PEDAGOGICAL ACADEMY:
SCIENTIFIC NOTES

PHYSICAL EDUCATION AND SPORTS

UDC 615.8 + 616-08

DOI https://doi.org/10.5281/zenodo.19388547

Methodology for integrating isometric self-stretching into the structure of manual manipulations

Taras Sheremeta,

Bachelor of Science in Chemistry, Owner, Massage Therapist,

Fliks Balance & Wellness LLC, 7459 N Waukegan Rd, Niles, IL, 60714, USA,

https://orcid.org/0009-0007-4312-5531

Accepted: 12.12.2025 | Published: 30.12.2025

Abstract: Relevance of the study *is determined by the need to increase the efficiency of manual manipulations under conditions of growing prevalence of musculoskeletal dysfunctions and occupational overload of practitioners.*

The aim *of the study is to substantiate the methodological foundations for integrating isometric self-stretching into the structure of manual manipulations based on the principles of dynamic stability, biomechanical efficiency, and ergonomically optimized movement organization of the practitioner.*

Methods. *The study employs theoretical analysis and generalization of scientific sources, systemic and biomechanical analysis, and modeling of force transmission processes and movement organization in manual practice. A comparative analysis of isometric self-stretching against passive stretching and post-isometric relaxation was conducted across functional parameters: preservation of therapeutic contact, proprioceptive activation, load redistribution, and impact on practitioner endurance.*

Results. *The biomechanical and functional foundations of manual manipulations were investigated, and the role of isometric self-stretching as an integrated mechanism for maintaining myofascial balance and proprioceptive regulation was established. It was demonstrated that the effectiveness of manual impact increases when displacement of the center of mass, micromovements, and breathing-postural coordination are properly synchronized; the role of intra-abdominal pressure as a structurally necessary stabilizing component during force application was clarified. Key scientific and practical problems were identified: the absence of standardized integration algorithms, disruption of biomechanical coherence, difficulties in controlling proprioceptive processes, and the lack of self-monitoring protocols within the structure of the manual session. A conceptual-applied model of isometric self-stretching integration was developed, ensuring systemic organization of movement through a closed regulatory loop and enhancing the stability of therapeutic impact.*

Conclusions. *Integrating isometric self-stretching as a component of dynamic stability improves the stability of therapeutic impact, reduces localized overload, and enhances the ergonomic characteristics of professional activity. The transition from isolated technique application to their systemic integration within a unified biomechanical model has been substantiated. Prospects for further research are associated with the standardization of integration algorithms, development of self-monitoring protocols, quantitative evaluation of the proposed model's effectiveness, and its adaptation to various fields of physical therapy and sports practice.*

Keywords: *dynamic stability, movement biomechanics, proprioceptive regulation, myofascial balance, occupational ergonomics, kinematic chain, force transmission, neuromuscular coordination.*

Методологія інтеграції ізометричного саморозтягування в структуру мануальних маніпуляцій

PEDAGOGICAL ACADEMY:
SCIENTIFIC NOTES

Шеремета Тарас Михайлович,
бакалавр (хімія), власник, масажист,
Fliks Balance & Wellness LLC, 7459 N Waukegan Rd, Niles, IL, 60714, США,
https://orcid.org/0009-0007-4312-5531

Анотація: ***Актуальність дослідження зумовлена*** *необхідністю підвищення ефективності мануальних маніпуляцій в умовах зростання поширеності функціональних порушень опорно-рухового апарату та професійного перевантаження фахівців.*

Мета *дослідження полягає у науковому обґрунтуванні методологічних засад інтеграції ізометричного саморозтягування у структуру мануальних маніпуляцій на основі принципів динамічної стабільності, біомеханічної доцільності та ергономічно оптимізованої організації рухів фахівця.*

Методи. *Використано методи теоретичного аналізу та узагальнення наукових джерел, системного та біомеханічного аналізу, а також моделювання процесів передачі зусилля і організації руху в умовах мануальної практики. Порівняльний аналіз ізометричного саморозтягування з пасивним розтягуванням і постізометричною релаксацією здійснювався за функціональними параметрами: збереження терапевтичного контакту, залучення пропріорецепторів, перерозподіл навантаження та вплив на витривалість фахівця.*

