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SCIENTIFIC AND METHODOLOGICAL PRINCIPLES FOR THE DEVELOPMENT OF PROFESSIONAL COMPETENCIES IN SPECIALISTS IN THE FIELD OF KINESIOTHERAPY FOR DEGENERATIVE-DYSTROPHIC PATHOLOGY OF THE SPINE

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A long-standing combination of diagnostic and treatment services, research, and teaching has enabled us to develop a comprehensive system for training specialists in kinesiotherapy, based on the principles of evidence-based medicine, clinical biomechanics, and modern rehabilitation technologies. Zaporizhzhia has historically been a key center for the study of degenerative diseases of the spine, and the expertise of the Zaporizhzhia School of Vertebrology is widely recognized in the professional community.

From the perspective of modern concepts of neuromuscular control and adaptability of the musculoskeletal system, kinesiotherapy is considered a pathogenetically oriented method that ensures: restoration of movement stereotypes; optimization of muscular-fascial balance; reduction of the level of nociceptive impulses; improvement of tissue trophism and microcirculation; long-term reduction of pain syndrome without medication [1].

These assertions are supported by experimental studies demonstrating that regular activation of deep stabilizing muscles and soft tissue structures leads to lasting neurophysiological changes unachievable solely by pharmacological methods [2].

The training program we developed includes several complementary modules:

1. Theoretical module covering: biomechanics of the spine and large joints; neurophysiology of muscle tone and motor control; fundamentals of modern manual diagnostics; and algorithms for analyzing radiological examination methods (radiography of the spine, CT, MRI). This approach allows students not only to master the technique but also to understand its pathogenetic aspects [2].

2. A practice-oriented module, including: organizing "sparring pairs" based on a "specialist-patient" model; step-by-step development of myofascial traction, mobilization, post-isometric, and post-reciprocal relaxation techniques; and analysis of potential errors using video recordings and multimedia support. This form of training has been proven to improve the quality of motor skill development through repeated sensorimotor feedback [3].

3. A control and assessment module that includes: supervision by a teacher; objectification of the dynamics of competencies; and the development of individual treatment and diagnostic algorithms for further clinical practice [2].

Based on scientific, methodological, and clinical developments developed during the implementation of this approach, we have implemented personalized algorithms for clinical and functional assessment and the selection of kinesiotherapeutic tactics, which are successfully used in the rehabilitation of patients with vertebrogenic pathology.

An analysis of current trends in physical rehabilitation and related fields allows us to identify several areas for further improvement of training in kinesiotherapy methods:

1. Integration of digital technologies: use of 3D movement analysis systems; implementation of sensor platforms for balance and stabilometry assessment; development of virtual simulators of kinesiotherapy techniques; creation of digital training modules with augmented reality (AR) elements.

2. Standardization of clinical care protocols: development of unified approaches for various nosological groups (osteochondrosis, spondyloarthrosis, myofascial syndrome, consequences of spinal injuries); application of evidence-based medicine principles using validated scales (VAS, SF-36, EQ-5D, etc.).

Interdisciplinary collaboration is essential, specifically deeper integration of kinesiotherapy with clinical neurology, orthopedics, and sports medicine; participation of specialists in multidisciplinary teams for the management of patients with chronic vertebrogenic pathology; and joint scientific and clinical research.

The next area is the creation of training modules for teachers: improving the qualifications of trainers and teachers will standardize the delivery of material and improve the level of training for specialists on a regional and national scale.

Approaches to the development of personalized rehabilitation programs. Scientific data indicate the need to develop individualized recovery trajectories taking into account: morphological features of the spine; the level of muscle imbalance; kinematic patterns; and associated degenerative changes.

The presented experience confirms the effectiveness of a comprehensive, scientifically based approach to training in kinesiotherapy. Developing deep biomechanical, diagnostic, and practical competencies in specialists will ensure a higher level of quality rehabilitation for patients with degenerative diseases of the spine. Prospects for further development of this method are related to the digitalization of training, standardization of protocols, and expanded interdisciplinary collaboration, which will improve the effectiveness of rehabilitation programs and strengthen the position of kinesiotherapy in modern medical practice [2].

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