



THEORY AND METHODOLOGY OF TEACHING

UDC 615.825:796

DOI <https://doi.org/10.5281/zenodo.18456220>

**Methodology for Developing Individual Physical Therapy Trajectories
Based on the Analysis of Sport-Specific Activity**

Maksym Vlasov,

Master's Degree, Founder, Director, AthleteCare, 82 Pennwick Dr., Lititz, PA
17543, USA, <https://orcid.org/0009-0008-6128-6547>

Accepted: 12.01.2026 | Published: 30.01.2026

***Abstract:** The relevance of this study is determined by the growing intensity and variability of athletic loads, which are accompanied by an increased risk of functional disorders and musculoskeletal injuries, as well as by the limited effectiveness of unified approaches to physical therapy in sports rehabilitation. The absence of systematic consideration of sports activity specifics, biomechanical demands, and individual adaptive responses of athletes reduces the stability of recovery outcomes and increases the probability of injury recurrence.*

***The objective of this article** is to provide scientific justification for and develop a methodology for constructing individual physical therapy trajectories for athletes based on analysis of sports activity specifics, taking into account functional, biomechanical, and adaptive characteristics of the organism.*

***Research methods** include theoretical analysis and synthesis of scientific approaches to individualization of physical therapy in sports rehabilitation, systematization of sports activity characteristics, logical-structural analysis of*



principles for utilizing functional and biomechanical assessment results, and the method of theoretical modeling of individual physical therapy trajectories.

***Research findings** demonstrate that individualization of physical therapy is effective when holistically accounting for the type of motor activity, dominant physical qualities, spatial-temporal parameters of movements, load characteristics, and the phase of the training-competition cycle. Utilizing functional and biomechanical analysis results based on the principles of functional relevance, cause-and-effect interpretation, hierarchization of impairments, and dynamic adaptation enables the transition from symptomatic correction to management of athletic motor efficiency. Scientific and practical challenges in implementing individual physical therapy trajectories have been identified, related to coordination of rehabilitation and training loads, limited objectification of return-to-sport readiness criteria, and fragmentation of interdisciplinary interaction.*

*The **conclusions** confirm the appropriateness of using the proposed methodology as a scientifically grounded foundation for integrating physical therapy and the training process. This contributes to enhanced recovery effectiveness, reduced risk of recurrent injuries, and ensures correspondence of rehabilitation programs to the actual requirements of different sports.*

***Prospects for further research** are associated with empirical validation of the developed methodology in athletes of various qualification levels, refinement of quantitative criteria for assessing readiness for athletic loads, and development of interdisciplinary support models in sports rehabilitation.*

***Keywords:** sports rehabilitation, individualization of recovery, functional status of athlete, biomechanics of movements, movement patterns, adaptive mechanisms, load management, prevention of recurrent injuries.*



Методологія побудови індивідуальних траєкторій фізичної терапії на основі аналізу специфіки спортивної діяльності

Власов Максим Сергійович

магістр, засновник, директор, AthleteCare, 82 Пеннвік драйв, Літітц,
Пенсільванія 17543, США, <https://orcid.org/0009-0008-6128-6547>

Анотація: *Актуальність дослідження зумовлено зростанням інтенсивності та варіативності спортивних навантажень, що супроводжується підвищенням ризиком функціональних порушень і травм опорно-рухового апарату, а також обмеженою ефективністю уніфікованих підходів до фізичної терапії у спортивній реабілітації. Відсутність системного урахування специфіки спортивної діяльності, біомеханічних вимог і індивідуальних адаптаційних реакцій спортсменів знижує стабільність результатів відновлення та підвищує ймовірність рецидивів ушкоджень.*

Метою статті є наукове обґрунтування та розроблення методики побудови індивідуальних траєкторій фізичної терапії спортсменів на основі аналізу специфіки спортивної діяльності з урахуванням функціональних, біомеханічних та адаптаційних особливостей організму.

Методи дослідження включають теоретичний аналіз і узагальнення наукових підходів до індивідуалізації фізичної терапії у спортивній реабілітації, систематизацію характеристик спортивної діяльності, логіко-структурний аналіз принципів використання результатів функціонального та біомеханічного обстеження, а також метод теоретичного моделювання індивідуальних траєкторій фізичної терапії.

