Factors determining the structure of sports training of a student futsal team

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Abstract

Background and purpose

In the process of preparing the team for university competitions, it is quite difficult for the coach of the national futsal team to clearly regulate the training load, because the players of the national team have different ages, training and individual characteristics. Purpose: to identify the factors of sports training that affect the complex preparedness of futsal players of a student team.

Material and methods

21 students of the Yuriy Fedkovych Chernivtsi National University aged 19-20 (boys) in Chernivtsi. The experiment was conducted in September 2022. Futsal players completed physical development testing, physical and technical fitness (running 30 m; shuttle run 3x10 m; long jump from a place; high jump from a place; driving the ball in a straight line; driving the ball “snake”; passing the ball to a given distance; shots on goal from a run; kicking the ball with the leading foot; kicking the ball with the non-leading foot; stance with the ball on the kicking leg; stance with the ball on the non-kicking leg) and psychophysiological state. To determine the peculiarities of futsal players’ preparedness the factor analysis was used.

Results

The presence of five factors in the structure of futsal players’ preparedness is determined: “Explosive force”, “Technical possibilities”, “Special endurance”, “Coordination possibilities”, “Speed of reaction” are revealed. It is established that for the development of explosive power, special endurance in futsal players need to conduct specialized trainings, which include running exercises, intensive interval training, game, as well as exercises for the development of power muscles of the legs, coordination of movements and reaction speed.

Conclusions

The obtained results helped to give concrete recommendations concerning the use of the most effective means and methods from different types of preparation which can successfully solve the certain tasks and at the same time are accessible for application by futsal players of the student team.

Key words: futsal, factor analysis, students of higher education, preparation, technique
Анотація

Ірина Собко, Ігор Наконечний, Георгій Блудов, Євгеній Гузюк. Фактори, що визначають структуру спортивної підготовки студентської команди з футболу

Обґрунтування і мета

В процесі підготовки команди до університетських змагань тренеру збірної команди з футболу досить важко чітко регламентувати тренувальне навантаження, тому що гравці збірної мають різний вік, підготовку та індивідуальні особливості. Мета: визначити фактори спортивної підготовки, які впливають на комплексну підготовленість футболістів студентської команди.

Матеріал і методи

21 студент ЧНУ ім. Юрія Федьковича віком 19-20 років (хлопці) м. Чернівці. Експеримент проводився у вересні 2022 року. Футбалісти виконували тестування фізичного розвитку, фізичної та технічної підготовленості (біг 30 м; човниківий біг 3х10 м; стрибок в довжину з місця; стрибок у висоту з місця; ведення м'яча по прямій; ведення м'яча «змійкою»; передачі м'яча на задану відстань; удари по воротах з розбігу; набивання м'яча провідною ногою; набивання м'яча не провідною ногою; стійка і з утриманням м'яча на ногі, яка в б'є; стійка з утриманням м'яча на ногі, яка не б'є) та психофізіологічного стану. Для визначення особливостей підготовленості футболістів застосовувався факторний аналіз.

Результати


Висновки

Отримані результати допомогли надати конкретні рекомендації стосовно використання найефективніших засобів та методів з різних видів підготовки, які можуть успішно вирішувати визначені завдання і при цьому доступні для застосування футболістами студентської команди.

Ключові слова: футбол, факторний аналіз, здобувачі вищої освіти, підготовка, техніка
Introductions

Futsal is a favorite sport for students and is included in the competition program of higher education institutions. In the process of preparing a team for university competitions, it is quite difficult for the coach of the national futsal team to clearly regulate the training load in the process of performing game exercises [1,2,3], because the players of the national team have different ages, training and individual characteristics. The most rational approach is to structure the parameters of the load during the whole period of study in a higher education institution, which ensures a gradual improvement of the sports form of the player and the team as a whole [4]. The problem of planning of the training load is devoted to a rather large number of works of specialists, however there are considerable contradictions in interpretation of selection and variation of its main parameters. Therefore, in recent years, scientists use statistical methods to determine the selection of means and methods of sports training depending on the contingent athletes. In game sports, factor analysis can be used to study and analyze various aspects of the game, training, tactics, and other factors that can affect the success of a team or player [5,6].

Factor analysis can be useful for analyzing game data, you can use it to study game statistics, such as the number of goals, assists, shots on goal, and other indicators [7]. This will help identify the main factors that influence the outcome of matches and determine the most effective strategies.

Factor analysis can identify the key skills and technical characteristics of players that have the greatest impact on team performance, helping coaches focus their efforts on developing these skills. A study of physical fitness using factor analysis can help identify the relationship between player fitness and on-court performance, which optimizes training programs to maximize results [8].

Factor analysis can provide a deeper understanding of how different factors are interrelated and how they affect the game and training in futsal. This can help coaches and players make more informed decisions and improve their performance on the field [9].

Therefore, the purpose of our study is to identify the factors of sports training that affect the complex preparedness of futsal players of a student team.

Material and methods

Participants

Participants: 21 athletes aged 19-20 years (boys) studying at the Yuriy Fedkovych Chernivtsi National University. The athletes gave written consent to participate in the study.