Результати. *Досліджено біомеханічні та функціональні засади організації мануальних маніпуляцій і встановлено роль ізометричного саморозтягування як інтегрованого механізму підтримання м'язово-фасціального балансу та пропріоцептивної регуляції. Обґрунтовано, що ефективність мануального впливу підвищується за умови узгодження переміщення центру мас, мікрорухів і дихально-постуральної координації;*

розкрито роль механізму внутрішньочеревного тиску як структурно необхідного компонента стабілізації під час прикладання зусилля. Виявлено науково-практичні проблеми: відсутність стандартизованих алгоритмів інтеграції, порушення біомеханічної узгодженості, складність контролю пропріоцептивних процесів і відсутність протоколів самомоніторингу в структурі мануальної сесії. Розроблено концептуально-прикладну модель інтеграції ізометричного саморозтягування, що забезпечує системну організацію руху через замкнений контур регуляції та підвищує стабільність терапевтичного впливу.

Висновки. *Інтеграція ізометричного саморозтягування як складової динамічної стабільності дозволяє підвищити стабільність терапевтичного впливу, зменшити локальне перевантаження та покращити ергономічні характеристики професійної діяльності. Доведено доцільність переходу від ізольованого використання технік до їх системної інтеграції у єдину біомеханічну модель. Перспективи подальших досліджень пов'язані зі стандартизацією алгоритмів інтеграції, розробленням протоколів самомоніторингу, кількісною оцінкою ефективності запропонованої моделі та її адаптацією до різних напрямів фізичної терапії і спортивної практики.*

Ключові слова: *динамічна стабільність, біомеханіка руху, пропріоцептивна регуляція, м'язово-фасціальний баланс, ергономіка праці, кінематичний ланцюг, передача зусилля, нейром'язова координація.*

Problem statement. The contemporary development of physical therapy and manual medicine necessitates increasing the effectiveness of rehabilitation interventions in the context of the growing prevalence of functional disorders of the musculoskeletal system. Traditional manual approaches are predominantly based on passive interventions, whereas modern rehabilitation concepts are oriented toward

integrating external techniques with active patient participation and mechanisms of neuromuscular regulation.

Isometric self-stretching has significant potential as a means of activating proprioceptive and reflex mechanisms; however, its integration into the structure of manual manipulations remains methodologically insufficiently developed. The lack of coordinated approaches to combining these interventions limits the possibilities for comprehensive correction of movement disorders and reduces the effectiveness of rehabilitation programs.

Thus, the problem lies in the need for scientifically substantiated integration of isometric self-stretching into the system of manual manipulations, which is directly related to improving physical therapy technologies and enhancing recovery outcomes in both clinical and sports practice.

Analysis of recent research and publications. A review of contemporary studies indicates the formation of several interrelated scientific approaches reflecting the psychological, clinical-biomechanical, applied, and evidence-based aspects of this problem. Within research focused on psychological and behavioral determinants of the effectiveness of body-oriented interventions, it has been established that therapeutic outcomes largely depend on cognitive attitudes, expectations, and the level of patient engagement. In particular, S. Park and J. Y. Kim demonstrate that different intervention modalities, including the fascial distortion model, foam rolling, and self-stretching, produce varying effects on ankle dorsiflexion range of motion, highlighting the importance of selecting appropriate techniques depending on therapeutic goals [1]. L. Ceballos-Laita et al. emphasize, based on a systematic review and meta-analysis, that stretching interventions can be effective in reducing glenohumeral internal rotation deficit, although their outcomes depend on protocol characteristics and duration, which has direct methodological significance for individualized rehabilitation planning [2]. U.-S. Savchenko highlights the necessity of systematic and long-term intervention to achieve stable results [3], while

Chaudhuri et al. demonstrate the effectiveness of physiotherapeutic interventions for upper cross syndrome, confirming the importance of combining multiple rehabilitation approaches to improve functional outcomes [4].

At the same time, a substantial body of research is devoted to the clinical and biomechanical substantiation of combining manual manipulations with isometric self-stretching as complementary components of rehabilitation. I. Iasinska demonstrates that the effectiveness of rehabilitation programs is largely determined by adherence, which directly influences the stability of therapeutic outcomes [5]. V. Dudonienė et al. show that post-isometric relaxation is effective in reducing pain syndrome and can be considered an intermediate link between passive manual techniques and active self-stretching [6]. M. Fonta et al. establish that static self-stretching positively affects range of motion and muscle strength, confirming its functional relevance [7]. R. KumaR et al. substantiate the expediency of combining manual interventions with rehabilitation exercises in functional disorders of the cervical spine [8].

