Sports Nutrition and Therapy
ISSN: 2473-6449

Bonfanti and Jimenez-Saiz, Sports Nutr Ther 2016, 1:1
DOI: 10.4172/2473-6449. 1000e102

Editorial Article OMICS International

Nutritional Recommendations for Sport Team Athletes

Bonfanti N[1] **and Jimenez-Saiz SL**[2*]

[1]*PhD, Professor of San Jorge University of Zaragoza, Autovía Mudéjar, km. 299, 50830 Villanueva de Gállego, Zaragoza, Spain*

[2]*PhD, Director of the Master's Degree in Sports Training and Nutrition, European University of Madrid, 8, Av. de Fernando Alonso, 28108 Alcobendas, Spain*

[*]**Corresponding author:** Jimenez-Saiz SL, PhD, Director of the Master's Degree in Sports Training and Nutrition, European University of Madrid, 8, Av. de Fernando Alonso, 28108 Alcobendas, Spain, Tel: +34 91 211 3503; E-mail: sergiolorenzo.jimenez@universidadeuropea.es

Received date: February 12, 2016; **Accepted date:** February 15, 2016; **Published date:** February 18, 2016

Nutritional Recommendations

In present days, consistent scientific evidence is confirming that nutritional intake has an essential role in optimizing training and competition performance in athletes. When nutritional practices are adequate, athletes can exploit their maximum talent performance, while promoting a suitable recovery process with a lower risk of disease and sport injuries [1-3]. Therefore, in order to address these issues, it is important to clearly define all the nutritional parameters which optimize the athletes feeding practices: energy intake, macro and micronutrients consumption and hydration practices.

To begin, it will be necessary to estimate the individual total daily energy requirement, its mean, the calories that athletes expend each day taking into account the potential changes in corporal composition needed. It will be important to obtain a negative or positive energetic balance for fat loss or muscle mass gain respectively [4-6], through a progressive process carried out alongside a sport nutritionist [1,5,7]. In any case, the first step will be to estimate the resting metabolic rate (RMR) value by using the Cunningham equation [8], which is the best recommended option for athletes, or the Harris-Benedict equation as a second option, when lean mass data is not known [1]. The second step will be to add, the calories spent in training and physical activities (thermic effect of activities) and by the thermic effect of food. The numerous recommended methods for athletic population are described on the specific scientific bibliography [9,10].

It is known that carbohydrates (CHO) intake is essential for an optimum adaptation to several stress signals imposed by repeated sessions of training. An adequate timing and amount of this nutrient is one of the key factors for muscle and hepatic glycogen recovery. Sport nutritionists recommend a diet based on CHO for sports where it works as the mean fuel during exercise, as it occurs in majority of team sports [11]. CHO is the primary energy fuel for both, aerobic and anaerobic pathway and is the key nutrient for muscle contraction during exercise in intermittent intensity exercises that characterize virtually almost all team sports (e.g.: basketball, football, handball, etc.). The rate of utilization and exhaustion of CHO is different for each sport depending largely on training duration and intensity as well as upon the degree of hydration and the current training level of athletes [11]. Moreover, the availability of carbohydrates for the central nervous system becomes a limiting factor for cognitive performance in this kind of sports [12,13]. For all these issues, the nutritional recommendations for carbohydrate intake must include the timings before, during and after training or competition and during the recovery period throughout the entire day [14].

