COMPREHENSIVE REHABILITATION OF OLDER ADULTS FOLLOWING ACUTE STROKE: EMPHASIS ON THERAPEUTIC EXERCISES AND THE MULTIDISCIPLINARY APPROACH

Salii A.O.[1], Danylchenko S.I.[1], Golovchenko I.V.[1], Tarasova O.O.[1], Morozenko D.V.[2], Honchar O.O.[3, 4]

[1]Kherson State University, Kherson-Ivano-Frankivsk, Ukraine
[2]State Institution "Sytenko Institute of Spine and Joint Pathology of the National Academy of Medical Sciences of Ukraine", Kharkiv, Ukraine
[3]Municipal Enterprise "Poltava Regional Clinical Medical Cardiovascular Center of Poltava Regional Council", Poltava, Ukraine
[4]Poltava State Medical University, Poltava, Ukraine

https://doi.org/10.35339/ic.2025.12.2.sdg

ABSTRACT

Background. Stroke remains one of the leading causes of long-term disability worldwide, especially among older adults. Given the increasing incidence of CerebroVascular Accidents (CVAs) in the aging population, there is a growing need for comprehensive, individualized rehabilitation programs that address the specific physical, cognitive, and emotional needs of elderly patients.

Aim. To evaluate the effectiveness of therapeutic exercise as part of a multidisciplinary rehabilitation approach in elderly patients following an acute stroke.

Materials and Methods. The study included 21 patients aged 62 to 79 years who were undergoing rehabilitation following an acute CVAs in a district hospital setting. The rehabilitation process featured a seven-stage individualized program consisting of physical therapy, occupational therapy, speech and language therapy, cognitive training, and psychosocial support. The effectiveness of the interventions was evaluated using standardized scales: the Modified Rankin Scale, Barthel Index, Montreal Cognitive Assessment, Visual Analogue Scale, and Borg Rating of Perceived Exertion.

Results. 76% of the participants (n=16) showed significant improvement in their overall condition, including reduced neurological symptoms (aphasia, hemiplegia), enhanced motor skills, better balance, improved emotional well-being, and increased independence in daily activities. The remaining 24% of patients (n=5) also demonstrated positive changes but required additional rehabilitation cycles due to limited recovery potential and complex comorbidities.

Conclusions. Individualized therapeutic exercises, integrated within a multidisciplinary rehabilitation framework, are effective in improving the physical and cognitive outcomes of elderly patients after stroke. Early initiation of rehabilitation, combined with continuous assessment and support from a multidisciplinary team, enhances functional recovery and improves the overall quality of life in this vulnerable population.

Keywords: *elderly patients, functional recovery, cerebrovascular accident.*

Corresponding Author:
Danylchenko Svitlana – PhD, Associate Professor of the Department of Physical Therapy and Occupational Therapy, Kherson State University, Kherson-Ivano-Frankivsk, Ukraine.
✉ Ukraine, 76018, Ivano-Frankivsk, Shevchenka str., 14.
E-mail: svetlanaadanilch@gmail.com

Introduction

The problem of stroke holds significant medical and social relevance, particularly in the context of global population ageing. According to epidemiological studies, the risk of developing an acute CerebroVascular Accident (CVA) increases with age, leading to a higher incidence of stroke among elderly individuals. Consequently,

there is a steady rise in the number of patients requiring long-term medical, rehabilitative, and social support. According to the European Stroke Organization (ESO), the total annual cost of treatment and rehabilitation for stroke patients in European Union countries exceeds €60 billion, with the proportion of elderly individuals among these patients continuing to grow [1–3].

In Ukraine, the situation is further complicated by the high prevalence of risk factors such as arterial hypertension (affecting approximately 28.3% of the population), type 2 diabetes, and coronary heart disease. Behavioral factors (such as tobacco use, alcohol abuse, physical inactivity, and poor dietary habits) also contribute significantly. In addition, psychosocial factors present a particular threat, notably chronic stress linked to economic instability, high unemployment rates, ongoing military conflict, and the increasing prevalence of post-traumatic stress disorder [4; 5].

In view of these challenges, rehabilitation of elderly patients after an acute CVA becomes particularly relevant. It represents a key stage in post-stroke care, significantly influencing prognosis, the level of functional recovery, and the overall quality of life. Considering age-related factors, comorbidities, reduced physical activity, cognitive impairments, and psycho-emotional difficulties (such as depression, anxiety, and decreased motivation), rehabilitation programs must be tailored to the specific needs of geriatric patients [3; 6].

