

Fuelling Peak Performance Workbook

Module 3

Hacking Your Before and After

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Pre and Post-Exercise Nutrition

Outcomes from Module 3

- ★ Possess the tools and strategies to plan your food and fluid intake before, during and after training
- ★ Practical tips on meals, snacks and products
- ★ Know how to tweak fat, protein and carbohydrate to achieve performance goals – and be clear on how much and how often.

Preparing and fuelling the body for sport and exercise

All exercise and muscular work requires the expenditure of stored energy and there are several energy sources available to the muscles.

Eating a meal or snack before exercise will give our bodies the opportunity to top up glycogen stores in the muscles and liver and therefore the energy to workout harder and longer. Ideally a meal should be consumed 3-4 hours before exercise and a snack 1-2 hours before exercise. This gives the body time to digest and absorb the food before the training session starts. We don't want our digestive systems busy during training when our bodies needs to be focusing on delivering energy to muscles. These 'ideal' time frames are not always possible of course, especially when we are talking about early morning (or what seems like the middle of the night!) training (more about that later).

The pre-exercise meal or snack should provide carbohydrate, which is the key fuel source for muscles during exercise. Beginning a training session with no fuel and low carbohydrate stores will inevitable lead to fatigue and reduced endurance, intensity and stamina. However, many people do this on a daily basis and wonder why they underperform and are continually tired.

The amount of carbohydrate should be specific to your level of activity and overall energy needs. The energy cost of an activity such as running, swimming or cycling is directly proportional to the speed and distance travelled. For activities where the body weight needs to be supported, body weight is also an important factor, which explains the emphasis on low body fat levels in marathon runners.

Foods eaten before exercise should contain carbohydrate, be low in fat and contain moderate amounts of fibre to make digestion easier and avoid stomach upset. Fluid is also an important factor in preparing for a training session.

Pre-training meal ideas (3-4 hours)

- ★ Fruit toast with ricotta and banana
- ★ Baked potato with corn/cheese/baked beans
- ★ Baked beans or spaghetti on toast
- ★ Breakfast cereal with milk
- ★ Sandwich with meat and salad filling
- ★ Fruit salad or berries with yoghurt
- ★ Pasta or rice with a low fat sauce
- ★ Pita bread wrap with tuna and salad

Pre-training snack (1-2 hours)

- ★ Fresh fruit
- ★ Canned fruit
- ★ Tub of yoghurt
- ★ Cereal/muesli bar
- ★ Flavoured milk
- ★ Fruit bun or fruit scone
- ★ Up n Go or similar drink
- ★ Breakfast cereal and milk

What if appetite is a problem?

For some people eating before a training session is can be a problem due to discomfort or lack of appetite. Training your stomach to accept food is similar to training your muscles to work hard, it takes time and effort. Liquid meals can be a great starting point as they are easily digested and not too bulky. Try liquid meals such as low fat milkshakes, fruit smoothies, fresh flavoured milk drinks or tetra paks such as Up and Go. Many teenagers love the convenience of these liquid meals.

What about early morning training?

Its dark outside and your students and athletes are rolling reluctantly out of bed for an early morning training session. Their entire body is still in sleep mode and that includes their stomach. Eating at this point in the day can sometimes seem so wrong and it's a real struggle to get anything at all down. It is inevitable that some of the timing rules that we just talked about go straight out the window, because there is simply not the ideal 1-2 or 3-4 hours before exercise available. Eating at this point in the day can sometimes seem so wrong and it's a real struggle to get anything at all down. It is inevitable that some of the timing rules that we just talked about go straight out the window, because there is simply not the ideal 1-2 or 3-4 hours before exercise available. It is still very important that they have something to eat as while asleep, it is possible to lose around two-thirds of energy stores just through sleeping. If this seems an impossible task, encourage them to organise their snack or Breakfast Number 1 the night before. It's best to start small and work up. The payoff will be worth it and you get the most out of them in a training session.

If a pre-exercise snack is not eaten, you are basically asking your body to perform without petrol and it is never a winning combination. Your students and athletes may need some convincing but won't know how good they can feel until they have tried it.

During Exercise

During low intensity exercise, most of the energy demand is met by the breakdown of fat (which is why we tell individuals who are carry too much weight to exercise longer at moderate intensity rather than short and hard).

As the exercise intensity increases, the total energy demand increases and the contribution of carbohydrate increases (especially muscle glycogen). Carbohydrate is stored in the muscles and liver as GLYCOGEN. At high intensity efforts virtually all the energy demand is met from carbohydrate with no contribution of fat. Glycogen is available immediately within the muscle cells whereas fatty acids and glucose from the liver have to be transported from the liver into the bloodstream. Small amounts of fat are stored within the muscles but these do not make a major contribution to energy production.

If muscle and liver glycogen is at full capacity (enough carbohydrate has been consumed), your stores will last for approx. 90 minutes depending on several factors including:

- ★ Exercise intensity
- ★ Exercise duration
- ★ Training status

The higher the intensity of the exercise the faster the glycogen is used and at very low exercise intensity, the muscle glycogen falls very slowly. At high exercise intensities fatigue is reached before all the muscle glycogen is used, when fatigue is reached after 1.5 - 2 hours, muscle glycogen is close to zero.

