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Original Article

Improvement of technical preparedness of elite female weightlifters with different types of body build

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Abstract:
Types of body build of elite female weightlifters according to weight categories have been defined. Digital video filming and computer video-analysis using applied "Weightlifting analyzer 3.0" software have been used to define typologically-specified techniques of competition exercises for elite female weightlifter with various build. Data analysis showed true differences of biomechanical structure of technique for competition exercises for elite female weight-lifters with different build and weight category. Biomechanical model indices of technique of competition exercises for female weight-lifters with different types of build and weight categories have been defined. Methods of improving general exercises due to directed influence on optimization of individual elements of motion actions of elite female weight-lifters with different build and weight categories have been developed and proven.
Key words: elite female weight-lifters, weight categories groups, snatch, jerk, technique, types of body build..

Introduction

Female weightlifting is relatively young kind of sports as it was included to the Olympics as late as in 2000. Current training system envisages constant improvement of athletes' technical preparedness that is aimed at realization of efficient technical and tactical actions under conditions of competitive activity. Increased competition in the international tournaments requires coaches and athletes to search new way to improve effectiveness of competition activity. This often makes them, according to tactics, change athlete's weight category or increase the number and intensity of trainings, which can lead to unbalanced development of qualities of basic groups of muscles. All this combined and less stable psychic (due to intense stress) can lead to unstable technique of doing training exercises and, eventually, to failure in achieving full potential in major tournaments.

Weightlifting exercises are rather difficult as lifting boundary weight is related to maximum tension of body and limb muscles, quick change in their muscle work mode, and, the main thing, retention of balance in support phase of female athletes' motion. Constitutional and typological features of athletes' build also influence on the technique. Hence, defining individual features of technical preparedness of female weightlifters with consideration of various types of body build allows to create individual and group models of motion structure as well as improve the process of its refinement at the stage of maximum realization of individual capabilities.

Material & methods

Aim of research– to substantiate and elaborate the methods of improvement of technical preparedness on female weightlifter based on modeling biochemical structure of motion during competition exercises.

To achieve the aim and tackle the research problems, the following methods have been used: scientific and methodological literature and advanced experience data generalization, polling and interviewing, anthropometry methods, optic and electronic methods of motion technique research, biomechanical computer video-analysis, pedagogical experiment, methods of mathematical statistics.

The research was based on surveying competition activity of elite female weightlifters (masters of sports, masters of sports of international grade), participants in final parts of Ukraine, Europe, and World championships 2014-2016. 116 female athletes have been surveyed. These athletes took part in snatch- and jerk lift competitions with weight in intensity zone of 97-100% of maximum result. Competition was videotaped. Anthropometric indices of female athletes, who took part in pedagogical survey, were defined. Typologically-conditioned features of technique of competition exercises have been defined for female weightlifters with different types of build and weight categories.

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With purpose of processing the obtained data, clustering of all female athletes by morphometric features (build, weight) has been done. The research was carried out based on three groups of weight categories: the first one – 48, 53, 58 kg.; the second one – 63, 69 kg; the third one – 75 and over 75 kg.

The research of female athletes showed that different types of female athletes' body build can be seen within each weight categories. It has been found that, by lengthwise size of the body, length of arms and lower limbs, bigger percentage of female athletes (46.4%) have a mesomorphic type of body build, while 23.8% - dolichomorphic, and 29.8% - brachymorphic. Data analysis shows that the bigger weight category is, the bigger the number of female athletes who have brachymorphic type of body build.

Based on the analysis of biomechanical characteristics, typologically-conditioned features of technique of female athletes with different types of build have been defined. It should also be noted that biomechanical structure of the snatch lift and receiving barbell to the chest has the same tendency to show most of technical features. True differences in motion techniques during competition exercises of elite female weightlifters with different build ($p<0,05$) have been found. Among dynamic, 75% have true differences; among space and time characteristics – 33.3%; among characteristics of vertical height of barbell trajectory – 55% out of 100% of the tested.

Results

Female athletes with dolichomorphic build use the lowest potential of force applied to the barbell (130 i 145 %) in the starting phase (F_1) and in the final phase (F_3), compared to female athletes with other types of build (fig. 1), while at the moment of the first maximum knee and joint extension (K) and in the amortization phase (F_2), the index of force is the highest (118 i 113 %), which leads to the development of the highest velocity of barbell motion (fig. 2).

