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EXPEDIENCY OF EARLY APPLICATION OF PHYSICAL REHABILITATION TO IMPROVE THE FUNCTIONAL STATE OF UPPER LIMB IN WOMEN WITH POSTMASTECTOMY SYNDROME

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ДОЦІЛЬНІСТЬ РАННЬОГО ЗАСТОСУВАННЯ ЗАСОБІВ ФІЗИЧНОЇ РЕАБІЛІТАЦІЇ ДЛЯ ПОЛІПШЕННЯ ФУНКЦІОНАЛЬНОГО СТАНУ ВЕРХНЬОЇ КІНЦІВКИ В ЖІНОК З ПОСТМАСТЕКТОМІЧНИМ СИНДРОМОМ. Юрій БРІСКІН[1]**, Тетяна ОДИНЕЦЬ**[2]*. [1]Львівський державний університет фізичної культури, м. Львів, Україна, [2]Запорізький національний університет, м. Запоріжжя, Україна, e-mail: puch1ik@mail.ru*

Анотація. *Мета* – визначити доцільність раннього застосування засобів фізичної реабілітації для поліпшення функціонального стану верхньої кінцівки в жінок з постмастектомічним синдромом. *Методи:* теоретичний аналіз наукової та методичної літератури й емпіричних даних; гоніометрія; динамометрія; методи математичної статистики. *Матеріал:* у дослідженні брало участь 135 жінок з постмастектомічним синдромом, що перенесли радикальну мастектомію за Мадденом. *Результати:* встановлено, що раннє реабілітаційне втручання ефективне лише для зменшення обсягу постмастектомічного набряку; доцільності початку реабілітаційних заходів зі стаціонарного етапу для відновлення амплітуди руху в плечовому суглобі і сили кисті з боку оперативного втручання не виявлено.

Ключові слова: жінки, постмастектомічний синдром, фізична реабілітація, верхня кінцівка.

Statement of the problem. Breast cancer is quite common cancer pathology of women not only in Ukraine but throughout the world. Modern trends in incidence and mortality rates show a steady increase of the share of the localization of tumors for women [3, 4]. There are 166,25 patients with breast cancer registered in oncologic institutions of Ukraine in 2014. Paying attention to this disease is caused by the fact that according to Zaporizhzhya Regional Oncology Center in 2014 676 women were diagnosed with the breast cancer and the number of registered deaths totaled 342 cases [3]. Modern conception of breast cancer treatment is based on usage of complex impact, which includes radiation therapy, chemical therapy, hormone therapy, immune therapy. But the method of priority is still surgery [4, 6].

Analysis of library resources. Analysis and synthesis of problem-oriented scientific and methodological literature showed that the most frequent treatment consequence of breast cancer is postmastectomy syndrome, which includes disorders of physical, functional, psychological and significant deterioration of life quality. Postmastectomy syndrome is expressed in such symptoms as lymphostasis, weakening of muscular strength, restriction of movements' amplitude in shoulder joint, disordering of sensitivity, vegetative-trophic disorders of upper limb and negative psycho-emotional effects [4, 5, 6].

Advanced randomized researches prove purposefulness of early detection and constant monitoring of these disorders for timely overcoming of negative functional disorders and improvement of life quality of women of this nosology [5, 6, 7]. However, in most cases orientation on medical component of rehabilitation, working out of modern schemas of medicine provisioning, implementation of reconstructive plastic surgery, prevail. But physical rehabilitation of patients with PMS is not paid sufficient attention to.

The above said witness about significance of working out and realization of timely rehabilitation measures for timely correction of the functional state of upper limb 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 "Fundamentals of physical rehabilitation of women with postmastectomy syndrome" (state registration number 0115U007008).

The purpose of the research: is to determine the expediency of early application of physical rehabilitation to improve the functional state of the upper limb in women with postmastectomy syndrome.

Material and methods of the research. The following methods were applied: theoretical analysis of scientific-methodic literature data, Internet and empiric data; goniometry (assessment of shoulder joint's mobility); dynamometry (assessment of hand flexors' strength); anthropometry (assessment of difference between segment perimeters of upper limb at level of shoulder, forearm and wrist for determination of swelling volume); mathematical statistical methods. The research was performed at the Zaporozskiy Regional Cancer Center.

In the experiment, 135 women participated that had symptoms of postmastectomy syndrome. Using a random sampling method, we formed a main group (MG) and a group for comparison (CG) with 25 people in each group that held stationary and dispensary stage of rehabilitation. 85 women had only dispensary stage of rehabilitation and were divided into two main groups (MG_1 and MG_2), depending on the activities of personality-oriented programs. The average age of women was 60.27±0.79 years. The first comprehensive personality-oriented program [2] included: aqua aerobics (aqua motion, aqua building, aqua stretching), conditioned swimming, recreational aerobics (MG and MG_1); second [1] – conditioned swimming and pilates (CG and MG_2).

These women groups engaged on the relevant personality -oriented program during 12 months at the dispensary stage of rehabilitation. At the beginning of the dispensary stage of rehabilitation groups were homogeneous by all indicators of the functional state of the upper limb.