If training for longer than an hour, glycogen stores will need to be replenished. It is essential that carbohydrate intake begins well before the first signs of fatigue are apparent. What type of food and fluid is used will depend on the logistics of the activity. For a swimmer, it is difficult to consume food but possible to drink sports drink, which will provide carbohydrate and electrolytes. Cycling allows more solid food whilst running longer than an hour really only allows for carbohydrate gels and sports drink. Team sports can often accommodate both fluid and fruit. Sometimes it can seem like a major hassle to carry fuel belts and bottles but the benefits in performance far outweigh the initial logistical problems.

The amount of carbohydrate required during training is as follows:

Exercise	Length of time	Carbohydrate
Brief exercise	< 45 min	not required
Sustained high intensity exercise	45 - 75 min	small amounts (including mouth rinse)
Endurance exercise	2+ hrs	30-60g/hr
Ultra-endurance exercise (glucose/fructose mix)	4+ hrs	Up to 90g/hr

Foods containing 25-30g of carbohydrate include:

- ★ 1 carbohydrate gel
- ★ 1 large banana
- ★ 2 slices of bread with jam/vegemite
- ★ 400ml sports drink
- ★ 1 muesli bar or ½ sports/energy bar
- ★ ½ packet of carbohydrate ‘chews’ or lollies
- ★ 25-30g lollies (not the preferred option)

Don’t forget! If carbohydrate is consumed without enough water, this can result in side effects such as stomach upset, abdominal pain and dehydration. This will ultimately lead to poor performance and in some cases, inability to finish a training session or race. The aim should be to consume around a cup (250ml) of water per carbohydrate item.

Protein and Caffeine

Research has shown that there is no need for protein during training. Other research has shown that consuming caffeine before an exercise session may have a glycogen sparing effect through using more fat as fuel but this requires more investigation. A cup of coffee is not harmful before an early morning training session and may in fact wake you up! Caffeine will be covered in more detail in the last week when we discuss supplements.

Recovery

A common complaint of athletes is fatigue and inability to recover. Quite often this is a result of poor recovery practices and insufficient carbohydrate. It is super important to replenish carbohydrate stores immediately after a training session or competition. Timing is everything and ideally should be within 15-30 minutes of finishing the session. It is very easy to waste time after training, talking to friends, teammates, gathering belongings or just generally milling around. As a coach or teacher, keep an eye on your watch or set the timer to remind your charges. They should be aiming for 50g carbohydrate within the 15-30 minute window and then following-up with something more substantial.

After hard exercise the recovery of glycogen is a relatively slow process and normally takes 24 hours. If adequate dietary carbohydrate is not consumed following exercise, recovery can take up to 7-10 days. Most athletes do not have this luxury.

If you students and athletes are training every day and if the diet does not contain adequate carbohydrate, the muscle glycogen will not recover between training sessions.

Protein is also very useful and essential for recovery – sports nutrition experts recommend 10-20g of protein alongside the 50g carbohydrate.

Some barriers to recovery after exercise are:

- ★ Limited time before next training session
- ★ Limited availability of high carbohydrate foods
- ★ Lack of appetite after training
- ★ Restricted energy intake to control body weight
- ★ Presence of muscle damage

There are a number of characteristics that are important to look at when choosing recovery foods:

- ★ Presence of other valuable nutrients: it is important that the majority of carbohydrate foods chosen in an athletes diet are nutrient-rich, that is they should supply some protein, vitamins and minerals.
- ★ Bulky or compact: the bulkiness of many of the more nutrient-rich foods is often a limiting factor for athletes to achieve the carbohydrate intake they need. Compact carbohydrate sources such as sugar and high-sugar foods, including jam, honey and confectionery as well as carbohydrate-containing drinks may provide a practical solution to getting enough carbohydrate.
- ★ Appeal and palatability.
- ★ Glycaemic index: We discussed this concept last week in Module 2. We know that carbohydrate foods can be classified according to how quickly it is digested and absorbed into blood as glucose. A food with a low G.I. factor, eaten 1-2 hours before an event, gives an athlete a winning edge by providing a slow-release source of fuel for the exercising muscles therefore, extending endurance. A high G.I. factor food given after exercise helps restore muscle fuel stores faster.

50g Carbohydrate Snacks

- ★ 600-800ml sports drink
- ★ 800ml cordial
- ★ 500ml juice or non-cola soft drink
- ★ 50-60g jelly beans or jelly lollies
- ★ 1.5 carbohydrate gels
- ★ 1 round thick jam or honey sandwiches
- ★ 2 muesli bars
- ★ 2 large pancakes
- ★ Bowl of pasta
- ★ 1 cup of creamed rice

* See handout at the back of the workbook for a full range of 50g carbohydrate snacks

Protein Supplementation

Research shows that consuming 10-20g of protein after intense exercise lasting longer than one hour aids recovery of muscles. This can be achieved through various foods but many athletes and active individuals choose to use commercial protein powders. A fact sheet detailing the breakdown of types of protein powders can be downloaded from <https://www.sportsdietitians.com.au/factsheets/supplements/protein-supplementation/>

Snacks containing 10-20g protein plus carbohydrate

- ★ 600ml low fat flavoured milk
- ★ 4 heaped tablespoons skim milk powder plus 250ml low fat milk
- ★ 1 Go Natural Protein Bar
- ★ 2 eggs or 100g tin tuna plus 2 slices of bread
- ★ 420g can baked beans

“Obstacles are those frightful things you see when you take your eyes off your goal.”

- Henry Ford - Founder of Ford Motor Co.
