

Importance of early physical rehabilitation in recovery of pain and tactile sensitivity of women with postmastectomy syndrome

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Purpose: to determine the expediency of early application of physical rehabilitation to improve the pain and tactile sensitivity of women with postmastectomy syndrome.

Material & Methods: theoretical analysis of scientific and methodical literature, analysis of heart rate variability, methods of mathematical statistics. The study involved 135 women with postmastectomy syndrome who underwent radical mastectomy by Madden.

Results: at the end of the annual research it was found that women of MG showed significantly better indicators of pain sensitivity in the areas of armpit, deltoid, triceps and forearms; tactile sensitivity – only by armpit compared to MG₁.

Conclusions: identified the feasibility of early rehabilitation intervention to improve the pain and tactile sensitivity in women during the year training by the first personality-oriented rehabilitation program.

Keywords: women, postmastectomy syndrome, sensitivity, physical rehabilitation.

Introduction

The problem of rehabilitation of women with the postmastectomy syndrome occupies an important place in the modern stage of breast cancer treatment not only in Ukraine but throughout the world. This is due not only to the stable growth of morbidity, but also the necessity to improve the quality of life of these patients [4; 5]. Postmastectomy syndrome manifests edematous, cerebrovascular and mixed neuropathic symptoms, has early and late signs, which are very dynamic and variable over time [2; 3; 4], that is why physical rehabilitation is an integral component of the treatment.

Recent studies of A. Cheville, 2010 [8], K. M. Cavanaugh, 2011 [7], M. Scaffidi, M. C. Vulpiani, M. Vetrano та ін., 2012 [10], C. Arving, I. Thormodsen, G. Brekke et al., 2013 [9] prove the feasibility of early detection and continuous monitoring of postmastectomy syndrome signs for timely overcoming negative functional disorders and improvement of life quality at all stages of rehabilitation.

The above definitely indicates the importance of developing, conducting and determination the usefulness of timely rehabilitation measures to improve pain and tactile sensitivity in women with postmastectomy syndrome.

Relationship with the academic programs, plans, themes

The selected research direction corresponds to the research topic of Zaporizhzhya National University "The development, experimental testing and implementation in practice the measures of physical rehabilitation to improve the health status of different categories of people" (state registration 0114U002653) and Lviv State University of Physical Culture "Basis of physical rehabilitation of women with the postmas-

tectomy syndrome" (state registration 0114U007008).

The purpose of the research

To determine the expediency of early application of physical rehabilitation to improve the pain and tactile sensitivity of women with the postmastectomy syndrome.

Material and Methods of research

The article used the following methods: theoretical analysis of scientific and methodical literature, assessment of pain and tactile sensitivity, methods of mathematical statistics. The study of pain and tactile sensitivity of the upper extremity was performed to assess the presence and severity of these disorders as a result of breast cancer treatment. Evaluation of sensitivity was conducted in ten areas of the upper limb that meet certain zones of innervation brachial plexus.

Each of the ten areas considered as follows: 0 – no sensitivity; 1 – impaired sensitivity; 2 – normal sensitivity [1], which generally provides an opportunity to get maximum points (20) if you have normal sensitivity. The results on the operated side of the upper extremity compared to nonoperated. Study of the pain sensitivity was conducted by needle, tactile – by brush [1]. Sensitivity was studied in these areas: shoulder blade, the upper part of the trapezius muscle, ectopectoralis, under the arm, deltoid, biceps, triceps, forearms, hand and phalanges of fingers.

Organization of the research. The researches were conducted on the base of Zaporozhye regional oncology dispenser. In the research 135 women with post mastectomies syndrome participated (50 patients were on inpatient and dispensary rehabilitation stages, 85 – only on dispensary).