Results of the research and their discussion. Analysis of the conducted experiment showed positive influence and purposefulness of application of the worked out personality-oriented physical rehabilitation program for improvement of functional state of upper limb in women with postmastectomy syndrome.

In six months at rehabilitation dispensary stage (Table 1), it was shown the advantage of an early start of rehabilitation, as evidenced by significantly lower values of swelling volume in part of shoulder – by 0.64 cm ($p<0.01$), forearm – by 0.64 cm ($p<0.001$), wrist – by 0.73 cm ($p<0.001$) in women MG compared to MG_1.

Table 1

Comparison of swelling volume (M±m) in women with postmastectomy syndrome in 6 months at rehabilitation dispensary stage

Indicator	MG_1 (n=45)	MG (n=25)	MG_2 (n=40)	CG (n=25)
Shoulder, cm	1.44±0.13	0.80±0.17**	1.67±0.15	1.72±0.13
Forearms, cm	1.08±0.11	0.44±0.13***	1.47±0.14	1.48±0.13
Wrist, cm	0.93±0.09	0.20±0.08***	1.02±0.14	1.08±0.08

Notes: ** – $p<0.01$, *** – $p<0.001$ comparing MG_1 and MG.

The same trend was observed in a year (Table 2), however, comparing CG and MG_2 showed no differences in six months or in a year.

Table 2

Comparison of swelling volume (M±m) in women with postmastectomy syndrome in 12 months at rehabilitation dispensary stage

Indicator	MG1 (n=45)	MG (n=25)	MG2 (n=40)	CG (n=25)
Shoulder, cm	1.17±0.12	0.64±0.12**	1.37±0.15	1.40±0.10
Forearms, cm	1.02±0.11	0.40±0.11***	1.15±0.16	1.16±0.11
Wrist, cm	0.88±0.09	0.12±0.06***	0.87±0.15	0.84±0.09

Notes: ** – $p<0.01$,

*** – $p<0.001$ comparing MG_1 and MG.

Advantages of early beginning of physical rehabilitation for improving the active amplitude of the shoulder joint has not been established between the main group, which began rehabilitation at the stationary stage and the first main group – at dispensary stage, women MG_1 were significantly more values of flexion and abduction by 7.05 ($p<0.01$) and 4.81 ($p<0.01$) degrees respectively compared with patients of MG (Table 3).

Table 3

Comparison of goniometry indicators on operated side (M±m) in women with postmastectomy syndrome in 6 months at rehabilitation dispensary stage

Indicator	MG_1 (n=45)	MG (n=25)	MG_2 (n=40)	CG (n=25)
Flexion, degrees	168.17±1.52	161.12±2.03**	158.17±1.58	150.48±2.58є
Extension, degrees	52.13±1.01	52.16±1.19	53.55±1.12	44.32±2.22єєє
Abduction, degrees	163.33±1.26	158.52±1.88*	156.90±1.41	146.24±2.26єєє
Internal rotation, degrees	59.73±1.06	56.60±1.53	59.50±1.26	50.92±1.82єєє
External rotation, degrees	76.28±1.18	71.68±1.49*	74.65±1.02	70.20±2.43

Notes: * – $p<0.05$,

** – $p<0.01$ comparing MG_1 and MG; є – $p<0.05$, єєє – $p<0.001$ comparing MG_2 and CG.

At this stage in women MG_2 were better indicators of flexion, extension, abduction and internal rotation by 7.69 ($p<0.05$), 9.23 ($p<0.01$) and 10.66 ($p<0.001$) and 8.58 ($p<0.001$) degrees respectively, compared with the CG.

At the end of the year (Table 4) indicator of internal rotation was more by 3.14 ($p<0.05$) degrees in women MG_1 compared to MG; extension amplitude and internal rotation were also higher by 3.01 ($p<0.05$) and 5.47 ($p<0.01$) degrees, respectively in women MG_2 compared to CG.

Table 4

Comparison of goniometry indicators on operated side (M±m) in women with postmastectomy syndrome in 12 months at rehabilitation dispensary stage

Indicator	MG_1 (n=45)	MG (n=25)	MG_2 (n=40)	CG (n=25)
Flexion, degrees	171.55±1.12	172.12±0.94	161.95±1.43	169.04±1.57єє
Extension, degrees	56.02±0.72	56.32±0.54	56.85±0.95	53.84±0.80є
Abduction, degrees	167.31±1.28	168.84±1.14	162.92±1.55	165.12±1.58
Internal rotation, degrees	65.46±0.99	62.32±0.75*	62.75±1.13	57.28±1.36єє
External rotation, degrees	80.15±1.20	77.60±1.30	78.05±1.03	75.68±2.07

Notes: * – $p<0.05$ comparing MG_1 and MG; є – $p<0.05$, єє – $p<0.01$ comparing MG_2 and CG.

