

HYDROKINESITHERAPY FOR CHRONIC LOW BACK PAIN IN BALLET DANCERS

V.V. Kostyaeva, N.A. Chulyukova

Russian University of Sport "GTSOLIFK", Moscow, Russia

Abstract. Chronic pain in the lumbar spine is a manifestation of pathologies of the musculoskeletal system. For classical ballet dancers, this problem can become a serious obstacle, often leading to disability and, as a result, to the cessation of professional activities. Currently, there are many generally recognized rehabilitation methods, one of which is hydrokinesitherapy. Objective of the study: to evaluate the effectiveness of hydrokinesitherapy for chronic pain in the lumbar spine in ballet dancers. Methods: assessment of pain intensity and impaired vital activity; assessment of health-related quality of life; determination of functional mobility and flexibility in the lower spine. Hydrokinetic therapy reduced pain intensity (26.3%); improved physical (14.8%) and mental (11.3%) health of dancers; increased functional mobility (8.9%) and flexibility (7.4%) in the lumbar spine. Hydrokinesitherapy can be considered as an effective and safe therapy for patients with chronic pain in the lumbar spine. This approach helps to relieve pain, improve the quality of life and the functional capabilities of patients.

Keywords: hydrokinesitherapy, rehabilitation, physiotherapy, chronic pain, physical limitations.

Introduction. Injury of the spine with chronic pain is the most common and progressing disease of skeletal muscles [1-3]. Treatment of chronic back pain among people engaged in different types of physical activity continues to be the subject of active scientific study. Limited movement in the area, constant stress in muscles surrounding the spine and worsened motor reflexes characterize this disorder [2-4]. Studies show that pathologies of the lumbar spine are the fifth most common for representatives of choreography and dancing and account for 10 to 15% of the total number of traumatic injuries registered in ballet dancers [1, 3]. For ballet dancers, back pain sensations are commonly associated with high stress of the muscular and ligamentous system, which may lead to disability and, consequently, to end of professional career [5, 6]. Rehabilitation protocols of patients with chronic low back pain include advanced therapy methods aimed towards shortening the recovery period and accelerating return of patients to their professional activity.

Lately, physiotherapy has been increasingly used as an effective method of rehabilitation treatment. Physiotherapeutic approaches are of particular interest in the context of selecting ways, forms, and methods of rehabilitation in the comprehensive therapy of spinal injuries and pathologies. One of the methods of physiotherapeutic treatment of spinal pathologies is hydrokinesitherapy [7], based on therapeutic exercise in water. The key mechanism of its

therapeutic effect is hydrostatic pressure of water, which relieves strain in the spine, joints and muscles of the patient. The influence of water properties helps to minimize pain and discomfort, relieve muscle tension, increase joint mobility and prevent recurrence of injuries in the future. All therapeutic and preventive techniques used in the rehabilitation of ballet dancers suffering from chronic low back pain have the main goal of prolonging their professional career [3, 4]. In this regard, the introduction of the most effective methods of low back pain therapy into the rehabilitation process of ballet dancers is a demanded direction and determines the relevance of our study.

Objective of the study: to evaluate the effectiveness of hydrokinesitherapy for chronic low back pain in ballet dancers.

Methods and organization. In our 8-week study, which included professional dancers of the "Classical Ballet Studio" located in Saint Petersburg, we have estimated the effectiveness of the applicable methods. The participants were divided into two groups: control (n=6) and experimental (n=7), average age – 19.1 ± 2.0 years. The study involved the participants who met the following criteria: entries of chronic pain in the lumbar spine in medical history; professional activity in choreography; previous experience of using passive physiotherapy methods for therapeutic and preventive purposes.

The methods of ongoing monitoring included: assessment of health-related quality of

life (MOS SF-36 – Medical Outcomes Study-Short Form, points) – mental and physical health of the dancers was assessed; assessment of low back pain and impaired vital activity (points) – assessed with RDQ (Roland-Morris Disability Questionnaire), self-rated physical limitation caused by pain in the lumbar spine was registered [6]; determination of functional mobility in the lumbar spine (Schober test, cm); determination of flexibility in the lumbar spine (Hopkins test, cm). Comparative estimation of the results was carried out by calculating the mean values ($\bar{X}$) and the standard deviation (σ). The reliability of the study results was processed with the Wilcoxon signed-rank test and the Student's t-test, as long as $p \leq 0.05$.

In the present study, participants of the experimental group underwent the rehabilitation course with hydrokinesitherapy. The therapy included sessions of exercises in water and therapeutic swimming held twice a week, lasting 50 minutes each. Therapeutic gymnastics (TG), including dry controlled spine traction therapy, was applied to the control group as a method of therapeutic and restorative influence. This method promoted decompression of intervertebral discs and relaxation of paravertebral muscles [5].

As part of the TG, controlled spine traction therapy with free weights were performed twice a week. The full course of rehabilitation therapy included 16 spine traction sessions.

Results and discussion. Table 1 shows the indices used to estimate physical and mental health of the dancers, as well as pain syndrome intensity influencing their activity during rehabilitation.

The analysis of quality of life indices in the ballet dancers revealed the advantage of hydrokinesitherapy over spine traction therapy. Thus, hydrokinesitherapy demonstrated a more pronounced positive effect on physical (14.8%) and mental (11.3%) health of the ballet dancers with chronic low back pain, in contrast to spine traction therapy (9% and 11.0%). In addition, a study of the pain syndrome degree showed a moderate reduction in pain (26.3%) at rest in the participants of the experimental group after the course, which is superior to the result obtained in the control group (18.9%).