Результати дослідження демонструють, що індивідуалізація фізичної терапії є ефективною за умови цілісного врахування типу рухової активності, домінантних фізичних якостей, просторово-часових параметрів рухів,



характеру навантажень і фази тренувально-змагального циклу. Використання результатів функціонального та біомеханічного аналізу на основі принципів функціональної релевантності, причинно-наслідкової інтерпретації, ієрархізації порушень і динамічної адаптації дозволяє перейти від симптоматичної корекції до управління руховою ефективністю спортсмена. Виявлено науково-практичні проблеми реалізації індивідуальних траєкторій фізичної терапії, пов'язані з узгодженням реабілітаційних і тренувальних навантажень, обмеженою об'єктивізацією критеріїв готовності до повернення у спорт та фрагментарністю міждисциплінарної взаємодії.

Висновки підтверджують доцільність використання запропонованої методики як науково обґрунтованої основи інтеграції фізичної терапії та тренувального процесу. Це сприяє підвищенню ефективності відновлення, зниженню ризику повторних ушкоджень і забезпеченню відповідності реабілітаційних програм реальним вимогам різних видів спорту.

Перспективи подальших досліджень пов'язані з емпіричною валідацією розробленої методики у спортсменів різної кваліфікації, уточненням кількісних критеріїв оцінювання готовності до спортивних навантажень та розвитком міждисциплінарних моделей супроводу у спортивній реабілітації.

Ключові слова: спортивна реабілітація, індивідуалізація відновлення, функціональний стан спортсмена, біомеханіка рухів, рухові патерни, адаптаційні механізми, керування навантаженням, профілактика повторних травм.

Introduction. The current development of physical therapy in sports is characterized by a growing need for evidence-based approaches to individualizing rehabilitation and recovery programs that account for the specificity of athletic activity. High levels of physical stress, competitive intensity, and the diverse nature of motor actions across different sports lead to the formation of specific functional disorders,



overuse injuries, and musculoskeletal trauma that cannot be effectively addressed through standardized physical therapy protocols. In sports rehabilitation practice, there remains a gap between general clinical approaches and the actual biomechanical, neuromuscular, and metabolic demands of specific athletic activities, which negatively affects recovery timelines, stability of functional outcomes, and risk of injury recurrence. From a scientific perspective, the integration of data on athletes' motor activity structure, load characteristics, and physiological adaptation mechanisms into the methodology for developing individualized physical therapy trajectories remains a critical issue. Resolving this problem is fundamentally important for establishing an evidence base for sports physical therapy, improving interdisciplinary collaboration among rehabilitation specialists, sports medicine practitioners, and coaching staff, and for enhancing the effectiveness of practical solutions aimed at restoring athletes' functional capacity, optimizing their performance, and reducing injury rates in the context of intensive athletic activity.

Literature Review. A review of contemporary scientific research demonstrates a gradual shift from universal rehabilitation protocols toward multidimensional, personalized recovery models that integrate psychological, functional, biomechanical, digital, and organizational factors. In this context, important methodological foundations are established by studies in which individual trajectory is conceptualized as a process of personal and functional transformation for the athlete. For instance, Y. Tatmurzinova substantiates a resource-oriented approach to psychological transformation that is methodologically aligned with contemporary physical therapy, where recovery effectiveness depends on the patient's agency and capacity to mobilize internal resources during the rehabilitation process [1]. In the study by Kozak et al., individualization of rehabilitation processes is examined through the lens of educational and clinical system resilience during the COVID-19 pandemic and Russia's full-scale war against Ukraine, highlighting the importance of continuity in athletes'



rehabilitation pathways and the adaptability of physical therapy methodology under crisis conditions [2].

The psychological dimension of individualization is further elaborated by A. Zhaivoronok, who examines art therapy practices as a tool for supporting and restoring personal resources that can be integrated into physical therapy for athletes to enhance motivation and adherence to prolonged individualized programs [3]. Meanwhile, O. Krykun demonstrates that the psychological characteristics of athletes in coordination-intensive sports significantly influence the rehabilitation course, particularly recovery rates, motor control, and the establishment of return-to-competition criteria, necessitating adaptation of individual trajectories to the cognitive-coordinative specificity of athletic activity [4].