Contemporary international guidelines (AHA/ASA [7], ESO [8], WHO [9]) emphasize the importance of a multidisciplinary approach involving neurologists, physicians in physical and rehabilitation medicine, physical therapists, occupational therapists, speech and language therapists, psychologists, rehabilitation nurses, and social workers. This format allows for an individualized rehabilitation process, ensuring both physical and psychosocial recovery for patients [10; 11].

Therefore, investigating the effectiveness of therapeutic physical exercises in elderly patients after stroke is a vital direction in modern medical science. It has practical value for improving functional status, reducing the degree of disability, and promoting greater autonomy in this vulnerable population group [3; 12].

The **aim** of this study was to evaluate the effectiveness of a proposed program of therapeutic exercises as part of the physical rehabilitation system for elderly patients after stroke.

Materials and Methods

The object of this study comprised elderly individuals who had experienced an acute CVA and underwent a rehabilitation course. The study involved 21 patients aged between 62 and 79 years, who received treatment at the Municipal Enterprise "Blyzniuky Central District Hospital" (Blyzniuky, Kharkiv Region, Ukraine).

The study was conducted in accordance with the fundamental principles of the Declaration of Helsinki (1964–2013), ICH GCP Guidelines (1996), EU Directive 86/609/EEC (November 24, 1986), and the orders of the Ministry of Health of Ukraine No.690 (September 23, 2009), No.944 (December 14, 2009), and No.616 (August 03, 2012). Participation in the study was entirely voluntary. Each patient provided signed informed consent, being personally informed of their rights and obligations, including the possibility to withdraw from the study at any time without any consequences or the need to justify their decision.

A comprehensive approach was applied to evaluate the effectiveness of physical rehabilitation in elderly patients after acute stroke. The methodology included clinical and functional assessment, psycho-emotional and cognitive evaluation, and statistical analysis methods.

Clinical and Functional Assessment. Clinical and functional assessment was carried out using standardized scales:

- NIH Stroke Scale (NIHSS) – to determine the severity of neurological deficit;
- Functional Independence Measure (FIM) – to assess the level of self-care and daily living independence;
- Modified Rankin Scale (mRS) – to evaluate the degree of disability;
- Visual Analog Scale (VAS) – for subjective assessment of pain intensity;
- Borg Rating of Perceived Exertion Scale – to assess the patient's perceived level of physical exertion.

Cognitive screening was conducted using the Montreal Cognitive Assessment (MoCA).

The psycho-emotional status was evaluated by a psychologist through clinical interview, behavioral observation, and assessment of motivation dynamics regarding participation in the rehabilitation process.

The effectiveness of the rehabilitation program was analyzed based on the dynamics of clinical indicators before and after the 14-day therapeutic intervention period.

Statistical analysis of changes in functional indicators pre- and post-rehabilitation was performed using descriptive statistics (mean, standard deviation) and the paired t-test to determine the significance of differences between pre- and post-intervention values ($p<0.05$ considered statistically significant).

The processing of statistical data was carried out using SPSS 10.0 (IBM, USA).

Results

The analysis of the results demonstrated a positive dynamic in the majority of patients undergoing rehabilitation according to the developed program. In 76% of cases (16 patients), an improvement in overall functional status was observed, including a reduction in neurological deficits (aphasia, hemiplegia), improved motor skills, balance, emotional state, and increased levels of independence in daily living and social activity. The remaining 24% of participants (5 patients) also showed positive progress. However, considering individual rehabilitation potential, an extension or repetition of the rehabilitation course was recommended.

Rehabilitation interventions were carried out following an individualized rehabilitation program developed by the authors, structured into seven consecutive stages:

1. *Diagnostic Stage*

A comprehensive assessment of patients' condition was conducted using standardized scales (*Table 1*):

- Visual Analog Scale (VAS) for pain assessment;
- Borg Scale for subjective evaluation of physical exertion;
- Montreal Cognitive Assessment (MoCA) for detecting cognitive impairments.

Additionally, comorbidities, psycho-emotional state, and speech disorders were analyzed with the involvement of a psychologist and a speech-language therapist.

2. *Early Rehabilitation Stage.* This stage included passive kinesiotherapy aimed at preventing contractures and maintaining muscle tone, use of anti-decubitus mattresses, and regular repositioning of the body. Vital signs such as heart rate, blood pressure, and respiratory rate were continuously monitored.

