

# Influence of bodybuilding activities on physical qualities of skilled female athletes in different phases of peculiar biological cycle

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**Purpose:** to conduct research on the impact of training female athletes engaged in bodybuilding and fitness bikini on the manifestation of physical qualities in different phases of the ovarian-menstrual cycle.

**Material & Methods:** researches were conducted in sports fitness-clubs of Kharkov "Feromon", "Gorod", "King" with the skilled female athletes who are engaged in bodybuilding and fitness-bikini within 3 months of the preparatory period in number of 14 people. We used as methods of the research: the analysis of references and testing of level of motive qualities in separate phases of OMC.

**Results:** the theoretical analysis of features of the accounting of phases of OMC at female athlete is submitted and the testing of the level of development of physical qualities in different phases of the specific biological cycle at the qualified sports-women, who are going in for bodybuilding, is held.

**Conclusions:** the received results demonstrate that physical efficiency of the the skilled female athletes, who are engaged in bodybuilding, is not identical in phases of the ovarian-menstrual cycle. It is revealed that the best conditions for performance of considerable exercise stresses in post-ovulatory and post-menstrual phases of OMC, therefore it is expedient to plan them in the preparatory periods of the qualified sportswomen, who are going in for bodybuilding.

**Keywords:** testing, phases of OMC, physical qualities, bodybuilding, female athlete.

## Introduction

One of the most significant differences of the female body from the male is the structure and functioning of the reproductive system and its hormonal regulation [6; 16]. Therefore, any recommendations of health systems should be based on the particular features of their impact on women in the different phases of the ovarian-menstrual cycle. First of all, it should be noted that these changes during the cycle taking place not only in the genital system of women, and subject to a number of other organs and systems (nervous, cardiovascular, endocrine, respiratory, immune, and others) [18; 19; 20; 21].

There are two main points of view on the relationship between the ovulatory-menstrual cycle and performance. Some experts deny the dependence of the performance of its phases in female athletes [2]. Other researchers [1; 4; 17] believe that the different concentrations of sex hormones in the body during the ovulatory-menstrual cycle, changes the functional status of the vital systems of the body, can not affect on the level of performance of female athletes. Meanwhile, it is proved that not in all phases of the biological cycle of the female athlete is able to perform training and competition loads.

For example, Ukrainian investigators [5; 12; 14; 16; 17] dealing with the problem of women's sports for many years, we came to the conclusion that all women have different levels of manifestation of motor abilities during the ovulatory-menstrual cycle is not constant and varies in accordance with the cycle phases.

At the same time, the researchers did not deny the influence of menstrual function in the operation, pay attention to the personality of its dynamics in the individual phases in the different female athletes [11; 15].

Researchers who have studied the muscular activity of women, found that, depending on the character of the ovarian-menstrual cycle and the dynamics of the health of all female athletes can be divided into categories. Thus secrete such group of women at which stability of working capacity during an ovarian-menstrual cycle is observed, and group of sports-women in whom there is a sharp decrease in working capacity in a menstrual phase. Other groups, dedicated scientists, different: it is the female athletes, reach the menstrual phase of maximum performance, and female athletes show the maximum level of performance during ovulation [17].

It should be noted that the L. G. Shahlin classifies women as a result of subjective self-assessment of state of health in the menstrual phase [17]:

1 group – female athletes with good health and good condition of the objective. Sports results do not depend on the phase of ovarian-menstrual cycle.

2 group – female athletes who complain of drowsiness, weakness, reluctance to exercise; typically it has reduced blood pressure.

3 group – female athletes who have headaches such as mi-

graines, pain in the lower abdomen and lower back, irritability blood pressure have often increased and the pulse quickens.

4 group – female athletes are poisoning symptoms: loss of appetite, nausea, joint pain, aching, restless sleep, sometimes increased heart rate, respiration, blood pressure, temperature rise.

The study G. Erdeby shown that in those sports where female athletes get great exercise (cross-country skiing, different types of rowing), they are deep menstrual dysfunction (amenorrhea, hypomenorrhea, dysmenorrhea, etc.). Moreover, the author notes that during the period of reduction of both physical and mental stress in their normalization observed occurrence of ovarian-menstrual cycle [18]. The negative effect of intense exercise on the course of the cycle in female athletes is reported in a number of scientific papers [3; 7–10; 13].

Studying the question changes in other systems female athletes body in connection with a comparison of the various phases of the menstrual cycle, the inventors have determined, firstly, their presence, and secondly, the dependence of the depth of functional metabolic changes in organs and tissues of ovarian-phase of the menstrual cycle.

There are studies in which the authors are confident that female athletes can continue to practice and perform at competitions throughout the ovarian-menstrual cycle [9]. The authors who hold this view say that, with the participation of female athletes in competitions in the premenstrual and menstrual phases of ovarian-menstrual cycle and achieve results significantly deteriorated.

