ADAPTATION OF QUANTITATIVE INDICES
OF HIGH-SPEED AND POWER PREPARATION
OF FOOTBALL PLAYERS OF HIGH QUALIFICATION

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Abstract. Football is one of the most popular sports in the majority of the countries of the world. Questions of training of high quality soccer players, the organizations of training occupations excite both specialists’ trainers, and athletes and fans. In this article theoretical and practical sides of power and high-speed training of sportswomen (female soccer) are shined, the characteristic is given to development of explosive strength of soccer players; stages of high-speed and power preparation are defined. The table is provided in article with indicators of data of the high-speed and power preparation received by means of the universal dinamographical stand, on experimental and control groups, the main tenance of stages of physical training of sportsmen is described. The special attention is paid to rational distribution of loadings in process of the preparatory period and the description of exercises taking into account physiological features of sports trainings for women. The author defined methods of carrying out the exercises, providing gradual increase in physical activities.

Keywords: high-speed and power preparation, football players, modular technology, explosive effort, physical activities, nonspecific exercises, microcycle, force of muscles, stage by stage control.

Introduction
Modern soccer is characterized by high intensity of game actions, fast switching on a game course, power single combats on all fields, a wide variety of used game receptions in the conditions of deficiency of time and space. All this demands from sportswomen not only good technical tactical training, but also a high level of development of special physical qualities and ability to realize them in a difficult game situation (Godik, 1995; Kots, 1996; Stuja, 1997; Tyulenkov, 2001).

In connection with considerable increase in recent years volume and intensity of training and competitive loadings intensity of functional systems which is reflected in level of manifestation of motive opportunities of football players sharply increases. It isn't necessary to forget that when planning training process it is especially important to consider adaptive reactions of a female organism which precede a little differently, than at men. The advanced practice and a number of scientific researches in sports, and in particular in soccer, show that successful performance of game receptions significantly depends on level of the high-speed and power preparation (HSPP) of football players. However purposeful development of the high-speed and power qualities (HSPQ) and increase on this basis of accuracy of performance of game actions are interfered by insufficiency of researches about nature of interrelation between them.

The purpose of the conducted researches was scientific and methodical justification of modular technology of development of the HSPP of football players’ high qualifications in training process.

Research methods
analysis and generalization of scientific literature, methods of pedagogical control and pedagogical experiment (testing motive coordination and physical preparation), instrumental and analytical methods.

As tool methods of researches the universal dinamographical stand UDS-3 at which characteristics of the HSPP level of sportswomen (Godik, 1995; Kots, 1996) were registered and estimated was used.

Much attention in the course of researches was paid to an assessment of explosive strength of football players. That fact was thus considered that explosive nature of efforts is shown when overcoming the burdening which aren't reaching sizes, but with the maximum acceleration (Stuja, 1997; Tyulenkov, 2001). For an assessment of explosive force the index was used:

\[ J = \frac{F_{\text{max}}}{t_{\text{max}}} \text{(kg/sec)}; \]
J – coefficient, characterizing the explosive force of muscles in an isometric mode;  
\( F_{\text{max}} \) – maximum the value of force shown in this movement (kg);  
\( t_{\text{max}} \) – time of achievement of the maximum size of explosive effort (s).

The listed above procedures were carried out with obligatory observance of the general for control of a physical preparation of metrological requirements:

– situation when bending a knee joint (120°) was standardized;
– length of segments of a body of each examinee was considered at change of the moments of force. According to it, correction position of a body of the examinee was carried out;
– the direction of a vector of force which remained to constants throughout all inspection was considered.

For carrying out pedagogical experiment the control group (CG) and the experimental groups (EG) of football players of the highest league, participants of the championship of Uzbekistan were organized. Sportswomen of the Sevinch team of Karshi and "Andijanka" Andizhan were carried to CG. Researches were conducted during 2011-2012.

**Results and Discussion**

For justification of efficiency of the offered technique on development of the HSPP of football players at the beginning and at the end of experiment were carried out research on UDS 3. Their results are presented in table 1.

