

EFFECTS OF THE REHABILITATION PROCESS WITH STRENGTH AND HIGH-INTENSITY WORKOUTS ON THE BODY COMPOSITION OF WOMEN WITH ALIMENTARY OBESITY

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The work was aimed to assess the effectiveness of the impact of the rehabilitation complex including high-intensity physical exertion on women with alimentary obesity. Obesity is a common disease among women. The anthropometric indices and component composition of the body in 50 women with obesity were investigated, including 1 group of women of reproductive age, 2 group of women in the postpartum period, and 3 group of women of the per climatic period. , reduction in waist coverage, adipose tissue mass and an increasing in the proportion of musculoskeletal tissue, as well as normalization of blood pressure, blood sugar, cholesterol and LDL. More pronounced positive dynamics were observed in the group of women of reproductive age. In women of the per climatic period the effect was less pronounced but reliable for a number of indicators.

Keywords: adipose tissue, strength training, anthropometry, body composition

Relevance of this research. The problem of obesity in the modern world does not lose its relevance. Moreover, every year it becomes more relevant. According to statistics, more than 1 billion people in the world are overweight, and of these, 300 million are obese. It means that every seventh inhabitant of the planet has overweight. For example, 50% of overweight people have high blood pressure and 65% of obese people are suffering from atherosclerosis. Moreover, 50% of these patients have serious health problems and have heart pains. Isolation of the metabolic syndrome in a separate nosological form shows its pathological basis [2]. In case of obesity, not only lipid metabolism suffers, however suffering the overall reactivity of lipid metabolism, immunity, resistance to stress and phycolgy [1].

Regular exercises can be determined as a salvation from obesity and the path to health. Obesity is a condition of the body in which fat deposits and accumulates in excess amount. For all times women seek to have perfect forms, but not all of them have achieved the expected results. How to choose the best type of training for effective fat burning and the formation of a beautiful relief body? If the word "obesity" is disassembled, then its essence lies in the particle "fat", but histologically the adipose tissue consisting of adipocytes, which are divided into white, brown and intermediate beige [1-3]. They can affect human body in completely different ways. White adipose tissue is not only a passive tissue for storing additional energy in the form of fat but also a tissue that performs extensive endocrine functions [4-6]. It contains a nucleus shifted to the periphery of one large lipid drop and affects the increase in blood

pressure, development of diabetes and other pathologies [7-9].

In turn, the brown adipocytes contain centrally located nuclei and several lipid droplets. They are especially rich by peculiar mitochondria and abundantly supplied with the ends of the sympathetic nerves and blood vessels [10], which is the key to weight loss.

If earlier it was believed that a person has brown VT almost completely disappears with time, now it has become clear that it is also present in adults and is located in the same place as in newborns, but in smaller quantities [5].

Regular physical activity contributes to the secretion of the hormone irisin, which turns white adipose tissue into brown, which due to its high energy activity, prevents obesity [11, 12].

Materials and methods of research

For the study were selected 50 women from Osh region with alimentary obesity. They had completed a four-week rehabilitation course in a health center in the summer and autumn in 2017. The first main group consisted of 20 women of reproductive age (on average 34.2 ± 1.5 years), the second main group – 20 women who applied to a health center in the period 0.5-1.5 years during post-partum period, the third main group – 10 women of the periclioma period (on average 48.4 ± 1.2 years).

Inclusion criteria:

- Informed consent of women to conduct research and the implementation of the proposed program
- Relative health, lack of current infectious and somatic diseases
- Overweight, exceeding the age norm of more than 10%, body mass index (BMI) is

more than 25 kg / m², thickness of the skin fold on the abdomen is more than 3 cm.

The control group was consisted of 20 healthy residents of Osh region with reproductive age of (average 34.8 ± 1.6 years), with a normal body weight who underwent a similar health course. All surveyed patients had a similar lifestyle and they were representatives of mental labor professions.

