



Are lollies at the cutting edge?

Here's a topic designed to create heated debate among coaches. Should lollies be considered a good post-training or post-competition recovery food? Some people are supportive. After all, lollies provide a source of carbohydrate that is easily eaten and loved by all. Therefore, we can safely assume that lollies provide a practical choice that will ensure the guidelines to refuel after exercise are met. Some sports dietitians even make up individualised 'recovery bags' for their athletes based on lollies - so this must mean that they are a good post-exercise snack, right? However, other people are ardent opponents of this practice. They think that lollies are made from sugar, which is a toxic and dangerous substance. They argue that eating lollies causes an insulin burst, followed by a rapid drop in insulin levels and a sugar craving - a vicious eating cycle. So, who is right?

What are the priorities for recovery nutrition?

Recovery is a challenge for athletes who are undertaking two or more sessions each day, training for prolonged periods, or competing in a program that involves multiple events. Between each work-out, the body needs to adapt to the physiological stress. In the training situation, with correct planning of the workload and the recovery time, adaptation allows the body to become fitter, stronger and faster. In the competition scenario, however, there may be less control over the work-to-recovery ration. A simpler but more realistic goal may be to start all events in the best shape possible. Recovery encompasses a complex range of process that include:

- restoring the muscles and liver with expended fuel
- replacing the fluid and electrolytes lost in sweat
- allowing the immune system to handle the damage and challenges caused by the exercise bout
- manufacturing new muscle protein, red blood cells and other cellular components as part of the repair and adaptation process.

The importance of each of these goals varies according to the workout - for example, how much fuel was utilised? Was muscle damage caused? Did the athlete lose much sweat? Was a stimulus presented to increase muscle protein? A pro-active recovery means providing the body with all the nutrients it needs, in a speedy and practical manner, to optimise the desired processes following each session. State-of-the-art guidelines for each of the following issues are presented below:

- **Refueling**

The muscle can restore its fuel (glycogen) levels by about 5 per cent per hour, provided that enough carbohydrate is eaten. Depending on the fuel cost of the training schedule and the need to fuel up to race, a serious athlete may need to consume 6-10g of carbohydrate per kg body weight each day (300 -700g per day). If the time between prolonged training sessions is less than 8hrs, it makes sense to use all of this period for effective refueling. To kick-start this process an intake of at least 1g/kg of carbohydrate - 50-100g for most athletes - is needed. This has led to the advice that athletes should consume carbohydrate - either their next meal, or at least a snack - as soon as possible after an exhausting workout, to prepare for the next.

- **Rehydration**

Most athletes finish training or competition sessions with some level of fluid deficit. In hot conditions or after strenuous sessions, fluid losses are usually large and require a focused effort to rehydrate after the workout. In this case, comparing pre- and post-session measurements of body weight can provide an approximation of the overall fluid deficit. Athletes may need to replace 150 per cent of the fluid deficit to get back to baseline - for example, if you are 2kg





lighter (2 litres lighter) at the end of the session, you will need to drink 3 litres of fluid over the next hours to fully replace the existing and ongoing fluid losses.

- **Immune System**

In general, the immune system is suppressed by intensive training, with many parameters being reduced or disturbed during the hours following a work-out. This may place athletes at risk of succumbing to an infectious illness during this time. Many nutrients or dietary factors have been proposed as an aid to the immune system - for example, vitamins C and E, glutamine, zinc and echinacea - but none of these have proved to provide universal protection. The most recent evidence points to carbohydrate as one of the most promising nutritional immune protectors. Consuming carbohydrate during and/or after a prolonged or high-intensity work-out has been shown to reduce the disturbance to immune system markers. Carbohydrate intake may be beneficial for a number of reasons. For example, it reduces the stress hormone response to exercise thus minimising its effect on the immune system. It also supplies glucose to fuel the activity of many of the immune system white cells.

- **Muscle Repair and Building**

Prolonged and high-intensity exercise causes a substantial breakdown of muscle protein. During the recovery phase there is a reduction in catabolic (breakdown) processes and a gradual increase in anabolic (building) processes. Recent research has shown that early intake of essential amino acids from good quality protein foods helps to promote the increase in protein rebuilding. In fact, protein consumed immediately after, or in the case of resistance training work-outs, immediately before the session, is taken up more effectively by the muscle into rebuilding processes, than protein consumed in the hours afterwards. However, the protein needs to be consumed with carbohydrate foods to maximise this effect. Carbohydrate intake stimulates an insulin response, which potentiates the increase in protein uptake and rebuilding.

