AIS Sports Nutrition - Football

AUSTRALIAN INSTITUTE OF SPORT

Recovery Nutrition

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 ratio. A simpler but more realistic goal may be to start all events in the best shape possible.

Recovery encompasses a complex range of processes that include;

- refueling the muscle and liver glycogen (carbohydrate) stores
- replacing the fluid and electrolytes lost in sweat
- manufacturing new muscle protein, red blood cells and other cellular components

as part of the repair and adaptation process
• allowing the immune system to handle the damage and challenges caused by the exercise bout
The emphasis an athlete needs to place on each of these broad goals will vary according to the demands of the exercise session. Key questions that need to be answered include - How much fuel was utilised? What was the extent of muscle damage and sweat losses incurred? Was a stimulus presented to increase muscle protein?
A proactive 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

Muscle glycogen is the main fuel used by the body during moderate and high intensity exercise. Inability to adequately replace glycogen stores used up during a workout will compromise performance in subsequent sessions.
The major dietary factor in postexercise refueling is the amount of carbohydrate consumed. Depending on the fuel cost of the training schedule or the need to fuel up to race, a serious athlete may need to consume between 7-12 g of carbohydrate per kg body weight each day (350-840 g per day for a 70kg athlete) to ensure adequate glycogen stores. As an overemphasis on other nutrients, such as protein and fat, can easily replace carbohydrate foods within the athlete's energy requirements, careful planning of meals and snacks throughout the day is needed achieve the required level of intake (for more information on carbohydrate requirements for athletes, refer to the "Carbohydrate" Fact Sheet).
In the immediate post exercise period, athletes are encouraged to consume a carbohydrate rich snack or meal that provides 1-1.2 g of carbohydrate per kg body weight within the first hour of finishing, as this is when rates of glycogen synthesis are greatest. This is especially important if the time between prolonged training sessions is less than 8 hrs. The type and form (meal or snack) of carbohydrate that is suitable will depend on a number of factors, including the athletes overall daily carbohydrate and energy requirements, gastric tolerance, access and availability of suitable food options and the length of time before the next training session. Table 1 gives examples snacks providing at least 50g of carbohydrate.

Rehydration

The majority of athletes will finish training or competition sessions with some level of fluid deficit. Research suggests that many athletes fail to adequately drink sufficient volumes of fluid to restore fluid balance. As a fluid deficit incurred during one session has the potential to negatively impact on performance during subsequent training sessions, athletes need to incorporate strategies to restore fluid balance, especially in situations where there is a limited amount of time before their next training session.
Athletes should aim to consume 125-150% of their estimated fluid losses in the 4-6 hours after exercise (Refer to the "How much do athletes sweat?" Fact Sheet for advice on how to monitor fluid losses during exercise). The recommendation to

consume a volume of fluid greater than that lost in sweat takes into account the continued loss of fluid from the body through sweating and obligatory urine losses. Fluid replacement alone will not guarantee re-hydration after exercise. Unless there is simultaneous replacement of electrolytes lost in sweat, especially sodium, consumption of a large volume of fluid may simply result in large urine losses. The addition of sodium, either in the drink or the food consumed with the fluid, will reduce urine losses and thereby enhance fluid balance in the post exercise period. Further, sodium will also preserve thirst, enhancing voluntary intake. As the amount of sodium considered optimal for re-hydration (50-80 mmol/L) is in excess of that found in most commercially available sports drinks, athletes may be best advised to consume fluids after exercise with everyday foods containing sodium.
In considering the type of fluids needed to achieve their re-hydration goals, athletes should also consider the length of time before their next session, the degree of the fluid deficit incurred, taste preferences, daily energy budget, as well as their other recovery goals. With the latter, athletes can simultaneously meet their refueling, repair and contribute to their re-hydration goals by consuming fluids that also provide a source of carbohydrate and protein e.g. flavoured milk, liquid meal supplement.

