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## THE ROLE OF NUTRITION AND NUTRITIONAL SUPPORT IN SPORTS REHABILITATION: A SCIENTIFIC APPROACH TO ACCELERATING RECOVERY

**Abstract:** Modern sports medicine pays significant attention to the recovery of athletes after intense physical exertion and injuries. One of the key factors influencing the speed and completeness of rehabilitation is nutrition. This article examines the role of nutritional support as a scientifically based tool for optimizing recovery processes, improving physical performance, and preventing overtraining. Based on the analysis of modern research and practical data, the importance of specialized food products, vitamins (particularly vitamin D), and metabolic supplements in sports practice is emphasized.

**Keywords:** nutritional support, sports rehabilitation, recovery, vitamin D, specialized food products, physical performance.

### Introduction

Elite sports are characterized by significant physical and psycho-emotional stress, often leading to fatigue, overtraining, and injuries. Recovery from such stress is one of the top priorities of sports medicine, as athletic performance and the health of athletes depend on its effectiveness. Nutrition plays a fundamental role in ensuring energy metabolism, maintaining homeostasis, and tissue regeneration, making nutritional support an essential component of the rehabilitation process.

The concept of using food nutrients as therapeutic agents, known as "food pharmacology," was first proposed in the 1960–1970s by Linus Pauling and academician A.A. Pokrovsky. Today, this idea is developing within the framework of nutrition science — a field that studies the impact of diet on health and performance. This article explores the scientific foundations of nutritional support in sports rehabilitation, including the role of vitamin D, specialized products, and metabolic supplements.

### Nutritional Support as a Rehabilitation Tool

Nutritional support involves the use of specialized food products, vitamin-mineral complexes, and metabolic supplements to optimize body composition, accelerate recovery, and enhance physical performance. The main objectives of such support include:

Modern studies show that nutritional interventions can influence muscle anabolism, energy metabolism, antioxidant protection, and immune function. For example, the use of products enriched with chondroprotectors reduces recovery time after musculoskeletal injuries, while L-carnitine promotes muscle mass growth and fat reduction, which is especially important for preventing sarcopenia.

To assess the effectiveness of nutritional support, instrumental methods such as bioimpedance analysis and metabolography are used, allowing the tracking of body composition dynamics and energy metabolism. These data confirm that targeted nutrition can significantly improve rehabilitation outcomes and prepare athletes for competitions.

### The Role of Vitamin D in Recovery Processes

In recent years, special attention has been paid to vitamin D as a promising adaptogen. Its deficiency is widespread among athletes (60–80% in various populations), especially during the winter season or among those training indoors.

Hypovitaminosis D is associated with decreased muscle function, performance, and testosterone levels — a key anabolic hormone regulating reparative processes.

The mechanisms of vitamin D action include:

Stimulation of cellular differentiation and proliferation in myocytes through vitamin D receptors (VDR);

Activation of  $1\alpha$ -hydroxylase in skeletal muscles, allowing the synthesis of the active form of vitamin D (calcitriol) directly in tissues;

Increase in muscle fiber diameter and enhancement of regeneration.

Studies demonstrate that correcting vitamin D deficiency (for example, taking 70 IU/kg of body weight for 6 months) leads to normalization of its blood level, an increase in testosterone, and improvement in physical performance. The fat-soluble form of the supplement shows a more pronounced effect compared to the water-soluble form.

#### Specialized Food Products in Sports Practice

Traditional nutrition often fails to fully meet the body's needs during intense physical exertion. Specialized products, such as protein shakes, isotonic drinks, amino acid complexes (BCAA), and vitamin-mineral supplements, are designed to target metabolism.

Examples of applications include:

BCAA: Consumption of 5–10 g before and after training accelerates muscle fiber recovery;

Isotonics: Maintain water-electrolyte balance during prolonged exercise;

Chondroprotectors: Reduce the risk of joint injuries and speed up rehabilitation.

These products are adapted to specific sports and preparation stages (preparatory, pre-competitive, competitive, and recovery), allowing individualized nutrition based on the nature of the load and physiological needs.

#### Practical Significance and Research Results

Scientific data confirm that nutritional support improves hematological and biochemical indicators in athletes. For example, wrestlers showed an increase in hemoglobin levels by 12%, alkaline phosphatase by 54%, and aspartate aminotransferase by 7% compared to the control group. However, they initially exhibited reduced vitamin D levels (by 2.4 times) and testosterone (by 4.7 times), highlighting the need to correct nutritional status.

Long-term use of vitamin D and specialized products leads to the restoration of hormonal balance, improvement of microelement composition (such as magnesium, calcium, and iron), and enhancement of physical performance. These results have practical significance for sports medicine, enabling the development of personalized rehabilitation programs.

#### Conclusion

Nutritional support represents a scientifically based approach to accelerating athlete recovery. The integration of vitamin D, specialized products, and metabolic supplements into rehabilitation protocols optimizes physiological processes, reduces the risk of injuries, and enhances athletic performance. Further research should focus on studying the long.

### References

1. Holick M.F. Vitamin D deficiency // N Engl J Med. 2007. Vol. 357. P. 266–281.
2. Lips P., et al. Vitamin D supplementation and health outcomes // Nutrients. 2019. Vol. 11. P. 1034.
3. Pokrovsky A.A. Pharmacology of food: a new approach to nutrition // Vestn Ross Akad Med Nauk. 1976. Vol. 31. P. 12–18.
4. Tokaev E.S., et al. Comprehensive nutritional support system for professional athletes. Moscow: Akademiya-T, 2017.
5. Pulatov S. S., Valiev R. A. RESPIRATORY PHYSIOTHERAPY INTERVENTIONS IN ACUTE VIRAL RESPIRATORY INFECTIONS: A COMPREHENSIVE THERAPEUTIC EXPLORATION // Экономика и социум. – 2023. – №. 12 (115)-1. – С. 581-582.
6. Valiev R. A. Professional Athletes' Perspectives on the Function of Sports Medicine Specialists in Treating Psychosocial Aspects of Sport-Injury Rehabilitation // International Journal of Integrative and Modern Medicine. – 2024. – Т. 2. – №. 7. – С. 215-221.
7. Qosimov I. U. THE EFFECTIVENESS OF PILOIDOTHERAPY IN REHABILITATION // Ethiopian International Journal of Multidisciplinary Research. – 2024. – Т. 11. – №. 01. – С. 141-146.
8. Olimova N. A., Minavarov R. A., Azimov A. R. REHABILITATION OF POST-TRAUMATIC DEFORMITIES OF THE UPPER EXTREMITIES // Ethiopian International Journal of Multidisciplinary Research. – 2024. – Т. 11. – №. 03. – С. 353-355