drink, jelly sweets, jaffa cakes, flapjack, sports gel (see table for more examples)* for every hour of training

Eat little and often this will keep energy and blood glucose levels topped up and less likely to cause any stomach discomfort.

Quantities and types of snacks and meals that can be consumed that will not cause stomach discomfort around exercise will depend on each athlete.

Recovery
Recovery between skiing and snowboarding lessons and days of exercise ***is the most important phase.*** This enables the athlete to be able to train and train again to the best of their ability and achieve performance improvements such as skill, speed, endurance and strength. Gradual carbohydrate depletion due to inadequate intake can occur over days and be much more subtle.

For the recreational participant this means adequately refuelling and rehydrating at the end of the day ready for another day on the piste.

For the athlete this often includes replenishing energy and fluid levels between sessions for x2 day training and refuelling and rehydrating ready for the next day.

The body is more efficient at replenishing energy stores straight after exercise and this is particularly important when the athlete has 2 training sessions per day.

Immediately after (within 30minutes)

Eat a carbohydrate snack every hour *e.g. cereal bar, fruit, sandwich, bowl of cereal* and keep sipping on fluids until the next meal *e.g. water, squash, sports drink.*

Nutrition for Training cont.

Strength & Conditioning
It is important to meet daily energy demands when training to improve muscle strength.
Eating a snack or meal as appropriate containing both carbohydrate and protein either immediately before or after a gym session will help to maximise adaptations to training. The carbohydrate will provide the working muscles with energy and enhance absorption of the protein which will be used to rebuild, repair and remodel new muscle.

Immediately before or after:
Snack/meal containing approximately carbohydrate and protein *e.g. Low fat milkshake, yoghurt + banana, large bowl of cereal, recovery sports drink (Lucozade, SIS, Powerade), chicken sandwich, tuna and sweetcorn pasta, beans and egg on toast.*

During
<1 hour
Sip regularly on water to maintain hydration.
>1hour
Alternate between a sports drink and water to provide you with energy and fluids through out the session and prevent early fatigue.

Recovery As above.

Effects of being Carbohydrate Depleted on Performance include;

- Reduced power output.
- Tire early in exercise.
- Poor mental function.
- Reduced co-ordination.
- Poor training gains.
- Increase risk of illness and injury.
- Delayed shivering response.

Hydration for Training

Fluid requirements are higher in the cold compared to temperate environments i.e. cold air is dry by warming and humidifying this air respiratory fluid losses rise, increase in dieresis (urination), reduced thirst and heavier clothing is worn to keep warm which contributes to sweat loss.
Exercising generates heat causing our bodies to increase in temperature, in order to keep cool we sweat. Wearing more layers of clothes, carrying heavy equipment, 'hiking' the mountain and on sunny winter days will lead to further increases in sweat loss. The more we sweat the more fluid we need to replace.
Dehydration of as little as 2% will increase cardiovascular strain and impair performance. Adequate daily hydration is crucial for both performance and health.
To maintain hydration drink plenty regularly through out the day *e.g. water, squash, teas, coffee (if habitual), fruit juice and milk all count.*

Avoid starting training or competition feeling thirsty as by this point likely to be 2% dehydrated.

Have a drink with all meals *(approx 500mls or 2 ½ glasses)* and snacks *(approx 250mls or 1 large glass).*

Be prepared carry a drinks bottle through out the day and make a conscious effort to drink.

Plan ahead making sure fluids are available to drink through out the day.

Encourage athletes to drink before during and after exercise.

Before
2hours
Drink at least 500-750ml of fluid *e.g. water, squash, tea, coffee, sports drink, fruit juice and milk all count.*

30 minutes
Drink 250-500ml of fluid e.g. sports drink, water, squash.

(E.g. Drink 2-3 extra glasses of fluid at breakfast and lunch and 1-2 glasses prior to leaving for the slopes).

During
Drink regularly through out exercise if possible or drink plenty during the breaks e.g. sports drink, water or squash.

Aim to start drinking early in the exercise and sip regularly ***ideally a sports drink*** as this will help absorb the fluid better and reduce urine production which is useful when exercising in the cold.