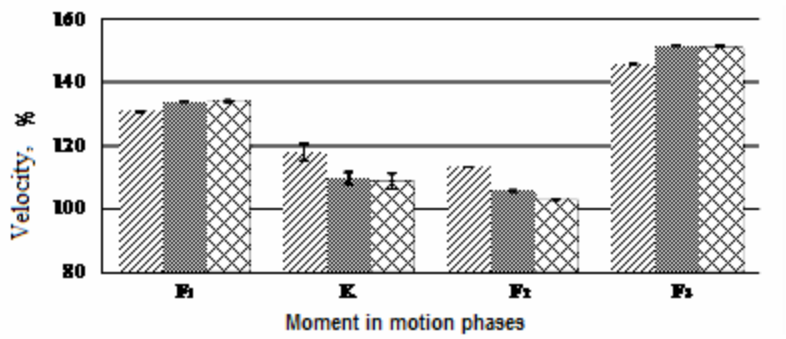

Fig. 1. Force applied to the barbell by female weightlifters with different body build in snatch lift:
– dolichomorphic type; – mesomorphic type; – brachymorphic type;

F_1 – is the moment of the first maximum application of force to the barbell when taking it off the platform in the stage of starting motion; K – is the moment of the first maximum extension of knees and joints (point on the boundary of starting phase and amortization phase); F_2 – is the moment of maximum force application in the amortization phase; F_3 – is the moment of maximum application of force to the barbell in the final phase; * – here and later on the dynamic weight of the barbell (%) + inertial force provided that statistic barbell weight is 100%

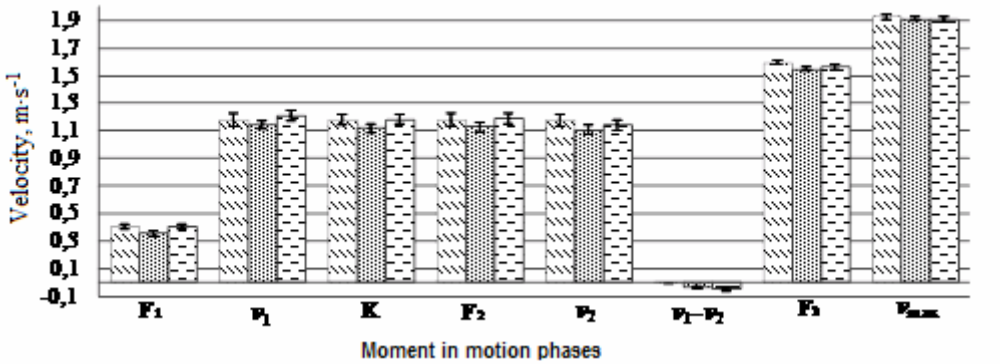

Fig. 2. Vertical velocity of the barbell motion during snatch lift done by female athletes with different build:
– dolichomorphic type; – mesomorphic type; – brachymorphic type;

F_1 – is barbell velocity at the moment of the first maximum of force application to the barbell in the starting phase; v_1 – is maximum barbell velocity in the starting phase; K – is barbell velocity on the boundary of the starting phase and the amortization phase (moment of the first maximum of knees and joints extension); F_2 –

is barbell velocity at the moment maximum application of force in the amortization phase; v_2 – is maximum barbell velocity in the amortization phase; v_1-v_2 – is value of barbell velocity reduction in the amortization phase compared to the starting phase; F_3 – is barbell velocity at the moment of maximum application of force to the barbell in the final phase; v_{max} – is maximum barbell velocity in the final phase.

A characteristic feature of snatch technique of female athletes having dolichomorphic type of build is that the height of their barbell upraise is the lowest, while the distance that the barbell travels from the point of maximum upraise to the point of fixation is the longest – 10.7% of body length (fig. 3).

Compared to female athletes having dolichomorphic and mesomorphic type of build, those having brachymorphic type the highest index of force in the starting and final phase (134 and 151%) (fig 1.), while, at the moment of first maximum of knees and joints extension and in the amortization phase, this force index is the lowest (108 and 103%). Such exercise of force leads to highest motion velocity that lasts up to the moment of application of force in the amortization phase (fig. 2) and its gradual reduction in the final phase up to the lowest value (1,90 m·s^{-1}).