3. *Activation Stage.* Gradual achievement of vertical body positioning was implemented: balance training, acclimatization to sitting and standing, and simulation of walking while lying or sitting. Manual therapy based on the Maitland concept was applied, along with breathing exercises, speech therapy, and swallowing training.

4. *Middle Rehabilitation Stage.* An individualized therapeutic exercise program was introduced for the affected upper and lower limbs.

The exercise set for the upper limbs included:

- fist clenching (10–20 repetitions);
- circular movements in the radiocarpal joints (15 repetitions each direction);
- elbow flexion and extension (20 repetitions);
- arm raising and lowering (20 repetitions);
- arm abduction in the lying position (20 repetitions).

The exercise set for the lower limbs included:

- toe flexion/extension (20 repetitions);
- foot pulling ("pedal pressing") (15 repetitions);
- knee flexion and return to the starting position (15 repetitions);

Table 1. Scales and methods for assessing patients' functional status

Scale / Method	Purpose	Description
Visual Analog Scale	Subjective pain assessment	0 – no pain; 10 – worst possible pain
Borg Scale	Perceived physical exertion	6–20 points: from "very light" to "maximal exertion"
Montreal Cognitive Assessment (MoCA)	Cognitive status assessment	Maximum – 30 points; >26 – normal, <25 – cognitive impairment
Modified Rankin Scale (mRS)	Level of disability after stroke	0 – no symptoms; 6 – death
Functional Independence Measure (FIM)	Independence in daily living and care	Range 18 to 126 points; higher scores indicate greater independence
National (U.S.) Institutes of Health Stroke Scale	Degree of neurological deficit	0–42 points; higher scores indicate more severe condition

- hip joint abduction (10 repetitions).

Occupational therapy included training in self-care skills.

5. *Late Rehabilitation Stage.* This stage involved restoring daily living independence, cognitive therapy, and psychosocial support. Individualized social integration programs were developed, including occupational therapy and participation in support groups.

6. *Home Stage.* This stage involved independent speech therapy practice and performing facial exercises ("horse", "smile", "kiss"). Occupational therapy was continued at home under periodic supervision by specialists.

7. *Monitoring and Outcome Assessment.* All rehabilitation activities were conducted with gradual increases in workload according to the patients' functional status. The total duration of the course was 14 days (see *Table 2*).

The Role of Speech Therapy in the Rehabilitation Process. Speech impairments are common consequences of stroke and significantly reduce patients' quality of life. The study confirmed that timely involvement in speech therapy sessions contributed to improved communication abilities, increased motivation to participate in other stages of rehabilitation, and enhanced psycho-emotional status. Speech rehabilitation was conducted by specialists in speech and language therapy who performed initial diagnostics of speech disorders and developed individualized treatment programs [12].

In the early stages, short sessions (10–15 minutes) were used, including emotionally significant stimuli (photos, videos, objects) aimed at activating speech activity. Therapy effectiveness was higher when started early. Patients who began speech therapy within the first days after stabilization showed better recovery rates. Meta-analyses have demonstrated that early and intensive speech therapy significantly improves communication functions, reading, writing, and expressive language. The advantage was observed with ≥[20–50] hours of therapy, including home exercises [13; 14].

Occupational Therapy and Ergotherapeutic Interventions. Ergotherapeutic support significantly improved self-care skills and household independence. Occupational therapy was conducted considering the patient's functional status and included training of everyday skills, elements of household activities, and preparation for potential vocational adaptation.

Patients with pronounced functional limitations underwent preparation for activities in adapted environments (e.g., day care centers, volunteer activities, supported home activities). The occupational therapy component also involved exercises using assistive devices (massage, mechanotherapy, therapeutic complexes). Participants in the group receiving daily 3-hour occupational therapy sessions over 8 weeks showed significant improvements in Activities of Daily Living (ADL) compared to the control group without OT ($p=0.02$) [15; 16].

Monitoring and Adjustment of the Rehabilitation Process. Throughout the entire program, continuous monitoring of patients' functional status was conducted. Standardized functional assessment scales and clinical evaluations by the multidisciplinary team were used. In cases of slowed progress or changes in functional status, individual rehabilitation programs were adjusted accordingly.

