Position of the Academy of Nutrition and Dietetics, Dietitians of Canada, and the American College of Sports Medicine: Nutrition and Athletic Performance

ABSTRACT

It is the position of the Academy of Nutrition and Dietetics (Academy), Dietitians of Canada (DC), and the American College of Sports Medicine (ACSM) that the performance of, and recovery from, sporting activities are enhanced by well-chosen nutrition strategies. These organizations provide guidelines for the appropriate type, amount, and timing of intake of food, fluids, and supplements to promote optimal health and performance across different scenarios of training and competitive sport. This position paper was prepared for members of the Academy, DC, and ACSM, other professional associations, government agencies, industry, and the public. It outlines the Academy's, DC's, and ACSM's stance on nutrition factors that have been determined to influence athletic performance and emerging trends in the field of sports nutrition. Athletes should be referred to a registered dietitian nutritionist for a personalized nutrition plan. In the United States and in Canada, the Certified Specialist in Sports Dietetics is a registered dietitian nutritionist and a credentialed sports nutrition expert.
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POSITION STATEMENT

It is the position of the Academy of Nutrition and Dietetics, Dietitians of Canada, and the American College of Sports Medicine that the performance of, and recovery from, sporting activities are enhanced by well-chosen nutrition strategies. These organizations provide guidelines for the appropriate type, amount, and timing of intake of food, fluids, and dietary supplements to promote optimal health and sport performance across different scenarios of training and competitive sport.

THIS ARTICLE OUTLINES THE current energy, nutrient, and fluid recommendations for active adults and competitive athletes. These general recommendations can be adjusted by sports dietitians*

**Because credentialing practices vary internationally, the term* "sports dietitian" *will be used throughout this article to encompass all terms of accreditation, including registered dietitian nutritionist (RDN), registered dietitian (RD), professional dietitian (PDt), or Board Certified Specialist in Sports Dietetics (CSSD).*

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to accommodate the unique issues of individual athletes regarding health, nutrient needs, performance goals, physique characteristics (ie, body size, shape, growth, and composition), practical challenges, and food preferences.

EVIDENCE-BASED ANALYSIS

This article was developed using the Academy of Nutrition and Dietetics (Academy) Evidence Analysis Library (EAL) and will outline some key themes related to nutrition and athletic performance. The EAL is a synthesis of relevant nutrition research on important dietetics-related practice questions. The publication range for the evidence-based analysis spanned March 2006 to November 2014. For the details on the systematic review and methodology go to www.andevidencelibrary.com. Figure 1 presents the evidence analysis questions used in this position paper.

NEW PERSPECTIVES IN SPORTS NUTRITION

The past decade has seen an increase in the number and topics of publications

This Academy position paper includes the authors' independent review of the literature in addition to systematic review conducted using the Academy's Evidence Analysis Process and information from the Academy Evidence Analysis Library (EAL). Topics from the EAL are clearly delineated. The use of an evidence-based approach provides important added benefits to earlier review methods. The major advantage of the approach is the more rigorous standardization of review criteria, which minimizes the likelihood of reviewer bias and increases the ease with which disparate articles may be compared. For a detailed description of the methods used in the evidence analysis process, access the Academy's Evidence Analysis Process (http:www.andevidencelibrary.com/eaprocess).

Conclusion Statements are assigned a grade by an expert work group based on the systematic analysis and evaluation of the supporting research evidence. Grade I=Good; Grade II=Fair; Grade III=Limited; Grade IV Expert Opinion Only; and Grade V=Not Assignable (because there is no evidence to support or refute the conclusion).

See grade definitions at www.andevidencelibrary.com/.

Evidence-based information for this and other topics can be found at https://www.andevidencelibrary.com and subscriptions for nonmembers are purchasable at https://www.andevidencelibrary.com/store.cfm.

Evidence Analysis Library question	Conclusion and evidence grade
Energy balance and body composition	
#1: In adult athletes, what effect does negative energy balance have on exercise performance?	In three out of six studies of male and female athletes, negative energy balance (losses of 0.02% to 5.8% body mass; over five 30-day periods) was not associated with decreased performance. In the remaining three studies where decrements in both anaerobic and aerobic performance were observed, slow rates of weight loss (0.7% reduction body mass) were more beneficial to performance compared to fast (1.4% reduction body mass) and one study showed that self-selected energy restriction resulted in decreased hormone levels. **Grade II - Fair**
#2: In adult athletes, what is the time, energy, and macronutrient requirement to gain lean body mass?	Over periods of 4-12 weeks, increasing protein intake during hypocaloric conditions maintains lean body mass in male and female resistance-trained athletes. When adequate energy is provided or weight loss is gradual, an increase in lean body mass may be observed **Grade III - limited**
Recovery	
#3: In adult athletes, what is the effect of consuming carbohydrate on carbohydrate and protein-specific metabolic responses and/or exercise performance during recovery?	Based on the limited evidence available, there were no clear effects of carbohydrate supplementation during and after endurance exercise on carbohydrate and protein-specific metabolic responses during recovery. **Grade III - Limited**
#4: What is the effect of consuming carbohydrate on exercise performance during recovery?	Based on the limited evidence available, there were no clear effects of carbohydrate supplementation during and after endurance exercise on endurance performance in adult athletes during recovery. **Grade III - Limited**
#5: In adult athletes, what is the effect of consuming carbohydrate and protein together on carbohydrate- and protein-specific metabolic responses during recovery?	• Compared to ingestion of carbohydrate alone, coingestion of carbohydrate plus protein together during the recovery period resulted in no difference in the rate of muscle glycogen synthesis. • Coingestion of protein with carbohydrate during the recovery period resulted in improved net protein balance postexercise. • The effect of coingestion of protein with carbohydrate on creatine kinase levels is inconclusive and shows no impact on muscle soreness postexercise. • **Grade I - Good**
#6: In adult athletes, what is the effect of consuming carbohydrate and protein together on carbohydrate and protein-specific metabolic responses during recovery?	Coingestion of carbohydrate plus protein, together during the recovery period, resulted in no clear influence on subsequent strength or sprint power. **Grade II - Fair**
#7: In adult athletes, what is the effect of consuming carbohydrate and protein together on exercise performance during recovery?	Ingesting protein during the recovery period (postexercise) led to accelerated recovery of static force and dynamic power production during the delayed onset muscle soreness period and more repetitions performed subsequent to intense resistance training. **Grade II - Fair**

(continued on next page)

Figure 1. Evidence analysis questions included in the position statement. Evidence grades: Grade I: Good, Grade II: Fair, Grade III: Limited, Grade IV: Expert opinion only; and Grade V: Not assignable. Refer to http://www.andevidencelibrary.com/ for a complete list of evidence analysis citations.