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Original article

INNOVATIVE ADVANCED PHYSIOTHERAPY ALGORITHM FOR LOW BACK PAIN

Aleksandar Andreev[1, 2], Petya Parashkevova[1]
1) Department of Public Health, Faculty of Public Health and Health Care, "Angel Kanchev" University of Ruse, Bulgaria.
2) Medical center "Medika Expert", Ruse, Bulgaria.

ABSTRACT:

Introduction: Low back pain (LBP) is a prevalent issue with a wide array of causes necessitating varied therapeutic strategies. Given its significant impact on the global population and quality of life, innovative approaches in physiotherapy are essential.

Materials and Methods: This study was conducted at the Medica Expert Medical Center, where 29,786 primary examinations of individuals over 18 years old were reviewed. The study focuses on the development and application of an advanced physiotherapy algorithm designed to enhance classification and treatment modalities for LBP.

Results: In 2022, nearly half (47%) of the examinations were related to LBP, highlighting the need for specialized therapeutic approaches. The innovative algorithm implemented demonstrated substantial improvements in patient outcomes, including better pain management and enhanced mobility.

Discussion: The treatment-based classification system updated in 2015 was expanded to include a wider range of physiotherapy tasks, significantly aiding in the personalization and effectiveness of treatment protocols. This has implications for both the efficiency of clinical practice and patient quality of life.

Conclusion: The innovative advanced physiotherapy algorithm for LBP offers a detailed and adaptable approach that improves upon traditional classification systems. Its application has shown promising results in clinical practice, suggesting a substantial advancement in the management of LBP.

References: A comprehensive list of references from recent studies and significant literature supports the findings and methodologies applied in the study, including contributions from major health organizations and previous empirical research.

Keywords: physiotherapy, low back pain, rehabilitation,

INTRODUCTION

Pain in the lumbar region is characterized by different causes and duration. The variety of causes of pain in the lumbar region need a different therapeutic approach. Knowledge about the characterization of pain in the lumbar region allows us to apply adequate therapeutic means, and this leads to good pain management [1].

Chronic low back pain imposes a significant disease burden and ranks as the leading condition among a total of 291 different diseases. [2]. An estimated 623 million people all over the world suffer from low back pain [3]. Patients suffering from chronic pain complain about disturbance in daily life, ranging from work duties and family commitments to social activities and leisure time. Therefore, rather than exclusively rating the intensity of the pain symptom, a patient's impairment and reduced quality of life-related to the pain condition should also be assessed. The World Health Organization inaugurated the International Classification of Functioning, Disability and Health (ICF) as a complementary classification system to the international classification of diseases (ICD-10). The ICF is used to classify a patient's individual, health condition-related functioning and impairment, as well as their overall health status in daily life. The ICF follows a biopsychosocial and resource-centered approach and is used globally by different health professionals. The ICF core sets establish minimal standards for classifying specific health conditions across five main domains: body functions, body structures, activities and participation, environmental factors, and personal factors. Functional classification is crucial to all aspects of health and enhances the ability of healthcare professionals to gain a more comprehensive and meaningful understanding of a patient's health status while also improving multi-professional collaboration to optimize treatment outcomes. In recent years, the importance of the biopsychosocial and cross-professional approach of the ICF has been widely recognized [4].

The International Classification of Diseases (ICD) has been the primary foundation for comparing statistics on causes of mortality and morbidity across different locations and over time [5].

The first International Classification of Diseases, Adapted for Indexing of Hospital Records and Operation Classification (ICDA), was published in 1962 by the U.S.

Public Health Services.

