The Role of Nutrition in Injury Prevention and Healing

NANCY RODRIGUEZ, PhD, RD • University of Connecticut

Diet design for optimal training, enhanced recovery, and peak performance is considered integral to an athlete's ultimate realization of his or her competitive goals. Indeed, an athlete who is well nourished is not only healthy but typically capable of training more intensely and competing quite successfully, as well as being less susceptible to injury. Similarly, an injured athlete of good nutritional status should respond more favorably to treatment interventions and require less "down time" for recovery, returning to training and competition relatively free of complications.

This article addresses contemporary approaches to nutritional support of the competitive athlete for injury prevention and healing, but its primary focus will be the practical application of sound nutritional principles known to consistently benefit the physically active individual. The potential for certain nutrients, sport-specific nutritional supplements, and engineered foods to prevent injury, improve recovery, or enhance healing will also be considered. The ability to optimize the athlete's nutritional status throughout treatment interventions for and recovery from musculoskeletal injury extends from knowledge of the basic fundamentals of sport nutrition.

Nutritional Considerations for Physical Well-Being

The nutritional demands of recovery and healing are better understood when the essentials of nutrition for physically active individuals are considered. Certain nutrition principles can be generalized across athletes as well as across sports—issues related to energy balance, protein requirements, diet composition, and hydration status. While there are exceptions for gender (e.g., iron for females) and for age groups (e.g., calcium from adolescence through young adulthood), appropriate consideration of these areas in the diet of a competitive athlete will most often accommodate other nutritional requirements such as vitamins and minerals.

Energy

Athletes must always be encouraged to consume enough calories to maintain energy balance; energy intake equals energy expenditure. As a consequence of inadequate calorie intake, many athletes complain of fatigue or find they are unable to return to an intense training schedule following the off-season. There is truth to the idiom "eat to compete." Athletes in negative energy balance...
are not likely to maximize their training or performance potential. Furthermore, an increased susceptibility to fatigue may also precipitate injury. Athletes should consume enough calories to support the energy demands of training and competition.

Protein

Regardless of gender or sport, athletes are always attentive to protein intake. Research in this area has accelerated in recent years and many experts support a higher protein intake in competitive athletes. While the daily protein requirement for healthy adults is 0.8 g/kg body weight, recommendations for athletes range from 1.2 to 1.8 g/kg. In either case, protein intake for a 70-kg athlete should range from 70 to 130 g. This is an amount common to the American diet and is not considered excessive for the physically active person. In contrast, contemporary nutritional supplements and engineered foods designed to achieve daily protein intakes approximating 200-300 g are considered extreme.

Diet Composition

The overall recommendation that an athlete’s diet provide enough carbohydrate to maintain or replenish liver and muscle glycogen still stands. The literature continues to support a diet for which the calorie composition reflects approximately 15–20% protein, 25–30% fat, and 50–60% carbohydrate. Carbohydrate intake should approximate 6–10 g/kg. Nonprotein calories, particularly carbohydrate, are important for the body’s efficient use of protein. Anabolism is a process that requires energy. Since most athletes are striving to maintain or increase lean body mass, it is important that they understand the need for nonprotein energy sources to support protein synthesis in the body.

Hydration

Adequate hydration is critical to good health and contributes substantially to optimal training and peak performance. While the average person needs approximately 2 liters of fluid a day, a 70-kg athlete exercising in warm weather may require 3 to 6 liters to achieve water balance. Losses of water approaching 2% or more of one’s body weight will compromise endurance performance as well as strength and power efforts. Athletes must be attentive to their drinking habits since they typically have sweat losses that are much in excess of less active individuals. It is crucial that athletes stay well hydrated before, during, and after training and competition.

In summary, it is worthwhile to make an overall evaluation of the athlete’s dietary behavior in terms of calories, protein, carbohydrate, and water. Assuming that he or she consumes enough calories and macronutrients from a variety of foods in a balanced diet, this should assure adequate consumption of the required micronutrients as well. Any use of sport-specific supplements or engineered foods is often a personal choice rather than an established component of sound diet design for the athlete.

Relationship of Nutritional Status to Injury Prevention

A well-nourished, healthy athlete should have the lowest risk for injury. However, there are a variety of areas that complement the basic nutritional directives outlined above. These include nutrition-based protocols specific to the postexercise recovery period and nutrient-specific issues concerning bone health.

Nutrition During Postexercise Recovery

Nutrition-specific protocols for athletes following intense training and competition are consistent with the baseline recommendations that emphasize hydration and carbohydrates. Rehydration following an

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<tr>
<th>BASIC NUTRITION PRINCIPLES FOR ATHLETES</th>
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<tr>
<td>• Consume enough calories to maintain energy balance.</td>
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<tr>
<td>• Protein intake should not exceed 1.2 to 1.8 g/kg body weight.</td>
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<tr>
<td>• Carbohydrate consumption should approximate 6–10 g/kg body weight.</td>
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<td>• Drink at least 1 liter of fluid for every 1,000 calories consumed.</td>
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