

WELLNESS, NUTRITION, AND SPORTS PERFORMANCE

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INTRODUCTION

Nutrition fundamental component of sports training, deserving special attention and becoming foundational from a very early age for every athlete (Aladzhov, 2014; Dimitrova, 2017; Dimitrova, B. et al., 2021). It aims to optimally supply the body with nutrients, which is why it is associated with adhering to several essential principles of athlete nutrition (Dimitrova, 2019; Ignatova et al., 2020; Gigova, 2021; Nesheva, 2023). These principles are mainly derived from rational and healthy eating and aim to maintain excellent athletic shape and good health (Dimitrova, 2018; Nesheva, 2023a). Proper nutrition directly influences the enhancement of body capacity, abilities, and sports performance. Understanding the principles of dietetics that aid in developing an athlete is crucial for achieving high results. Becoming a good athlete is not about spending one or two hours at the stadium or in the gym, but about maintaining a 24-hour regimen for the body (Dimitrova, 2018a; Dimitrova, B. et al., 2020). For this reason, the athlete must be responsible for their performance—diet, sleep, recovery, behavior, and attitude towards the training and competitive process (Dimitrova, 2019b). Physical labor and regular sports activities boost self-esteem towards better motivation and willpower, better time management, and more rational achievement of daily goals (Chipeva, M. 2021; Dimitrova, 2019a).

Nutrition is a fundamental aspect of athletic training, requiring special attention, and is crucial from an early age for every athlete. Before embarking on the path of professional sports, children and their parents must carefully evaluate whether they can endure the demands of this challenging journey, as the work is grueling, the sacrifices are significant, and the competition in modern elite sports is fierce. Reaching the pinnacle of a sports career requires substantial sacrifices, which not everyone is willing to make. In Bulgaria, nutrition is not well integrated into both youth and professional sports. There is an overemphasis on training, exertion, and training methods, while recovery takes a backseat, often relying on traditional methods such as massage and sauna. Sleep also tends to be underestimated.

METHODS

Nutritional Assessment and Dietary Analysis

Food Diaries and Dietary Recall: Collect detailed information on athletes' dietary habits through 24-hour dietary recalls or food frequency questionnaires. Analyze the data for macronutrient and micronutrient intake, caloric distribution, and adherence to recommended dietary guideline

Nutritional Intervention Trials

Controlled Feeding Trials: Implement tightly controlled dietary interventions where athletes consume predesigned meals tailored to specific performance goals. Monitor their effects on physiological and psychological outcomes.

Supplementation Studies: Investigate the role of specific supplements (e.g., creatine, beta-alanine, omega-3 fatty acids) in enhancing recovery, reducing inflammation, or improving endurance.

Customized Nutrition Plans: Tailor diets based on individual athlete needs, genetic predispositions, and sports-specific demands. Evaluate outcomes to refine personalized nutrition strategies.

RESULTS

Nutrition determines how the body functions. People often rush to eat something prepared, not realizing that these meals may lack essential vitamins, minerals, and salts necessary for the body. Therefore, it's important to follow a proper diet, be aware of how one should eat, and adhere to the principle of eating three meals a day, with breakfast being particularly crucial and not to be skipped (Aladzhov, 2014). The specific nutritional needs must be aligned with the type of sport, taking into account its biomechanical and physiological characteristics and energy requirements. Whether the sport is endurance-based, cyclical, or a contact sport, the nutrients should be appropriately arranged to meet the demands of the respective sport. It's also essential to consider how proteins, carbohydrates, and fats should be balanced in an athlete's diet (Maughan et al., 2012). Adequate water intake, which often doesn't get enough attention, is crucial as well. Additionally, the use of dietary supplements, tailored to the athlete's personal needs and the specifics of their sport, is important. We cannot expect to compete in elite sports, train professionally, or visit the gym and stadium multiple times a day, without proper nutrition (Melshina et al., 2017). A balanced diet is essential for providing the necessary vitamins, minerals, micronutrients, and macronutrients that ensure adequate recovery and improve performance on the field. It is scientifically proven that the quantity and quality of food determine an individual's health (Nedelchev, 2019). Therefore, with a well-balanced diet, proper nutritional planning, adequate supplementation, and sufficient water intake, the risk of injuries decreases significantly. The body functions optimally when it is not burdened by poor-quality food that is hard to process and taxes the body's resources during sports