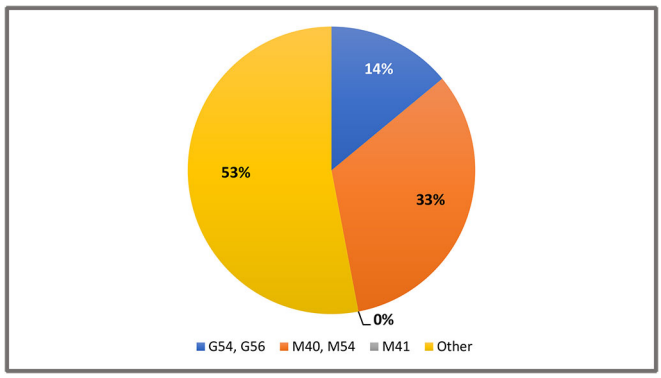
The transition to ICD-10-CM/PCS code sets is scheduled to take place on October 1, 2015, and all users will adopt the new code sets on that date. For secondary users, this indicates that starting October 1, 2015, the data you receive will be coded using ICD-10-CM/PCS.

In Bulgaria until 2023, ICD-10 is the most widespread and used in medical documentation, and these codes are used both in clinical pathways and for medical referrals by specialist doctors.

The World Health Organization released the 11th revision of the International Classification of Diseases and Related Health Problems (ICD-11) on June 18, 2018, which came into effect on January 1, 2022. In addition to the chapters on disease classification in conventional medicine (CM), a new chapter on traditional medicine (TM) conditions – Module 1, was introduced. Low back pain (LBP) is a common reason for physician visits, and the classification codes for LBP in ICD-11 are crucial for ensuring accurate clinical diagnoses. [6].

In 2022, 29,786 primary examinations of people over 18 years were conducted by various specialists in the offices of the Medica Expert Medical Center, Ruse, Bulgaria. 4071 of them according to ICD codes were G54-G56, 9845 according to ICD – M 40, M 54, 36 according to ICD – M 41, 15836- other ICD codes that are not related to back and lower back pain (chart 1). 47 percent of all examinations were classified as low back complaints. This requires deeper knowledge and refinement of means, such as looking for ways to systematize information and facilitate therapists' work.

Chart 1. Medical examination in Medika Expert in 2022



MATERIALS AND METHODS:

In about 23% of cases, the pain becomes chronic, and 10–12% of patients with chronic low back pain may have varying degrees of disability. "Early therapeutic exercise of the difficult and painful activities allows for a faster and more complete resolution of the symptoms associated with limited mobility due to pain (or fear of pain)" [7].

When the patient arrives at the physiotherapy practice, different algorithms are applied. Over the years, therapy algorithms have undergone changes. The patient often ends up in a physiotherapy practice after triage and referral from a GP or a specialist after the anamnesis, examination and functional tests. At this level, it is necessary to choose physiotherapy methods and means. Understanding the origin of pain - which tissue is impaired, which structure gives pain signals and the cause of it, can lead to the right choice.

Pain is the first and most important sign of discomfort, and therefore, it must be sought, located and characterized. Pain is not a specific activity of our senses like sight and hearing but a complex psychophysical phenomenon - the so-called "unpleasant experience". Clinicians include in the diagnostic complex of syndromes of many internal diseases the manifestations of pseudoradicular syndrome related to the corresponding segment of the spine - hyperalgesic skin areas, muscle spasm, changes in the subcutaneous connective tissue, the periosteal connective apparatus, blockage with or without reflex scoliosis, etc.

It has been proven that the intensity of the pain is not determined only by physiological factors but is a combination of psychological trauma, pessimistic thinking, depressive states of mind [8]. The "time" factor determines whether the pain is acute or chronic. Acute pain is primarily a warning signal, and chronic pain is most oftenly an integral part of a localized disease, and sometimes, it is an independent disease. It is influenced by external factors such as: gender, age, personal culture and others [9].

There is a discussion in the literature regarding the classification of spinal pathologies – according to the affected anatomical structure, according to the induced pathokinetic changes or functional deficit. In cases related to soft tissue damage, kinesitherapy is determined by the stages of regeneration. However, the situation is always complicated by the proximity of peripheral nerve structures and the spinal cord. As is well known, after acute trauma or repetitive micro traumatism, soft tissues react with an inflammatory response. There is constant pain due to the chemical irritation of the nociceptors. Range of motion is limited due to swelling and muscle spasms. Therefore, in the presence of aseptic inflammatory symptoms in an acute period, the treatment is aimed at reducing the inflammatory symptoms, relieving the stress on the injured tissues and providing conditions for a physiological regenerative process. Modern trends aim at changing the generally accepted practice of prescribing strict bed rest for a long period of time because this leads to decreasing in the mechanical strength and functional integrity of soft tissues. Early application of precisely targeted non-destructive movements allows for a reduction in pain intensity and earlier functional recovery.