At the same time, a separate body of scientific works is focused on the development of applied rehabilitation solutions that ensure the integration of self-stretching into recovery practice. S. Naz et al. demonstrate the effectiveness of combining various physical therapy methods in chronic pain syndrome, confirming the feasibility of combined approaches [9]. K. A. Alahmari et al. establish that behavioral factors, particularly the nature of daily physical loads, significantly influence therapy outcomes [10]. J. J. Jeon et al. demonstrate the effectiveness of combining self-stretching with kinesiotaping, which provides additional stabilization and sensorimotor control [11]. M. Yoshimura et al. confirm that self-stretching affects not only muscle stiffness but also microcirculation parameters [12].

An important role is also played by studies aimed at summarizing the evidence base and introducing technological solutions into rehabilitation systems. R. KumaR

et al. highlight the role of manual therapy techniques, particularly Cyriax manipulation, in combination with rehabilitation strategies, supporting the integration of passive and active treatment methods [13]. K. Shem et al. demonstrate the effectiveness of targeted self-stretching in compression syndromes, confirming its therapeutic significance [14]. L. Ceballos-Laita et al., in a systematic review, summarize the effectiveness of stretching in restoring joint function, allowing it to be considered an evidence-based component of therapy [15].

Identification of previously unresolved aspects of the general problem. Despite the advancement of research in the field of biomechanics of manual manipulations, a comprehensive methodology that integrates force transmission, dynamic stability, and the internal organization of the practitioner's movements remains lacking. The functional role of isometric self-stretching, particularly under conditions of continuous therapeutic contact, as well as its interaction with proprioceptive regulation and variable loading in real clinical practice, has not been sufficiently elucidated.

At the same time, issues related to ensuring biomechanical consistency and reproducibility of outcomes remain unresolved due to the absence of standardized approaches to the integration of such techniques. This limits practical implementation and increases the risk of inefficient use of the method's potential. The present study aims to address these gaps by substantiating the principles of integration and developing a comprehensive model that systematically combines biomechanical and functional components of manual activity.

Purpose of the article (statement of objectives). The aim of the article is to provide a scientific substantiation of the methodology for integrating isometric self-stretching into the structure of manual manipulations based on the principles of dynamic stability, biomechanical rationale, and ergonomic organization of the practitioner's movements.

To achieve this aim, the following objectives are defined:

1. To analyze the theoretical and methodological foundations of manual manipulations and the role of isometric self-stretching in ensuring biomechanical efficiency and neuromuscular regulation.

2. To substantiate the principles of integrating isometric self-stretching, taking into account center of mass control, micromovements, and breathing-postural coordination, and to identify key challenges in their implementation.

3. To develop a conceptual and applied model for integrating isometric self-stretching to enhance the effectiveness of manual manipulations and the ergonomic efficiency of professional practice.

Main material. The contemporary organization of manual manipulations is based on a biomechanical model in which therapeutic impact is formed through the coordinated interaction of structural alignment, controlled displacement of the center of mass, and continuous force transmission. The shift from localized muscular activity toward the use of body weight and kinematic chains allows for increased precision, stability, and efficiency of manual action. In this context, the principle of dynamic stability ensures the integration of micromovements, breathing-postural coordination, and controlled body position adjustments into a unified functional process (Table 1).

Table 1

Biomechanical and methodological foundations of manual manipulations within the context of dynamic stability

Component	*Core content*	*Functional significance*
Neutral alignment	Optimal positioning of body segments (foot–pelvis–spine–shoulders–head)	Ensures efficient force transmission through the kinematic chain
Center of mass control	Controlled body weight shifting during manipulations	Generates pressure without excessive muscular effort

Support chains	Coordinated functioning of skeletal and fascial structures	Provides stability and load distribution
Micromovements	Continuous minor adjustments of body position	Prevents static overload and maintains mobility
Breathing-postural coordination	Synchronization of breathing phases with movement and applied pressure	Enhances trunk stability and precision of action
Force transmission	Transfer of mechanical load from support to the point of contact	Ensures uniformity and control of therapeutic pressure

Source: compiled by the author based on [2; 8; 10, p. 15; 16, p. 5].