activities. Unhealthy food offers nothing but a false sense of happiness and satisfaction. We know which foods provide proteins, carbohydrates, and fats. We need to balance them according to our specific needs and minimize foods that don't provide natural, balanced nutrients and that burden the body. These include foods that are full of additives, stabilizers, preservatives, simple sugars, and high fats, which can stress the body in various ways. I understand the challenges posed by different age groups in influencing the psychological characteristics of athletes. It is crucial to prioritize high-quality food such as lean meats, fish, rice, potatoes, fruits, vegetables, oats, pasta, nuts, vitamins, and minerals—all of which are essential for a healthy diet.

We processed foods, fast foods, pizzas, doners, hamburgers, and sweets in minimal quantities. While it's possible to consume these foods, it's best to do so immediately after training or a football match, as they can somewhat aid in recovery. For instance, football players might eat pizza in moderation but only after exercise or physical activity when the calories from such foods can help replenish the burned energy. Certain sports require endurance, where a slightly higher intake of fats might be permissible to provide sustained energy over time. In explosive sports, carbohydrates are crucial for quickly providing the energy needed for performance. In cyclical sports like football and volleyball, the nutritional requirements are mixed, so the diet should be balanced. Nutrition must be tailored to the individual athlete, considering their genetic background, and to some extent, their position on the field. It should also take into account the athlete's unique characteristics, such as whether they are overweight or underweight, need to gain or lose weight, their metabolism, and the position they play—be it goalie, winger, or center. What does the position require? More muscle mass or more speed, agility, endurance, and flexibility? All these factors need to be part of an integrated system that complements each aspect effectively.

Unfortunately, coaches are often left to handle all aspects of athlete preparation, which is unrealistic as they can't be experts in everything. They struggle to manage, but need support from specialists like dietitians, psychologists, and experts in fields such as kinesiology.

Many people mistakenly think that athletes just play a game for an hour and a half and that's it, when in fact, it involves years of grueling, 24-hour commitment, dedication, and sacrifices.

Nutrition is a critical component of an athlete's comprehensive preparation. It aims to provide the body with optimal nutrients and involves adhering to several key principles derived from rational and healthy eating to maintain peak performance and good health. Proper nutrition directly affects the body's capacity and the athlete's performance.

Many nutritional and top diet principles can be applied to athletes' diets because these diets are often based on proven nutritional principles that align with human physiology. While nutrition may vary depending on the type of sport, it generally involves adhering to several common principles.

1. **Athlete's Weight:** An athlete's body weight is influenced by genetics, lifestyle, environment, social conditions, family background, and education. Maintaining and achieving an optimal weight is a personal priority linked to persistence, motivation, willpower, and mental stability. In many sports, maintaining optimal or low weight is crucial, often requiring changes in diet and strict adherence to healthy eating principles.
2. **Simplicity Daily, Variety Weekly and Monthly:** Breakfasts, lunches, and dinners should be consistent in composition to ensure proper digestion and nutrient absorption. This approach aligns with the concepts of balanced eating. An athlete's daily menu should provide the necessary energy and contain a proper balance of nutrients, vitamins, and trace elements. The challenge in preparing weekly and monthly menus is ensuring the food is diverse, high-energy, and balanced.
3. **Breakfast:** It should be consumed at least two hours before the morning workout and primarily consist of carbohydrates to provide energy. It may include warm drinks like tea and milk, sweetened with a spoonful of sugar or honey. Pre-workout meals should be concentrated, high-calorie, easily digestible, and small in volume, rich in carbohydrates and vitamins. Breakfast should account for about 25-30% of daily intake. If there's an afternoon snack, it should be light, comprising about 10% of the day's food.
4. **Lunch:** This depends on the athlete's training schedule. If lunch is after a workout, it should include a larger quantity of food (40-45% of daily intake) with higher protein, fat, and mineral content. If lunch precedes training, it should be smaller (30-35% of daily intake), with more carbohydrates and easily digestible food.
5. **Dinner:** Dinner should be protein-rich and eaten before 7:30 PM. If the sport requires muscle mass gain, an additional protein product can be consumed 1-2 hours after dinner. A high-protein dinner is based on the idea that amino acids are better absorbed during sleep when growth hormone is secreted in larger amounts. In a three-meal day, dinner should comprise 25-30% of total food intake, or 20-25% if there's an afternoon snack. If the athlete has a workout or event in the afternoon, dinner should be at least an hour after and should make up 25-30% of the daily intake.
6. **Composition of Food:** Nutrition should provide the body with all essential nutrients—proteins, carbohydrates, fats, vitamins, minerals, and antioxidant compounds. If the athlete needs to follow a low-energy diet, energy intake is reduced primarily from fats and carbohydrates.