In this study group sessions were conducted, including the combination of strength and high-intensity cardio trainings lasting 3 times per week for 1 hour.

Classes were included: warm-up, strength training was conducted according to the scheme: Monday – hands, Wednesday – legs and Friday – the whole body; high intensity cardio trainings according to the Tabata protocol with 3 sets for 12 minutes and stretching. Tabata training is a high-intensity interval training, the goal of which is to perform the maximum number of movements in minimum amount of time. High-intensity Tabata workouts significantly speed up the metabolism and cause the body to be active.

In addition to strength and high-intensity cardiovascular training the rehabilitation complex included lymphatic drainage massage, diet therapy with a calorie deficit and Maxim national healing drink, containing mostly fiber, was used for snacking. The complex developed by the rehabilitation is filed for patenting as a way to correct body weight and shape.

The following methods have been used in this study:

1. Standard clinical and laboratory examination (complete blood count, determination of sugar, cholesterol, and blood pressure monitoring).

2. Somatometric measurements (measurements of height, weight, calculation of body mass index, waist circumference, thighs, buttocks, and shoulder).

3. Determining the thickness of the skin folds on the abdomen, chest, back, hip and shoulder an electronic digital cetac-100 calipers were used with 1 mm of error bar.

4. Determination of body composition using the ABDS-01 “Medass” bio impedance analyzer with the following parameters: basal metabolic rate, body mass index, fat mass, lean mass, active cell mass, musculoskeletal mass, specific (normalized to the surface area of the body) basal metabolism, total body water, extracellular fluid volume, as well as body fat percentage.

The study was performed twice: before the start of the rehabilitation course and upon its completion in a month. The results were processed using Excel and SPSS variation statistics computer programs for parametric and non-parametric indicators using Student’s t-test for parallel distribution. Differences between the compared values were considered statistically significant at a significance level of $p < 0.05$.

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Results of research and their discussion

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Table 1 is showed the changes after the course of power and high-intensity loads among healthy women of reproductive age.

Table 1

Dynamics of changes after the course of power and high-intensity loads among healthy women of reproductive age (control group)

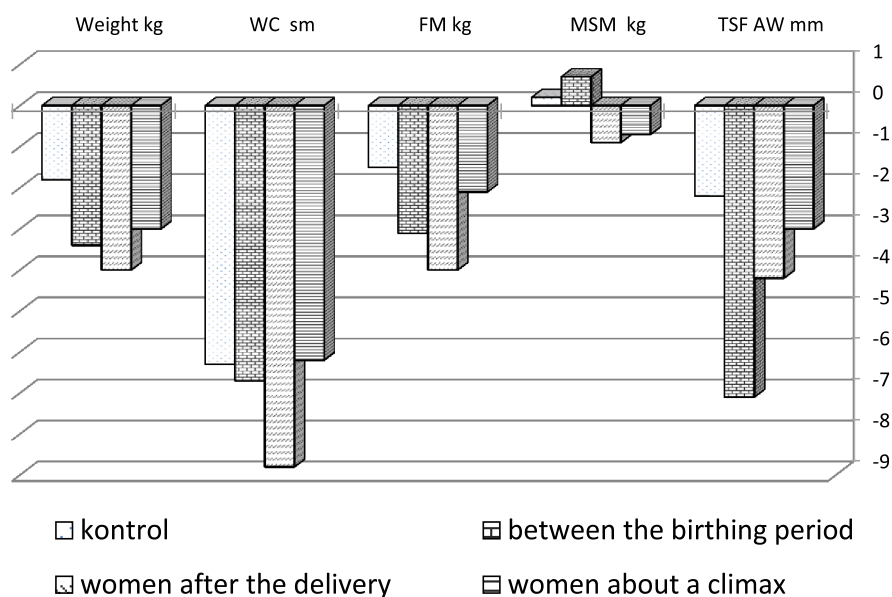
Research points	Weight kg	BMI	WC sm	BC sm	FM kg	MSM%	TSF AW mm	TSF T mm	TSF B mm	SME kcal/sq.m/ days
Initial	57,1	21,95	76,8	93,6	26,4	48,2	19	8,1	13,5	840
aftertrainings	55,3	21,03	70,5	91,8	24,9	48,4	16,8	6,5	11,1	844
Difference Δ	1,8 * ±0,5	0,92 ±0,4	6,3 * ±1,1	1,8 ±1,1	1,5 * ±0,6	+0,2 ±0,2	2,2 * ±0,6	1,6 ±0,5	2,4 ±0,5	+4 ±1,6