The results of lumbar instability analysis in the observed groups are presented in table 2.

The study revealed a positive effect of the two applied techniques on the functional state of the lumbar spine in the subjects.

Table 1

Change in the quality of life aspects of the dancers during rehabilitation, $\bar{X} \pm \sigma$

Indices/method	Experimental group (n=7)		Difference %	Control group (n=6)		Difference %	P
	Before	After		Before	After		
Quality of life	57.9 $\pm$ 3.4	68.0 $\pm$ 3.0	14.8	60.6 $\pm$ 5.9	66.6 $\pm$ 4.5	9.0	≤ 0.05
- physical health							
- mental health	69.5 $\pm$ 6.6	78.4 $\pm$ 6.0	11.3	69.9 $\pm$ 5.0	78.6 $\pm$ 4.5	11.0	≤ 0.05
(points)							
Pain and impaired vital activity (points)	3.8 $\pm$ 0.8	2.8 $\pm$ 0.5	26.3	3.7 $\pm$ 0.6	3.0 $\pm$ 0.6	18.9	-

Note: reliability of difference is presented with the Wilcoxon signed-rank test

Table 2

Changes in the functional indices of the dancers during rehabilitation, $\bar{X} \pm \sigma$

Indices/method	Experimental group (n=7)		Difference %	Control group (n=6)		Difference %	P
	Before	After		Before	After		
Functional mobility, cm	13.2 $\pm$ 1.0	14.5 $\pm$ 1.0	8.9	12.9 $\pm$ 1.6	13.9 $\pm$ 1.4	7.1	≤ 0.05
Flexibility, cm	16.2 $\pm$ 0.9	17.5 $\pm$ 1.1	7.4	15.8 $\pm$ 1.0	16.9 $\pm$ 0.8	6.5	≤ 0.05

Note: reliability of difference is presented with the Student's t-test

The indices significantly improved both in the experimental group (8.9% and 7.4%) and in the control group (7.1% and 6.5%). However, the hydrokinesitherapy method revealed an advantage over spine traction therapy, according to the data obtained. The results of the study indicate a favorable effect of hydrokinesitherapy on the lumbar instability, taking into account the professional activity of the subjects.

Conclusion. The final results of the study revealed that compared to exercises on land (TG), hydrokinesitherapy led to better changes determining the physical (14.8%) and psychological (11.3%) activity of the experimental group, reducing pain syndrome (26.3%) compared to the control group (18.9%).

Conflict of interest. The authors declare no conflict of interest.

REFERENCES

1. Pavlenko S.S. Lower back pain (epidemiology, clinical and diagnostic classification, modern directions in diagnosis, treatment and standardization of medical care): a guide. Novosibirsk: Sibmedizdat: NSMU, 2007. 172 p. (in Russ.)
2. Fairbank J.C., Pynsent P.B. The Oswestry Disability Index. *Spine*, 2000, vol. 25, no 22, pp. 2940-2952.
3. Maher C.G. Effective physical treatment for chronic low back pain. *Orthop Clin North Am*, 2004, no. 35(1), pp. 57–64. DOI: 10.1016/S0030-5898(03)00088-9.
4. Freburger J.K., Holmes G.M., Agans R.P., Jackman A.M. et al. The rising prevalence of chronic low back pain. *Arch Intern Med*, 2009, no. 169(3), pp. 251-258. DOI: 10.1001/archinternmed.2008.543
5. Starikov S.M., Kozyreva O.V. Modern approaches to the use of physical rehabilitation for dorsopathies. *Manual'nyj terapevt – vrach lechebnoj fizkul'tury*, 2011, no. 3-4, pp. 63-66 (in Russ.)
6. Roland M, Fairbank J. The Roland-Morris Disability Questionnaire and the Oswestry Disability Questionnaire. *Spine*, 2000, no. 25(24), pp. 3115-3124. DOI: 10.1097/00007632-200012150-00006.
7. Mahfouz M.M., Sedhom M.G., Essa M.M., Kamel R.M., Yosry A.H. Effect of aquatic versus conventional therapy in treatment of chronic low back pain. *Int J Physiother*, 2018, no. 5(6), pp. 184-189.

INFORMATION ABOUT THE AUTHORS:

Viktoriya V. Kostyaeva – Senior Lecturer of the Department of Physical Rehabilitation, Massage and Health-Improving Physical Culture named after I.M. Sarkizov-Serazini, Russian University of Sport “GTSOLIFK”, Moscow, e-mail: borisova-viktoriya@yandex.ru

Natal'ya A. Chulyukova – Lecturer of the Department of Physical Rehabilitation, Massage and Health-Improving Physical Culture named after I.M. Sarkizov-Serazini, Russian University of Sport “GTSOLIFK”, Moscow, e-mail: bumbox2010@mail.ru

For citation: Kostyaeva V.V., Chulyukova N.A. Hydrokinesitherapy for chronic low back pain in ballet dancers. *Russian Journal of Sports Science: Medicine, Physiology, Training*, 2025, vol. 4, no. 1(13). DOI: 10.24412/2782-6570-2025_04_01_5