The implementation of these components in practice occurs as an integrated motor strategy, where each movement of the practitioner constitutes part of a continuous process of mechanical impulse transmission. In particular, during deep pressure application in the paravertebral region, effectiveness is achieved not through active hand pressure but through gradual forward displacement of the center of mass while maintaining neutral alignment. This enables the generation of stable pressure with minimal involvement of distal segments and prevents overload of the wrist and shoulder girdle.

In dynamic techniques, such as gliding manipulations along muscular chains, micromovements ensure continuous adaptation of body position to the changing force vector, maintaining uninterrupted contact and uniform load distribution. Simultaneously, breathing-postural coordination acts as a mechanism of internal stabilization: the exhalation phase is synchronized with the moment of force application, enhancing pressure control and reducing the need for compensatory muscular activity [10, p. 15].

The role of support chains becomes particularly important under prolonged static-dynamic loading conditions, where maintaining functional performance

depends on the ability to evenly distribute mechanical load across body segments. In such cases, micro-adjustments of the feet, pelvis, and thoracic region help prevent fixation and local overstrain, ensuring sustained stability of manual intervention. Thus, the described principles function as an integrated system of movement and force control, improving not only therapeutic effectiveness but also the ergonomic safety of professional activity.

The functional role of isometric self-stretching in manual practice fundamentally differs from other methods of correcting the myofascial condition. Unlike passive stretching, which is externally applied and requires interruption of therapeutic contact, and post-isometric relaxation, which involves alternating active contraction by the patient and passive stretching, isometric self-stretching of the practitioner is directly integrated into the manipulation process–without pauses, technique changes, or loss of support. This approach ensures simultaneous maintenance of myofascial balance, precision of proprioceptive regulation, and continuity of force application. A comparative analysis of the three approaches according to key functional parameters is presented in Table 2.

Table 2

Comparative characteristics of isometric self-stretching, passive stretching, and post-isometric relaxation in manual practice

Parameter	*Isometric self-stretching (practitioner)*	*Passive stretching*	*Post-isometric relaxation*
Performing subject	Practitioner, independently during work	Practitioner or patient, outside manipulation	Patient (active phase) + practitioner (passive phase)
Maintenance of therapeutic contact	Complete – performed without interruption	Absent – requires stopping	Partial – interrupted between phases
Proprioceptor involvement	Active – via isometric tension and controlled elongation	Limited – Golgi receptors activated passively	Active – via contraction–relaxation cycle

ISSN: 2786-9458

Load redistribution	Dynamic – through micromodifications of the kinematic chain	Absent – localized effect	Local – limited to target muscle
Impact on practitioner endurance	Positive – reduces local overload during session	Neutral or minimal	Neutral
Integration complexity	Requires coordination of movement and breathing	Low – separate technique	Moderate – structured protocol
Standardization level	Low – depends on practitioner biomechanics	High – well described in literature	High – validated in studies

Source: compiled by the author based on [6; 7; 9, p. 49; 11; 12; 14, p. 276].

The comparative analysis demonstrates that isometric self-stretching is the only approach among those considered that is performed without interrupting therapeutic contact while simultaneously activating proprioceptors and redistributing load through the kinematic chain. This combination of properties determines its functional advantage under conditions of continuous manual work. A representative example is deep pressure applied to the trapezius muscle, where local tension gradually accumulates in the practitioner's shoulder girdle. Unlike passive stretching, which would require interruption, or PIR, which involves a separate contraction phase by the patient, isometric self-stretching is implemented through controlled body displacement that creates a vector of elongation in the overstrained area without loss of support or stability [14, p. 276]. Isometric activation maintains structural integrity and ensures smooth load redistribution. A similar mechanism is observed in prolonged gliding techniques along the paravertebral lines, where load on the lumbar region gradually increases [9, p. 49]. In this case, isometric self-stretching is achieved through micro-adjustments of pelvic and lower limb positioning, creating a decompressive effect without altering the trajectory of hand movement. Unlike passive stretching, which acts locally, this approach preserves dynamic load redistribution across the entire kinematic chain. Of particular

importance is the proprioceptive component, which neither passive stretching nor PIR in their standard forms directly influence in real time. During deep tissue work, isometric elongation activates receptor mechanisms that allow the practitioner to finely perceive changes within their own body and promptly adjust the applied force–especially in techniques involving sustained pressure, where even minor deviations affect the outcome.