After
Drink plenty by continuing to sip regularly on fluids to replace fluid lost during exercise and account for ongoing losses e.g. sweating, urine production and to be fully rehydrated ready for the next day (*E.g. drinking in the bus on way back down to accommodation).*

The effects of dehydration include;

- Tire sooner in the day.
- Impaired concentration and focus.
- Exercise will feel harder to do.
- Reduced muscle activity.
- Increase in carbohydrate metabolism.
- Increased heart rate.
- Increase risk in frost bite.

Practical Implications for the Coach/Instructor

1. During exercise carry a rucksack to take supplies and/or money to buy something in the mountain cafe.
2. Allow time for a toilet stop before hitting the chairlift.
3. Allow for stoppages during the day to provide an opportunity to drink or buy fluids from cafe/shop.
4. Hot chocolate is an ideal drink to have in breaks this provides a source of energy, fluid, help warm you up and will lift mood and morale.
5. Lunch breaks in the day are important, warm foods provide a boost to temperature e.g. Soups, breads, chilis, toasted sandwiches, pasta and rice dishes, baked potatoes.
6. For athletes place bags at the bottom or the top of the run or leave bags in a communal place that is safe and easy to access.
7. Have a communal area on the slopes as a 'food station' to dump all bags.
8. Sitting on a chair lift is an ideal opportunity to encourage athletes/recreational participants to drink.
9. Top tip to prevent drinks from freezing *e.g. keep them close to your body, wrap them in some extra clothing with a heat pad (e.g. pair of socks) or heat the drink prior to leaving for the slopes, if using a camel back/platypus to prevent the tube from freezing blow back into the mouth piece after drinking.*
10. Encourage the athletes to monitor hydration, a simple way to see if you are dehydrated is to check the colour of your urine, it should be straw colour, the darker the colour the more dehydrated you are.

Signs and Symptoms of Low Energy Levels and Dehydration

Drowsiness, weakness, change in usual behaviour or performance, low mood or motivation, impatience, irritability, weakness, early fatigue, sluggish feeling, reduced work rate, feeling chilly, generally unwell.

Nutrition for Competition

In the days leading up to competition the athlete should be well fuelled and hydrated and avoid alcohol to fully replenish muscle carbohydrate stores and fluid levels.

On the day of competition it is imperative to maintain blood glucose and fluid levels for optimal concentration, focus, quick decision making, skill and prevent early fatigue.

Before
2-3 hours
(Consider time of race/run/event)
Choose easy to digest carbohydrate foods, keeping the fibre low *e.g. bowl of cornflakes with white toast and honey, brioche with large glass of fruit juice, baguette with honey/jam, crepes with lemon and sugar.*
In the hours leading up to an event maintain blood glucose and fluid levels by eating little and often on easily digested carbohydrate foods and sipping on *fluids e.g. sports drinks, gels, jelly sweets* (I.e. during course inspection or warm up).
If appetite is reduced with pre competition nerves a sports drink is ideal at providing both energy and fluid and reducing the need to go to the toilet which may help when standing at the top of a run waiting to start a race.
In between runs/heats athletes need to top up energy and fluid levels

E.g. to achieve this;

1. Have an area at the top or the bottom of a run where foods and drinks can be accessed easily by the athletes.
2. Snacks and fluids can be eaten on the chair lift.

Avoid trying anything new on day of competition this may cause stomach upset or the athlete may dislike so then will not eat compromising performance.
Practice all competition nutrition strategies, foods and fluids during training.
Plan and prepare in advance and organise meals and provision of *snacks e.g. plan a days competition menu, purchase suitable snacks, pre-order meals, investigate facilities at the venue to determine suitable eateries.*

Apres Ski and Alcohol

Apres ski is part of the culture of winter sports.
Much of this time involves eating rich foods and drinking alcohol. Over eating on high fat rich foods and drinking alcohol can make you feel groggy, impair performance and affect your ability to ski or snowboard safely.
Evening times should be thought of as recovery time in which you should be refuel and rehydrate after a day on the slopes.

The effects of alcohol include;

- Impairs the replenishment of carbohydrate to the muscles inhibiting recovery and subsequent bouts of exercise.
- Causes dehydration by stimulating urine production.
- Reduces aerobic capacity and the ability to maintain usual exercise period.
- Impairs skilled movement, judgement and concentration.
- When an athlete or recreational participant is under the influence they are likely to forget about eating and drinking to replace energy and fluid.
- Symptoms of hangover including tiredness, nausea, less alert, generally unwell will effect performance.
- Increase risk of injury as result of behavioural effects causing inhibition, increased aggression and impaired motor control.
- Delays recovery from injury by reducing blood flow away from the site.