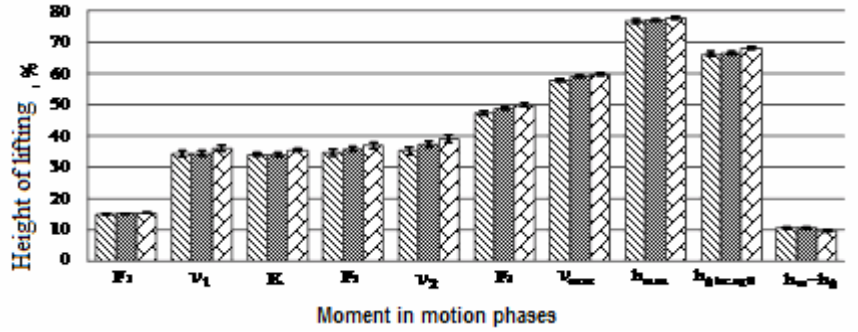

Fig. 3. Height of barbell upraise in snatch lift done by female weightlifter with different build:
– dolichomorphic type; – mesomorphic type; – brachymorphic type;

F_1, v_1, K, F_2, v_2, F_3, v_{max} – is the name of moments of motion, same as in figure 2; h_{max} – is maximum height of barbell upraise; $h_{fixation}$ – is height of barbell fixation in squat phase; h_m–$h_ф$ – is value of lowering the barbell in squat phase.

The height of barbell lifting is the highest throughout the entire motion, while the distance that the barbell travels from the point of maximum upraise to the point of fixation is the shortest – 9.6% of athlete's height (fig. 3).

Female weightlifters having mesomorphic type of build show average dynamic indices compared to female athletes having other types of build (fig. 1), which results in the lowest velocity of barbell upraise throughout the entire motion up to the moment (v_{max}) of maximum velocity in the final phase – 1.91 m·s^{-1} (fig. 2) and average values of barbell upraise height (fig. 3).

When receiving the barbell to the chest, dynamic indices have true differences in 75%, space and time – in 42%, indices of vertical height of barbell movement – in 63%. It has been found, that female weightlifters having dolichomorphic type of build apply the lowest rate of force to the barbell in starting and in final phase – 128 and 136% (fig.4, the definition are the same as in fig. 1), while, at the moment of the first maximum knee and joint extension as well as in the amortization phase, this rate of force if the highest – 109 and 106%, which results in the highest velocity compared to the indices of female weightlifters having other types of build (fig. 5, the definitions are the same as in fig. 2).

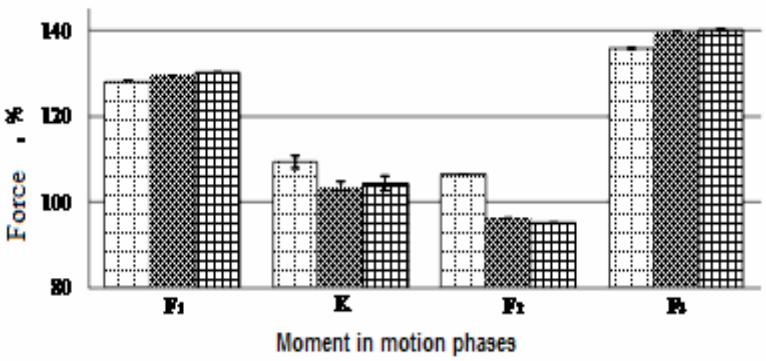

Fig. 4. Force applied to the barbell by female weightlifter with different types of build during receiveing the barbell on the chest:
– dolichomorphic type; – mesomorphic type; – brachymorphic type

The analysis of kinematic characteristics showed that female athletes having dolichomorphic type of build raise the barbell to the lowest height, which is evidenced by indices of its movement along the entire trajectory, while the distance that the barbell travels from the point of maximum upraise to the point of fixation in squat position is the longest – 21.9% of athlete's height (fig. 6, the definitions are the same as in fig. 3).

