METHODOLOGY DEVELOPMENT AND INTEGRATED CONTROL POWER-SPEED HIGH-CLASS HANDBALL PLAYERS

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Annotation. *Purpose*: based practices and identify effective means of controlling the level of development of power-speed high-class handball players. *Material*: The study involved 24 women's handball team player of Super League of Ukraine "Dneprjanka" Kherson. *Results*: methodical conditions defined development speed-strength. Revealed significant changes in terms of the development of power-speed after applying the proposed method of training. Hit run handball throws the ball with 7 meters at best point guards (4.9 ball) and welterweight (4.6 ball) players, and the lowest at the extremes (4.4 ball) and linear (4.4 ball) players. Analyzing the accuracy of the shots from a 9-meter mark, found no significant differences between the mean values are not established. *Conclusions*: Exercise speed-strength of character necessary to carry out the preparatory and in the early part of the basic training. Handball is recommended to use individual tasks to improve the general and special speed-strength training.
Keywords: handball, team, playing roles, integrated control, tests, speed-strength.

Introduction

Analyzing progress of sport games status in Ukraine we cannot but agree with V.A. Zaporozhanov [4], G.A. Lisencuk [9], V.Ya. Ignatyeva [5], who say that there is an acute demand in using of scientifically grounded modern methods of sport training's control.

Great number of scientists recognize that there is non compliance of sport games' level in Ukraine with world level and national interests and demands [1-4, 6, 7, 14]. Among many reasons they mention the main one – insufficient organizational and methodic maintenance of trainings, including absence of scientifically grounded system of complex control that worsens managing of training of country's sport teams [8, 10, 13, 15, 16].

In competitions sportswomen function in conditions of constant quick changes of conflict game's situations. L.A. Latyshkevich, I.Ye. Turchin [8], Matthys S.P.J. [17], Moesch K. [18] affirm that organism is influenced by extreme by value and duration loads, which require mobilization of all handball players' skills andy ability to demonstrate them in variable situations. It witnesses that physical fitness alongside with technical-tactic level is one of the most important components of training process's building. Alongside with it insufficient level of female handball players' physical fitness prevents from effective mastering of technical tactic actions and does not permit effectively realize them in competition functioning [7, 10, 11, 12, 17-20].

Significant part of works, devoted to hand ball, is connected with studying of technical-tactic fitness of highly qualified handball players. To less extent there exist researches, devoted to complex studying of handball players' physical fitness.

That is why development of methodic of speed-power qualities' training and complex control over their level among highly qualified female handball players, condition urgency of our research.

Purpose, tasks of the work, material and methods

The purpose of the research is to ground methodic of training and control of level of speed-power qualities of female highly qualified handball players.

Material and methods: the contingent of the research included handball players of women team of Ukrainian super league "Dnieprianka", Kherson. Most of sportswomen are candidate masters of sports and masters of sports in handball, participants of European cup competitions, who are the members of main three Ukrainian teams. We involved sportswomen of main and reserve team staff, 24 persons in total. They were 8 half middle players, 7 end players, 5 – linear and 4 ball handlers. Half of sportswomen were students of Kherson state university.

We applied a number of common methods of pedagogic experiment and some special, videlicet: testing of handball players' speed power qualities.

Results of the research

Organization of the research stipulated theoretical, experimental and analytical directions, which were combined in organizational structure, consisting of four stages.

At first stage (September – October 2012) by data of literature sources we generalized experience of advanced specialists in handball as well as comprehensively studied status of speed-power fitness of handball sportswomen. As a result there appeared demand in perfection of speed-power fitness of qualified handball players.

At the same stage we worked out complex of tests and carried out pedagogic testing for determination of initial level of speed-power fitness.

The second stage (November 2012) was connected with analysis of structure of highly qualified female handball players' training. With the help of complex testing we determined the level of sportswomen's speed-power fitness.

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The tasks of third stage (January – March 2013) implied introduction of methodic of female handball players' speed-power qualities' training in training proves of women handball team "Dnieprianka".

The forth stage (March- April 2013) was connected with processing of the received data, with foundation of purposefulness and effectiveness of the offered methodic application on the base of worked out complex of tests at different stages of training.

In modern handball speed-power qualities remain to be of first priority. It is connected with the fact that in course of competition functioning, during game, sportsman fulfills great number of jumps, jerks, accelerations, which would be impossible without significant speed-power fitness.

According to the above mentioned we determined the level of speed-power fitness at the beginning of experiment, before application of special methodic for development of this fitness.

Analyzing the received results we can note that at the beginning of experiment higher results in 30 meters run were demonstrated by end players (M ± m = 4.5 ± 0.1 sec), a little lower results were shown by ball handlers and half middle players, the lowest were of linear players (M ± m = 4.8 ± 0.2). It is explained by the fact that in competition functioning exactly end players fulfill the highest quantity of quick jerks, which require high speed and speed-power qualities.

Analysis of jump tests showed that practically in all exercises, results of end and half middle players significantly differed from results of ball handlers and linear players. Only in test high jump from the spot by methodic of Abalakov half middle players yielded end players (M ± m = 43.3 ± 0.7cm and M ± m = 46.2 ± 0.5cm accordingly). In general there exists clear regularity, implying that with increasing of anthropometric indicators sportswomen's indicator of jump exercises also increase.

