NUTRIENT RECOMMENDATIONS FOR ATHLETES are low carbohydrate diets preferred?

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Low-carbohydrate diets have been a subject of discussion for over two decades. They have attracted attention as a means of losing weight and optimising blood glucose control, particularly in people with Type 2 diabetes. However, this approach is not safe or effective in sports and exercise.

IMPORTANCE OF OPTIMAL NUTRITION:

Optimal nutrition is vital for performance of physical activity, athletic performance and recovery from exercise. Special consideration should be given to choice of fuel, timing of nutrient intake and amount that is consumed, because training efforts and adaptations may be amplified by diet modifications.

Optimal nutrition is important to meet energy requirements, keep immunity intact, build and repair muscle, stabilize blood sugar levels, shorten recovery time and enhance adaptation following exercise. With optimal training methods, sensible nutrition and maximal physical adaptations, athletes would be able to perform to the best of their abilities.

As different fuel sources are preferred by the different energy systems (phosphagen, glycolytic and aerobic) intake of all 3 macronutrients (protein carbohydrate and fat) are essential to ensure optimal energy and fuel delivery during exercise.

Carbohydrates:

The major role of carbohydrate in human nutrition and exercise is the provision of energy. Carbohydrates are the main energy source for the glycolytic energy systems and are an important fuel source for the aerobic system as well. Adequate carbohydrates prevents muscle breakdown for energy. Carbohydrates are the main energy source for the brain and are required for the metabolism of vitamins and minerals. Carbohydrates are further needed to maintain blood glucose levels and replace muscle glycogen. Athletes need to consume adequate amounts to maintain body weight, health and maximize training effects.

Carbohydrate intake is influenced by age, gender, level of physical activity, sport-specific nutritional goals and environmental conditions. General carbohydrate recommendations for athletes range from 6-10 g/kg body weight per day and can even be as high as 8-12g/kg/d for ultra-endurance athletes. Athletes involved in moderate amounts of high intensity training typically need to consume a diet consisting of 55-65% carbohydrates (6-8g/kg/d) in order to maintain liver and muscle glycogen stores.

Protein:

Protein is required for muscle synthesis and repair, forms part of hormones & enzymes, is required for muscle contraction, acts as a lactic acid buffer, and is required for the transport of nutrients & oxygen.

Sufficient energy intake (carbohydrates) is needed for optimal protein and amino acid usage. If sufficient carbohydrates are not ingested, protein will be utilized to meet energy needs and protein thus becomes a very expensive source of energy. Protein recommendations for endurance, high intensity and strength training range from at least 1.2-1.7g/kg/d and can be as high as 2.2g/kg/d for certain strength training athletes.

Fat:

Fat forms an essential part of a healthy diet. Fat is an important energy source, forms part of enzymes, hormones & cell membranes, is associated with vitamin A, D & E absorption, is the primary fuel source for the heart, protects vital organs and suppresses appetite.

Fat intake should range from 20% to 30% of total energy intake. Fat is a source of energy that should form an essential part of the diets of athletes. Fat intake should not be neglected, but high-fat diets are not recommended for athletes either.

LOW CARBOHYDRATE DIETS IN SPORT:

Inadequate energy and carbohydrate intake relative to energy expenditure, compromises performance and negates the benefits of training. Low energy and carbohydrate intake will not sustain athletic training and has several detrimental effects:

1 Low carbohydrate diets are associated with decreases in resting metabolic rate.

It has been known for quite some time that the low calorie aerobic exercise model creates a much less efficient metabolism in the long run. Dietary restriction decreases basal metabolic rate (BMR) by 10-20% and a slowed BMR is a predictor of fat gain. When attempting to loose weight, it is rather recommended to combine an aerobic exercise regime with resistance training and moderate energy restriction. Resistance training increases lean muscle mass, that increases metabolic rate and contribute to weight/fat loss. The most reliable way to enhance BMR is through the development or maintenance of muscle tissue.

2 Chronic low energy intake results in poor nutrient intake, especially of micronutrients, which might lead to metabolic dysfunction. Poor nutrient intake leads to compromised immunity and affects overall health.

3 With limited energy intake, fat and lean muscle tissue will be utilized to fuel bodily processes, leading to loss of lean muscle mass. Decreased lean muscle mass leads to a loss of strength & endurance, compromised immunity, endocrine and decreased musculoskeletal function.