The pathogenesis of vertebral pain syndromes is as complex as the anatomical and functional structure of the spine, where the pathological processes provoking all the clinical symptoms start. In this complex pathogenetic chain, a number of exogenous factors that play the role of an "unlocking" mechanism, as well as some endogenous factors that represent a predisposing terrain for these diseases [10].

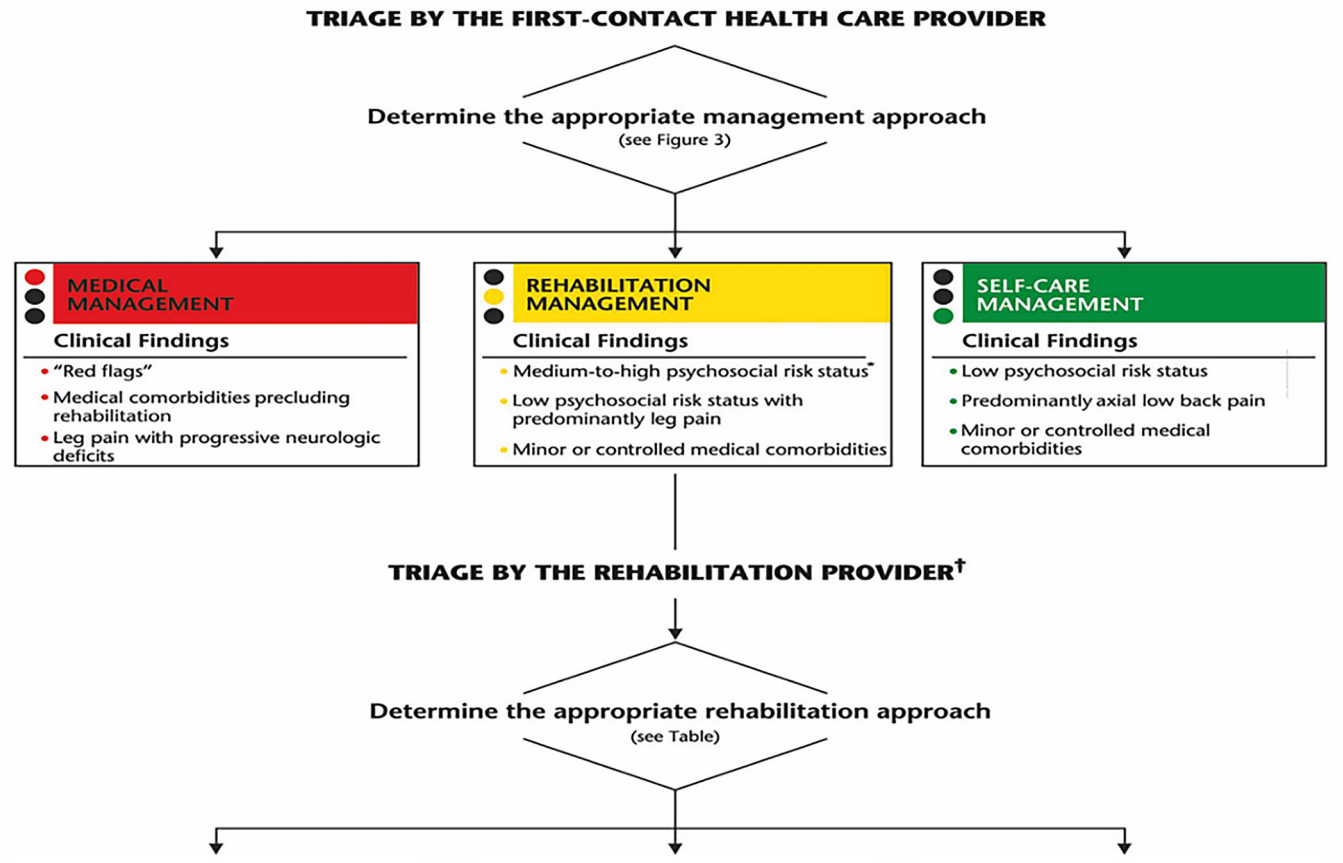
In Bulgaria's health care system, regulated by the National Health Insurance Fund (NHIF), patients are referred by a GP or a specialist based on ICD codes and admitted by a physical and rehabilitation medicine doctor. He conducts a clinical examination and if indicated for physiotherapy, refers the patients. If they are not consulted with other specialists or appoint new clinical and imaging examinations. According to the same ICD codes, the documents required by the NHIF are prepared, and referrals are made to physiotherapists or other specialist consultants.