Comparative analysis of mean values of hand force index and power of the hand (Table 5) has shown more value by 7.03 % ($p < 0.001$) and 3.5 kg ($p < 0.001$) in women MG_2 compared to CG respectively in 6 months. A similar situation is observed comparing the same indicators between MG_1 and MG.

Table 5

Comparison of dynamometry indicators on operated side (M ± m) in women with postmastectomy syndrome in 6 months at rehabilitation dispensary stage

Indicator	MG_1 (n=45)	MG (n=25)	MG_2 (n=40)	CG (n=25)
Power of the hand, kg	25.91±0.68	23.44±0.62**	25.90±0.49	22.40±0.56єєє
Hand force index, %	31.27±0.87	29.53±0.72	33.31±1.12	26.28±0.99єєє

Notes: ** – $p < 0.01$ comparing MG_1 and MG; єєє – $p < 0.01$ comparing MG_2 and CG.

After a year of training by personality-oriented programs (Table 6) difference was established only by the hand force index, which was larger by 3.29 % ($p < 0.05$) in women MG_2.

Table 6

Comparison of dynamometry indicators on operated side (M ± m) in 12 months at rehabilitation dispensary stage

Indicator	MG_1 (n=45)	MG (n=25)	MG_2 (n=40)	CG (n=25)
Power of the hand, kg	27.08 ± 0.54	26.56 ± 0.53	26.32 ± 0.48	26.08 ± 0.65
Hand force index, %	33.90 ± 0.90	33.59 ± 0.85	33.85 ± 1.10	30.56 ± 1.09є

Notes: є – $p < 0.05$ comparing MG_2 and CG.

In this way, for the first time revealed heterochrony effectiveness and impact of physical rehabilitation to improve the functional state of the upper limb in women with postmastectomy syndrome and justified the rationality of its use.

Conclusions. The worked out and tested problem-oriented physical rehabilitation program for women with post mastectomy syndrome contributed to the improvement of the functional state of the upper limb. As a result of the six-month monitoring it was found that the earlier rehabilitative intervention was extremely effective for reducing of postmastectomy swelling volume: women of the main group showed less swelling values in the part of the shoulder – by 0.64 cm ($p < 0.01$), forearm – by 0.64 cm ($p < 0.001$) and wrist – by 0.73 cm ($p < 0.001$) compared to the first main group. Expediency of early intervention to restore the range of movement's active amplitude in shoulder joint and force of the hand on operated side was not identified.

The prospects of further researches imply working out of physical rehabilitation program to improve the functional state of cardiovascular system for women with post mastectomy syndrome after stationary stage and determination of its effectiveness.

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ЦЕЛЕСООБРАЗНОСТЬ РАННЕГО ПРИМЕНЕНИЯ СРЕДСТВ ФИЗИЧЕСКОЙ РЕАБИЛИТАЦИИ ДЛЯ УЛУЧШЕНИЯ ФУНКЦИОНАЛЬНОГО СОСТОЯНИЯ ВЕРХНЕЙ КОНЕЧНОСТИ У ЖЕНЩИН С ПОСТМАСТЭКТОМИЧЕСКИМ СИНДРОМОМ

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Аннотация. *Цель* – определить целесообразность раннего применения средств физической реабилитации для улучшения функционального состояния верхней конечности у женщин с постмастэктомическим синдромом. *Методы:* теоретический анализ научно-методической литературы и эмпирических данных; гониометрия; динамометрия; методы математической статистики. *Материал:* в исследовании принимали участие 135 женщин с постмастэктомическим синдромом, перенесших радикальную мастэктомию по Маддену. *Результаты:* установлено, что раннее реабилитационное вмешательство эффективно исключительно для уменьшения величины постмастэктомического отека; целесообразности начала реабилитационных мероприятий со стационарного этапа для восстановления амплитуды движения в плечевом суставе и силы кисти со стороны оперативного вмешательства не выявлено.

Ключевые слова: женщины, постмастэктомический синдром, физическая реабилитация, верхняя конечность.

ADVISABILITY OF EARLY PHYSICAL REHABILITATION OF UPPER LIMB FUNCTIONAL STATE IMPROVEMENT IN WOMEN WITH POSTMASTECTOMY SYNDROME

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Abstract. *The article deals* with advisability of early physical rehabilitation aimed at restoration of the upper limb functional status in women with postmastectomy syndrome. *Objective:*

to determine the advisability of early physical rehabilitation with the aim of improvement of the upper limb functional status in women with postmastectomy syndrome. *Methods:* theoretical analysis of scientific-methodic literature data; Internet and empirical data; goniometry; dynamometry; anthropometry; mathematical statistics methods. *Subject of research:* 135 women who underwent radical mastectomy after Mudden were involved in the research. All the women exhibited symptoms of postmastectomy syndrome. *Results:* It was found that early rehabilitation intervention is effective for reducing the postmastectomy swelling exclusively; whereas early in-patient rehabilitation measures for shoulder joint ROM and hand strength restoration were not detected.

Keywords: women, postmastectomy syndrome, physical rehabilitation, upper limb.

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