Note: BMI – body mass index, WC – waist circumference, BW – buttock circumference, FM – fat mass, MSM% – musculoskeletal mass relative, TSF AW – the thickness of the skin fold on the anterior abdominal wall, TSF T – the thickness of skin folds on the thigh, TSF B – the thickness of the skin fold on the back, SME – the specific main exchange. Asterisk * – difference with baseline level reliably, $p < 0.05$

Table 2

Dynamics of changes in the studied parameters after the health course among women with alimentary obesity in the off-period (group 1), post-partum period (group 2), in climacteric period. (group 3)

group		Weight kg	BMI	WC sm	BC sm	FM kg	MSM%	TSF AW mm	TSF T mm	TSF B mm	SME kcal/sq.m/days
1	before	75,5	29,66	91,3	103,9	29,3	45,2	34,5	17,1	25,5	823,6
	after	72,0	28,1	84,6	102,1	26,2	45,9	27,4	11,3	20,6	835,8
	Δ	-3,45* ±0,5	-1,56 ±0,4	-6,7 ±1,1	-1,8 ±1,1	-3,1 ±0,6	+0,7 ±0,3	-7,1 ±0,6	-5,8 ±0,5	-4,9 ±0,5	+12,2 ±2,8
2	before	67,8	27,7	87,2	98,8	25,0	45,1	30,6	13,6	22,0	838
	after	63,6	26,0	78,4	97,8	21,0	46,0	26,4	8,6	18,2	859
	Δ	-4,2* ±0,5	-1,7* ±0,4	-8,8* ±1,0	-1,0 ±1,1	-4,0* ±0,7	-0,9 ±0,4	-4,2* ±0,6	-5,0* ±0,5	-3,8* ±0,5	+21* ±2,9
3	before	79,2	30,6	97,0	107,2	31,4	43,7	36,2	18,2	28,8	846
	after	76,2	29,4	90,8	104,6	28,7	44,4	33,2	13,4	26,4	826
	Δ	-3,0* ±0,5	-1,2 ±0,5	-6,2 ±1,2	-2,6 ±1,1	-2,7 ±0,7	-0,7 ±0,4	-3,0 ±0,6	-4,8 ±0,6	-2,4 ±0,5	-20 ±2,8



Summary weight changes after a course of power and high-intensity loads among the 4 study groups

According to the Table 2, the best dynamics (-3.45 ± 0.4 kg) was observed in women at post-partum period. The dropped weight by women of per climatic age was also significant, but somewhat less pronounced (-3.0 ± 0.4 kg). In a healthy women dropped weight as a result of the health program also was turned out to be reliable (-1.91 ± 0.4 kg), although initially they had a small mass. Weight loss occurred due to fat mass, which in 1 and 2 main groups

decreased by -3.2 ± 0.5 kg and -2.62,±0,5 kg, respectively (p < 0,05).

Chart shows that effective weight correction is possible with the use of strength and high-intensity training at any age.

Clinical and laboratory studies have shown that in all women with alimentary obesity who had abnormal blood pressure, blood sugar, cholesterol and LDL, after the rehabilitation course, the indicators returned to normal.

Conclusions

The use of the described comprehensive rehabilitation program with strength and high-intensity workouts provides evidence-based instrumental on its effectiveness, which allow us to recommend this program for helping to obese patients and healthy people wishing to lose their weight and maintain longevity of their life.

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