Compared to female athletes having dolichomorphic type of build, those having brachymorphic type show the highest rates of force in the stating and final phase – 130 and 140% (fig. 4, the definitions are the same as in fig. 1), while, at the moment of the first maximum of knees and joints extension as well as in in the amortization phase, this index of force is significantly lower – 104 and 95%. This force allows female athletes to achieve maximum motion velocity that lasts up to the moment of application of force in the amortization phase (fig. 5, the definitions are the same as in fig. 2)

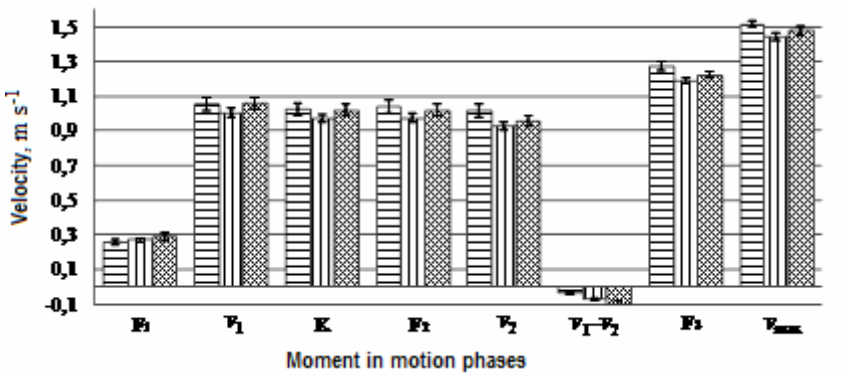

Fig. 5. Vertical velocity of barbell during receiving it to the chest by female weightlifters with different build: ▤ – dolichomorphic type; ▥ – mesomorphic type; ▩ – brachymorphic type

I partially reduces in the final phase – up to 1.48 m s^{-1}. The height of barbell lift by female weightlifters having dolichomorphic and mesomorphic type of build is the highest throughout the entire motion amplitude, while the distance that the barbell travels from the point of maximum upraise to the point of fixation is the shortest – 9.6% of body length (fig. 6, the definitions are the same as in fig. 3).

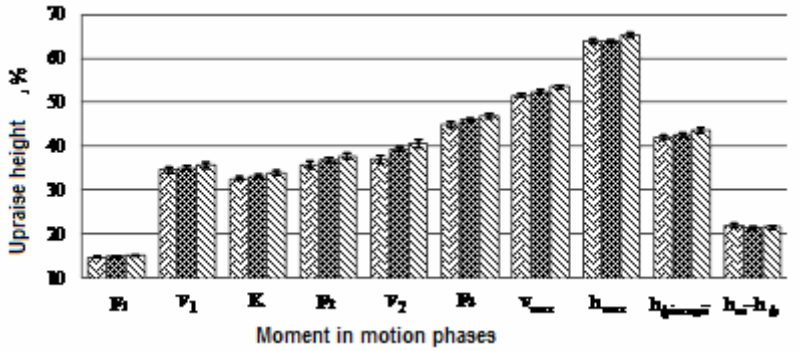

Fig. 6. Height of receiving a barbell to the chest by female weightlifters with different build: ▨ – dolichomorphic type; ▩ – mesomorphic type; ▨ – brachymorphic type

Typologically-conditioned features of technique of receiving a barbell to the chest by female weightlifter having mesomorphic type of build have been defined. Female athletes show average dynamic results compared to the athletes having the two other types of build (fig. 4, the definitions are the same as in fig. 1). This results in the lowest velocity of barbell upraise throughout the entire motion amplitude (fig. 5, the definitions are the same as in fig. 2) and average indices of barbell upraise (fig. 6, the definitions are the same as in fig. 3)

Thus, based on the analysis of biomechanical characteristics of techniques of competition exercises, typologically-conditioned features of motion actions of female weightlifters with different build have been defined. This proves the necessity of individual and group approach to improvement of technical preparedness of female athletes with different build.

True differences of biomechanical indices of motion actions in snatch lift and receiving a barbell to the chest by elite female weightlifters with different types of build and depending on weight categories ($p<0,05$) have been defined.