An important methodological component of physical therapy individualization is the integration of patient-centered principles with analysis of training and competition conditions. Andriichuk O. and colleagues examine patient-centeredness as the foundation for constructing individual physical therapy trajectories during sports rehabilitation camps, emphasizing the need to align clinical decisions with training regimens, loads, and athlete goals [5]. The methodological prerequisites for such individualization are also formed during professional training: O. Rybak and colleagues substantiate the use of information and digital technologies in teaching biomechanics, which enables deeper analysis of motor activity and its subsequent application in designing personalized physical therapy trajectories [6]. This approach is further developed in the study by R. Zhang, which demonstrates the potential of big data and deep learning for personalized sports rehabilitation analysis, allowing prediction of recovery dynamics with consideration of the intensity and structure of athletic loads [7].

A substantial role in the methodology of individualized physical therapy trajectories is played by sport-specific and biomechanical analysis. Draovitch P. and co-authors systematize recommendations for sport-specific rehabilitation, emphasizing



that the effectiveness of an individualized recovery trajectory is determined by the alignment of exercises and progression criteria with the typical movement patterns of a particular sport [8].

Empirical data from S. Liebel and co-authors confirm that athletes' recovery trajectories after concussion vary significantly depending on the sport, which justifies the need for differentiated approaches in physical therapy [9]. Further theoretical generalization is offered by I. Cranswick and co-authors, who develop a multicomponent model of musculoskeletal rehabilitation, within which the individual trajectory is interpreted as the integration of physical, behavioral, and contextual factors of sports activity [10]. The multidisciplinary nature of such solutions is emphasized by M. Kaur and co-authors, who stress the need to coordinate medical, physiotherapeutic, and coaching interventions within a single personalized recovery plan [11]. The quantitative basis for such individualization is formed by A. Penichet-Tomas, who demonstrates the role of applied biomechanics in injury prevention and rehabilitation, which allows individual trajectories to be justified on the basis of measurable movement parameters [12].

The final methodological dimension is the systemic and organizational conditions for the implementation of individual physical therapy trajectories. Staes F. and co-authors analyze the practical challenges of reducing injuries in elite youth sports schools, emphasizing the impact of the organizational environment and training structure on the stability of recovery processes [13]. The clinical consistency of individual trajectories is reinforced by the recommendations of Quatman-Yates C. and co-authors, who propose a model of physical therapy after concussion based on the International Classification of Functioning, which ensures consistency in assessment, interventions, and criteria for return to activity [14]. The methodology of individual trajectories is also indirectly influenced by the research of I. Cunningham and co-authors, which shows the importance of the quality of training and development of



sports officials for the formation of a safe competitive environment and reduction of the risk of repeat injuries [15].

Identification of previously unresolved parts of the general problem. Despite the development of scientific approaches to the individualization of physical therapy in sports rehabilitation, questions remain unresolved regarding their systematic integration with the specifics of sports activities. The characteristics of sports activities as a methodological basis for building individual recovery trajectories are not sufficiently generalized, and the results of functional and biomechanical analysis are often applied fragmentarily, without clear principles for transformation into practical programs. Models for the implementation of individual physical therapy trajectories in conditions of high intensity and variability of sports loads remain limited, which complicates the coordination of rehabilitation and training influences. The proposed study aims to overcome these gaps by systematizing the characteristics of specific sports activities, substantiating the principles of using functional and biomechanical analysis, and developing a comprehensive methodology for building individual physical therapy trajectories. This ensures methodological unity in approaches to the individualization of recovery and creates a basis for improving the effectiveness and safety of physical therapy in modern sports.

Formulation of the article's objectives (task setting)

The purpose of the article is to develop a methodology for building individual physical therapy trajectories for athletes based on an analysis of the specifics of sports activities, taking into account the functional, biomechanical, and adaptive characteristics of the body.

To achieve this goal, the article proposes to solve the following tasks:

1. Analyze modern approaches to the individualization of physical therapy in sports rehabilitation, taking into account the specifics of sports activities.
2. Justify the use of the results of functional and biomechanical analysis for individualized planning of physical therapy in conditions of intense sports loads.



