

## MEASURING THE EFFECTS OF EXERCISES WITH EXTENSIONS ON THE FEMALE BODY, TAKING THE EXAMPLE OF KETTLEBELL SPORT (GIREVOY)

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**Abstract.** Objectives. Currently, there is a significant increase in the popularity of women's athletic activity with heavy weights. Many of the provisions on the effect of strength exercises on the female body are contradictory; in particular, there are many disputes regarding the dangers of striking a barbell or kettlebells against the female chest. This article describes the results of the research on the impact of kettlebell sport, particularly, the impact of the long cycle discipline on the female body at different ages.

**Method.** There was used the survey method in the form of a questionnaire and the method of ultrasound diagnostics with pedagogical observation.

**Design.** A survey was conducted in the form of a questionnaire, on the eve of the kettlebell World Club Championship in February 2017 in California (USA). The questionnaire contained questions for the self-assessment of the health of the musculoskeletal, nervous and cardiovascular systems and the status of reproductive function. In the next stage of ultrasound research the athletes carried out a monthly training plan throughout the experiment. Information was collected on the physical and psychological status of female athletes, assessing the influence of exercises and load parameters of competitive kettlebell sport disciplines on the bodies of the participants

**Results.** According to the results of the survey, it was found that the main impact of kettlebell training is on the musculoskeletal system. A comparative analysis of the results of the ultrasound diagnostics of the mammary glands and pelvic organs showed a lack of pathological changes.

**Conclusion.** The results of scientific research showed that regular kettlebell lifting exercises, particularly in the long cycle discipline, do not negatively affect the female body.

**Keywords:** female sport, kettlebell sport, power exercises

### PRACTICAL IMPLICATION

The practical implication of the research is:

- The self-assessment of physical and psychological status of female athletes showed absence of negative effects the nervous and cardiovascular systems and the status of reproductive function. This conclusion lays the ground for further popularization of long cycle discipline.
- Correct technique of kettlebell exercises excludes sub-maximal loads on the female body which confirmed by assessing the influence of exercises and load parameters of competitive kettlebell sport disciplines on the bodies of the participants. This conclusion lays the ground for further education professional kettlebell coaches of long cycle discipline.
- The regular kettlebell lifting exercises do not negatively impact the female chest and the status of reproductive function. This conclusion supports the popularization of the kettlebell sport for women.

### INTRODUCTION

Many of the provisional findings on the effect of the kettlebell long cycle discipline on the female body are contradictory, especially concerning the shock loads in such elements of the technique as striking the kettlebells against the female chest. In this context, it is of undoubted interest to research the health status of female kettlebell athletes<sup>1</sup>.

A review of the scientific literature has shown there is a lack of modern scientific research on the

peculiarities of the impact of kettlebell training on women's health<sup>2</sup>. For the first time, we have researched the effects of the competitive disciplines of kettlebell sport on the health status of female athletes in the competitive period.

The objectives of the research:

1. To study the impact of kettlebell exercises on the female body at different ages
2. To identify the impact of kettlebell sport disciplines on physical status of female athletes
3. To determine the positive and negative factors kettlebell sport, particularly, the impact of the long cycle discipline on the female body.

### METHODS

At the first stage of the research, a survey was conducted in the form of a questionnaire, on the eve of the kettlebell World Club Championship in February 2017 in California (USA).

The objectives of this stage of the research were:

- I. Theoretically substantiate the components of the activity of internal body systems for the assessment of the health status of female's athlete.
- II. To reveal the presence of pain among the female participants of the kettlebell World Club Championship.

At the second stage of the research in the period from 2017 to 2018, using the method of ultrasound diagnostics of the pelvic organs and mammary glands, an experiment was conducted at the «Female

Consultation №8» at the State Healthcare Institution of the Krasnogvardeisky area of Saint Petersburg. Ultrasound diagnostics was carried out on an ALOKA SSD-4000 universal stationary ultrasound scanner with built-in IDMS and a frequency of working sensors of 7.5-10 MHz. The total number of participants in the experiment was 10 women. The composition of both experimental groups was not statistically different (with a confidence level  $p > 0.5$ ).