The analysis shows that with female athletes having *dolichomorphic* type of build between the first and the third weight category groups, force applied to the barbell in receiving it to the chest increases with the increase of weight category by 2.4% and 2.8% in the starting phase and in the amortization phase, while in the final phase, it decreases by 4.3%. Space and time indices (50%) also have true differences with increased weight category groups. In starting phase, female weightlifter start 11% more slowly, while in amortization phase,

barbell motion velocity increases by 15%. At the same time, in final phase, it decreases by 1.5 ($p>0.05$) and 3.8%. The research of barbell upraise height with female athletes having dolichomorphic type of build showed true differences in 70% of indices with the increase of weight category groups. Indices of barbell upraise height in starting phase at the moment of the first maximum of application of force to the barbell decreases in the third group by 7.3%, while in amortization phase it increases by 10.2% average. Female athletes of all three weight category groups have practically the same maximum height of barbell upraise. True differences have been observed in the length of squat, which decreased by 7.2% with female athletes from the third group compared to female athletes from the first weight category group (fig. 7, the definitions are the same as in fig. 3).

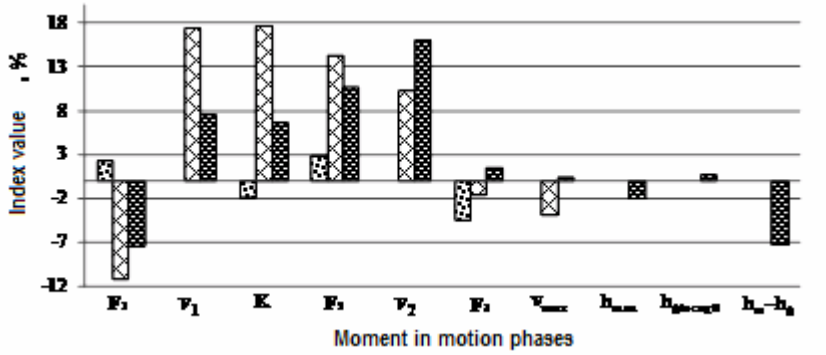

Fig. 7. Change of biomechanical indices of technique of receiving a barbell to the chest by female athletes from different weight category groups:
– force of action; – barbell velocity; – height of upraise

Force of action applied to a barbell by female athletes having *brachymorphic* types of build truly change in 80% of indices of technique that are peculiar to starting and amortization phase.

It has been found that force applied to the barbell by female athletes having *brachymorphic* type of build at the moment of takeoff from the platform increases with the increase of weight category groups and constitutes the difference of 7.9% between the first and the third group. At the moment of the first maximum of knees extension and in amortization phase, there is a tendency to its decrease by 6 and 10% respectively, while in final phase in slightly increases by 1.4% ($p>0.05$). Vertical barbell velocity with female athletes having brachymorphic type of build increases with the increase of weight category groups and constitutes an average difference of 15 and 25% respectively between the first and third group in starting and amortization phase. In final phase, the increase of barbell velocity index is slight.

The analysis of vertical movement of the barbell with female weightlifter having brachymorphic type of build shows true changes in almost 80% of indices of technique depending on weight category groups. Thus, female athletes from the heaviest categories reach the first maximum of effort with lower height of the barbell. (-11%), while, in further phases of movement, this index of barbell movement height significantly increases relative to body length. It has been revealed that maximum height of barbell upraise (h_{max}) almost does not increase, while the height of its fixation increases by 2.7% and stipulates 5% shorter distance of support squat ($p>0.05$).

Force applied to the barbell by female weightlifter having *mesomorphic* type of build during receiving it to the chest shows almost 50% of true differences between ath;etes's weight category groups. In particular, in starting phase, force applied by female athletes to barbell increases in the third group of weight categories by 5.6%, while in amortization phase it is almost unchanged, and significantly decreases in final stage by 8.9%. Thus, female athletes from heavy weight categories apply more force to barbell at the start, which results in significant increase of barbell motion velocity (by 7.7%) and in amortization phase (by 20%), while force reduces during takeoff, which results in decrease of velocity (by -4%).

Space and time indices (62%) also have true differences with the increase of weight category groups. In the starting phase, female weightlifters from the third group of weight category start faster by an average of 13%, while, in amortization phase, barbell motion velocity decreases by 4% compared to female athletes from the first group of weight category.