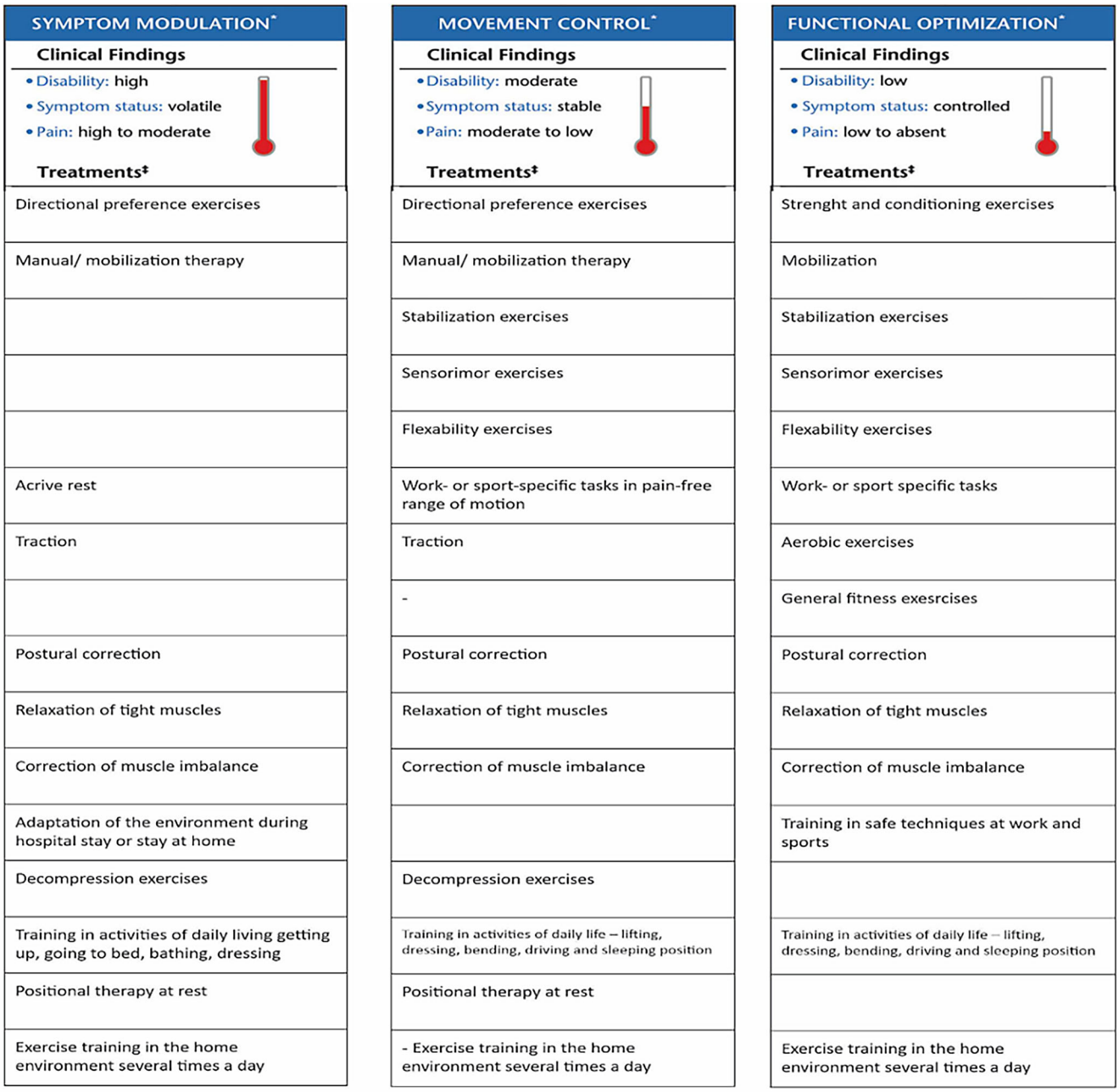
The formulation of physiotherapy tasks is based on observation, examination, anamnesis, imaging diagnostics, functional and specialized tests, scales and tests. At this stage, a more detailed picture of the disease is obtained, reaching an understanding of the suffering at the tissue level. The patient can then be classified based on the origin of the pain, often falling into more than one category. All this requires constant updating and optimization of the means and methods of physiotherapy.