The purpose of the research in the form of a questionnaire on the eve of the kettlebell World Club Championship in February 2017 in California (USA) was to identify the self-assessed state of health of the female participants.

The questionnaire contained questions for the self-assessment of the health of the musculoskeletal, nervous and cardiovascular systems and the status of reproductive function<sup>3</sup>.

A prerequisite for the experiment at the second stage of the research was a comparison of the initial ultrasound indicators of the control and experimental groups in September 2017 and the end indicators in September 2018, as well as a comparison of these characteristics with the standard indicators for women of childbearing age.

In the second year of ultrasound research the athletes carried out a monthly training plan throughout the experiment. Information was collected on the physical and psychological status of female athletes, assessing the influence of exercises and load parameters of competitive kettlebell sport disciplines on the bodies of the participants<sup>4</sup>. Each stage of the annual macrocycle training affects the endurance of female athletes in different ways and causes significant

functional changes in the body, ultimately affecting the overall physiological state<sup>5</sup>.

The main idea of the ultrasound research was to emit an ultrasound scanner with a high frequency wave of oscillation, which passes through biological tissues, where some of them are absorbed, scattered or reflected back, and after which the same device receives the returned waves and transforms them into an image on a monitor. Images of the studied organs can be seen on the screen as a result of using an ultrasound scanner.

Mammary gland scans were performed on the right and left breast, during which the following were evaluated:

- Adipose tissue size
- Ferrous compounds and their parameters
- Lactiferous ducts and their condition
- Density of tissues and walls
- During the pelvic ultrasounds, the following were evaluated:

- Uterus, cervix and endometrial thickness
- The size of the echo structure (M-ECHO)
- The size of the ovaries
- Any structural changes in the fallopian tubes

## RESULTS

A mathematical analysis (by percentage) was carried out on the survey results, which included data from 16 athletes from 6 countries (Figure 1). Female kettlebell athletes competed in the snatch, jerk and long cycle disciplines with kettlebells weighing 16 and 24 kg each; 16 athletes from 7 countries took part in the survey. The average age of female athletes was 30-40 years. The average length of kettlebell sport experience was 3-5 years (Table 1).

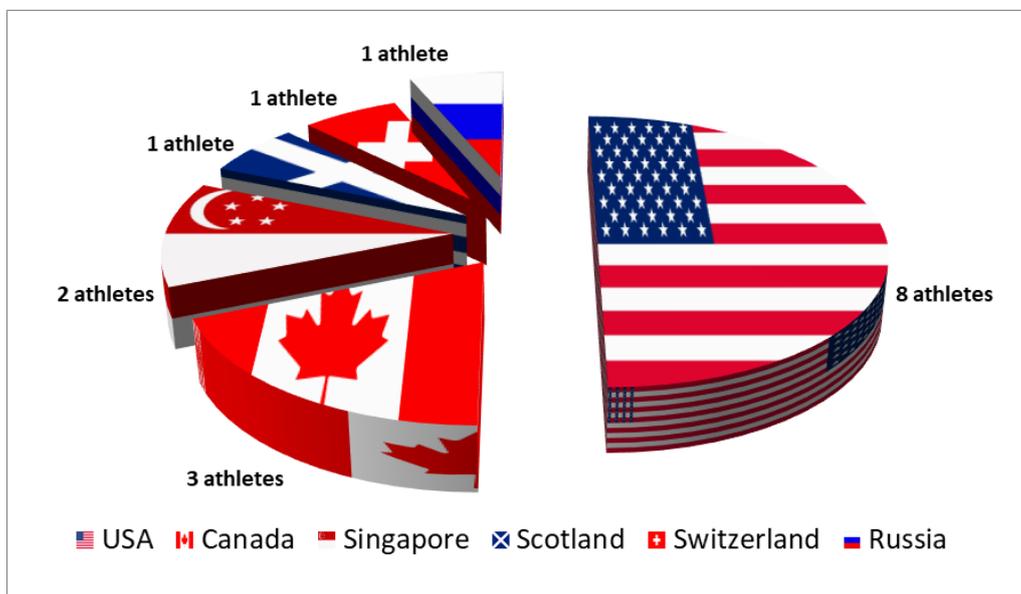


Figure 1 - The quantitative composition of the survey participants

Table 1

**GENERAL CHARACTERISTICS OF PARTICIPANTS IN THE CHAMPIONSHIP (N = 16)**

Characteristics of respondents (n = 16)		
Parameters	Categories	Number of respondents
Age (years)	20-30	3
	31-40	9
	41-60	4
Training experience (years)	3	4
	3-5	9
	5-10	3
Discipline	Long cycle	13
	Jerk	8
	Snatch	8
Kettlebell weight (kg)	12	2
	16	9
	24	5

