

PURPOSEFULNESS OF EARLY APPLICATION OF PHYSICAL REHABILITATION MEANS FOR IMPROVEMENT OF EXTERNAL RESPIRATION SYSTEM FUNCTIONAL STATE OF WOMEN WITH POST MASTECTOMIES SYNDROM

Briskin Y.A.¹, Odinets T.Y.²

¹Lvov State University of Physical Culture

²Zaporozhe National University

Abstract. *Purpose:* to determine purposefulness of early application of physical rehabilitation means for improvement of external respiration system functional state of women with post mastectomies syndrome. *Material:* in the research 135 women with post mastectomies syndrome, who endured radical mastectomy by Madden, participated. Women of main groups were trained in compliance with appropriate programs during one year. Effectiveness of trainings was controlled after half of year. Admission to trainings was given by oncologist. Patients of these groups belonged to third clinical group. At the beginning of dispensary period the groups were equal by all indicators of external system function. *Results:* it was found that early rehabilitation is more effective exclusively for indicators of bronchial patency. Complex, personality oriented program included: aqua-fitness; conditional swimming; health related aerobic and Pilates. It was found that after half year training advantages of early physical rehabilitation were noticed only in indicators of forced exhale volume at first second. *Conclusions:* we stated importance of early rehabilitation trainings of women with post mastectomies syndrome.

Key words: external respiration, women, spirometry, post mastectomies syndrome.

Introduction

Modern tendency of breast cancer dynamic witnesses about rising importance of this malignant tumor's localization for women [7, 8, 16, 20]. Constant perfection of breast cancer treatment facilitates prolongation of women's life span. However, it does not exclude side effects of therapy [5, 13, 14, 15, 19].

Advanced researches prove purposefulness of early diagnosis and correction of complications from side of muscular skeletal apparatus, cardio-vascular and nervous systems for their removal in due time and improvement of women's life quality [11, 12, 17, 18]. However, prevailing orientation on medical component of rehabilitation, development of modern schemas of medical provisioning, implementation of reconstructive-plastic operations do not pay sufficient attention to physical rehabilitation of patients with post mastectomies syndrome (in particular to improvement of external respiration system's functioning).

The above said undoubtedly witnesses about importance of working out, conduct and determination of usefulness of timely rehabilitation measures. The purpose of the mentioned measures is improvement of external respiration system indicators in women with post mastectomies syndrome.

Purpose, tasks of the work, material and methods

The purpose of the research is to determine purposefulness of early application of physical rehabilitation means for improvement of external respiration system functional state of women with post mastectomies syndrome.

Material and methods of the research: theoretical analysis of scientific research literature data, spirometry, methods of mathematical statistic. Indicators of external respiration system's functioning were assessed with spirometry CMII-21/01-«P-Д», produced by "Monitor". By spirometry the following indicators were assessed: vital capacity of lungs (VCL); forced vital capacity (FVC); volume of forced exhale per 1 second (VFE₁); peak volume quickness (PVQ); instant volume quickness at moment of exhaling 25% of FVC (IVQ₂₅); instant volume quickness at moment of exhaling 50% of FVC (IVQ₅₀); maximal lungs' ventilation (MLV); minute volume of breathing (MVB); reserve volume of inhale (RV_{inh}); reserve volume of exhale (RV_{exh}).

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). 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

Detail analysis of vital capacity of lungs after 6 months' trainings showed: in 56% of MG women indicators were normal, in 32% - conventionally normal, in 12% a little reduced. In MG1 patients they were: accordingly in 47, 35, 13%, and in MG2 - in 50, 28, 22%, in comparison group (CG) – in 28, 36 and 24%. Indicators of peak volume quickness were normal and conventionally normal in 32% of MG patients; a little reduced – in 24% of the tested. In MG1 patients this indicators was accordingly 42, 22, 16%, in MG2 women - 18, 30%, in CG– 12, 48 and 8%.