Table 2. Changes in patients' functional status after a 14-day course

Indicator	Before rehabilitation (mean ± SD)	After rehabilitation (mean ± SD)	Δ (change)
NIHSS	11.4±2.2	6.8±1.9	−4.6
MoCA	21.2±3.1	25.1±2.9	+3.9
FIM	56.5±7.3	78.7±6.9	+22.2
VAS	6.2±1.5	2.8±1.3	–3.4
Borg Scale (after baseline load)	15.1±1.8	12.4±1.5	–2.7

Notes: NIHSS – National (U.S.) Institutes of Health Stroke Scale;
MoCA – Montreal Cognitive Assessment;
FIM – Functional Independence Measure;
VAS – Visual Analog (pain) Scale.

Pharmacological Support. All patients received supportive pharmacological therapy aimed at improving cerebral circulation, neuroprotection, and thrombosis prevention, as well as pain relief and anti-inflammatory medications when necessary to facilitate participation in rehabilitation activities.

Psychological Support. Psycho-emotional support was provided with the involvement of a psychologist or psychiatrist. The main areas included management of depressive and anxiety symptoms, motivation enhancement, psychoeducation, and support of social interaction (group sessions, involvement of relatives, social adaptation).

Final Stage. The concluding phase involved assessment of achieved results and formulation of individualized recommendations for further lifestyle: maintaining physical activity, preventing recurrent stroke, psychohygiene, balanced nutrition, and medical-social support.

Criteria for Evaluating Rehabilitation Effectiveness:

- reduction in NIHSS scores by at least 4 points;
- increase in FIM by ≥20%;
- improvement in MoCA scores by ≥3 points;
- decrease in subjective pain level (VAS) by ≥3 points;
- improvement in communication skills (as assessed by speech therapist);
- increase in daily living independence (according to mRS scale);
- positive dynamics in mood and motivation (as assessed by psychologist).

The obtained data indicate the high effectiveness of a comprehensive rehabilitation program that includes therapeutic physical exercises, speech therapy, occupational therapy, pharmacological support, and psycho-emotional care. Significant improvements in cognitive, motor, and psychosocial status were primarily observed in patients who began rehabilitation early and were actively engaged in the program's active phase.

Therapeutic exercises during the recovery period after acute cerebrovascular accident (stroke) are not only an important clinical tool but also a social factor that promotes the preservation of independence, quality of life, and social integration in elderly patients. A comprehensive multidisciplinary approach, individualization of interventions, and early initiation of rehabilitation are key to effective functional recovery. The authors emphasize the importance of early rehabilitation onset, a multidisciplinary team, and individualized programs to improve functional outcomes and quality of life in post-stroke patients [2; 17].

Discussion

Thus, the structure of the physical rehabilitation program for elderly patients after stroke is based on the principles of comprehensiveness and individualization. The study results demonstrate the effectiveness of combining therapeutic physical exercises, speech therapy, occupational therapy, psychological support, and social integration in the recovery process. This confirms the feasibility of implementing a multidisciplinary approach in geriatric rehabilitation practice after stroke. Systematic reviews show that multidisciplinary rehabilitation programs significantly improve the physical, cognitive, and social recovery of stroke patients [18–20].

The obtained results confirm the effectiveness of therapeutic exercises as a key element in the rehabilitation of elderly patients after acute cerebrovascular accident. These findings are consistent with current research data emphasizing the importance of early and individualized physical intervention to improve patients' functional status [21; 22].

Regular physical activity after stroke promotes neuroplasticity – the brain's ability to form new neural connections that compensate for lost functions. This is especially important for elderly patients, whose neuroplasticity is diminished due to age-related changes. It has been shown that physical exercises contribute not only to motor recovery but also to cognitive and psycho-emotional rehabilitation [11].

Within our study, improvements were observed in NIHSS, MoCA, and FIM scores, indicating positive dynamics in both physical and cognitive functions. The role of a multidisciplinary approach is important, particularly speech therapy, occupational therapy, and psychological support, which were integrated into the rehabilitation process.

The significance of therapeutic exercises for emotional recovery is no less important. Physical activity helps reduce symptoms of depression and increases motivation to participate in rehabilitation, as confirmed not only by observation but also by psychological assessment over time. A systematic review confirms the effectiveness of comprehensive physical exercises in improving patient independence and social integration, especially with early and regular application after vascular crises [17; 23].

Special attention should be paid to the age-related characteristics of the rehabilitation process. Elderly patients often have comorbidities, cognitive impairments, and reduced physical endurance. Therefore, individualization of programs and phased interventions are crucial to avoid overload and achieve realistic goals. This approach aligns with recommendations from ESO (2023) and AHA (2022) [3; 21].