Studying and comparing results of tests, connected with evaluation of upper limbs' speed-power qualities, videlicet – throwing of ball for distance from different initial positions, we can conclude that these qualities are the best among linear players: (M ± m = 14.8 ± 0.2 meters – by test "throw of filled ball in standing position" and M ± m = 10.7 ± 0.2meters – "throw of filled ball from sitting position") and ball handlers (M ± m = 14.7 ± 0.5 m and M ± m = 10.8 ± 0,2 meters accordingly); the worst results were of half middle and end players, who, in average, covered distance of M ± m = 10.4 ± 0.3 m from sitting position and M ± m = 14.5 ± 0.4 meters – from standing position. In our opinion, the received results are conditioned by game role of players.

Having determined general status of speed-power qualities we researched special speed-power fitness with the help of specially selected tests. Having analyzed tests' results we could note that end players had the highest speed on site (M ± m = 4.9 ± 0.3) as well as half-middle (M ± m = 5.2 ± 0.5sec.) a little lower were results of ball handlers (M ± m = 5.3 ± 0.3sec.) and the least results were demonstrated by linear players (M ± m = 5.8 ± 0.1sec.).

To some extent higher level of upper limbs' speed-power qualities in test "throw of handball ball from run" was demonstrated by half-middle players, a little less and practically equal - by ball handlers and linear players and the least was shown by end players. In our opinion it is connected with the fact that fulfillment of this test depends greatly on anthropometric parameters of sportswomen and specificities of competition functioning, which influence on development of certain motion skills.

Analysis of tests for accuracy, quickness and strength of upper limbs, videlicet, throws of ball at 7 and 9 meters distances for accuracy and strength showed that throws from 7 meters distance were better than from 9 meters. Distance, at which ball bounded also was bigger with throw from 7 meters. This is explained by the fact that the less is the distance to target the more accurate is throw and the higher distance is covered by the ball, the less distance it goes after hitting wall.

Results of some tests of players of different roles witness that the highest accuracy of 7 meters' throws is intrinsic to ball handlers. Less accuracy was demonstrated by half middle players and the worst – by end and linear players. Higher indicators of throw power and, accordingly, of bound distance, was shown by linear and half middle players, less power of throws was demonstrated by ball handlers and end players. A little different situation was with 9 meters' throws for accuracy: the best indicators were shown by half middle players and practically equal indicators were demonstrated by ball handlers, linear and end players. Power of these throws was identical to 7 meters' throws.

Results of complex test witness about dominating of end players (M ± m = 33.4 ± 1.5 sec.), a little less indicators were shown by ball handlers (M ± m = 35.7 ± 1.7 sec.) and low indicators were demonstrated by half middle (M ± m = 38.4 ± 1.1 sec.) and linear players (M ± m = 39.5 ± 1.8 sec.).

Generalizing testing results of special and general fitness levels we can conclude that their demonstration depends on many factors, among which the main are anthropometric parameters of sportswomen, specificities of competition functioning and handball players' movements at competitions.

Higher indicators of lower limbs' speed-power qualities were demonstrated by end and half-middle players. High values of upper limbs' speed-power qualities, demonstrated in throw exercises, characterize half middle, linear players and ball handlers.

However, it is necessary to note that results of studying of speed-power qualities points at need in application of certain methodic for perfection of female handball players' speed power fitness.

In compliance with tasks of our research we worked out and implemented methodic of development of highly qualified female handball players' speed-power qualities. This methodic included certain complexes of exercises of

different orientation with different loads. Also we analyzed in detail and specified certain methodic conditions for development of speed-power qualities.

In the course of our research, in season, in breaks between tours of Ukrainian championship, connected with participants of combined team in selective competitions for world championship, we applied our methodic of trainings. Most of offered by us exercises were fulfilled in preparatory and sometimes in main parts of training. Besides, handball players were offered individual tasks on perfection of general and special speed-power fitness.

With application of the worked out methodic all female handball players fulfilled all offered exercises practically equally, however, in some cases we accentuated development of quality, which was dominating for a certain sportswoman.

On completing of experimental part of our work we carried out repeated testing for determination of speed-power fitness after application of our methodic. Results of testing of general speed-power fitness are given in table 1.

Table 1

Indicators of general speed-power fitness of female handball players after implementation of the worked out methodic

Test	Game role			
	Ball handlers M ± m	Half middle players M ± m	End players M ± m	Linear players M ± m
30 meters run, sec.	4.4±0.2	4.5±0.1	4.3±0.1	4.7±0.3
High jump from the spot, cm	49.7±0.2	50.1±0.4	55.0±0.2	44.6±0.9
Long jump from the spot, cm	225.2±2.4	231.2±1.5	225.4±1.1	222.3±0.7
High jump from the spot, cm	262.2±2.4	260.5±1.8	251.4±2.2	257.2±1.9
Jumps in series (times)	8.8±0.2	9.2±0.5	8.1±0.2	8.6±0.1
Ling jumps from three steps, cm	504.8±3.5	495.1±1.6	488.2±2.5	481.4±1.9
Throw of filled ball from behind head (standing), m	15.8±0.2	15.7±0.2	14.9±0.1	15.9±0.1
Throw of filled ball from behind head (sitting), m	12.2±0.1	11.8±0.2	11.9±0.3	12.4±0.3

Analyzing results of repeated testing we can note that positive changes took place in practically all tests. For example the best indicators of 30 meters' run were demonstrated by end players (M ± m = 4.3 ±0.1 sec.), and the worst – by linear players (M ± m = 4.7 ± 0.3 sec.).