<table>
<thead>
<tr>
<th>№</th>
<th>Indicators of high-speed and power readiness</th>
<th>At the beginning of experiment</th>
<th>At the end of experiment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>( P_{\text{o}} ) – maximum, any force of muscles (kg)</td>
<td>( X \pm \sigma )</td>
<td>( X \pm \sigma )</td>
</tr>
<tr>
<td>1</td>
<td>( F_{\text{max}} ) – maximum size of explosive effort of muscles (kg)</td>
<td>71,3±4,6</td>
<td>70,4±3,2</td>
</tr>
<tr>
<td>2</td>
<td>J- high-speed and power index (kg/s)</td>
<td>51,4±6,4</td>
<td>50,2±5,8</td>
</tr>
<tr>
<td>3</td>
<td>Q- starting force of muscles (kg/s)</td>
<td>345,6±2,9</td>
<td>342,9±3,8</td>
</tr>
<tr>
<td>4</td>
<td>G- the accelerating force of muscles (kg/s)</td>
<td>427,8±2,2</td>
<td>425,4±6,7</td>
</tr>
</tbody>
</table>

At an initial stage of experiment in CG rather low indicators of the maximum explosive force in an isometric mode (50,2±3,8) in comparison with EG (51,4±4,4) were defined, however these distinctions statistically aren't significant (\( P>0,05 \) with \( t_{\text{estim}} 0,92 \)). The similar picture is noted in the indicators characterizing starting force of muscles in an isometric mode (Q). In CG it is equal 425,4±3,8, but in EG 427,8±4,4 (\( P>0,05 \) npt \( t_{\text{estim}} -1,85 \)).

Considering such indicator as a high-speed and power index, it is possible to note that at football players of EG its value were equal 345,6±2,9, and at CG 342,9±3,8 (\( P<0,05 \) with \( t_{\text{estim}} -2,53 \)).

**Table 1**

The comparative analysis of indicators of high-speed and power preparation of football players on UDS-3 at the beginning of pedagogical experiment.
However these distinctions statistically aren't significant (P>0.05 with t<sub>estim</sub> 0.92). The similar picture is noted in the indicators characterizing starting force of muscles in an isometric mode (Q). In CG it is equal 425.4 ± 3.8, and in EG 427.8 ± 4.4 (P>0.05 with t<sub>estim</sub> -1.85).

Considering such indicator as a high-speed and power index, it is possible to note that at football players of EG of its value were equal 345.6 ± 2.9, and at CG 342.9 ± 3.8 (P<0.05 with t<sub>estim</sub> K1.85). Coefficient, characterizing accelerating force of muscles in an isometric mode (G) in EG it was equal 260.8 ± 2.2, and at CG 261.4 ± 4.4. Distinctions aren't essential and statistially aren't reliable (P>0.05 with t<sub>estim</sub> K0.55).

Therefore the technique is offered and its efficiency is experimentally proved.

The technique of development of high-speed and power preparation included three consecutive stages:

The 1st stage solved a problem of increase of versatile physical preparation of football players with emphasis on a power component and developments of all main muscular groups and strengthening of the copular device. This problem was solved at an all-preparatory stage.

The 2nd stage solved a problem of increase of high-speed force and jet ability of the neuromuscular device in a dynamic mode. The means increasing speed of movements for the account of increase in power of efforts shown thus were for this purpose used: different types of hopping exercises, blows to a ball on the range, special exercises on training devices, etc. The following methods of training were used: repeated and serial, interval, pliometrical, game. Generally this task was implemented at a special and preparatory stage.

The 3rd stage solved a problem of increase of level of power endurance. The main methods were repeated, interval, game. Along with specialized means nonspecific exercises were widely used also: "long" jumps, run uphill, complexes of exercises with the burdening, special game tasks. Performance of this task was carried out at a precompetitive stage.

It should be noted that soccer national championship among women is held on system of tours. Breaks between rounds make from 6 to 8 weeks, and duration of competitions doesn't exceed 6 days. Many teams in breaks between calendar rounds of the championship take part in various tournaments. Considering such organization of competitions in female soccer, we offered the following experimental program.