The analysis of indices of vertical barbell movement with female weightlifters having mesomorphic type of build shows true differences in over 70% of indices. For instance, with the increase of weight category groups, index of upraise height at the moment of the first maximum of application of force to the barbell decreases and constitutes the difference between the first and the third groups – 9.6% with female athletes having mesomorphic type, as well as those having other types of build. At the same time, it grows by an average of 7% at the moment of passing the level of knees and in amortization phase. In final phase, at the moment of maximum velocity, the height of the barbell almost does not change with female athletes of different weight category groups, while maximum height of upraise and distance to the height of barbell fixation decreases by 2.5 and 5.0% respectively in the third group of weight category.

Thus, based on the analysis of biomechanical characteristics of technique of competition exercises, there have been defined individual typologically-conditioned features of snatch lift and receiving a barbell to the chest execution by female athletes from different weight category groups, which proves expediency of using individual and group approach in the elaboration of programs and methods of improvement of elite female weightlifters' technical preparedness.

Based on the results of questioning of specialists in weightlifting, the need of coaches and female athletes in knowledge of new approaches to technical preparedness improvement has been revealed. It has been found that the majority of questioned (98.8%) shows interest to any informational material related to improvement of technical preparedness of female weightlifters. At the same time, in 62.7% of cases, respondents obtain such information from the Internet. Priorities of respondents' interest in aspects of preparedness have been defined. Namely, 45% of female athletes consider technical preparedness to be significant, while physical, psychological, and tactical preparedness are considered equally significant (55%). In addition to this, 85% of respondents acknowledged that they had to copy or repeat the technique of elite female athletes. This proves importance of taking into account peculiarities of female weightlifters' body build in the process of improvement of technique of competition exercises in weightlifting, which was confirmed by 93.4% of respondents who think that snatch technique has individual peculiarities depending on the body build.

Questioning of specialists proved the necessity of improvement of technical preparedness of female athletes having different types of body build based on modeling biomechanical structure of competition exercises motion.

Based on statistic individual and group models of technical preparedness of female athletes, a methodological approach to improvement of technical preparedness of qualified female weightlifters has been substantiated, elaborated, and implemented in the training process. The approach is based on modeling of specific indices of biomechanical structure of female athletes' motions and their quality and quantity characteristics (fig. 8).

The use of our models in training process makes stage or operative control easier and allows differentiated evaluation of technical preparedness of qualified female athletes. 1 – 22 – biomechanical characteristics of technique of competition exercises at the moment of motion that are depicted in fig. 1, 2, 3.

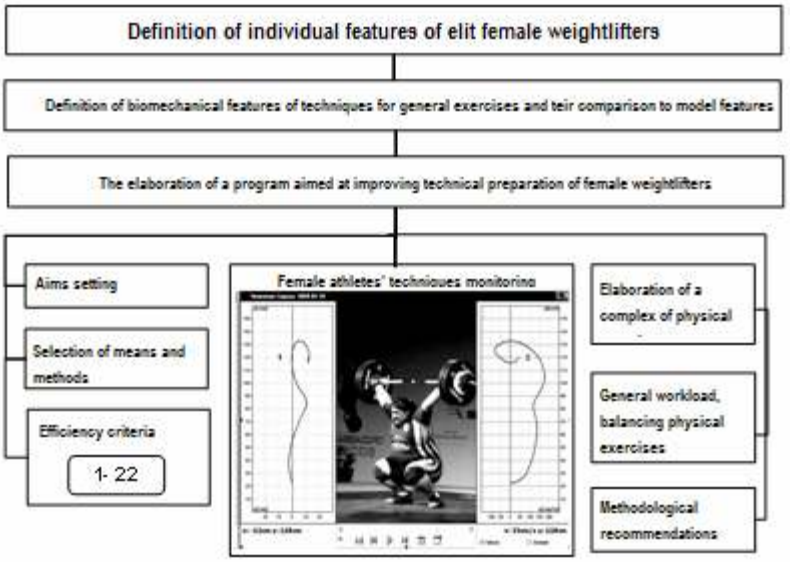

Fig. 8. Flowchart illustrating improvement of technique of motion actions done by elite female weightlifters:

The proposed methods are aimed at improving technique of motion actions done in competition exercises by means of correcting individual elements of biomechanical structure of qualified female weightlifters' motions. The improvement requires tackling the following problems: improvement of efficiency of specific motion actions that constitute the basis for snatch technique and receiving a barbell to the chest; improvement of structure of motion actions with consideration to female athletes' individual features; improvement of reliability and efficiency of technique of competition exercises done by elite female weightlifters.

