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ЛІКАРСЬКОЇ РОСЛИННОЇ СИРОВИНИ**

**THE CURRENT STATE OF DEVELOPMENT AND IMPLEMENTATION OF
SYSTEMS OF PREVENTIVE AND HEALTHY NUTRITION;
SUPPLEMENTS AND FOOD PRODUCTS WITH SPECIAL MEDICAL
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NUTRITIONAL SUPPORT IN REHABILITATION: INTEGRATION OF MACRO-MICROELEMENTS

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Key words: rehabilitation, nutritional support, children, restoration of functions, macro- and microelements.

Introduction. Nutritional support, particularly, providing the body with adequate macro- and microelements, plays a key role in ensuring the effectiveness of the rehabilitation process [1,4]. Macroelements (carbohydrates, proteins, fats, as well as minerals - calcium, magnesium, potassium, etc.) provide energy metabolism, support muscle mass and bone structure, while microelements (iron, zinc, selenium, vitamins, etc.) are involved in enzymatic processes, immune response and antioxidant protection of the body [2,3]. In the context of rehabilitation, it is important not only to restore motor function, but also to optimize metabolic processes. Frequent deficiencies of macro- and microelements can cause functional disorders and slow down recovery [3,5].

The aim of this work is to summarize data on the role of macro and microelements in the rehabilitation process and to justify the need for their integration into recovery programmes from the standpoint of evidence-based clinical practise.

Materials and methods. An analysis of scientific publications in international databases PubMed, Scopus and Web of Science over the past 10 years was conducted.

Results and their discussion. According to a systematic review by Stanescu et al., trace elements not only play a role in supporting fundamental physiological functions of the body, but also modulate oxidative stress, antioxidant defence mechanisms and immune response. These processes contribute to the activation of enzyme systems that ensure tissue regeneration and restoration of functional integrity after damage. The authors emphasise that selenium functions as a cofactor of glutathione peroxidase, a key antioxidant enzyme that regulates the level of peroxide radicals and prevents oxidative damage to cells [5].

According to modern research, macro- and micronutrients interact synergistically, providing comprehensive support for metabolic and physiological processes during rehabilitation. Adequate intake of proteins and energy creates the basis for optimal activity of enzymatic systems involved in the synthesis of structural proteins, support of muscle and bone metabolism and regulation of energy flows. Meanwhile, minerals and vitamins act as cofactors of enzymes that regulate metabolic pathways, provide antioxidant protection, support the immune response and stimulate cell regeneration. Such interaction of macro- and micronutrients contributes to the full restoration of body functions, including the restoration of muscle strength, energy endurance, tissue healing and maintenance of the structural integrity of organs and systems. According to Stanescu et al., the integration of nutritional support into rehabilitation programmes increases the effectiveness of physiotherapeutic and functional interventions due to the synergistic combination of energy, structural and

regulatory support of the body [5]. Marushko Yu.V. and Khomych O.V. underscore that persistent respiratory difficulties in children following COVID-19 underscore the importance of implementing prompt and effective rehabilitation strategies. The authors accentuate the importance of an individualised approach and a comprehensive combination of physical exercises, breathing techniques and psycho-emotional support for the full restoration of respiratory function in children. In addition, they spotlight that assessing nutritional status and ensuring adequate intake of macro- and micronutrients is an important component of the rehabilitation programme [3,4].

Thus, current scientific evidence suggests that the integration of macro- and micronutrient status assessment and correction is a necessary component of rehabilitation guidelines. This approach ensures the optimization of biochemical and physiological processes underlying the restoration of body functions. This confirms the feasibility of an interdisciplinary rehabilitation model, within which nutritional support is considered an integral component of a comprehensive rehabilitation programme.

Conclusions:

1. The integration of macro- and micronutrients into rehabilitation programmes is an important component of evidence-based clinical practise and affects the functional outcome of recovery.

2. Macro- and micronutrients play a complementary role in rehabilitation, providing an energy and structural basis for supporting muscle metabolism and tissue repair, as well as regulating enzymatic, immune, and antioxidant processes, which helps reduce inflammation and increase the effectiveness of rehabilitation interventions.

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