Thus, unlike methods applied as separate therapeutic techniques, isometric self-stretching functions as an intrinsically embedded mechanism for maintaining working quality. It simultaneously ensures optimal tissue condition of the practitioner and stability of therapeutic impact, which, in modern manual practice, constitutes a key indicator of professional effectiveness. At the same time, as demonstrated by the comparative analysis, the low level of standardization remains its primary practical limitation and defines the direction for further methodological development.

Substantiation of the principles for integrating isometric self-stretching into manual manipulations involves considering it as a dynamic mechanism realized through the coordinated interaction of center-of-mass displacement, micromovements, and breathing-postural coordination. Within this logic, elongation of the myofascial structures arises not as a separate action, but as a consequence of properly organized movement embedded in the process of force application and maintenance of kinematic chain stability (Table 3).

Table 3

Principles of integrating isometric self-stretching into the structure of manual manipulations

Principle	*Essence*	*Functional effect*
Controlled center-of-mass displacement	Formation of the elongation vector through changes in body position	Ensures isometric elongation without loss of control
Micromovement regulation	Continuous minor corrections of segmental position	Adapts to changing loads and maintains stability
Breathing-postural synchronization	Coordination of breathing phases with force application	Increases precision and reduces energy expenditure
Continuity of the kinematic chain	Preservation of uninterrupted force transmission through all segments	Prevents local overload
Integration into movement	Incorporation of self-stretching into the manipulation process	Eliminates interruption of therapeutic contact
Regulated amplitude	Control of elongation intensity within the limits of functional stability	Prevents loss of balance and overload

Source: compiled by the author based on [6; 8; 9, p. 50; 12; 14, p. 274].

In applied terms, these principles are implemented as a unified controlled system in which any change in body position has both a mechanical and a corrective effect. For example, during slow deep pressure in the lumbar region, the therapist does not increase pressure through the hands, but gradually shifts the center of mass forward. At that moment, not only is the applied force increased, but a parallel elongation vector is also created along the posterior body surface, reducing tension in the therapist's own muscles without loss of stability [3, p. 53]. In more dynamic techniques involving movement along muscle lines, micromovement regulation makes it possible to avoid abrupt peak loads. For instance, when transitioning from the thoracic to the cervical region, even a slight shift of the foot or rotation of the pelvis changes load distribution in such a way that isometric elongation occurs gradually and under control [13]. This eliminates the need for additional

compensatory movements and preserves smoothness of contact. Particular attention should also be paid to breathing-postural synchronization, which is often underestimated in actual practice but in fact determines the quality of stabilization. When working with deep structures, coordinating the exhalation phase with the moment of force application not only improves precision but also creates an internal «amplifier» of stability through regulation of intra-abdominal pressure. At that moment, isometric self-stretching emerges as a natural concomitant effect, with tissues lengthening without loss of positional control. Illustrative examples also arise in situations of prolonged static-dynamic loading, such as when working with large muscle masses. If movement is properly organized, even minor positional changes–shifting weight onto the supporting leg, micro-rotation of the pelvis, or adjustment of trunk inclination–allow tension to be "built out" of specific areas [4]. This occurs without pauses and without loss of contact, which is fundamentally important for preserving the rhythm of manual action. Thus, in modern practice, integration of isometric self-stretching is realized not through the addition of new techniques, but through a change in the quality of execution of existing ones. It is precisely the coordination of movement, breathing, and body-mass distribution that transforms isometric elongation into a continuously operating mechanism that simultaneously supports therapeutic effectiveness and the ergonomic resilience of the practitioner's work.