4 Decreased energy intake of 10%-20% will lead to weight loss without the athlete feeling deprived or overly hungry.

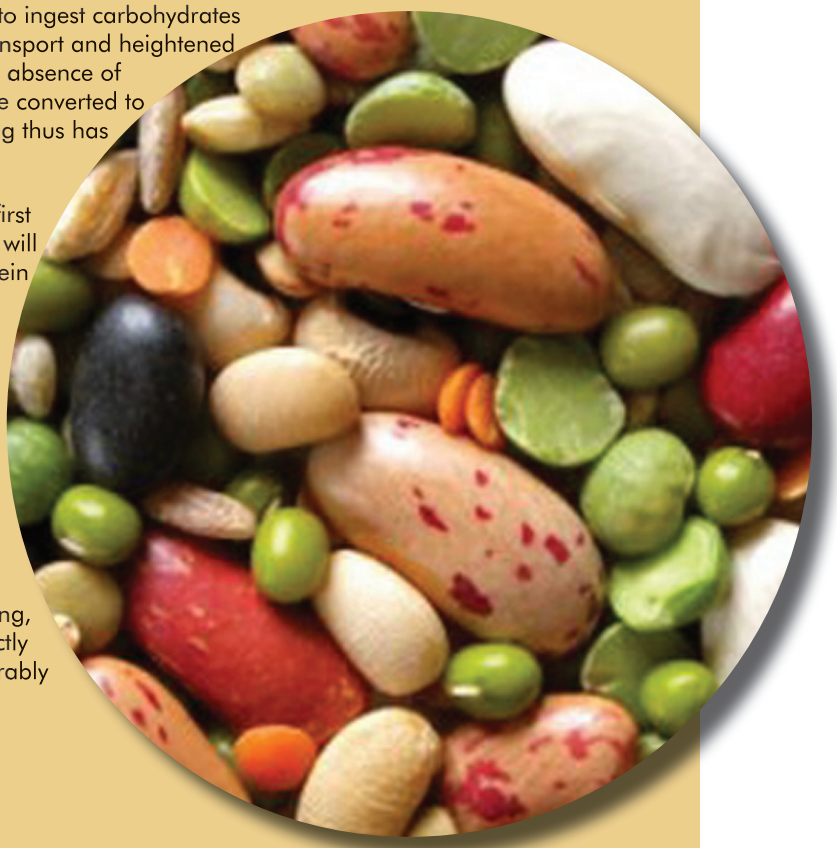
5 Failure to replenish glycogen stores regularly will result in fatigue, impairment of performance at training or during competitions, injury, illness, prolonged recovery processes, loss of muscle mass, and menstrual dysfunction.

Due to these important functions of carbohydrates in sports, extreme limitations of carbohydrate are not recommended. Diets should rather be high in carbohydrates, moderate in protein and fat.

COMMON MYTH IN SPORTS NUTRITION: USE A PURE PROTEIN SUPPLEMENT OR HIGH PROTEIN, LOW CARBOHYDRATE MEAL REPLACEMENT FOR RECOVERY DIRECTLY AFTER INTENSE TRAINING SESSIONS:

After intense training, including weight training, muscle glycogen is depleted, muscle protein degradation is increased, and the body enters a damaging catabolic state. Dietary goals are to replace muscle glycogen first by providing enough energy and carbohydrates, promote protein synthesis/ building, replace lost fluid & electrolytes, and support the immune system. Protein intake directly after exercise is important too, but should not exceed carbohydrate intake.

Directly after training a "window of opportunity" exists for increased nutrient intake and recovery. During this period it is essential to ingest carbohydrates and protein in a 4:1 ratio to ensure rapid nutrient transport and heightened anabolism. Protein balance cannot be restored in the absence of carbohydrate intake (during which protein will only be converted to glycogen). Sufficient carbohydrate intake post training thus has a protein sparing effect.



A carbohydrate intake of 1.0 to 1.5 g/kg during the first 30 minutes and again every 2 hours for 4 to 6 hours will be adequate to replace glycogen stores. 10-20g Protein consumed after exercise will be sufficient to provide adequate amounts of amino acids for building and repair of muscle and ensure optimal recovery.

Sufficient scientific evidence exists that the intake of certain proteins especially protein peptides in conjunction with carbohydrates elicits an insulinotrophic effect that speeds up nutrient uptake and glycogen replenishment.

Expensive high protein low carbohydrate meal replacements can be consumed 1-3 hours post training, and only after muscle glycogen was replenished directly after training. Pure protein supplements should preferably be consumed directly before going to bed.

Alfred Rheeder - PVM Nutritional Sciences. Should you require nutritional assistance contact PVM at (012) 804 7676 or visit www.pvm.co.za

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