

# LUCOZADE SPORT SCIENCE:

## NUTRITION FOR RECOVERY

### KEY POINTS

- Recovery is the period immediately following exercise that allows the body (and its various components) to repair, regenerate and adapt for both short and long term gain.
- The three key nutritional areas for recovery include the provision of carbohydrate, protein and fluid.
- The most important factor affecting the storage of carbohydrate as muscle glycogen is the total amount of carbohydrate consumed.
- Protein is a key nutrient known to stimulate protein synthesis aiding the manufacture and repair of muscle tissue.
- The benefits of carbohydrate and protein ingestion appear to be increased when the two macronutrients are ingested together.
- Following exercise, individuals should be looking to fully replace any fluid and electrolyte losses that might have occurred during exercise.

### INTRODUCTION

The ability to recover fully from training and competition is important for all individuals. During periods of high training volume many people may train daily or even twice daily. Furthermore, there are a number of sports in which competition is divided into different periods providing short intervals for recovery, and there are other sports which require athletes to participate in different contests on the same day. In such instances, recovery may determine the extent to which adaptations occur over time, whilst in competition it may define successful performance.

Recovery can be defined as the period following exercise that allows the body (and its various components) to repair, regenerate and adapt for both short and long term gain. The three key nutritional areas for recovery include:

- Carbohydrate to help replenish the body's muscle glycogen stores.
- Protein to stimulate protein synthesis aiding the manufacture and repair of muscle tissue.
- Fluid and electrolytes to help restore and maintain fluid balance (hydration).

### CARBOHYDRATE

The most important factor affecting the storage of carbohydrate as muscle glycogen is the total amount of carbohydrate consumed. When the recovery time between exercise is short (0-4 h) the immediate consumption of carbohydrate results in higher rates of muscle glycogen storage compared with delayed feeding. However, when the recovery period is longer, assuming total carbohydrate intake is sufficient; there is no further advantage of ensuring early carbohydrate consumption. In these latter situations athletes can choose their preferred meal schedule according to what is practical and comfortable.

Carbohydrate can be consumed as either a series of snacks or large meals, although more frequent intake of smaller snacks may be useful in overcoming the discomfort often associated with eating

large amounts of bulky carbohydrate foods. When early carbohydrate consumption is necessary following exercise, consume moderate to high glycaemic index (GI) foods to stimulate the insulin response so critical to glycogen storage. General recommendations for carbohydrate intake during recovery are provided below. However, these should be fine-tuned with individual consideration of total energy needs, specific training needs and feedback from training performance.

### Current Carbohydrate Guidelines

- ▶ Immediate recovery after exercise (0-4 h): 1.0-1.2 g/kgBM/h at frequent intervals
- ▶ Daily recovery: moderate duration/low intensity: 5-7 g/kgBM/day
- ▶ Daily recovery: moderate to heavy endurance training: 7-12 g/kgBM/day
- ▶ Daily recovery: extreme exercise programme (4-6+h per day) 10-12 g/kgBM/day

NB g/kgBM/day: grams of nutrient per kilogram of body mass per day.

## PROTEIN

Protein is a key nutrient and its importance within the athletic diet has long been recognised, particularly in the area of recovery where protein is known to stimulate protein synthesis aiding the manufacture and repair of muscle tissue.

Whilst the role of protein within the athletic diet is well established, there is some controversy regarding the amount of protein needed by individuals. Currently, it is recommended that 1.2-1.7 g/kgBM/day protein is consumed (84-119 g for a 70 kg individual), with approximately 15-20 g taken within the first 60 min after endurance training. This protein requirement is generally met through the normal diet, although specialist protein products may be useful in the periods immediately after exercise to help promote recovery.

More recently, it has become common place to consume protein in combination with carbohydrate. Together carbohydrate and protein seem to have a larger effect on insulin, a key hormone influencing the uptake of carbohydrate in the muscle. However, the increased effect on muscle glycogen storage seems to be restricted to when carbohydrate intake might be below the threshold for maximal storage or feeding intervals are more than 1 h apart. However, when taken together, it seems the effect on protein synthesis is greater following resistance exercise compared to protein taken in isolation. Consequently, it is recommended that following high intensity training, or situations of high training/competition volume carbohydrate should be consumed together with protein.

Consume 15-20 g of protein within 60-120 min of exercise, preferably in combination with 1.0-1.2 g/kgBM carbohydrate.

## HYDRATION

The consumption of fluid before, during and after exercise is critical to help avoid dehydration and thus, the safe and effective functioning of the body. Following exercise, individuals should be looking to fully replace any fluid and electrolyte losses that might have occurred during exercise. This is best assessed by measuring body mass immediately before and immediately after exercise. For example, if you start exercise weighing 70 kg finish 69 kg then you have lost 1 kg in body mass as sweat (1 kg = 1 litre).

The main factors affecting post-exercise hydration are the volume and composition of the fluid consumed, whilst the aggressiveness of the strategy will depend on the amount of sweat lost and/or the timing of the next exercise bout. When rapid and complete restoration of fluid balance is necessary, plain water is not the ideal post-exercise hydration drink as it stimulates high urine flow and reduces the drive to drink. Ideally fluids consumed in recovery should contain sodium as this the primary electrolyte lost in sweat, in addition to aiding the retention of ingested fluid, stimulating thirst and also enhancing the absorption of carbohydrate in the small intestine.

Individuals are recommended to consume 1.5 litres (L) of fluid for each kilogram (kg) of body mass lost as sweat to help compensate for the inevitable urine losses that occur after exercise.

Consume the fluid over time as opposed to one large bolus.

## SUGGESTED READING

- Burke, L.M., Kiens, B. and Ivy, J.L. (2004). Carbohydrates and fat for training and recovery. *Journal of Sports Sciences*, 22, 15-30.
- Sawka, M.N., Burke, L.M., Eichner, E.R., Maughan, R.J., Montain, S.J. and Stachenfield, N.S. (2007). American College of Sports Medicine position stand: Exercise and Fluid Replacement. *Medicine and Science in Sports and Exercise*, 39, 377-390.
- Shirreffs, S.M., Armstrong, L.E. and Cheuvront, S.N. (2004). Fluid and electrolyte needs for preparation and recovery from training and competition. *Journal of Sports Sciences*, 22, 57-63.