Athletes:

Avoid alcohol 24-48hrs before training or competition.
Follow nutritional goals for recovery before alcohol is consumed.
Avoid binge drinking and if occasionally celebrating, limit intake to 2-4 units in that day.
Drink a large glass of water for every alcoholic drink.
Have an alcohol policy in place during camps.

Recreational Participants:

A carbohydrate containing snack should be eaten straight off the slopes e.g. cereal bar, sweet biscuits, fruit cake, flapjack, fruit bread, crepes, pancakes, fruit juice, sweet biscuits, sandwich, bowl of cereal.
A high carbohydrate dinner should follow based on breads, potatoes, pasta, rice served with extra bread and plenty of water available at the table to drink.
Accidental hypothermia victims often have high levels of alcohol in their blood as alcohol causes a fall in body temperature and can potentially inhibit shivering.
Avoid drinking alcohol during the day.
Alcohol should be consumed in moderation, drink a large glass of water for every alcoholic drink.

Travel and Foreign Foods

Training and competing in different countries places an additional challenge on the athlete meeting their nutritional goals. Being faced with unfamiliar foods and a foreign language can make it difficult in choosing appropriate food items.

Be prepared and Plan ahead;

1. Be aware of the food and food preparation facilities that are available to you when you arrive and plan strategies ahead.
2. Investigate the country of origin before you leave finding out about traditional food and drinks.
3. Accommodation: Book with meals in mind or phone the manager/catering department to determine if you can organise a pre arranged set menu. Self catering accommodation will enable you to prepare your own meals and snacks.
4. On arrival find out about local amenities available such as food outlets, supermarkets, venue catering, restaurants, cafes along with opening and closing times.
5. Eating out: Try to stick to eating similar foods as back home and order meals with plenty of breads, potatoes, pasta and rice.
6. Avoid fried and convenience foods.
7. Take a provisional supply of snacks with you or advise athletes to pack extra items *e.g. cereal, cereal bars, powdered sports drinks, sweet biscuits (jaffa cakes, ginger nuts, garibaldi), powered milk, dried or tinned fruit.*

The Young Athlete

This is even more crucial for young athletes to make sure they are consuming a well balanced diet and eating enough energy. Unlike adults in young athletes their bones, hearts, lungs and muscles are still growing and Young athletes use more energy than adults during the same activity. It is vital for young athletes to get the right amount of energy and nutrients to:

1. Support growth and development.
2. Sustain training and competition.

Simple nutritional advice to help meet nutritional needs include;

- To make sure the young athlete is getting enough they need to have frequent meals and snacks that are high in carbohydrates and a balance of all the other nutrients i.e. protein, fats, vitamins and minerals.
- Do not skip meals.
- Encouraging them to drink plenty regularly through out the day.
- Avoid staring exercise feeling thirsty.
- Be prepared and pack snacks and drinks to take to the slopes e.g. putting cereal bars, sweets into their pockets, having one communal bag of supplies, taking money in case they run out of food.
- Plan meal and snack stoppages during training *e.g. place bags at bottom or top of run or have a communal place to keep all food and drinks.*

- Eat and drink regularly during training *e.g. water, sports drinks, squash, hot chocolate, biscuits, cereal bars, sweets.*

- Eat and drink immediately after training *e.g. leave snacks in the bus to eat when leaving the slopes or have food and drink items ready to eat when arriving back at accommodation e.g. hot chocolate, squash, water, bowl of cereal, flapjack, cereal bars, fruit, sandwich or baguettes.*
- To help meet energy needs foods high in added sugars and fat can then be added to the diet *e.g. puddings, sweets, biscuits, muffins, buns, pastries, crisps, chocolate and soft drinks (preferably not fizzy drinks).*

Summary

Optimal Performance requires Optimal Nutrition!

1. Base all meals and snacks on carbohydrate foods and drinks.
2. Eat little and often before during and after exercise.
3. Drink regularly throughout the day.
4. Have a drink with all meals and snacks.
5. Sports drinks are ideal before, during and after exercise.
6. Monitor pee colour.