Carbohydrates: These are the body's primary fuel. The body stores carbohydrates as glycogen in the muscles and liver. During intense training, this glycogen is depleted, and the body starts

drawing energy from body fats and proteins. Excess sugars can lead to conversion into fats. Hence, it's important to maintain an optimal carbohydrate intake. This amount should be sufficient to replenish the body's glycogen stores and support performance during physical activity. Endurance athletes have the greatest need for carbohydrates, while gymnasts and weightlifters require the least.

Table 1. Nutrition for Athletes, by IOC, 2021 standards.

Training Load Description of Load Carbohydrate Intake		
Light	Low-intensity activities or activities requiring specific skills	3-5 g/kg/day
Moderate	Moderately intensive programs (around 1 hour daily)	5-7 g/kg/day
High	Endurance programs (1-3 hours/day of moderate to high intensity)	6-10 g/kg/day
Very High	Extremely high loads (4-5 hours/day of moderate to high intensity)	8-12 g/kg/day

These are the primary building blocks of the body. They form muscle tissue and contribute to the construction of structural proteins and enzymes. For athletes focusing on strength development and muscle building, proteins are a key component. This can be effective only with the right combination of high protein intake and substances that support anabolic processes. In sports nutrition, not only the quantity but also the quality of proteins is crucial, meaning they should contain all the essential amino acids necessary for the human body.

Table 2. Protein Nutrition for Athletes, in accordance with the motor intensity by IOC, 2021 standards.

Training Load	Protein Intake
Low physical activity	0.8 g/kg/day
Regular training program	1.0 g/kg/day
Endurance sports with intensive training program	1.2-1.6 g/kg/day
Endurance sports with very intensive or competitive training program	2.0 g/kg/day
Strength sports with intensive training program	1.2-1.7 g/kg/day
Young athletes	2.0 g/kg/day

integral to nerve tissue, hormones, and more. The more trained an organism is, the more effectively and quickly it utilizes fats for energy needs. Athletes like marathon runners, cyclists, ski jumpers, and swimmers have the highest fat requirements. It is recommended to reduce animal fats to 10%, with the remainder coming from dairy, fish, and plant sources.

Vitamins and Minerals: These are essential for the proper functioning of the body's metabolism. They are crucial for the correct operation of all organs and systems; a deficiency can lead to

imbalances and metabolic issues. Therefore, food should contain adequate vitamins and minerals, mainly sourced from fresh fruits and vegetables. Sports activities significantly increase the demand for these substances, and often they are supplemented through dietary supplements.

7. **Fluid Intake:** Water is necessary for all biochemical processes in the body. To maintain optimal physical condition, proper hydration is crucial. Athletes should drink fluids before, during, and after physical exertion to stay well-hydrated. The amount of fluid intake should be carefully adjusted according to physical activity, air temperature, and other factors influencing fluid loss.
8. **Eating Fruits on an Empty Stomach:** Due to their tendency to ferment quickly, fruits are best consumed half an hour to an hour before meals. Vegetables and salads should be eaten during main meals and seasoned with olive oil.
9. **Combining Foods:** There are various theories about food combinations, ranging from those that completely exclude combining certain foods to those that advocate mixing many different foods. Rational nutrition combines hard-to-digest foods with vegetables and spices for easier digestion. While there is no scientific evidence of chemical incompatibility between different foods, there is evidence of nutrient competition during absorption, such as fats hindering glucose transport, sugars interfering with fat absorption, and two types of sugars competing with each other.
10. **Self-Control:** This is a crucial factor for all athletic success. An athlete's diet is an element of their personal freedom, but to achieve high sports performance, they must adhere to a specific regimen and principles.