At the same time, several limitations of the conducted study should be noted. First, the small sample size does not allow for broad generalizations. Second, the rehabilitation period was relatively short (14 days), limiting the ability to assess long-term outcomes. Future research should expand the sample size and apply controlled comparative designs to enhance the validity of conclusions.

Conclusions

1. Early initiation of rehabilitation after stroke, even in elderly patients, is critically important for improving motor, cognitive, and emotional functions. Interventions should begin within the first few days after the patient's condition stabilizes.

2. Therapeutic exercises must be individually tailored, taking into account the patient's age, comorbidities, and functional level. Daily physical activity is recommended with a gradual increase in intensity, under the supervision of a specialist.

3. A multidisciplinary approach (including physical therapist, occupational therapist, speech therapist, psychologist, and physiatrist) should be the standard of care for post-stroke patients. This ensures the integrity of the rehabilitation process and improves long-term outcomes.

4. Patient and family education is a key component of successful rehabilitation. It should include guidance on home exercises, stroke prevention strategies, and the basics of a healthy lifestyle.

5. Establishing conditions for ongoing follow-up and social reintegration – through outpatient rehabilitation programs, telemedicine support, and peer support groups – enhances patient motivation and reduces the risk of rehospitalization.

DECLARATIONS:

Disclosure Statement

The authors have no potential conflicts of interest to disclosure, including specific financial interests, relationships, and/or affiliations relevant to the subject matter or materials included.

Statement of Ethics

The authors have no ethical conflicts to disclosure.

Data Transparency

The data can be requested from the authors.

Funding Sources

There are no external sources of funding.

Consent for publication

All authors give their consent to publication.

References

1. Johnson W, Onuma O, Owolabi M, Sachdev S. Stroke: a global response is needed. Bull World Health Organ. 2016;94(9):634-634A. DOI: 10.2471/BLT.16.181636. PMID: 27708464.

2. Langhorne P, Bernhardt J, Kwakkel, G. Stroke rehabilitation. Lancet. 2011;377(9778):1693-702. DOI: 10.1016/S0140-6736(11)60325-5. PMID: 21571152.

3. Vluggen TPMM, van Haastregt JCM, Tan FE, Verbunt JA, van Heugten CM, Schols JMGA. Effectiveness of an integrated multidisciplinary geriatric rehabilitation programme for older persons with stroke: a multicentre randomised controlled trial. BMC Geriatr. 2021;21(1):134. DOI: 10.1186/s12877-021-02082-4. PMID: 33622269.

4. Luo Y, Hao J, Zhu L, Huang Y, Liu Z, Chen Y, et al. Effects of multicomponent exercise nursing intervention in elderly stroke patients with frailty: a randomized controlled trial. Front Med (Lausanne). 2024;11: 1450494. DOI: 10.3389/fmed.2024.1450494. PMID: 39416863.

5. Saraiva J, Rosa G, Fernandes S, Fernandes JB. Current trends in balance rehabilitation of stroke survivors: A scoping review of experimental studies. Int J Environ Res Public Health. 2023;20(19):6829. DOI: 10.3390/ijerph20196829. PMID: 37835099.

6. Li X, He Y, Wang D, Rezaei MJ. Stroke rehabilitation: from diagnosis to therapy. Front Neurol. 2024;15: 1402729. DOI: 10.3389/fneur.2024.1402729. PMID: 39193145.

7. Guidelines for Adult Stroke Rehabilitation and Recovery: A Guideline for Healthcare Professionals from the American Heart Association/American Stroke Association. Stroke Rehab Guideline Writing Committee. Stroke. 2016;47(6):e98-169. DOI: 10.1161/STR.0000000000000098. PMID: 27025897.

8. Motor rehabilitation after stroke: European Stroke Organisation (ESO) consensus-based definition and guiding framework. Kwakkel G, Stinear C, Essers B, Munoz-Novoa M, Branscheidt M, Cabanas-Valdés R, et al. Eur Stroke J. 2023;8(4):880-94. DOI: 10.1177/23969873231191304. PMID: 37548025.

9. Rehabilitation in health systems: guide for action. World Health Organization. Geneva: WHO; 2019. 72 p. Available at: https://www.who.int/publications/i/item/9789241515986

10. French B, Thomas LH, Leathley MJ, Sutton CJ, McAdam J, Forster A, et al. Repetitive task training for improving functional ability after stroke. Cochrane Database Syst Rev. 2007;(4):CD006073. DOI: 10.1002/14651858.CD006073. PMID:17943883.