According to the results of the survey, it was found that the main impact of kettlebell training is on the musculoskeletal system. The overall pain indicator was at 21.3 percentage (Table 2).

Table 2

**SELF-ASSESSMENT OF ACTIVITY DIFFERENT BODY SYSTEMS OF ATHLETES, N = 16 (WITH THE NUMBER OF RESPONSES GIVEN BY PERCENTAGE)**

Self-assessment	Pain	Absence of pain
Musculoskeletal system (5 indicators)	21.3	78.7
Nervous system (4 indicators)	17.2	82.8
Cardiovascular system (4 indicators)	4.7	95.3
Reproductive function (4 indicators)	1.6	98.4
TOTAL: 17 indicators	11.8	88.2

Kettlebell training has the greatest impact on the lumbar spine; it is the most vulnerable part of the female body (the ratio of respondents' answers: pain at 43.8%, absence of pain at 56.2%).

Self-assessment of the state of the nervous system showed complaints of feeling tired and weak in the morning at 43.8% of respondents. It is necessary to consider that, in part, this is due to acclimatization after a long flight to the USA from Europe or Asia.

The lowest rates of pain were reported in the indicators of the cardiovascular system (at 4.7 % of respondents) and the reproductive system; only one of the 16 interviewed complained of pain in the lower abdomen after exercise.

A comparative analysis of the results of the ultrasound diagnostics of the mammary glands in 2017 and 2018 showed that the thickness of the mammary glands was in the normal range of 14-20 mm for both groups of participants. Lactiferous ducts were easily distinguishable and did not have local extensions; deformations were absent. Deviation indicators from the standard of the nodal abnormalities in the mammary gland were recorded only for one of the participants in the control group, competing in the kettlebell snatch discipline. A nodular lesion was found in the left mammary gland at 0,38 cm. It was established that this change was a consequence of neuro-psychological fatigue and was not associated with kettlebell lifting because kettlebell snatch involves no impact on the chest area.

Analysis of the results of the ultrasound diagnostics of the pelvic organs showed that in both groups of participants the fallopian tubes had not expanded, the size of the uterus was within the normal range of 35–40 mm; the echo structure was within the normal range of 3,5–15,0 mm. The measurements of the ovaries corresponded to those of a healthy woman. The size of the ovaries was in the range from 2 to 8 cm<sup>3</sup>, the length not more than 30 mm, the width not more than 25 mm and the thickness not more than 15 mm.

**DISCUSSION**

Currently, there is a significant increase in the popularity of women's athletic activity which has different orientations:

- Sports. Women participate in different types of competitions such as weightlifting (as an Olympic sport); in world and continental championships in powerlifting; in kettlebell sport; in bodybuilding and fitness,

- Recreational,
- Wellness,
- Adaptive.

That is why an annual medical examination of the female health of the musculoskeletal, nervous and cardiovascular systems and the status of reproductive function should take place in all stages of sports training.

In order to increase the scientific and evidence base, it is considered expedient to further conduct medical and biological researches on female body,

using more detailed examination techniques such as breast mammography and densitometry of the lumbar spine.

Not only do coaches need to control the body's reaction from strength exercises during the training but also, they need to monitor psychological state of female athletes.

#### **CONCLUSION**

The results of scientific research showed that regular kettlebell lifting exercises, particularly in the long cycle discipline, do not negatively affect the female body. This conclusion supports the popularization of the long cycle discipline for women.

In January 2018 the long cycle discipline had been acknowledged as an official competitive discipline by the Ministry of Sports of the Russian Federation and a ranking table and protocols had been set for each weight class. This innovation lays the ground for further research on the effects of this discipline on the female body.

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