Independent indicators of FVC (after one year's training) were normal in 80% of MG patients, in 88% – of MG1, in 78% – of MG2 and in 32% of CG, conventionally normal – in 20, 18, 22 and 44% of women accordingly. Detail analysis of PVQ showed that in 44% of MG women it was normal, in 52% – conventionally normal; in CG patients it was accordingly 20 and 16%.

After half year's trainings advantages of early rehabilitation trainings (see table 1) were registered only by indicators of forced exhale volume in first second. This indicators was by 140 ml ($p < 0.05$) higher in women of MG1, comparing with women of MG. At the same time, after one year trainings confident differences between these groups were observed by indicators of forced vital capacity of lungs, volume of forced exhale in first second, instant volume quickness at level of 50% FVC, reserve exhale volume, minute breathing volume in favor of MG. By indicators of reserve inhale volume and maximal lungs' ventilation confident differences were in favor of MG1.

Table 1. Comparison of indicators of women with post mastectomies syndrome at dispensary stage of rehabilitation

Indicator, units of measurements		6 months				12 months			
		MG ₁ (n=45)	MG (n=25)	CG (n=25)	MG ₂ (n=40)	MG ₁ (n=45)	MG (n=25)	CG (n=25)	OG ₂ (n=40)
VCL, l	A	2,77±0,05	2,90±0,09	2,62±0,05	2,61±0,04	2,95±0,04	2,79±0,05	2,79±0,05	2,73±0,03
	B	89,42±1,83	89,60±3,00	80,40±1,74	84,02±1,50	95,86±1,58	96,52±3,03	85,88±2,24	88,30±1,60
FVCL, l	A	2,68±0,03	2,58±0,08	2,43±0,03	2,59±0,03 ^o	2,81±0,03	2,97±0,06*	2,58±0,03	2,64±0,02
	B	91,44±1,39	84,00±3,13	78,80±1,54	88,40±1,48 ^{ooo}	96,62±1,38	97,16±2,44	84,04±1,71	90,50±1,42
VFE ₁ , l	A	2,56±0,04	2,42±0,05*	2,38±0,03	2,28±0,05	2,62±0,02	2,84±0,05**	2,43±0,03	2,38±0,04
	B	105,95±1,94	95,12±2,95**	92,76±1,87	93,90±2,42	109,75±1,77	112,08±2,45	95,28±2,23	98,67±2,17
PVQ, l/sec	A	4,43±0,14	4,67±0,20	4,39±0,09	3,43±0,11 ^o	4,82±0,13	5,18±0,16	4,14±0,14	3,79±0,13
	B	76,60±2,40	78,20±3,64	73,04±1,67	59,22±1,95 ^{ooo}	83,88±2,21	87,08±2,99	69,16±2,54	65,72±2,30
IVQ ₂₅ , l/sec	A	4,05±0,12	4,31±0,16	4,17±0,09	3,26±0,10 ^o	4,44±0,10	4,71±0,14	3,67±0,12	3,51±0,12
	B	79,42±2,22	81,40±3,50	78,40±1,79	64,00±2,14 ^{ooo}	88,06±2,12	89,24±3,03	69,28±2,53	69,17±2,54
IVQ ₅₀ , l/sec	A	4,00±0,14	4,08±0,17	3,95±0,10	2,91±0,10 ^o	3,97±0,07	4,65±0,12***	3,85±0,15 ^o	3,38±0,11

Indicator, units of measurements	6 months				12 months			
	MG ₁ (n=45)	MG (n=25)	CG (n=25)	MG ₂ (n=40)	MG ₁ (n=45)	MG (n=25)	CG (n=25)	OG ₂ (n=40)
B	112,17±3,7 7	110,12±4,7 2	104,72±3,0 7	81,60±2,86 °°°	113,75±2,7 2	125,12±4,3 9 *	103,00±4,4 4	95,60±3,22
MVB l/min	7,97±0,20	7,28±0,46	8,96±0,49	7,15±0,26 °°	7,29±0,36	6,28±0,35 *	6,93±0,25	6,94±0,25
RVinh, l	1,27±0,04	1,19±0,06	0,90±0,06	1,28±0,04 °°°	1,56±0,06	0,98±0,06 ***	1,01±0,06	1,15±0,07
RVexh, l	0,86±0,05	0,91±0,09	0,76±0,05	0,77±0,05	0,97±0,06	1,25±0,11 *	0,96±0,08	1,01±0,10
MVB, l/min	68,37±2,54	76,44±4,02	68,28±2,35	62,63±2,60	86,38±3,00	75,55±2,24 **	68,98±3,85	68,46±1,96