The treatment-based classification (TBC) system for managing low back pain (LBP) has been employed by clinicians since 1995. This article discusses the recent updates to the TBC, which focus on retaining its strengths, addressing its shortcomings, and incorporating recent research advancements. This update of the TBC (has 2 levels of triage: [11] the level of the first-contact healthcare provider and [12] the level of the rehabilitation provider. At the first contact healthcare provider level, the purpose of triage is to assess whether the patient is suitable for rehabilitation by excluding serious pathologies and comorbidities or determining if self-care management is appropriate. For rehabilitation providers, the goal of triage is to select the most suitable rehabilitation strategy based on the patient's clinical presentation. Three approaches are described: a symptom modulation approach for patients with a recent—new or recurrent—episode of low back pain (LBP) with significant symptoms, a movement control approach for those with moderate pain and disability, and a function optimization approach for patients with minimal pain and disability. This perspective article underscores the importance of evaluating and addressing psychological and comorbid factors in each patient. The updated TBC aligns with the American Physical Therapy Association's clinical practice guidelines for low back pain. [13].

We have expanded the number of possible physiotherapy tasks at the rehabilitation provider's level, which were only 3 or 4 in the 2015 scheme. We have added new ones with which they can easily personalize the therapy (table 1.) Thus, the prescribed physiotherapy expands the possibilities and gives options for broader application of various current techniques. After selecting the fields that correspond to the patient's current condition, it is easy to select the physiotherapy guidelines and tasks to apply. In this way, the therapeutic algorithm is visualized in one form by visualizing the link between the dysfunction, the duration of the complaints, the strength of the pain and the choice of treatment.

Table 1. Modified table for a therapeutic approach in low back pain (Andreev & Parashkevova, 2023)





SYMPTOM MODULATION*	MOVEMENT CONTROL*	FUNCTIONAL OPTIMIZATION*
Clinical Findings	**Clinical Findings**	**Clinical Findings**
• Disability: high	• Disability: moderate	• Disability: low
• Symptom status: volatile	• Symptom status: stable	• Symptom status: controlled
• Pain: high to moderate	• Pain: moderate to low	• Pain: low to absent
Treatments‡	**Treatments‡**	**Treatments‡**
Directional preference exercises	Directional preference exercises	Strenght and conditioning exercises
Manual/ mobilization therapy	Manual/ mobilization therapy	Mobilization
	Stabilization exercises	Stabilization exercises
	Sensorimor exercises	Sensorimor exercises
	Flexability exercises	Flexability exercises
Acrive rest	Work- or sport-specific tasks in pain-free range of motion	Work- or sport specific tasks
Traction	Traction	Aerobic exercises
	-	General fitness exesrcises
Postural correction	Postural correction	Postural correction
Relaxation of tight muscles	Relaxation of tight muscles	Relaxation of tight muscles
Correction of muscle imbalance	Correction of muscle imbalance	Correction of muscle imbalance
Adaptation of the environment during hospital stay or stay at home		Training in safe techniques at work and sports
Decompression exercises	Decompression exercises	
Training in activities of daily living getting up, going to bed, bathing, dressing	Training in activities of daily life – lifting, dressing, bending, driving and sleeping position	Training in activities of daily life – lifting, dressing, bending, driving and sleeping position
Positional therapy at rest	Positional therapy at rest	
Exercise training in the home environment several times a day	- Exercise training in the home environment several times a day	Exercise training in the home environment several times a day