3. Develop a methodology for constructing individual physical therapy trajectories for athletes for different types of sports activities.

Presentation of the main research material. In sports rehabilitation, the individualization of physical therapy is formed as a response to the different structure of motor activity, the intensity of loads, and the adaptive capabilities of athletes. Modern scientific approaches to its implementation are based on clinical, functional, biomechanical, and adaptive models that determine the logic of selecting means, modes, and sequences of therapeutic interventions. In scientific research, individualization is mainly interpreted as the process of adapting physical therapy programs to the individual characteristics of the athlete, but the degree to which the specifics of a particular sport are taken into account varies significantly depending on the methodological basis of the approach (Table 1).

Table 1

Modern scientific approaches to the individualization of physical therapy in sports rehabilitation

Approach	Scientific basis	Principle of individualization	Practical focus
Protocol-adaptive	Clinical recommendations, evidence-based medicine	Correction of standard programs according to the athlete's condition	Restoration of basic functions
Functionally oriented	Functional diagnostics, movement tests	Elimination of identified functional deficits	Normalization of motor function
Biomechanical	Kinematic and kinetic analysis	Optimization of movement patterns and loads	Correction of movement technique
Load adaptation	Adaptation theory, sports physiology	Individual dosage and progression of loads	Return to athletic form
Interdisciplinary	Sports medicine, physical therapy, training	Coordination of therapy with athlete training	Improving readiness for competitive activity

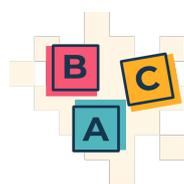
Source: compiled by the author based on [4, p. 39; 5, p. 114; 7, p. 4; 8, p.276; 10, p. 7; 11, p. 237; 13].

In modern sports physical therapy practice, these approaches are used as complementary components of a single recovery process. Protocol-adaptive models



prevail in the early stages of rehabilitation, when the key task is to stabilize the athlete's condition and restore basic motor ability after injuries. They ensure medical safety and control of the recovery process, but require further refinement to take into account the specifics of motor activity. The functionally oriented approach is widely used to correct mobility limitations, muscle imbalances, and coordination disorders. In practice, it allows the physical therapy program to be adapted to the individual functional indicators of the athlete, but the effectiveness of this approach increases significantly when combined with an analysis of the motor actions typical for the sport [11, p. 237]. Biomechanical approaches provide a deeper understanding of the mechanisms of load formation and compensatory movements, which is of practical importance for athletes in technically complex and asymmetrical sports. In practical terms, their application makes it possible to correct movement patterns taking into account the requirements of competitive activity and to prevent overload of individual links of the musculoskeletal system. Load-adaptation approaches are aimed at the gradual return of the athlete to the intensities and volumes of work characteristic of their sport. In physical therapy practice, they are implemented through individual progression of loads, coordinated with the training process, which allows for the formation of functional readiness for competitive activity [5, p. 114]. Interdisciplinary approaches combine rehabilitation, therapeutic, and training solutions into a single system of athlete support. Their practical implementation creates the conditions for the transition from fragmentary individualization to the construction of holistic individual physical therapy trajectories based on the analysis of the specifics of sports activities, which directly leads to further methodological justification, presented in the following sections of the article.

The specifics of sports activities are a determining factor in the formation of individual physical therapy trajectories, since it is precisely these specifics that determine the nature of the loads, typical adaptation mechanisms, and the profile of functional risks for athletes. In the context of physical therapy, it is not the formal division of sports that is important, but the systematization of the key characteristics of



motor activity, which directly determine the content, sequence, and direction of restorative influences (Table 2).