The analysis of literature data to announce that most of the authors involved in this issue, expressed the unanimous opinion of the high level of expression of the essential physical qualities (except flexibility) in the postmenstrual and postovulatory phases, and a decrease in performance during menstruation, ovulation and menstrual period. However, the question of the existence of a specific minimum level of quality motor for ovarian-menstrual cycle remains open. The study also conducted in various sports are not fully reflect the specificity of sports activities power character, to which the body-building, which requires research.

### Communication of the research with scientific programs, plans, subjects

Scientific research performed on the topic Consolidated Plan

**Table 1**  
Indicators of physical fitness in different phases of the ovarian-menstrual cycle qualified female athletes engaged in bodybuilding (n=14)

| Indicators  | Phases OMC |            |            |            |            |
|---|------------|------------|------------|------------|------------|
|   | I          | II         | III        | IV         | V          |
| Running on 30 m, s  | 5,4±0,09   | 5,1±0,08   | 5,2±0,08   | 5,0±0,09   | 5,3±0,08   |
| Shuttle run 3x10 m, s                                     | 10,1±0,1   | 9,8±0,09   | 10,0±0,09  | 9,7±0,08   | 10,0±0,09  |
| Raising the body of the supine position, count times      | 39,8±2,45  | 47,9±2,26  | 41,7±2,31  | 48,7±2,37  | 40,9±2,33  |
| Jump up from the place, cm                                | 29,8±0,75  | 33,7±0,81  | 30,1±0,77  | 34,2±0,80  | 30,2±0,76  |
| Long jump from the place, cm                              | 168,2±3,18 | 179,7±3,26 | 170,6±3,21 | 180,6±3,27 | 169,9±3,20 |
| Flexion and extension arms in emphasis lying, count times | 32,7±1,76  | 41,6±1,83  | 34,8±1,79  | 42,4±1,84  | 32,1±1,80  |
| Tilt forward from a seated position, cm                   | 11,2±1,03  | 13,7±1,05  | 11,5±0,98  | 13,8±1,04  | 11,9±0,99  |

**Note.** Phase OMC: I – menstrual; II – postmenstrual; III – ovulatory; IV – postovulatory V – before menstrual.

**Table 2**  
Matrix reliability of difference in terms of running 30 meters and 3x10 m shuttle run in different phases of the OMC skilled female athletes involved in bodybuilding (n=14)

| Phases OMC | II                             | III                            | IV                             | V                              |
|------------|--------------------------------|--------------------------------|--------------------------------|--------------------------------|
| I          | t=2,50; <0,05<br>t=2,24; <0,05 | t=1,67; >0,05<br>t=0,75; >0,05 | t=3,15; <0,01<br>t=3,13; <0,01 | t=0,83; >0,05<br>t=0,75; >0,05 |
| II         |                                | t=0,91; >0,05<br>t=1,58; >0,05 | t=0,83; >0,05<br>t=0,83; >0,05 | t=2,50; <0,05<br>t=1,58; >0,05 |
| III        |                                |                                | t=1,67; >0,05<br>t=2,50; <0,05 | t=0,91; >0,05<br>0             |
| IV         |                                |                                |                                | t=2,50; <0,05<br>t=2,50; <0,05 |
| V          |                                |                                |                                |                                |

**Note.** In the numerator – Running on 30 m; in the denominator – shuttle run 3x10 m.

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## The purpose of the research

To conduct research on the impact of training female athletes engaged in bodybuilding and fitness bikini on the manifestation of physical qualities in different phases of the ovarian-menstrual cycle.

## Material and Methods of the research

Research conducted in the sports fitness clubs Kharkiv City “pheromone”, “City”, “King” of skilled female athletes involved in bodybuilding and fitness bikini for 3 months during the preparatory period amount of 14 people. As research methods were used: analysis of literature and testing of motor skills in certain phases of the OMC.

## Results of the research and their discussion

When planning the training process of female athletes en-

gaged in bodybuilding, it is important to distribute physical loads taking into account the performance in different phases of the OMC. Therefore, we conducted studies during 3 meso-cycles of the preparatory period with the determination of the influence of individual phases of OMC on the manifestation of physical qualities, the results of which are presented in the table 1.

The results of the exercises with the use of the run, the best performance obtained in postmenstrual and postovulatory phases (table 2).

In run 30 meters mean group indicator female athletes study group was as follows: in phase II – 5,1 s, in IV – 5,0, which is significantly better than in the I and V phases of OMC ( $p < 0,05$ ). Results shuttle run 3x10 also higher in phases II and IV, compared with phase I ( $p < 0,05$ ) and IV with respect to the V phase ( $p < 0,05$ ).