How does recovery eating fit into the big picture of nutrition goals?

For the athlete who is undertaking two or more training sessions each day, eating for recovery plays a substantial role in the daily food schedule and in total nutrient uptake. Either meals (which generally supply all the nutrients needed for recovery) must be timetabled so that they can be eaten straight after the work-out, or special recovery snacks must be slotted in to cover nutrient needs until the next meal can be eaten. These recovery snacks then need to be counted towards total daily intake.

For athletes who have high-energy needs, these snacks add a useful contribution towards the total day's kilojoule needs. When there is a large kilojoule budget to play with, it may not matter too much if the snacks only look after the key recovery nutrients - for example carbohydrate - or contain extra kilojoules from fat. On the other hand, for the athlete whose skinfold goals require a careful attitude to kilojoule intake, recovery snacks may need to be low in fat, and count towards meeting daily needs for vitamins, minerals and other nutrients. Snacks that can supply special needs for calcium, iron or other nutrients may double up as recovery snacks and good overall choices.

What are the practical considerations for recovery eating?

Some athletes finish sessions with a good appetite, so most foods are appealing to eat. On the other hand, a fatigued athlete may only feel like eating something that is compact and easy to chew. When snacks need to be kept or eaten at the training venue itself, foods and drinks that require minimal storage and preparation are useful. At other times, valuable features of recovery foods include being portable and able to travel interstate or overseas without penalties from customs officials, being individually





packaged and sealed for the benefit of lengthy nights of drug testing, or being labelled with nutritional information so that the athlete can check how much they need to consume to meet their recovery goals. Situations and challenges in sport change from day to day, and between athletes - so recovery snacks need to be carefully chosen to meet these needs.

What is the bottom line for lollies?

For occasions or individual athletes, who want an easily consumed source of simple carbohydrates, lollies are a suitable choice. Like many other carbohydrate foods, lollies will help in meeting refueling goals. However, lollies do not provide protein, fluid or other nutrients that could be important in other recovery processes. Therefore, other recovery snacks should be eaten in addition to, or instead of, lollies to fulfill the complete recovery picture. Many coaches complain that athletes don't stop at the 60g of lollies that might be needed to kick-start glycogen synthesis after a work-out or event - in fact, lollies often come in jumbo family size packs of 500g or more, and are likely to be consumed in excess. The bottom line is that each athlete needs to judge their recovery needs and plan an eating pattern that fits their total package. The following table provides ideas for snacks providing carbohydrate, as well as carbohydrate-protein combinations.

Carbohydrate-rich recovery snacks

- (50g CHO portions)
- 700-800ml sports drink
- 2 sports gels
- 500ml fruit juice or soft drink
- 300ml carbohydrate loader drink
- 60-70g packet jelly beans or jubes
- 2 slices toast/bread with jam or honey or banana topping
- 1 large chocolate bar (80g)
- 2 cereal bars
- 1 cup thick vegetable soup + large bread roll
- 115g (1 large or 2 small) American muffins, fruit buns or scones
- 300g creamed rice
- 300g (large) baked potato with salsa filling
- 100g pancakes (2 stack) + 30g syrup

Nutritious carbohydrate-protein recovery snacks

(contain 50g CHO + valuable source of protein and micronutrients)

- 250-300ml liquid meal supplement
- 250-300ml milk shake or fruit smoothie
- 1-2 sports bars (check labels for carbohydrate and protein content)
- 1 large bowl (2 cups) breakfast cereal with milk
- 1 large or 2 small cereal bars + 200g carton fruit-flavoured yoghurt
- 220g baked beans on 2 slices of toast
- 1 bread roll with cheese/meat filling + large banana
- 300g (bowl) fruit salad with 200g fruit-flavoured yoghurt
- 2 crumpets with thick spread peanut butter + 200ml flavoured milk
- 300g (large) baked potato + cottage cheese filling + glass of milk
- 200g (1/3 - 1/4 pizza) with chicken/meat and vegetables

FACT SHEET