Notes: * – p<0.05, ** – p<0.01, *** – p<0.001 when comparing MG and MG; ° – p<0.05, °° – p<0.01, °°° – p<0.001 when comparing MG₂ and CG. VCL – vital capacity of lungs; FVCL – forced vital capacity of lungs; FVE₁ – volume of forced exhale per 1 second; PVQ – peak volume quickness; IVQ₂₅ – instant volume quickness at exhale with IVQ 25%; IVQ₅₀ – instant volume quickness at exhale with IVQ 50%; MVL – maximal ventilation of lungs; MVB – minute volume of breathing; RV inh – reserve volume of inhale; RV exh – reserve volume of exhale. A – actual; B - % from proper value.

After 6 months' trainings of physical rehabilitation in MG₂ patients the following indicators were confidently better (comparing with CG): forced vital capacity of lungs (by 0.16 l, p<0.01), minute breathing volume (by 1.81 l/min, p<0.01) and reserve volume of inhale (by 0.38 l, p<0.001). At the same time in CG the following indicators were better confidently: peak, instant and volume quickness at level of 25 and 50% of FVC. After one year only actual indicator of instant volume quickness at level of 50% of FVC was higher by 0.47 l/sec (p<0.05) in CG patients. At the same time in MG₂ women relative indicator of forced vital capacity was higher (by 6.46%, p<0.05) than in CG.

Discussion

The obtained results confirm scientific data of the following authors: K. M. Cavanaugh, 2011 [9], M. L. Kwan, B. Sternfeld, I. J. Ergas et al., 2012 [10], N. L. Stout, J. M. Binkley, K. H. Schmitz et al. [6], C. Arving, I. Thormodsen, G. Brekke et al. 2013 [11], S.R. Lu, R.B. Hong, W. Chou, P.C. Hsiao, 2015 [18] about significance of early rehabilitation training of women with post mastectomies syndrome. Our data supplement results of researches of S.G. Bygaytsov (2003 [2]) and O.A. Bas (2011 [1]) about quantitative and qualitative disorders of external respiration of this nosology women on different rehabilitation stages.

Thus, the problem of determination of lasting results of the worked out personality-oriented physical rehabilitation programs for women with post mastectomies syndrome is rather important.

Conclusions

The worked out and tested personality-oriented physical rehabilitation programs for women with post mastectomies syndrome facilitate improvement of functional state of external respiration system. As per results of year control it was registered that early rehabilitation is most effective exclusively for improvement of bronchial patency indicators: in MG forced vital capacity of lungs improved as well as forced exhale per one second and instant volume quickness of reserve and minute breathing volume in comparison with MG₁. Reserve volume of inhale and maximal lungs' ventilation were confidently better in MG₁. In CG indicators of instant volume quickness at level of FVCL 50% was higher by 0.47 l/sec (p<0.05) comparing with MG₂.

The prospects of further researches imply determination of purposefulness of early personality-oriented physical rehabilitation programs directed on improvement of cardio-vascular system of women with post mastectomies syndrome.

Conflict of interests

The authors declare that there is no conflict of interests.

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Information about the authors:

Briskin Y.A.; <http://orcid.org/0000-0001-6375-9872>;
y.briskin@ukr.net; Lvov State University of Physical Culture;
Kostyushko str. 11, Lvov, 79007, Ukraine.

Odinets T.Y.; <http://orcid.org/0000-0001-8613-8470>;
puch1ik@mail.ru; Zaporozhia National University;
Zhukovskogo str. 66, Zaporozhia, 69000, Ukraine.

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