Table 2

Key characteristics of sports activities that are taken into account when developing individual physical therapy trajectories for athletes

Characteristics of sports activities	Content interpretation	Significance for physical therapy planning
Type of physical activity	Predominantly cyclic, acyclic, or combined motor actions	Determines the structure and repetition of therapeutic exercises
Leading physical qualities	Dominance of strength, speed, endurance, or coordination	Forms functional priorities for recovery
Spatial-temporal parameters of movements	Amplitude, tempo, rhythm, symmetry of execution	Guides the correction of movement patterns
Nature of loads	Peak, continuous, or interval loads	Used for dosing and progression
Level of contact interaction	Presence or absence of external mechanical influences	Determines the preventive focus of therapy
Stage of athlete preparation	Preparatory, competitive, or recovery period	Ensures coordination with the training process

Source: compiled by the author based on [4, p. 40; 6, p. 180; 7, p.6; 8, p. 278; 9, p. 2797; 11, p. 238; 13].

The systematization of these characteristics is used as a tool for transitioning from general recovery schemes to functionally and activity-oriented individual trajectories. Thus, in cyclic sports, where movements are characterized by high repetitiveness and prolonged loads, individual physical therapy trajectories are formed with an emphasis on the endurance of stabilizing muscle groups, control of accumulated fatigue, and optimization of motor economy. In practice, this means combining restorative exercises with a gradual return to the rhythms and workloads characteristic of the sport [8, p. 278]. In acyclic and technically complex sports, the spatial-temporal characteristics of movements are of paramount importance. In such cases, physical therapy focuses on restoring coordination, symmetry, and precision of movement, which is of direct practical importance for the prevention of repeated injuries when performing explosive or asymmetrical movements. For example, in game



or combat sports, individual physical therapy trajectories include exercises that simulate typical competitive actions with controlled loads [13]. The dominant physical qualities of a particular sport determine the functional priorities of physical therapy and the relationship between the strength, coordination, and stabilization components of the programs. The intensity and volume of loads are used as basic parameters for building the progression of therapeutic influences, which allows recovery to be coordinated with the training process without losing athletic form. In practical terms, this is achieved through the gradual inclusion of the athlete in training regimes with controlled load parameters [6, p. 180]. The level of contact in a sport necessitates the consideration of external mechanical influences and the risks of re-injury, which is reflected in the inclusion of preventive components of physical therapy. Taking into account the phase of the training and competition cycle allows adapting individual physical therapy trajectories to the athlete's current functional state, ensuring a gradual and controlled transition from rehabilitation to full-fledged sports activity.

Functional and biomechanical analysis in physical therapy for athletes is a methodological tool for the transition from general individualization to the targeted formation of recovery programs focused on specific mechanisms of motor activity disorders. Their results acquire practical value only if they are used systematically, which requires clear principles for interpreting and transforming diagnostic data into the content of individualized physical therapy programs (Table 3).

Table 3

Principles for using the results of functional and biomechanical analysis in the formation of individualized physical therapy programs for athletes

Principle	Content of the principle	Methodological significance
Functional relevance	Focusing analysis on movements that are significant for sports activities	Ensuring the applied focus of programs
Causal interpretation	Identification of mechanisms of motor disorders formation	Elimination of the root causes of dysfunctions
Hierarchy of disorders	Identification of primary and secondary dysfunctions	Formulation of treatment priorities



Dynamic adaptation	Taking into account changes in functional indicators over time	Correction of programs during recovery
Integration with exercise	Coordination of therapy with the training process	Controlled transition to sports activities

Source: compiled by the author based on [6, p. 181; 7, p.8; 8, p. 280; 9, p. 2799; 12].

The principle of functional relevance means that functional and biomechanical analyses focus on those motor actions that directly determine the effectiveness and safety of an athlete's participation in training and competition. For example, in athletes of game sports, the key objects of analysis are acceleration, deceleration, changes in direction of movement, and landing after jumps, while in cyclic sports, they are the repetitive phases of the movement cycle that accumulate micro-overloads. On this basis, physical therapy exercises are designed as modified or simplified versions of sports-related movements [9, p. 2799]. The principle of cause-and-effect interpretation allows us to move from the observation of disorders to an understanding of the mechanisms of their formation. In practical terms, this makes it possible to identify that, for example, limited mobility or insufficient muscle control in the proximal segments cause overload of the distal joints. Accordingly, the physical therapy program is aimed not at the local elimination of pain syndrome, but at restoring the stability and coordination of the basic links of the motor chain. The hierarchical principle is particularly important for athletes with multiple functional impairments resulting from prolonged or repeated stress. In physical therapy practice, it allows us to determine which dysfunctions are critical for restoring motor efficiency and which are secondary and can be corrected at later stages [12]. This prevents programs from being overloaded with a large number of ineffective exercises. The principle of dynamic adaptation is implemented through regular reassessment of functional and biomechanical indicators during rehabilitation. In practice, this means that an individualized physical therapy program is not static but changes depending on the speed of recovery, tolerance to stress, and the athlete's gradual return to training. Integrating the results of the analysis