The methods feature a program that is a supplementary element to the basic program of female athletes training, and programs designed to define the type of body build of female athletes; specific exercises, methodological modes and training devices designed to improve individual elements of technique of motion actions done by female athletes; ongoing and stage monitoring based on our criteria of efficiency of snatch lift

and receiving a barbell to the chest technique; application of the methods (developed by us) in preparatory period of a two-cycle training of female athletes during a year-long macro-cycle.

Efficiency of experimental methods of improving technical preparedness of elite female athletes has been defined in the process of consecutive pedagogical experiment that was done during preparatory period of the first macro-cycle of a year-long training cycle in 2015 and lasted 11 weeks. 18 female weightlifter, elite members of national team Ukraine of the second group of weight category, took part in it. They were divided into 3 groups by the type of body build (6 athletes in each group). The program of improvement is build based on three control tests under condition of competition activity. The tests were done according to schedule and constant technical support of female athletes training during training camp. "Weightlifting analyzer 3.0" video-computer system (Germany) was used as means of technique control. It provided feedback that allows evaluating biomechanical characteristics of barbell motion during competition exercises.

The obtained control indices of technique of motion actions done by female weightlifters were compared to model ones and, based on the obtained differences, a program of correcting technical preparedness of each female athlete was developed by us.

According to the recommendations of educational program for Children's (and Youth) Sports School, and School of the Highest Sports Mastery for weightlifting, two training activities were done during a day. It lasted 6 days of a week. The proposed program contains a complex of exercises and means that were applied three times a week in the basic part of the activity.

In order to check methods of improving technique of female athletes, the first element of jerk, receiving a barbell to the chest, was selected. In order to improve qualified female athletes' specific qualities and individual elements of receiving a barbell to the chest, we used methodological means and the following sport devices in the process of the experiment:

1) A bandage to turn off visual analyzer (mobilizes capabilities of muscle and joint perception);

2) A "stand" – trainer (can be used to improve mechanisms of space and joint perception that are an integral part of the structure of a top pull, and an increase of the height and speed of jumping and squatting).

In order to correct individual elements of kinematic structure of receiving a barbell to the chest along with the development of motion qualities, the following specific and training weightlifting exercises were used: a) lifting a barbell "from the air" – from the level of mid-shin, from the level of knees, from the level of mid-thigh; b) lifting a barbell from semi-squat position; c) lifting a barbell from terminal blocks.

When using different variants of female athletes' motion actions, specific motion tasks were used, which could change: variations of working positions; variations of force accents in motion process; various motion amplitudes; tempo and rhythm structure of motion depending on the type of body build. In order to define true differences between indices obtained prior to the experiment and after it, a nonparametric criteria of Mann-Whitney for independent selections was used (table 1).

Table 1. Comparative Analysis of Biomechanical Characteristics of Receiving a Barbell to the Chest Technique of Female Athletes Having Dolichomorphic Typ of Body Build

Characteristic	Characteristics value											
	prior to the experiment						after the experiment					
	force applied to the barbell, %		barbell velocity, $m \cdot s^{-1}$		barbell upraise height, %		force applied to the barbell, %		barbell velocity, $m \cdot s^{-1}$		barbell upraise height, %	
	$\bar{x}$	m	$\bar{x}$	m	$\bar{x}$	m	$\bar{x}$	m	$\bar{x}$	m	$\bar{x}$	m
F_1	124	0,01	0,26	0,01	15,2	0,1	124	0,01	0,24	0,004	15,3	0,1
V_1	–	–	1,07	0,02	35,3	0,4	–	–	1,04	0,01	35,0	0,2
K	118	2,3	1,08	0,02	34,0	1,0	112**	1,2	1,04	0,02	33,0	0,7
F_2	109	0,02	1,1	0,02	38	0,7	104*	0,01	1,03**	0,01	36,9	0,4
V_2	–	–	1,12	0,03	39,6	0,9	–	–	1,03**	0,01	38,2	0,5
$V_{2\_}$%	–	–	0	0	–	–	-	-	-1	0	–	–
F_3	126	0,01	1,29	0,03	45,2	0,6	136**	0,01	1,25	0,01	44,7	0,2
V_{max}	–	–	1,45	0,02	51,9	0,9	–	–	1,48*	0,01	50,9	0,3
h_{max}	–	–	–	–	62,0	0,6	–	–	–	–	62,9*	0,3
$h_{фіксації}$	–	–	–	–	38,7	0,4	–	–	–	–	40,2**	0,3
$h_m – h_ф$	–	–	–	–	23,3	0,5	–	–	–	–	22,8	0,3

Notes: * − the difference is true at $p<0,05$; ** − the difference is true at $p<0,01$.