Daily Recommendations	Punctual intake related to training and competition
Carbohydrates 7-12 g/kg Weight	Previous meals: Breakfast 2-4 h before training/ competition: Meals rich in CHO which enables to reach the daily recommendation
	The last 2 h before exercise: 30 g CHO/h minimum
	During training (lasting >1 h) and competition: Solutions 6% CHO (6 g/100 ml) or 500-1000 ml/h isotonic beverage (30-60 g CHO/h) or solutions 2-3% CHO with addition of solid/semisolids foods rich in CHO until reaching 30-60 g/h
	Immediately post-exercise: 1 g/kg weight post-exercise (when the aim is to replenish muscle glycogen at maximum levels: e.g.: two training session in the same day) or 0.8 g/Kg weight (when the aim is to stimulate muscle fiber recovery: e.g.: hypertrophy) (no more than 30 min. after)
Proteins 1,4-1,7 g/kg weight	Immediately post-exercise: 20-25 g ó 0.25 g/kg weight along with CHO (no more than 30 min. after) To distribute, if possible, in 0.25 g/kg weight at different meals, every 3-4 h throughout the day including proteins that contain all the essential amino acids and rich in leucine.
Fat 20-35% of total daily energy intake	Distributed during the different meals throughout the day, taking into consideration to not overload with fat on the meals nearest to exercise.
Vitamins and minerals To meet recommendation for general population as a minimum level (RDI, 2011)	Ensure the supply of micronutrients through a varied diet rich in vegetable, fruits, white meats, whole grain, non-fat dairy and non-fried vegetable oil. This allows meeting optimum levels in general. To consider supplementation in individual cases of deficiency or risk of one or more micronutrients.
Hydration To follow ACSM (2007) recommendations	Weigh athletes before and after training and competition and measure fluid intake during exercise for determining an individual recommendation of fluid.

Table 1: Daily nutritional recommendations for team sports athletes.

Daily protein requirement of athletes is higher than sedentary population [1,15,16] since both, aerobic and resistance training are associated with the rupture of muscle fibers and a serious increment of leucine oxidation [17,18] . Moreover, athletes may need a higher level of protein intake than the amount estimated only for deficit risk prevention since this nutrient could help athletes to maintain a high level of function and obtain positive adaptations induced by training [1]. Furthermore, protein requirements cannot be generalized as well as carbohydrates since it seems that the amount of protein needed is dependent on the individuals training status. As an example, trained athletes would need a lower amount of protein per day in contrast to

untrained individuals. However, in periods of high load training and/or high intensity training, typical of high performance athletes, they would need to increase their consumption [15,16]. In addition, the amount of protein needed to enhance sport performance is discussed under the perspective of different types of exercise (endurance, high intermittent intensity or strength exercise) and training programs [1]. When energy intake is enough to cover calorie expenditure, the muscle mass of athletes can remain stable between a wide range of protein consumption [15]. On the other hand, high protein intake could be advantageous to cause muscle hypertrophy. However, scientific literature does not show convincing results about the consumption of more than 2-3 g of proteins/kg body weight, so is necessary for athletes, even when muscle mass gain is the objective [19]. There are other concomitant factors such as timing intake in relation to training, energy balance, carbohydrates availability and amino acids composition of ingested proteins that must be considered. All these factors have a key role for the use of dietary amino acids in protein synthesis, avoiding their oxidation to meet energy requirements [20,21]. Moreover, protein metabolism during and after exercise is also affected by sex, age and the intensity, duration and type of training [1,16].

In regards to fat intake, this is the second source of energy for exercising muscle after CHO. However, as opposed to CHO storage, the availability of fat during exercise is unlimited in almost all athletes. Additionally, it is known that intramuscular triglycerides can act as an important potentially source of energy during aerobic exercise, but it is unknown their real influence on athletic performance [22,23]. The fat intake recommendation for athletes is within 20-35% of the total daily energy intake (TDEI) since it has been shown that intakes lower than 20% (when fat loss it is not the objective) or higher than 35% of TDEI, does not have benefits on sport performance [1,3]. Table 1 summarizes the nutritional recommendations for sport team athletes that were discuss above along with a brief guideline for micronutrients consumption and fluid intake.