Table 1
Comparison of pain sensitivity indicators of women with postmastectomy syndrome at dispensary stage of rehabilitation, $\bar{X} \pm m$

Indicators	6 months					12 months						
	MG ₁ (n=45)	MG (n=25)	MG ₂ (n=40)	CG (n=25)	MG ₁ (n=45)	MG (n=25)	MG ₂ (n=40)	CG (n=25)	MG ₁ (n=45)	MG (n=25)	MG ₂ (n=40)	CG (n=25)
shoulder blade	1,68±0,06	1,32±0,09**	1,65±0,09	1,40±0,12	1,73±0,06	1,56±0,10	1,80±0,08	1,64±0,09	1,73±0,06	1,56±0,10	1,80±0,08	1,64±0,09
the upper part of the trapezius muscle	1,86±0,05	1,84±0,07	1,72±0,07	1,76±0,11	1,95±0,03	1,92±0,05	1,82±0,06	1,84±0,07	1,95±0,03	1,92±0,05	1,82±0,06	1,84±0,07
ectopectoralis	1,68±0,06	1,80±0,08	1,67±0,09	1,76±0,08	1,75±0,06	1,96±0,04**	1,75±0,08	1,84±0,07	1,75±0,06	1,96±0,04**	1,75±0,08	1,84±0,07
under the arm	1,33±0,07	1,60±0,10*	1,37±0,08	1,60±0,10	1,60±0,07	1,92±0,05***	1,70±0,07	1,76±0,08	1,60±0,07	1,92±0,05***	1,70±0,07	1,76±0,08
deltoid	1,82±0,05	1,96±0,04*	1,80±0,05	1,76±0,08	1,88±0,04	2,00±0,00**	1,87±0,05	1,84±0,07	1,88±0,04	2,00±0,00**	1,87±0,05	1,84±0,07
biceps	1,88±0,04	1,96±0,04	1,85±0,05	1,92±0,05	1,91±0,04	2,00±0,00*	1,87±0,05	2,00±0,00**	1,91±0,04	2,00±0,00*	1,87±0,05	2,00±0,00**
triceps	1,42±0,07	1,72±0,09**	1,60±0,07	1,48±0,14	1,71±0,06	2,00±0,00***	1,72±0,07	1,72±0,09	1,71±0,06	2,00±0,00***	1,72±0,07	1,72±0,09
forearm	1,77±0,06	2,00±0,00**	1,80±0,08	1,88±0,06	1,86±0,05	2,00±0,00**	1,85±0,07	1,92±0,05	1,86±0,05	2,00±0,00**	1,85±0,07	1,92±0,05
hand	2,00±0,00	2,00±0,00	2,00±0,00	2,00±0,00	2,00±0,00	2,00±0,00	2,00±0,00	2,00±0,00	2,00±0,00	2,00±0,00	2,00±0,00	2,00±0,00
phalanxes of fingers	1,97±0,02	2,00±0,00	1,95±0,03	2,00±0,00	2,00±0,00	2,00±0,00	1,95±0,03	2,00±0,00	2,00±0,00	2,00±0,00	1,95±0,03	2,00±0,00
sum of points	17,46±0,16	18,20±0,20**	17,42±0,30	17,56±0,49	18,42±0,13	19,36±0,15***	18,35±0,28	18,56±0,38	18,42±0,13	19,36±0,15***	18,35±0,28	18,56±0,38

Notes. * – $p < 0,05$, ** – $p < 0,01$, *** – $p < 0,001$ when comparing MG₁ and MG₂; •• – $p < 0,01$ when comparing MG₂ and CG.

Table 2
Comparison of tactile sensitivity indicators of women with postmastectomy syndrome at dispensary stage of rehabilitation, $X \pm m$