Procedure

In September 2022, an experiment was started to check anthropometric data, physical and technical readiness, psychophysiological state (18 indicators). Further, a factor analysis was carried out and instructions and recommendations were provided for the use of various sets of exercises for futsal players of the student team.

Methods of anthropometry, testing physical and psychophysiological capabilities of futsal players

1. Height was measured in a standing position, (sm);
2. Body weight was determined on scales (kg).
3. Running 30 m (s). Starting position: standing on the starting line with one foot in front of the other. On a signal, the sportsman starts running at the maximum speed. The time is fixed by an electronic stopwatch.
4. Shuttle run 3×10, (s). The shuttle run was performed by touching the lines with one hand at the coach's signal. The time of the exercise was recorded.
5. Long jump from a place, (cm).
6. Jump in height from a place, (cm). Stand sideways against the wall, stretch one arm up, record the result, perform a jump with the arm outstretched and record the result, then subtract the result of the first measurement from the jump result. Three times were given, and the best result was taken.

The computer program "Psychodiagnostics" [10] was used to determine psychophysiological capabilities.
7. Speed of simple visual-motor reaction, ms;
8. Speed of complex visual-motor reaction, ms.

Methods of testing the technical fitness of futsal players

1. Ball driving in a straight line, (c). The ball
was carried out on a straight line 30 m on a signal of the coach. The time is fixed by an electronic stopwatch.

2. Driving a ball by a "snake" (s). Ball driving with a circle of 5 chips which are located every 5 m. The length of a straight line is 30 m. Time is fixed by an electronic stopwatch.

3. Transfers of a ball on a given distance, (points). The ball is passed with the inside of the foot in pairs on the spot. The distance between athletes is 12 m. The expert committee of 3 coaches evaluated the technique of the pass and gave points on a 5-point scale.

Scoring scale:
- 5 points – executed performance of a technical action without errors;
- 4 points - performance of a technical action with one error or two minor mistakes (the athlete sets the wrong direction of the pass or insufficient impact force; the foot of the kicking leg is weakly deployed; during the swing, the kicking leg is not sufficiently pulled back; the toe of the supporting leg is turned outward, which complicates the movement of the kicking leg; the foot is too open or closed, which affects the trajectory of the ball);
- 3 points - the technical action is performed with gross errors (straight supporting leg; the ball is struck in the lower side of the ball; after the kick is completed, the kicking leg does not move behind the ball (no wiring);
- 2 - failure to perform a technical action
- 4. Passing the ball in 30 seconds (number of times). The ball is passed with the inside of the foot in pairs on the spot. The distance between sportsmen is 12 m. The number of exact transfers is fixed.

5. Shots on goal from the run-up, (points). Shots are made in the middle of the rise from a run at a distance of 12 m into an empty goal. An expert committee of 3 coaches evaluated the technique of kicks and gave points on a 5-point scale.

Scoring scale:
- 5 points – executed performance of a technical action without errors;
- 4 points - performance of a technical action with one error or two minor mistakes (the athlete does not have the toe of the leg that kicks the ball maximally extended, as a result, the blow is delivered with the upper part of the toe);
- 3 points - the technical action is performed with gross errors (the supporting leg is placed too far from the ball and the kicking leg barely reaches the ball; the leg is not sufficiently enough bent kicking leg);
- 2 - failure to perform a technical action

6. Shots on goal (number of times). Shots are made in the middle of the lift from a run at a distance of 12 m into an empty goal. The number of accurate shots is recorded.

7. Stuffed the ball with the leading foot, (number of repetitions). Standing on a place the sportsman performed filling of a ball with a leading foot to its loss.

8. Stuffed the ball with the non-leading foot (number of repetitions). Standing on the spot the athlete performed the filling of the ball with the non-leading foot until it was lost.

9. Stance with the ball on the kicking leg, (s)
10. Stance with the ball on the non-kicking leg, (s)

**Statistical analysis**

As for the methods of mathematical statistics, the factor analysis by the principal components method and the Kolmogorov-Smirnov one-sample test were used using SPSS and Microsoft Excel..

**Results**

In the group on all indicators of testing of anthropometry, physical fitness and psychophysiological state p>0.05 it testifies that there is no significant difference of the investigated from a normal distribution, and therefore it is possible to use statistical data for calculations in this group (Table 1). There are five factors (table 3) which influence the structure of sports training of futsal players. Percentage contribution of factors to the general variance. The percentage contribution of factors to the total variance showed that the factor "Explosive force" prevails (21.22 %), followed by the second "Technical possibilities" (16.84 %), the third "Special endurance" (12.67%), the fourth "Coordination capabilities" (12.67%), the fifth factor "Reaction speed" (11.59%).
Table 1

Results of testing anthropometry, physical fitness and psychophysiological state to test the hypothesis of normality of distribution (n = 21) of a group of futsal players