References

1. ADA, DC, ACSM (2009) Nutrition and Athletic Performance. Medicine and Science in Sports and Exercise 41: 709-731.
2. Burke LM, Deaking V (2015) Clinical Sports Nutrition (5th Edn). McGraw-Hill Book Company, Sidney.
3. International Olympic Committee (IOC) (2011) IOC consensus statement on sports nutrition 2010. Journal of Sports Sciences 29: S3-S4.
4. Ainsworth BE, Haskell WL, Herrmann SD, Meckes N, Bassett DR. et al. (2011) 2011 compendium of physical activities: A second update of codes and MET values. Medicine and Science in Sports and Exercise 43: 1575-1581.
5. Burke LM, Loucks AB, Broad N (2006) Energy and carbohydrate for training and recovery. Journal of Sports Science 24: 675-85.
6. Jeukendrup A, Gleeson M (2010) Sport Nutrition: An Introduction to Energy Production and Performance (2nd Edn). Human Kinetics, Champaign, Illinois.
7. Loucks AB (2004) Energy balance and body composition in sports and exercise. Journal of Sports Sciences 22: 1-14.
8. Cunningham JJ (1980) A reanalysis of the factors influencing basal metabolic rate in normal adults. The American Journal of Clinical Nutrition 33: 2372-2374.
9. Donahoo W, Levine J, Melanson E (2004) Variability in energy expenditure and its components. Current Opinion in Clinical Nutrition & Metabolic Care 7: 599-605.
10. Manore M, Meyer N, Thompson J (2009) Sport Nutrition for Health and Performance (2nd Edn) Human Kinetics, Champaign, Illinois.
11. Burke LM, Hawley JA, Wong SHS, Jeukendrup AE (2011) Carbohydrates for training and competition. Journal of Sports Sciences 29: S17-S27.
12. Welsh RS, Davis JM, Burke JR, Williams HG (2002) Carbohydrates and physical/mental performance during intermittent exercise to fatigue. Medicine and Science in Sports and Exercise 34: 723-731.
13. Winnick JJ, Davis JM, Welsh RS, Carmichael MD, Murphy EA. et al. (2005) Carbohydrates feedings during team sport exercise preserve physical and CNS function. Medicine and Science in Sports and Exercise 37: 306-315.
14. Mujika I, Burke LM (2011) Nutrition in team sports. Annals of Nutrition and Metabolism 57: 26-35.
15. Phillips SM (2006) Dietary protein for athletes: from requirements to metabolic advantage. Applied Physiology, Nutrition, and Metabolism 31: 647-654.
16. Tipton KD, Wolfe RR (2004) Protein and amino acids for athletes. Journal of Sports Sciences 22: 65-79.
17. Lamont LS, McCullough AJ, Kalhan SC (2001) Relationship between leucine oxidation and oxygen consumption during steady-state exercise. Medicine and Science in Sports and Exercise 33: 237-241.
18. McKenzie S, Phillips SM, Carter SL, Lowther S, Gibala MJ, et al. (2000) Endurance exercise training attenuates leucine oxidation and BCOAD activation during exercise in humans. American journal of physiology. Endocrinology and metabolism 278: E580-E587.
19. Phillips SM, Van Loon LJC (2011) Dietary protein for athletes: From requirements to optimum adaptation. Journal of Sports Sciences 29: S29-S38.
20. Gaine PC, Pikosky MA, Martin WF, Bolster DR, Maresh CM, et al. (2006) Level of dietary protein impacts whole body protein turnover in trained males at rest. Metabolism: Clinical and Experimental 55: 501-507.
21. Rodriguez NR, Vislocky LM, Gaine PC (2007) Dietary protein, endurance exercise, and human skeletal-muscle protein turnover. Current Opinion in Clinical Nutrition and Metabolic Care 10: 40-45.
22. Burke LM, Kiens B, Ivy JL (2004) Carbohydrates and fat for training and recovery. Journal of Sports Sciences 22: 15-30.
23. Spriet LL, Gibala MJ (2004) Nutritional strategies to influence adaptations to training. Journal of Sports Sciences 22: 127-141.