In order to estimate the efficiency of technical preparedness prior to start of experiment, competition activity of 2014 was analyzed apart from biomechanical indices, which showed low conversion of competition attempts. After the experiment, female athletes having all three types of body build observed positive changes in biomechanical structure of receiving a barbell to the chest technique, which, at certain point, is a result of educational and training work done during the research.

Application of the proposed methods within the group female athletes having dolichomorphic type of body build promoted true changes of average statistical values in 8 out of 22 control indices, namely: force applied by female athletes to the barbell during the first maximum of knees extension decreased by 6% ($p<0.01$), in amortization phase – by 5% ($p<0.05$), while in final phase it increased by 10% ($P<0.01$). Vertical velocity in amortization phase at the moment of application of force as well as maximum velocity decreased by 0.07 and 0.09 $м \cdot с^{-1}$ ($p<0.01$), while maximum velocity in final phase increased by 0.03 $м \cdot с^{-1}$ ($p<0.05$). Maximum height of barbell upraise and height of its fixation increased by 0.9 and 1.5% ($p<0.01$) relative to body length, which proves the efficiency of the methods proposed by us for female athletes having dolichomorphic type of body build.

Application of our methods in the group of female athletes having brachymorphic and mesomorphic type of body build promoted true changed in average statistic values – 7 out of 22 researched indices (32%) and 6 out of 22 control indices (26%) respectfully.

Dicussion

The research data show that current approaches to improving sports technique are related to the search of the most efficient methods of application of video-computer technologies in training process of qualified female weightlifters.

Fundamental points regarding significance of technical preparedness in weightlifting and priority of taking into account morphological characteristics of women specializing in weightlifting have been substantiated and further developed for competition exercises technique training [1; 2]; as well as data regarding expediency of dividing female weightlifters by the type of body build (dolichomorphic, mesomorphic, brachymorphic), which was often used in the research of competition exercises of male weightlifters [3; 4]; significant difference in data of technical preparedness of female weightlifters compared to data for male weightlifters [5; 6; 7] proves necessity of elaboration of model indices for female athletes. Scientific data regarding expediency of improving technical preparedness of elite female weightlifters during competition activities [8; 9; 10; 11; 12] have been supplemented. In particular, by the dynamic, space and time, and kinematic characteristics of motion phases, data regarding variants if improvement and correction of technical indices of motion actions done by female weightlifters during competition exercises have been supplemented. As authors say [13; 14; 15; 16], another important factor lifting a barbell is rational placement of athlete's body parts in every single moment of motion, starting from starting position and ending with phase of support squat.

The authors were the first to define data regarding types of body build (dolichomorphic, mesomorphic, brachymorphic) of elite female weightlifters from different groups of weight category, based on which an Internet-recourse software for improvement of their technical preparedness with data base for defining the type of body build has been designed; expediency of differentiation of training program and improvement of competition exercises technique of female weightlifters having different types of body build has been substantiated; differences between dynamic, space and time, and kinematic indices of motion actions done by elite female weightlifters with the change of type of body build and weight category groups have been described; methods of improvement of technical preparedness of female weightlifters having different types of body build and weight category groups has been elaborated. These methods include the combination of means of technical preparedness and methodological means that can be applied with consideration of model indices of competition exercises technique of elite female weightlifters.

Conclusions

The analysis of the results of methods implementation for improvement of technical preparedness of female weightlifter having different types of body build allows confirming the efficiency of individual approach to technical preparedness with consideration of tyopes of body build and weighting category groups. This can be proved by the results of pedagogical experiment that showed true improvement of technical indices regarding model features, and an increase of sports efficiency with female athletes from the experimental group.

Thus, data obtained in the result of the research form clear vision about new approaches to improvement of technical preparedness of elite female weightlifters having different types of body build and belonging to different groups of weight category.

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