with training loads allows physical therapy to be used as an intermediate link between the therapeutic-recovery and full-fledged sports stages. In modern practice, this manifests itself in the inclusion of therapeutic exercises in the structure of training sessions or in the phased modeling of competitive loads in safe conditions. This approach ensures not only the restoration of function, but also the formation of the athlete's readiness for the specific requirements of their sport, which is a key indicator of the effectiveness of individualized physical therapy programs.

The implementation of individual physical therapy trajectories in conditions of high intensity and variability of sports loads is accompanied by a complex of scientific and practical problems caused by both the peculiarities of the modern sports process and the methodological limitations of rehabilitation approaches. One of the key problems is the complexity of coordinating therapeutic interventions with the dynamics of training and competition loads, when the need for a rapid return of the athlete to participation in competitions conflicts with the physiological rates of tissue and functional system recovery. This leads to the risk of premature intensification of physical therapy and the formation of compensatory movement strategies. A significant problem remains the insufficient objectification of the criteria for an athlete's readiness to transition between stages of an individual physical therapy trajectory. In practice, decisions are often based on clinical or subjective indicators that do not always reflect the actual state of neuromuscular control and the ability of the musculoskeletal system to withstand specific sports loads [11, p. 239]. This complicates the prediction of rehabilitation outcomes and increases the likelihood of re-injury. Scientific and practical difficulties are also associated with the high individual variability of athletes' adaptive responses to therapeutic interventions that are identical in form and volume. Under conditions of intense stress, standard approaches to exercise dosing lose their accuracy, which limits the possibility of building stable individual physical therapy trajectories. An additional complicating factor is the accumulation of hidden fatigue and microdamage, which are not always



recorded during standard examinations but significantly affect the effectiveness of recovery. An important problem is the fragmentation of interdisciplinary interaction between physical therapists, sports medicine doctors, and coaching staff. The lack of a unified methodological framework and coordinated goals leads to differences in approaches to athlete training, which complicates the implementation of comprehensive individual physical therapy trajectories. In such conditions, rehabilitation programs often perform a compensatory rather than an integrative function. The problems of implementing individual physical therapy trajectories are exacerbated by the time and organizational resource constraints characteristic of modern high-performance sports. Shortened recovery times, a busy competition calendar, and limited access to instrumental control methods reduce the possibilities for deep individualization.

The development of individual physical therapy trajectories for athletes in modern sports requires a transition from fragmented rehabilitation solutions to a comprehensive methodology capable of systematically combining the analysis of the specifics of sports activities, the results of functional and biomechanical examinations, and the dynamics of training and competition loads. Such a methodology should be focused not only on restoring impaired functions, but also on preparing athletes to perform movements characteristic of their sport in competitive conditions. The methodological basis is the concept of physical therapy as a controlled process of gradual adaptation, in which the individual trajectory is formed taking into account the real requirements of sports activities, and not only clinical criteria for recovery (Fig. 1).