RESULTS

In 2022, a total of 29,786 primary examinations of persons over 18 years were conducted at the Medica Expert Medical Center in Ruse, Bulgaria. The examinations revealed that 47 percent of these cases were related to back and low back pain. Specifically, 4,071 cases were classified under ICD codes G54-G56, 9,845 cases under ICD codes M40, M54, 36 cases under ICD code M41, and the remaining 15,836 cases were classified under other ICD codes not related to back pain.

Through the implementation of the innovative advanced physiotherapy algorithm, significant improvements were observed in the management and treatment outcomes of patients with low back pain. The algorithm facilitated a more detailed and precise classification of low back pain, enhancing the ability of therapists to tailor treatments to the specific needs of patients. This personalized approach led to better pain management, increased mobility, and an overall improvement in the quality of life for patients.

The extended treatment-based classification (TBC) system was instrumental in this process. The TBC system, initially updated in 2015, was further refined to include a wider range of physiotherapy tasks at the level of the rehabilitation provider. This expansion allowed for a more comprehensive and individualized treatment plan for patients, addressing not only the physical but also the psychological aspects of pain.

DISCUSSION

The results underscore the significance of low back pain as a prevalent and impactful health issue. The high percentage of patients presenting with low back pain highlights the necessity for effective and efficient therapeutic interventions. The implementation of the innovative advanced physiotherapy algorithm represents a meaningful advancement in this regard.

The enhanced TBC system provided a structured approach to triage and treatment, enabling therapists to make informed decisions based on a thorough understanding of the patient's condition. By incorporating recent research developments and maintaining the strengths of the original TBC system, the updated algorithm offered a robust framework for managing low back pain.

One of the key benefits of the innovative algorithm was its ability to integrate various therapeutic techniques and modalities, allowing for a more holistic approach to patient care. This was particularly important given the complex and multifactorial nature of low back pain, which often involves both physical and psychological components.

The study also highlighted the importance of rapid triage and accurate classification of pain origin. The ability to quickly identify the underlying cause of pain and select appropriate therapeutic interventions was crucial for improving patient outcomes. The innovative algorithm's emphasis on detailed classification and personalized treatment plans facilitated this process, leading to more effective pain management and faster recovery times.

Moreover, the algorithm's integration into clinical practice demonstrated its practicality and utility. Therapists reported that the algorithm was easy to use and helped streamline the treatment process, making it more efficient and effective. This feedback suggests that the algorithm has the potential to be widely adopted in clinical settings, benefiting a larger population of patients with low back pain.

CONCLUSION

Based on the literature review and analysis of the topic, it can be concluded that ICF and ICD are extremely detailed classifiers. They are widely used for various types of diseases and dysfunctions, but they are not helpful enough at the therapeutic level. Some clinics use advanced therapeutic classifiers and triage systems, but the innovative algorithm attempts to optimize the treatment process. In 2022, at Medica Expert Medical Center in Ruse, Bulgaria, 47 percent of the examined patients had pain in the lower back area. This characterizes back and lower back pain as a socially significant problem, apart from being a medical problem. Rapid triage and selection of medication and physical therapy is associated with accurate and rapid classification of the origin of pain. The innovative algorithm, in an extended form of the physiotherapy classifiers described so far, considers the possibilities of physiotherapy at a more detailed level and can help to prepare a strategy for physiotherapy. It has already been implemented in physical therapy practice and needs to be further evaluated for its detail, application and usefulness.

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Address for correspondence:
Petya Andreeva Parashkevova
"Angel Kanchev" University of Ruse
8, Studentska Str., Ruse, Bulgaria.
E-mail: parashkevova@uni-ruse.bg