Indicators	6 months				12 months			
	MG ₁ (n=45)	MG (n=25)	MG ₂ (n=40)	CG (n=25)	MG ₁ (n=45)	MG (n=25)	MG ₂ (n=40)	CG (n=25)
shoulder blade	1,66±0,07	1,40±0,10*	1,70±0,08	1,56±0,10	1,80±0,06	1,64±0,09	1,80±0,08	1,72±0,09
the upper part of the trapezius muscle	1,84±0,05	1,88±0,06	1,77±0,06	1,88±0,06	1,91±0,04	1,92±0,05	1,82±0,06	1,92±0,05
ectopectoralis	1,68±0,06	1,76±0,08	1,65±0,09	1,88±0,06*	1,71±0,06	1,84±0,07	1,80±0,08	1,92±0,05
under the arm	1,44±0,08	1,68±0,09	1,35±0,07	1,60±0,10*	1,53±0,07	1,92±0,05***	1,62±0,07	1,60±0,10
deltoid	1,77±0,06	1,96±0,04*	1,87±0,05	1,60±0,10*	1,84±0,05	1,96±0,04	1,95±0,03	1,60±0,10**
biceps	1,84±0,05	2,00±0,00**	1,95±0,03	1,56±0,10***	1,93±0,03	1,96±0,04	1,95±0,03	1,64±0,09**
triceps	1,48±0,07	1,80±0,08**	1,55±0,07	1,76±0,10	1,80±0,06	1,92±0,05	1,82±0,06	1,80±0,08
forearm	1,77±0,06	2,00±0,00***	1,82±0,06	1,96±0,04	1,93±0,03	2,00±0,00*	1,85±0,05	1,96±0,04
hand	1,97±0,02	2,00±0,00	2,00±0,00	2,00±0,00	1,97±0,02	2,00±0,00	2,00±0,00	2,00±0,00
phalanxes of fingers	2,00±0,00	2,00±0,00	1,95±0,03	2,00±0,00	2,00±0,00	2,00±0,00	1,97±0,02	2,00±0,00
sum of points	17,51±0,17	18,48±0,22**	17,62±0,21	17,80±0,23	18,44±0,14	19,16±0,29*	18,60±0,23	18,16±0,24

Notes. * – $p < 0,05$, ** – $p < 0,01$, *** – $p < 0,001$ when comparing MG₁ and MG; • – $p < 0,05$, ** – $p < 0,01$, *** – $p < 0,001$ when comparing MG₂ and CG

Average age of the tested was 60.27 ± 0.79 years. At inpatient stage women were divided into two groups: main group ($n=25$) and comparison group ($n=25$). At dispensary stage they were divided into first main group ($n=45$) and second main group ($n=40$). The groups were completed in compliance with wishes of the patients and their motivations for training by personality oriented physical rehabilitation program. Before dividing into groups all women were consulted about specificities of training in every group. The first complex, personality oriented program [4] included: aqua-fitness (aqua-motion), aqua building, aqua stretching), conditional swimming; health related aerobic (first main group and main group); conditional swimming and pilates (group [3] – second main group and comparison group). Women of main groups trained as per appropriate programs during one year. Effectiveness of trainings was controlled after every half of year. Admission to trainings was given by oncologist. Patients of these groups belonged to third clinical group. At the beginning of trainings all groups were equal by all indicators of external respiration system functioning.

Results of the research and their discussion

To determine the feasibility of early application of physical rehabilitation to improve pain (Table 1) and tactile (Table 2) sensitivity in women with the postmastectomy syndrome we conducted a comparative analysis of these indicators in six months and in a year of training by personality-oriented programs of physical rehabilitation.

Advantages of early physical rehabilitation were noted after six months of training by the first personality-oriented program of physical rehabilitation. In women of the main group compared to the first main group was found significantly better performance pain sensitivity (Table 1) in areas under the arm, deltoid, triceps and forearms – by 0.33 points ($p<0.05$), 0.14 points ($p<0.05$), 0.33 points ($p<0.01$) and 0.23 points ($p<0.01$) after 6 months' trainings; in a year – by 0.32 points ($p<0.001$), 0.12 points ($p<0.01$), 0.29 points ($p<0.001$), 14

points ($p<0.05$) respectively.

In a comparison group of women compared with the second main group it was showed significantly better indicators of pain sensitivity just over the projection biceps by 0.13 points ($p<0.05$) after year of training by the second personality-oriented program of physical rehabilitation.