11. Chen JW, Guan Y, Zheng YL, Zhu K. Research trends and frontiers in exercise for movement disorders: A bibliometric analysis of global research from 2010 to 2021. Front Aging Neurosci. 2022;14:977100. DOI: 10.3389/fnagi.2022.977100. PMID: 36158546.

12. Koyuncu E, Cam P, Altınok N, Callı DE, Duman TY, Ozgirgin N. Speech and language therapy for aphasia following subacute stroke. Neural Regen Res. 2016;11(10):1591-4. DOI: 10.4103/1673-5374.193237. PMID: 27904489.

13. Brady MC, Kelly H, Godwin J, Enderby P, Campbell P. Speech and language therapy for aphasia following stroke. Cochrane Database Syst Rev. 2016;2016(6):CD000425. DOI: 10.1002/14651858.CD000425. PMID: 27245310.

14. Brady MC, Mills C, Prag Ora H, Novaes N, Becker F, Constantinidou F, et al. Complex speech-language therapy interventions for stroke-related aphasia: The RELEASE study incorporating a systematic review and individual participant data network meta-analysis. Eur Stroke J. 2025:23969873241311025. DOI: 10.1177/23969873241311025. PMID: 40401776.

15. Landi F, Cesari M, Onder G, Tafani A, Zamboni V, Cocchi A. Effects of an occupational therapy program on functional outcomes in older stroke patients. Gerontology. 2006;52(2):85-91. DOI: 10.1159/000090953. PMID: 16508315

16. Garcia-Perez P, Rodriguez-Martinez MC, Gallardo-Tur A, Blanco-Reina E, de la Cruz-Cosme C, Lara JP. Early Occupational Therapy Intervention post-stroke (EOTIPS): A randomized controlled trial. PLoS One. 2024;19(8):e0308800. DOI: 10.1371/journal.pone.0308800. PMID: 39159190.

17. Pollock A, Baer G, Campbell P, Choo PL, Forster A, Morris J, et al. Physical rehabilitation approaches for the recovery of function and mobility following stroke. Cochrane Database Syst Rev. 2014;2014(4):CD001920. DOI: 10.1002/14651858.CD001920. PMID: 24756870.

18. Winstein CJ, Stein J, Arena R, Bates B, Cherney LR, Cramer SC, et al. Guidelines for adult stroke rehabilitation and recovery: A guideline for healthcare professionals from the American Heart Association/American Stroke Association. Stroke. 2016;47(6):e98-e169. DOI: 10.1161/STR.0000000000000098. PMID: 27145936.

19. Tyson SF, Burton L, McGovern A. Multi-disciplinary team meetings in stroke rehabilitation: an observation study and conceptual framework. Clin Rehabil. 2014;28(12):1237-47. PMID: 25389172. DOI: 10.1177/0269215514535942.

20. Wen X, Li Y, Zhang Q, Yao Z, Gao X, Sun Z, et al. Enhancing long-term adherence in elderly stroke rehabilitation through a digital health approach based on multimodal feedback and personalized intervention. Sci Rep. 2025;15(1):14190. DOI: 10.1038/s41598-025-95726-z. PMID: 40268986.

21. Malik AN, Tariq H, Afridi A, Rathore FA. Technological advancements in stroke rehabilitation. J Pak Med Assoc. 2022;72(8):1672-74. DOI: 10.47391/JPMA.22-90. PMID: 36280946.

22. Gittler M, Davis AM. Guidelines for adult stroke rehabilitation and recovery. JAMA. 2018;319(8):820-1. DOI: 10.1001/jama.2017.22036. PMID: 29486016.

23. Saunders DH, Sanderson M, Hayes S, Johnson L, Kramer S, Carter DD, et al. Physical fitness training for stroke patients. Cochrane Database Syst Rev. 2020;3(3):CD003316. DOI: 10.1002/14651858.CD003316. PMID: 32196635.

Received: 24 Feb 2025
Accepted: 19 June 2025
Published: 30 Jun 2025

Cite in Vancouver style as: Salii AO, Danylchenko SI, Golovchenko IV, Tarasova OO, Morozenko DV, Honchar OO. Comprehensive rehabilitation of older adults following acute stroke: emphasis on therapeutic exercises and the multidisciplinary approach. Inter Collegas. 2025;12(2):8p. In press. https://doi.org/10.35339/ic.2025.12.2.sdg

Archived: https://doi.org/10.5281/zenodo.