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## The effectiveness of application of the personality-oriented programs for the physical rehabilitation of women with postmastectomy syndrome in restoring the functional state of the upper limb

**Abstract. Purpose:** to determine the peculiarities of personality-oriented programs of physical rehabilitation to restore the functionality of the upper limb in women with postmastectomy syndrome. **Material and methods:** analysis and synthesis of the literature and empirical data; goniometry; methods of mathematical statistics. 115 women with postmastectomy syndrome on clinical stage of rehabilitation were involved in this study. **Results:** influenced by the personality-oriented programs for women there was a gradual approximation to the normal indicators of goniometry in the shoulder joint of the surgical intervention. **Conclusions:** It was proved that the personality-oriented program of physical rehabilitation of women with the postmastectomy syndrome help to improve the range of motions in the shoulder joint in all directions throughout the year regardless of the selected program.

**Keywords:** goniometry, breast cancer, women, physical rehabilitation.

**Introduction.** A large number of domestic [1, 2, 3] and foreign literature [5, 6, 7, 8] indicates that breast cancer is the leading cancer pathology among the female population and is important not only for national health care system, but also for the economy and society as a whole. According to the National Cancer Registry Ukraine incidence of breast cancer increases with age and peaks among women age group 60-64 years [3]. The most common consequence of breast cancer is postmastectomy syndrome (PMES), which includes the manifestation of symptoms such as lymphostasis, limiting range of motion in the shoulder joint, violations of sensitivity, quality of life and adverse psychological and emotional effects [4, 8].

Analysis of current trends of PMES treatment indicates a significant number of proposed conservative methods [1, 2, 5, 7, 8] to overcome it, but the residual effects of the functional systems, emotional and physical condition continue to have a negative impact on quality of life of patients. Analysis of current scientific publications of the stated problem proves that exercise plays a key role in improving the functional state of the upper extremity among the women with the postmastectomy syndrome [4, 9, 10].

Taking into account the current trend of increasing number of women with PMES, the major role plays the development and implementation of personal-oriented programs of physical rehabilitation of this nosology based on individual commitment and determination of each of them to restore the range of motions in the shoulder joint.

**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).

**Objective:** to determine the peculiarities of personality-oriented programs of physical rehabilitation to restore the functionality of the upper limb in women with postmastectomy syndrome.

**Material and methods:** analysis and synthesis of the literature and empirical data; goniometry; methods of mathematical statistics. The study was conducted at the Zaporozhye Regional Oncology Center and Sports Complex "Spartac" in Zaporizhzhya. The experiment involved 115 women with postmastectomy syndrome, the average age of the studied was  $60,27 \pm 0,79$  years. In the clinical stage of rehabilitation to women was proposed to choose a physical rehabilitation program under which they will work during the year according to their own wishes and encouragement. Previously women were given a clear explanation about the features of their classes.

The first comprehensive personal-oriented program included: aqua aerobics (aqua motion, aqua building, aqua stretching), conditioned swimming, recreational aerobics (first main group); second – conditioned swimming and pilates (second main group); third – stretching and yoga (third main group). Personalization exercise was realized in each program, carried out in conditions of water or air, as well as the complex combination of different means.

During the formation of the studied groups of women was followed a strict randomization principle of quality and representativeness of the sample that is necessary for further comparison of the effectiveness of the proposed programs of rehabilitation. Women of the main groups were involved in relevant programs during the year, the efficiency was controlled through the semi-annual period of time. Access to classes was provided by the oncologist, patients belonged to the third clinical group. Contraindications for classes were not mentioned.

**Results of the research and their discussion.** As a result of forming experiment in the first main group of women (table 1) was found that after six months of training was a gradual improvement in active range of motion in the shoulder joint in all directions, the amplitude of bending motion was  $93,43 \pm 0,84\%$  of normal, extension –  $86,88 \pm 1,69\%$ , abduction –  $90,74 \pm 0,70\%$ , internal rotation –  $85,33 \pm 1,52\%$ , external –  $84,76 \pm 1,31\%$ , and a year later these figures respectively were  $95,30 \pm 0,62$ ,  $93,37 \pm 1,20$ ,  $92,95 \pm 0,71$ ,  $93,52 \pm 1,42$  and  $89,06 \pm 1,34\%$ .