Pilot researches in the preparatory period were conducted within 12 weeks and throughout all competitive period which duration made 112 days. The preparatory period was divided into 2 blocks for 6 weeks: in the first block within 3 weeks developing loadings with two times occupations in day, then 3 weeks of supporting loadings with one-time occupations in day were used. After a week of developing loadings week of the supporting followed. The first week of the preparatory period had character of involving loadings. The structure of a microcycle included five training days, the sixth day – control game, the seventh day – rest. The size of loading of the preparatory period is presented in table 2.

Table 2

<table>
<thead>
<tr>
<th>№</th>
<th>Preparation stages</th>
<th>Number of days</th>
<th>Volume (min)</th>
<th>Loading size</th>
<th>Orientation (min.)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>big</td>
<td>average</td>
</tr>
<tr>
<td>I</td>
<td>The all-preparatory</td>
<td>21</td>
<td>1890</td>
<td>6</td>
<td>7</td>
</tr>
<tr>
<td>II</td>
<td>The specially preparatory</td>
<td>35</td>
<td>2475</td>
<td>15</td>
<td>12</td>
</tr>
<tr>
<td>III</td>
<td>The precompetitive</td>
<td>28</td>
<td>2046</td>
<td>8</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>In total</td>
<td>84</td>
<td>6411</td>
<td>29</td>
<td>31</td>
</tr>
</tbody>
</table>
According to the author (Sharipova, 2005), in development of high-speed and power abilities of football players it is expedient to use to 50% of time for development of high-speed and power abilities not specific means and 50% in the form of games. In other ratios growth of high-speed and power indicators is shown to a lesser extent. The volume of loadings of a high-speed and power orientation increased gradually from the first microcycle to sixth (tab. 2).

It is visible that the volume of training loadings is equal 6411 min., from them at an all-preparatory stage 1890 min., on the special and preparatory – 2475 min., on precompetitive – 2046 min. are spent. On an orientation of loadings the greatest volume was allocated for development of power preparation – 605 min.

The three first weeks of microcycles were devoted to development of power opportunities of football players. The following methods were for this purpose used:
– The method of the maximum efforts providing repeated performance of exercises with near the limit burdening;
– The method of repeated efforts providing use of exercises with averages on weight by burdening;
– The method of explosive efforts providing repeated performance of exercises, carried out with near the limit speed with small burdening on weight.

The main problem of increase of level of power opportunities solved with use of nonspecific exercises: in a training hall with use of various burdening and block devices;
– gymnastic exercises.

The next 5 weeks of training were aimed at the development of high-speed force and jet ability of the neuromuscular device. On development of power and high-speed and power qualities 867 min. were taken away. By results of the conducted researches it was established that at football players of EG indicators of the maximum any force of muscles in an isometric mode increased (P_o) to 73,6 ± 2,9 (P<0,05). Value of the maximum explosive force has increased (F_max) to 53,4 ± 3,4 (P<0,05). The size of a speed-power index has considerably increased(J) to 346,1 ± 2,7 (P<0,05). The factor characterizing starting force of muscles (Q) has increased to 429,3 ± 3,8 (P<0,05). Also has changed towards increase the factor, characterizing force of muscles in an isometric mode (G) to 263,5 ± 1,5 (P<0,05) (see tab.2).

At an estimation of level of the HSPP some changes have been revealed also. So, P_o has made 1,5 ± 2,6(P>0,05), F_max=51,1 ± 3,1(P>0,05), J=346,1 ± 2,7(P>0,05), Q=426,2 ± 4,1(P>0,05), G=262,1 ± 2,1(P>0,05).

In comparison with the data of measurements received in the beginning of experiment, positive dynamics practically in all indicators is marked, however authentically statistical distinctions has not been noted. As a whole it is possible to consider, that performance of the offered experimental program has allowed raising level of the HSPP of football players of high qualification.

Conclusion

The presented data of year experimental work with football players of high qualification have allowed to develop and experimentally to prove means of perfection and methods of the pedagogical control of level of the HSPP of sportswomen with use UDS-3 and their technical skill at various stages of a year cycle. Practical use of the received results of research allows effectively and to apply purposefully the training means directed on increase of level speed-power and technical preparation of football players of high qualification.

References