Implementation of jumping exercises also higher in phases II and IV OMC (tab. 3): jump up from their seats in the second phase of 3.9 cm, III – 4.4 cm towards the best results of phase I ( $t = 3,55, 4,00; p < 0,01$ ). In phase III results was significantly lower in relation to Phase IV ( $t = 3,73; p < 0,01$ ), and the V phase

**Table 3**

**Matrix reliability of difference in the parameters of the jump up and in length jump from the place in different phases of the OMC in skilled female athletes engaged in bodybuilding (n=14)**

| Phases OMC | II                                       | III                                      | IV                                       | V  |
|------------|--|--|--|--|
| I          | $t = 3,55; < 0,01$<br>$t = 2,53; < 0,05$ | $t = 0,28; > 0,05$<br>$t = 0,53; > 0,05$ | $t = 4,00; < 0,01$<br>$t = 2,72; < 0,05$ | $t = 0,38; > 0,05$<br>$t = 0,38; > 0,05$ |
| II         |  | $t = 3,36; < 0,01$<br>$t = 1,99; > 0,05$ | $t = 0,45; > 0,05$<br>$t = 0,20; > 0,05$ | $t = 3,18; < 0,01$<br>$t = 2,15; < 0,05$ |
| III        |  |  | $t = 3,73; < 0,01$<br>$t = 2,18; < 0,05$ | $t = 0,09; > 0,05$<br>$t = 0,16; > 0,05$ |
| IV         |  |  |  | $t = 3,70; < 0,01$<br>$t = 2,34; < 0,05$ |
| V          |  |  |  |  |

**Note.** In the numerator – jump up from the place; in the denominator – long jump from the place.

**Table 4**

**Matrix reliability of difference in the parameters of the raising the body of the supine position and in flexion and extension arms in emphasis lying in different phases of the OMC in skilled female athletes engaged in bodybuilding (n=14)**

| Phases OMC | II                                       | III                                      | IV                                       | V  |
|------------|--|--|--|--|
| I          | $t = 2,43; < 0,05$<br>$t = 3,52; < 0,01$ | $t = 0,56; > 0,05$<br>$t = 0,84; > 0,01$ | $t = 2,61; < 0,05$<br>$t = 3,83; < 0,01$ | $t = 0,33; > 0,05$<br>$t = 0,24; > 0,05$ |
| II         |  | $t = 1,92; > 0,05$<br>$t = 2,81; < 0,05$ | $t = 0,25; > 0,05$<br>$t = 0,31; > 0,05$ | $t = 2,16; < 0,05$<br>$t = 0,23; > 0,05$ |
| III        |  |  | $t = 2,12; > 0,05$<br>$t = 3,14; < 0,01$ | $t = 0,24; > 0,05$<br>$t = 1,13; > 0,05$ |
| IV         |  |  |  | $t = 2,35; < 0,05$<br>$t = 4,01; < 0,01$ |
| V          |  |  |  |  |

**Note.** In the numerator – raising the body of the supine position in the denominator – flexion and extension arms in emphasis lying.

relative to the phase V ( $t=3,70$ ;  $p<0,01$ ).

A slightly smaller difference between the results of the female athletes of the study group was obtained in a long jump from the place (table 3). The highest rates were obtained in phase IV (180,6 cm) and phase II (179,7 cm), which was significantly better than in phase I ( $t=2,72$ ;  $2,53$ ;  $p<0,05$ , respectively), and also in phase IV relative to III ( $t=2,18$ ;  $p<0,05$ ) and V ( $t=2,15$ ;  $p<0,05$ ) phases.

The results of strength training, which is one of the most important for the preparation of bodybuilding, also tend to decrease in I, III, and V phases (table 4).

Number of raising the body of the supine position in phases II and IV was 47,9 and 48.7 times and was the highest, while in phase I – 39,8 times, III – a 41,7 V – 40,9 times. At the same time, significant differences obtained in phase II against the I ( $t=2,43$ ;  $p<0,05$ ) and V ( $t=2,16$ ;  $p<0,05$ ) and in phase IV phase with respect to the I ( $t=2,61$ ;  $p<0,05$ ) and V ( $t=2,35$ ;  $p<0,05$ ) phases.

Results flexion and extension arms in emphasis lying more significantly differ between phases OMC (tab. 4). The highest

female athletes showed in stage IV (42,4 times), which was significantly better than I ( $t=3,52$ ;  $p<0,01$ ), III ( $t=3,14$ ;  $p<0,01$ ) and V ( $t=4,01$ ;  $p<0,01$ ) phases. In phase II medium group indicator results were 41,6 times, which was significantly higher than I ( $t=3,52$ ;  $p<0,01$ ) and III ( $t=2,81$ ;  $p<0,05$ ) phases.

As for the indicators of flexibility (tilt forward from a seated position), the significant ( $p<0,05$ ) differences between the phases of the OMC is not detected.

## Conclusions

The results indicate that the physical performance of skilled female athletes engaged in in bodybuilding is not the same in the phases of ovarian-menstrual cycle. It was revealed that the best conditions to perform considerable physical activities in postovulatory and postmenstrual phases of the OMC, so it is advisable to plan for them in the skilled female athletes engaged in in bodybuilding.

**Prospects for further research** include determining the effect of bodybuilding activities on functional state and psychophysical performance of female athletes in different phases of the ovarian-menstrual cycle.

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