Table 1

**The evolution of the range of motion of the shoulder joint operating side (M±m) in the first main group of women on the clinical stage of rehabilitation**

Indicator	first main group (n=45)			
	beginning	six months	year	norm
flexion	144,08±1,97	168,17±1,52***	171,55±1,12··	180
extension	48,91±1,15	52,13±1,01***	56,02±0,72···	60
abduction	144,77±1,82	163,33±1,26***	167,31±1,28···	180
internal rotation	55,28±1,13	59,73±1,06***	65,46±0,99···	70
external rotation	71,80±1,36	76,28±1,18***	80,15±1,20···	90

**Notes:** \*\*\* -  $p < 0,001$  compared with the initial data; ·· -  $p < 0,01$ , ··· -  $p < 0,001$  compared to 6 months.

Among the women, in the second main group in the first six months (table 2) the amplitude of bending motion was 87,87±0,88 % of normal, extension – 89,25±1,87 %, abduction – 87,16±0,78 %, internal rotation – 85,00±1,81 %, external – 82,94±1,34%, and a year later these figures respectively were 89,97±0,79, 94,75±1,59, 90,51±0,86, 89,64±1,62 ta 86,72±1,14 %.

Table 2

**The evolution of the range of motion of the shoulder joint operating side (M±m) in the second main group of women on the clinical stage of rehabilitation**

Indicator	second main group (n=40)			
	beginning	six months	year	norm
flexion	143,25±2,10	158,17±1,58***	161,95±1,43··	180
extension	47,70±1,24	53,55±1,12***	56,85±0,95···	60
abduction	144,90±1,37	156,90±1,41***	162,92±1,55···	180
internal rotation	53,20±1,51	59,50±1,26***	62,75±1,13···	70
external rotation	71,10±1,11	74,65±1,02***	78,05±1,03···	90

**Notes:** \*\*\* –  $p < 0,001$  compared with the initial data; ·· –  $p < 0,01$ , ··· –  $p < 0,001$  compared to 6 months.

During the second half of the year among the women in the third main group (table 3) significantly improved all parameters shoulder joint range of motion except for the external rotation, while final flexion values were 93,77±0,88% of the norm, extension – 99,33±1,37%, abduction – 92,46±0,99%, internal rotation – 94,47±1,33%.

Table 3

**The evolution of the range of motion of the shoulder joint operating side (M±m) in the third main group of women on the clinical stage of rehabilitation**

Indicator	third main group (n=30)			
	beginning	six months	year	norm
flexion	143,93±2,21	162,86±1,87***	168,80±1,59···	180
extension	49,06±1,17	55,70±1,13***	59,60±0,82···	60
abduction	146,56±1,91	161,13±1,95***	166,43±1,78·	180
internal rotation	53,00±1,25	60,80±1,26***	66,13±0,93··	70
external rotation	73,53±1,40	78,13±1,06*	80,60±1,33	90

**Notes:** \*\*\* –  $p < 0,001$  compared with the initial data; ·· –  $p < 0,01$ , ··· –  $p < 0,001$  compared to 6 months.

Comparing the results of the performance range of motion of the shoulder joint among women in major groups during six months was established the presence of possible differences between them, including flexion and abduction was higher among women compared to first and second main group at 10,00 ( $p < 0,001$ ) and 6,43 ( $p < 0,001$ ) degrees respectively. When comparing these groups with the annual rate was also indicated better values flexion and abduction of women of first main group to 9,60 ( $p < 0,001$ ) and 4,39 ( $p < 0,05$ ) respectively compared to the degree of women of second main group, while extension amplitude was greater to 3,58 ( $p < 0,01$ ) greater degree among women compared to first and third main group.

**Conclusions.** Results of the study indicate that the developed personality-oriented program of physical rehabilitation of women with the postmastectomy syndrome helps to improve the range of motion in the shoulder joint in all classes

throughout the year regardless of the selected program. By the comparison of endpoint indicators of goniometry were shown significantly better outcomes in flexion and abduction of the shoulder joint among women in the first main group compared with the second.

**Prospects for further research** include determining of the effect of personality-oriented programs to reduce lymphostasis manifestations among women with postmastectomy syndrome.

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