The integration of isometric self-stretching into manual manipulations is accompanied by a number of interrelated scientific and practical problems that limit its systematic application. First of all, the absence of standardized algorithms for combining techniques leads to their fragmented and intuitive use without clear linkage to movement biomechanics and force transmission [15]. This complicates reproducibility of outcomes and does not allow the formation of a unified methodological framework. Another unresolved issue is the lack of integrated self-monitoring protocols within the structure of a manual session. In the therapist's

practice, the accumulation of mechanical load occurs gradually and often remains unnoticed until pronounced symptoms of overload appear. Systematic tracking of internal indicators–local fatigue, asymmetry of load distribution, and changes in breathing rhythm–would allow timely initiation of micro-pauses as targeted short-term corrections of postural balance without interrupting therapeutic contact [16, p. 43–45]. The absence of standardized algorithms for such monitoring limits the reproducibility of outcomes and constitutes one of the key directions for further methodological development. The difficulty of ensuring biomechanical coherence becomes evident in disruption of the integrity of the kinematic chain when attempts are made to integrate isometric elongation into the dynamic process of manual intervention. With insufficient control of movement, the force vector changes, contact stability decreases, and compensatory tensions arise, which contradicts the principles of effective load transmission [13]. The problem is further complicated by the variability of working conditions, which requires continuous adaptation of body position but, in the absence of clear reference points, often leads to load localization. An important limitation is the insufficient operationalization of proprioceptive regulation, which complicates objective control of correct performance and assessment of the method's effectiveness. In addition, the high dependence of results on the practitioner's individual biomechanical characteristics and level of training reduces the possibilities for standardization.

The proposed model of isometric self-stretching integration is regarded as a holistic system for organizing professional movement, within which manual impact is shaped not only by the technique of performing individual procedures, but also by the practitioner's coordinated biomechanical behavior. Its essence lies in the transition from the fragmented use of isolated ergonomic elements to their systemic integration into the force-transmission process, thereby ensuring both achievement of the therapeutic outcome and preservation of the practitioner's functional resilience. The model is is based on the principle of dynamic stability, according to

which the effectiveness of manual action is determined not by a static body position, but by the ability to maintain controlled equilibrium through continuous micro-adjustments, coordinated breathing, and optimized displacement of the center of mass [16, p. 25].

The relevance of the model is determined by the fact that existing approaches to manual therapy are predominantly focused on the technique of influencing the patient and insufficiently take into account the internal organization of the practitioner's own movement. As a result, even when procedures are performed correctly, overload, instability of pressure, and reduced endurance still occur. The proposed model differs in that it considers isometric self-stretching as a continuously operating integrative mechanism that ensures a balance between stabilization and elongation of the myofascial structures during work, without disrupting the integrity of manual contact.

Structurally, the model includes interrelated components that form a closed regulatory loop: basic alignment provides the mechanical foundation; displacement of the center of mass generates and doses the effort; micromovements perform the function of adaptation to changing loads; breathing-postural coordination stabilizes the system from within; and isometric self-stretching maintains the optimal functional condition of the tissues. The combination of these elements ensures continuity of movement and predictability of therapeutic impact (Fig. 1).