Studying of speed-power qualities in jump exercises showed that be test of Abalakov the best values were shown by end players (M ± m = 55.0 ± 0.2 cm), and the worst – by linear players (M ± m = 44.6 ± 0.9 cm). In test long jump from the spot the highest results were demonstrated by half middle players (M ± m = 231.2 ± 1.5 cm), practically equal results ball handlers and end players had and the worst results were shown by linear players (M ± m = 222.3 ± 0.7 cm). In test high jump the best result belonged to ball handlers and half middle players (M ± m = 262.2 ± 2.4 cm and M ± m = 260.5 ± 1.8 cm accordingly); indicators of linear players differed insignificantly. In connection with not very high growth, the leas indicators in this test were shown by end players (M ± m = 251.4 ± 2.2 cm). The trend to all handlers' dominating was registered also in test long jumps from three steps. The worst indicators were demonstrated by linear players. Results of jump endurance's testing proved that half middle players fulfill, in average, M = 9.2 skips, ball handlers - M = 8.8, linear players M = 8.6 and end players – 8.1 skips.

Analyzing indicators of upper limbs speed-power abilities we determined domination of linear players in both tests. Results of half middle players and ball handlers do not differ significantly between each other. Achievements of end players were not significant. It is explained by the fact that in process of competitions linear players often have to enter power fight for position and, consequently, they fulfill significant quantity of exercises for progressing of required for it qualities.

Having determined the level of general speed power fitness and researched its manifestation in players of different game roles we carried out identical studying of special speed-power fitness of female handball players and presented the results of it in table 2.

Table 2

Indicators of special speed-power fitness of female handball players after implementation of the worked out methodic

Test	Game role			
	Ball handlers M ± m	Half middle players M ± m	End players M ± m	Linear players M ± m
30 meters' run with dribbling, sec.	4.8±0.2	4.8±0.4	4.6±0.1	5.1±0.1
Complex test, sec.	32.4±1.8	34.1±0.6	32.1±0.7	36.2±1.2
Handball ball's throw from run, m	45.2±1.7	46.1±1.2	40.2±1.4	42.7±1.1
7 meter' handball ball's throw for accuracy (q-ty of points)	4.9±0.1	4.6±0.3	4.4±0.1	4.4±0.3
7 meter' handball ball's power throw , m	7.5±0.3	7.6±0.2	6.6±0.4	7.4±0.3
9 meter' handball ball's throw for accuracy (q-ty of points)	4.3±0.2	4.3±0.1	4.1±0.4	4.0±0.1
9 meter' handball ball's power throw , m	5.5±0.2	5.1±0.5	4.6±0.4	5.3±0.2

Results of after experiment testing showed the speed of 30 meters run with dribbling was increased by all handball players, with the least indicators belonging to end players (M ± m = 4.6 ± 0.1 sec.), and the highest – to linear players (M ± m = 5.1 ± 0.1 sec.). Speed power qualities by complex test were characterized by equally high values of ball handlers and end players and by low values of linear players.

Accuracy with 7 meters handball ball's throws was better among ball handlers (M ± m = 4.9 ± 0.1 points) and half middle players (M ± m = 4.6 ± 0.3 points); the lowest accuracy was demonstrated by end players (M ± m = 4.4 ± 0.1) and by linear players (M ± m = 4.4 ± 0.3). Analyzing accuracy of 9 meters handball ball's throws we determined that there were no significant differences between mean values.

Comparing the strength of throw and, accordingly, distance of bound from wall we can note that at distance of 7 meters results were nearly equal, while at 9 meters distance we registered expressive dominating of ball handlers and linear players.

Conclusions:

Summarizing our results we should note that there is a clear interconnection between peculiarities of motion functioning during competitions and requirement for female handball players to demonstrate certain motion skills. For example, in most cases end players finalize quick attack and they have to demonstrate significant speed-power endurance, videlicet – high start speed. That is why, as a rule, this category of sportswomen is characterized by not long height, but by ability to fulfill great quantity of accelerations and jerks.

Half middle players and ball handlers fulfill in competition functioning great number of throws to goal in spite of blocking by adversaries; that is why female handball players of this game role have significant length of body and lower limbs' speed power abilities. It also reflects in high results in jump exercises.

Linear players have to enter in power fights with adversaries. That is why they are characterized by significant speed-power qualities of upper limbs and by domination of power fitness.

In the whole results of the researches point at substantial changes in indicators of speed-power qualities after application of the offered methodic of trainings.

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