DISCUSSION

Nutrition plays a critical role in the performance, recovery, and overall health of athletes. A well-designed nutrition plan tailored to the specific demands of an athlete's sport, training intensity, and individual physiology can enhance performance, reduce the risk of injuries, and promote long-term well-being. This discussion highlights key nutritional considerations for athletes, focusing on macronutrient balance, hydration, supplementation, and timing of nutrient intake.

Macronutrient Requirements

1. **Carbohydrates:** Carbohydrates serve as the primary energy source for athletes, particularly during high-intensity and endurance activities. Adequate carbohydrate intake supports glycogen replenishment, delays fatigue, and improves endurance performance. For athletes engaging in light, moderate, or high-intensity training, carbohydrate needs vary between 3-12 g/kg/day, depending on the duration and intensity of activity. Insufficient carbohydrate intake can lead to reduced glycogen stores, resulting in diminished performance and delayed recovery.

2. Proteins: Proteins are essential for muscle repair, recovery, and growth. Athletes require higher protein intakes than the general population, ranging from 1.2-2.0 g/kg/day depending on their training load and type of sport. Endurance athletes benefit from protein to prevent muscle breakdown during prolonged activity, while strength athletes require protein to support muscle hypertrophy and repair. Timing protein intake post-exercise is particularly crucial for maximizing muscle protein synthesis.

3. Fats: Fats are a key source of energy, especially during prolonged, low-to-moderate-intensity exercise. Healthy fat intake supports hormonal balance and the absorption of fat-soluble vitamins. Athletes should aim for 20-35% of their daily caloric intake from healthy fats, with an emphasis on sources such as avocados, nuts, seeds, and fatty fish. Balancing fat intake is essential to prevent gastrointestinal distress during training or competition.

Hydration

Proper hydration is vital for maintaining performance and preventing dehydration, which can lead to fatigue, reduced cognitive function, and heat-related illnesses. Athletes should monitor fluid intake before, during, and after training or competition. Electrolyte replacement is crucial for prolonged activities to restore sodium, potassium, and other minerals lost through sweat. Individual hydration needs vary based on factors such as climate, intensity, and sweat rate, necessitating personalized hydration strategies.

Micronutrients and Supplements

1. Micronutrients: Vitamins and minerals, such as calcium, iron, magnesium, and vitamin D, are essential for optimal performance and recovery. Iron, for instance, is crucial for oxygen transport and energy production, particularly in endurance athletes. Female athletes and those following plant-based diets may require additional attention to micronutrient intake.

2. Supplements: While whole foods should be the primary source of nutrients, certain supplements can be beneficial for athletes when used appropriately. Examples include:

- Creatine for improved strength and power output.
- Caffeine for enhanced endurance and focus.
- Beta-alanine for buffering muscle acidosis during high-intensity efforts.

Athletes should consult with a nutritionist or healthcare provider before incorporating supplements into their regimen to ensure safety and efficacy.

Nutrient Timing

The timing of nutrient intake plays a critical role in optimizing performance and recovery.

- Pre-exercise: A meal rich in carbohydrates and moderate in protein, consumed 2-3 hours before activity, provides energy and prevents hunger.
- During exercise: For prolonged activities, consuming easily digestible carbohydrates (e.g., sports drinks or gels) helps maintain energy levels.
- Post-exercise: Consuming carbohydrates and protein within 30-60 minutes after exercise accelerates glycogen replenishment and muscle repair.

Individualization and Sport-Specific Needs

Athletes' nutritional requirements vary based on their sport, training schedule, and personal goals. Endurance athletes prioritize carbohydrates for sustained energy, while strength athletes focus on protein to support muscle growth. Additionally, young athletes, female athletes, and those with specific dietary preferences (e.g., vegetarian or vegan diets) require tailored nutritional strategies to meet their unique needs.

CONCLUSION

Nutrition is a cornerstone of athletic performance and recovery. By adopting a well-rounded approach that addresses macronutrient balance, hydration, micronutrient adequacy, and nutrient timing, athletes can optimize their physical and mental capabilities. Future research should continue to explore sport-specific nutrition strategies and the long-term effects of dietary patterns on athletes' performance and health. Education and access to nutritional support are essential to ensure athletes meet their unique demands and achieve their full potential.

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