Comparative analysis of tactile sensitivity in 6 months also showed the important role of early application of physical rehabilitation on stationary phase: women of the MG compared to the MG₁ revealed significantly better sensitivity in the parts of the deltoid, biceps, triceps and forearms – by 0.19 points ($p<0.05$), 0.16 points ($p<0.01$), 0.32 points ($p<0.01$) and 0.23 points ($p<0.001$) respectively.

At the end of the study, the women of MG have shown better sensitivity only in the area of the armpit by 0.39 points ($p<0.001$) and forearm – by 0.07 points ($p<0.05$) compared with women of MG₁.

Comparing the results of tactile sensitivity in women CG and MG₂ it had not been established the feasibility of early application physical rehabilitation at the stationary phase.

Conclusions

The worked out and tested personality-oriented physical rehabilitation programs for women with postmastectomy syndrome facilitate improvement of both pain and tactile sensitivity. However the results of the semi-annual and annual monitoring were shown feasibility of early rehabilitation intervention to restore the pain and tactile sensitivity in the areas of the deltoid, biceps, triceps and under the arm.

The prospects of further researches imply determination of purposefulness of early personality-oriented physical rehabilitation programs directed on improvement of respiratory system of women with postmastectomy syndrome.

Conflict of interests. The authors declare that there is no conflict of interests.

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References

1. Belova, A. N. & Shchepetova, O. N. 1999, *Rukovodstvo po reabilitatsii bolnykh s dvigatelnyimi narusheniyami* [Guidelines for rehabilitation of patients with movement disorders]. Part 2, Moscow: Antidor, pp. 209–211. (in Russ.)
2. Briskin, Yu. A. & Odinets, T. E. 2015, [Improved functional status of the upper limb in women with postmastektomichnym syndrome using problem-oriented program of physical rehabilitation] *Pedagogika, psikhologiya ta mediko-biologichni problemi fizichnogo vikhovannya i sportu* [Pedagogy, psychology, medical-biological problems of physical education and sport]. No 11, pp. 20–25. (in Ukr.)
3. Briskin, Yu. A. & Odinets, T. E. 2015, [Functional state of the cardiorespiratory system of women with postmastectomy syndrome with different types of attitude to the disease] *Slobozhanskii naukovo-sportyvnyi visnyk* [Slobozhanskyi science and sport bulletin]. Kharkiv: KSAPC, Vol. 48, No 4, pp. 31–34, doi:10.15391/sns.v.2015-4.005. (in Ukr.)
4. Vavilov, M. P., Kizhayev, Ye. V. & Kusevich, M. N. 2008, [Postradiating-postektomy syndrome: aspects of evidence-based medicine] *Opukholi zhenskoy reproduktyvnoy sistemy* [Tumors of the female reproductive system]. No 2, pp. 7–11. (in Russ.)
5. Odinets, T. E. 2015, [Technology of wellness aerobics in the structure of personality-oriented program of physical rehabilitation of women with postmastectomy syndrome] *Slobozhanskii naukovo-sportyvnyi visnyk* [Slobozhanskyi science and sport bulletin]. Kharkiv: KSAPC, Vol. 49, No 5, pp. 86–89, doi:10.15391/sns.v.2015-5.014. (in Ukr.)
6. Cavanaugh, K. M. 2011, Effects of early exercise on the development of lymphedema in patients with breast cancer treated with axillary lymph node dissection, *J. Oncol. Pract.*, Vol. 7 (2), P. 89–93.
7. Chevillat, A. 2010, Prevention of lymphoedema after axillary surgery for breast cancer, *BMJ*, Vol. 340, Available at: <http://www.bmj.com/content/343/bmj.d5326>.
8. Arving, C., Thormodsen, I. & Brekke, G. 2013, Early rehabilitation of cancer patients – a randomized controlled intervention study, *BMC Cancer*, Vol. 13 (9), Available at: <http://www.biomedcentral.com/1471-2407/13/9>.
9. Scaffidi, M., Vulpiani, M. C. & Vetrano, M. Early rehabilitation reduces the onset of complications in the upper limb following breast cancer surgery, *Eur J Phys Rehabil Med*, 2012, Vol. 48 (4), P. 601–611.

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