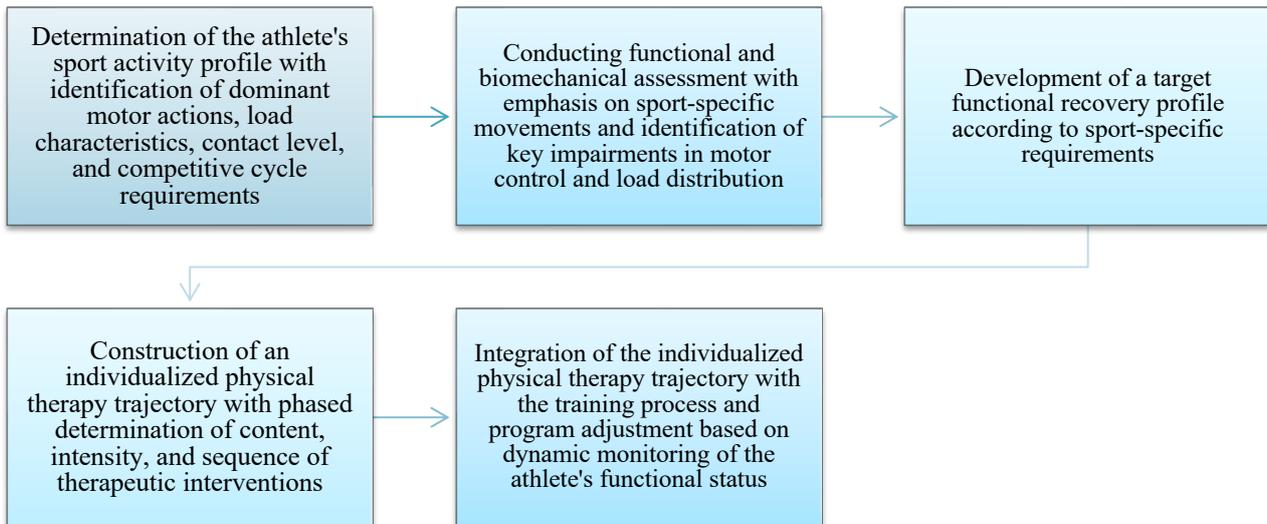


Fig. 1. Methodology for building individual physical therapy trajectories for athletes

Source: author's own development

The starting point for implementing the methodology is to form a clear understanding of the profile of sporting activity, which allows the physical therapist to focus the rehabilitation process on the real requirements of a particular sport. This approach ensures that the content of physical therapy corresponds to the typical movements and loads that athletes encounter in training and competition environments. The results of functional and biomechanical examinations are used to identify mechanisms that limit the effectiveness of sports-related movements, rather than just to record existing disorders. In practice, this allows physical therapy to be directed toward restoring movement control, stability, and coordination of muscle chains, which is critical for preventing re-injury. The formation of a target functional profile creates a benchmark for the entire individual physical therapy trajectory, determining the expected level of motor readiness of the athlete. This makes it possible to evaluate progress not only by clinical indicators, but also by the ability to perform movements characteristic of the sport with the necessary quality and intensity. The design of an individual physical therapy trajectory involves a gradual change in the nature of the



exercises from corrective and stabilizing to functionally and sports-oriented. In practical terms, this approach ensures the continuity of the recovery process and reduces the risk of a sharp transition from rehabilitation to full training.

Conclusions. The study found that the effectiveness of physical therapy in sports is determined by the level of methodological integration of the analysis of the specifics of sports activities, the functional state of the athlete, and the biomechanical mechanisms of movement execution. It has been proven that the use of unified or predominantly clinically oriented rehabilitation approaches does not meet the requirements of modern sports with its high intensity and variability of loads and reduces the stability of recovery results. The systematization of the characteristics of sports activities has shown that the type of motor activity, dominant physical qualities, spatial-temporal parameters of movements, load regime, level of contact, and phase of the training-competition cycle are decisive for the formation of the content of individual physical therapy trajectories. Their comprehensive consideration ensures the functional orientation of rehabilitation programs and reduces the risk of forming compensatory motor strategies. It is justified that the use of the results of functional and biomechanical analysis should be carried out according to the principles of functional relevance, cause-and-effect interpretation, hierarchy of disorders, dynamic adaptation, and integration with the training process, which allows moving from symptomatic correction to managing the athlete's motor efficiency. Key problems in the implementation of individual physical therapy trajectories have been identified, related to the coordination of rehabilitation and training loads, limited objectification of criteria for readiness to return to sport, high individual variability of adaptive responses, and fragmentation of interdisciplinary interaction. The proposed methodology for constructing individual physical therapy trajectories creates a scientifically sound basis for integrating rehabilitation and training processes, contributes to improving the effectiveness of recovery, and reduces the risk of re-injury.



Prospects for further research are related to empirical testing of the methodology, the development of quantitative criteria for assessing athletes' readiness for exercise, and the deepening of interdisciplinary support models.

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