ISSN: 2786-9458

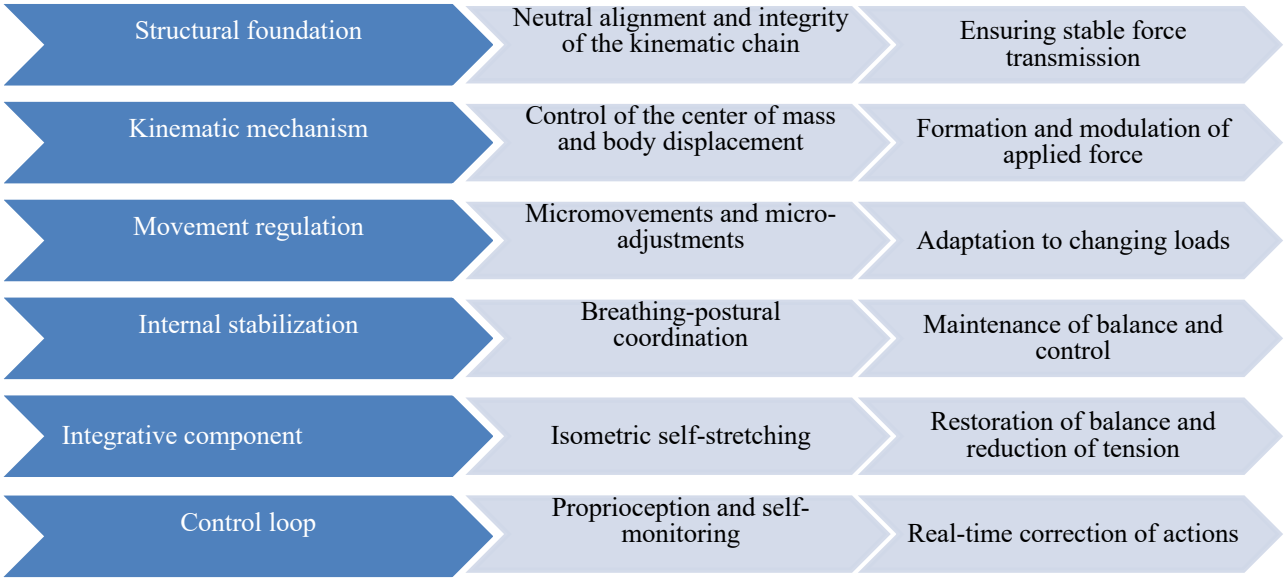

Fig 1. Structural-functional model of integration of isometric self-stretching into manual manipulations

Source: author's own development

Under practical conditions, the model is implemented as a continuous cycle in which each action of the practitioner simultaneously performs multiple functions. For example, during pressure application, displacement of the center of mass not only generates force but also creates conditions for isometric elongation in overloaded areas. Micromovements refine body positioning in response to tissue feedback, while breathing synchronizes internal stabilization with external force application. As a result, there is no need for dedicated recovery pauses, since regulation occurs directly during the intervention process. In prolonged manual interventions, the model allows maintenance of consistent pressure without increasing fatigue, as the load is continuously redistributed through the kinematic chain. In situations requiring positional changes, it ensures smooth transitions without loss of contact, and in complex techniques, it enhances precision through active proprioceptive regulation. The practical effect of its implementation lies in

increased stability of therapeutic impact, reduced risk of occupational overload, and the development of a more efficient and controlled working style consistent with contemporary requirements of manual therapy.

Conclusions. It has been established that the effectiveness of manual manipulations is determined by the biomechanical organization of the practitioner's movement rather than by localized muscular effort. Isometric self-stretching ensures maintenance of myofascial balance and proprioceptive regulation without interruption of therapeutic contact, which fundamentally distinguishes it from passive stretching and post-isometric relaxation. The mechanism of intra-abdominal pressure acts as a structurally essential component of stabilization during force application, while isometric elongation emerges as a natural consequence of properly organized movement. It has been found that the key problems include the lack of standardized integration algorithms, disruption of biomechanical coherence of movement, insufficient operationalization of proprioceptive regulation, and the absence of self-monitoring protocols within the structure of a manual session. A conceptual and applied model has been developed that integrates structural alignment, center-of-mass control, micromovement regulation, and breathing-postural coordination into a closed regulatory loop. Its implementation enhances the stability of therapeutic impact, reduces local overload, and promotes an efficient and controlled professional working style. Prospects for further research are associated with the standardization of integration algorithms, development of self-monitoring protocols, quantitative evaluation of the model's effectiveness, and its adaptation to various fields of physical therapy and sports practice.

References:

1. Park S., Kim J. Y. Comparison of the effect of the fascial distortion model, foam rolling and self-stretching on the ankle dorsiflexion range of motion. *The*

Journal of Korean Physical Therapy. 2020. Vol. 32, № 4. P. 238–244. DOI: https://doi.org/10.18857/jkpt.2020.32.4.238.

2. Ceballos-Laita L., Robles-Pérez R., Carrasco-Uribarren A., Cabanillas-Barea S., Pérez-Guillén S., Greidane E., Jiménez-del-Barrio S. Is stretching effective for reducing glenohumeral internal rotation deficit? A systematic review and meta-analysis. *Applied Sciences*. 2024. Vol. 14, № 16. Article 7166. DOI: https://doi.org/10.3390/app14167166.

3. Savchenko U.-S. Prevention of premature skin aging through the use of bioactive forms of vitamin C with hyaluronate. *The American Journal of Medical Sciences and Pharmaceutical Research*. 2025. Vol. 7, № 8. P. 51–55. DOI: https://doi.org/10.37547/tajmspr/Volume07Issue08-08.