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, which continues for at least 24 hours after exercise. Recent research has shown that early intake after exercise (within the first hour) of essential amino acids from good quality protein foods helps to promote the increase in protein rebuilding. Consuming food sources of protein in meals and snacks after this “window of opportunity” will further promote protein synthesis, though rate at which it occurs is less.
Though research is continuing into the optimal type (e.g. casein Vs whey), timing and amount of protein needed to maximise the desired adaptation from the training stimulus, most agree that both resistance and endurance athletes will benefit from consuming 15-25g of high quality protein in the first hour after exercise. Adding a source of carbohydrate to this post exercise snack will further enhance the training adaptation by reducing the degree of muscle protein breakdown. Table 2 provides a list of carbohydrate rich snacks that also provide at least 10g of protein, while Table 3 lists a number of everyday foods that provide ~10g of protein.

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 most recently probiotics - 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. Ensuring adequate carbohydrate stores before exercise and consuming carbohydrate during and/or after a prolonged or high-intensity work-out has been shown to reduce the disturbance to immune system markers. The carbohydrate

reduces the stress hormone response to exercise, thus minimising its effect on the immune system, as well as also supplying glucose to fuel the activity of many of the immune system white cells.

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

To optimise recovery from a training session, meals (which generally supply all the nutrients needed for recovery) must either 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.
For athletes who have high-energy needs, these snacks make a useful contribution towards their daily kilojoule requirement. When there is a large energy budget to play with, it may not matter too much if the snacks only look after the key recovery nutrients - for example carbohydrate e.g. sports drink. On the other hand, for those athletes with a low energy budget, recovery snacks will also need to contribute towards meeting daily requirement for vitamins, minerals and other nutrients. Snacks that can supply special needs for calcium, iron or other nutrients may double up as suitable recovery snacks. e.g. yoghurt

Real food Vs supplements

Many athletes fall into the trap of becoming reliant on sports food supplements, believing this to be the only and/or best way to meet their recovery goals. This often results in athletes “doubling up” with their recovery, consuming a sports food supplement that meets certain recovery goals e.g. liquid meal supplement, then following this up soon afterwards with a meal that would help them meet the same recovery goal e.g. bowl of cereal with fresh fruit. Unless constrained by poor availability or lack of time, athletes are best advised to favour real food/fluid options that allow them to meet recovery and other dietary goals simultaneously. This is especially important for athletes on a low energy budget.

What are some other 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. 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.

Table 1 - Carbohydrate-rich recovery snacks (50g CHO portions)
- 700-800ml sports drink
- 2 sports gels
- 500ml fruit juice or soft drink
- 300ml carbohydrate loader drink
- 2 slices toast/bread with jam or honey or banana topping

• 2 cereal bars
• 1 cup thick vegetable soup + large bread roll
• 115g (1 large or 2 small) cake style muffins, fruit buns or scones
• 300g (large) baked potato with salsa filling
• 100g pancakes (2 stack) + 30g syrup

Table 2 - Nutritious carbohydrate-protein recovery snacks (contain 50g CHO + valuable source of protein and micronutrients)
• 250-300ml liquid meal supplement
• 300g creamed rice
• 250-300ml milk shake or fruit smoothie
• 600ml low fat flavoured milk
• 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 + 250ml glass of milk
• 300g (large) baked potato + cottage cheese filling + glass of milk

Table 3 - Foods providing approximately 10g of protein.

Animal foods
• 40g of cooked lean beef/pork/lamb
• 40g skinless cooked chicken
• 50g of canned tuna/salmon or cooked fish
• 300 ml of milk/glass of Milo
• 200g tub of yoghurt
• 300ml flavoured milk
• 1.5 slices (30g) of cheese
• 2 eggs

Plant based foods
• 120g of tofu
• 4 slices of bread
• 200g of baked beans
• 60g of nuts
• 2 cups of pasta/3 cups of rice
• .75 cup cooked lentils/kidney beans