4. KumaR R., ShaRma S., Setia K. Effect of Cyriax manipulation on individuals with text neck syndrome: a research protocol for quasi-experimental study. Journal of Clinical & Diagnostic Research. 2023. Vol. 17, № 10. DOI: https://doi.org/10.7860/JCDR/2023/65793.18527

5. Iasinska I. Indicators of implementation and fidelity of skin care programs and their relationship to clinical benefits and confidence in adolescents. *Наукові інновації та передові технології*. 2025. Вип. 9, № 49. С. 1169–1182. DOI: https://doi.org/10.52058/2786-5274-2025-9(49)-1169-1182.

6. Dudonienė V., Mikalajūnė K., Pažėrienė A., Žlibinaitė L. Post-isometric relaxation versus self-stretching for non-specific neck pain in working-age individuals. *Applied Sciences*. 2024. Vol. 14, № 16. Article 7000. DOI: https://doi.org/10.3390/app14167000.

7. Fonta M., Tsepis E., Fousekis K., Mandalidis D. Acute effects of static self-stretching exercises and foam roller self-massaging on the trunk range of motions and strength of the trunk extensors. *Sports*. 2021. Vol. 9, № 12. Article 159. DOI: https://doi.org/10.3390/sports9120159.

8. KumaR R., ShaRma S., Setia K. Effect of Cyriax manipulation on individuals with text neck syndrome: a research protocol for quasi-experimental study. *Journal of Clinical & Diagnostic Research*. 2023. Vol. 17, № 10. DOI: https://doi.org/10.7860/JCDR/2023/65793.18527.

9. Naz S., Jamali N., Iftikhar A., Nawaz H., Iqbal T., Ghafoor F. Compare the effectiveness of Mulligan (Nags & Snags) and McKenzie (self-stretching) on improving the pain and functional ability in patient with chronic neck pain. *Pakistan Journal of Health Sciences*. 2023. Vol. 4, № 8. P. 47–52. DOI: https://doi.org/10.54393/pjhs.v4i08.501.

10. Alahmari K. A., Silvian S. P., Ahmad I., Reddy R. S., Tedla J. S., Kakaraparthi V. N., Renggaramanujam K. Impact of smartphone usage on efficacy of physiotherapy exercises and intervention measures for mechanical neck pain: a quasi-experimental study. *South African Journal for Research in Sport, Physical Education and Recreation*. 2020. Vol. 42, № 3. P. 11–28. URL: https://journals.co.za/doi/abs/10.10520/ejc-sport-v42-n3-a2 (accessed: 23.10.2025).

11. Jeon J. J., Jeon S. H., Yang K. J., Choi H., Cho H. Y., Hahm S. C. Self-stretching exercises with kinesio taping for management of chronic nonspecific neck pain in taxi drivers: a single-blind, randomized controlled trial. *Complementary Therapies in Medicine*. 2024. Vol. 80. Article 103010. DOI: https://doi.org/10.1016/j.ctim.2023.103010.

12. Yoshimura M., Taniguchi T., Yoshitomi T., Hashimoto Y. Effects of trapezius muscle self-stretching on muscle stiffness and choroidal circulatory dynamics: an evaluation using ultrasound strain elastography and laser speckle flowgraphy. *Tomography*. 2025. Vol. 11, № 7. Article 73. DOI: https://doi.org/10.3390/tomography11070073.

13. Chaudhuri S., Chawla J. K., Phadke V. Physiotherapeutic interventions for upper cross syndrome: a systematic review and meta-analysis. Cureus. 2023. Vol. 15, № 9. Article e45471. DOI: https://doi.org/10.7759/cureus.45471

14. Shem K., Wong J., Dirlikov B. Effective self-stretching of carpal ligament for the treatment of carpal tunnel syndrome: a double-blinded randomized controlled study. *Journal of Hand Therapy*. 2020. Vol. 33, № 3. P. 272–280. DOI: https://doi.org/10.1016/j.jht.2019.12.002.

15. Ceballos-Laita L., Robles-Pérez R., Carrasco-Uribarren A., Cabanillas-Barea S., Pérez-Guillén S., Greidane E., Jiménez-del-Barrio S. Is stretching effective for reducing glenohumeral internal rotation deficit? A systematic review and meta-analysis. *Applied Sciences*. 2024. Vol. 14, № 16. Article 7166. DOI: https://doi.org/10.3390/app14167166.

16. Sheremeta T. Ergonomics of the massage therapist's stance: self-stretching and micro-movements during work for preserving physical capacity. K: Gutenberg, 2025. 56 p.