<table>
<thead>
<tr>
<th>Test *</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal parameters</td>
<td></td>
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<tr>
<td>a,b</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$\bar{x}$</td>
<td>165.71</td>
<td>67.19</td>
<td>4.85</td>
<td>205.00</td>
<td>33.38</td>
<td>7.38</td>
<td>310.62</td>
<td>460.86</td>
</tr>
<tr>
<td>S</td>
<td>6.21</td>
<td>5.98</td>
<td>0.21</td>
<td>6.83</td>
<td>2.22</td>
<td>0.08</td>
<td>24.64</td>
<td>20.02</td>
</tr>
<tr>
<td>Differences of extremes</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Module</td>
<td>0.14</td>
<td>0.14</td>
<td>0.13</td>
<td>0.13</td>
<td>0.18</td>
<td>0.12</td>
<td>0.16</td>
<td>0.14</td>
</tr>
<tr>
<td>Positive</td>
<td>0.08</td>
<td>0.13</td>
<td>0.10</td>
<td>0.13</td>
<td>0.09</td>
<td>0.12</td>
<td>0.09</td>
<td>0.12</td>
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<tr>
<td>Negatives</td>
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<td>-0.14</td>
<td>-0.13</td>
<td>-0.07</td>
<td>-0.18</td>
<td>-0.11</td>
<td>-0.16</td>
<td>-0.14</td>
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<td>0.14</td>
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<td>0.13</td>
<td>0.18</td>
<td>0.12</td>
<td>0.16</td>
<td>0.14</td>
</tr>
<tr>
<td>Asymptotic value (two-sided)</td>
<td>0.200</td>
<td>0.200</td>
<td>0.200</td>
<td>0.200</td>
<td>0.071</td>
<td>0.200</td>
<td>0.192</td>
<td>0.200</td>
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<td>Monte Carlo value</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>value</td>
<td>0.749</td>
<td>0.735</td>
<td>0.843</td>
<td>0.802</td>
<td>0.445</td>
<td>0.885</td>
<td>0.616</td>
<td>0.769</td>
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<tr>
<td>Lower limit</td>
<td>0.74</td>
<td>0.72</td>
<td>0.83</td>
<td>0.79</td>
<td>0.43</td>
<td>0.88</td>
<td>0.60</td>
<td>0.76</td>
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<tr>
<td>Upper limit</td>
<td>0.76</td>
<td>0.75</td>
<td>0.85</td>
<td>0.81</td>
<td>0.46</td>
<td>0.89</td>
<td>0.63</td>
<td>0.78</td>
</tr>
</tbody>
</table>

Notes:
* - description of all 8 tests is provided in the section "Material and Methods"
- a. The tested distribution is normal.
- b. Calculated from the data.
- c. Lilliefors significance correction.
- d. This is the lower bound of true significance.
- e. Based on a sample of 10,000 tables with the original value of 1122541128.

In table 2, the group presents the results of testing on the indicators of technical readiness testing $p > 0.05$, which means that there is no significant difference between the subjects from the normal distribution, and therefore it is possible to use statistical data for calculations in this group.

Table 2

Results of testing of technical preparedness of normality of distribution (n = 21) of a group of futsal players

<table>
<thead>
<tr>
<th>Test</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
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<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$\bar{x}$</td>
<td>5.97</td>
<td>8.33</td>
<td>5.57</td>
<td>15.76</td>
<td>3.05</td>
<td>3.14</td>
<td>237.05</td>
<td>78.24</td>
<td>49.86</td>
<td>24.67</td>
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<tr>
<td>S</td>
<td>0.12</td>
<td>0.08</td>
<td>0.93</td>
<td>1.87</td>
<td>0.74</td>
<td>0.73</td>
<td>3.81</td>
<td>2.70</td>
<td>2.94</td>
<td>3.21</td>
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<td>Differences of extremes</td>
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</tr>
<tr>
<td>Module</td>
<td>0.15</td>
<td>0.13</td>
<td>0.26</td>
<td>0.17</td>
<td>0.24</td>
<td>0.24</td>
<td>0.11</td>
<td>0.13</td>
<td>0.14</td>
<td>0.18</td>
</tr>
<tr>
<td>Positive</td>
<td>0.11</td>
<td>0.10</td>
<td>0.26</td>
<td>0.12</td>
<td>0.24</td>
<td>0.24</td>
<td>0.10</td>
<td>0.12</td>
<td>0.11</td>
<td>0.18</td>
</tr>
<tr>
<td>Negatives</td>
<td>-0.15</td>
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<td>-0.17</td>
<td>-0.17</td>
<td>-0.24</td>
<td>-0.23</td>
<td>-0.11</td>
<td>-0.13</td>
<td>-0.14</td>
<td>-0.10</td>
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<tr>
<td>Statistics</td>
<td>0.15</td>
<td>0.13</td>
<td>0.26</td>
<td>0.17</td>
<td>0.24</td>
<td>0.24</td>
<td>0.11</td>
<td>0.13</td>
<td>0.14</td>
<td>0.18</td>
</tr>
<tr>
<td>Asymptotic value (two-sided)</td>
<td>0.200</td>
<td>0.200</td>
<td>0.001</td>
<td>0.114</td>
<td>0.003</td>
<td>0.002</td>
<td>0.200</td>
<td>0.200</td>
<td>0.083</td>
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<td>Monte Carlo value</td>
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<td></td>
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<tr>
<td>value</td>
<td>0.683</td>
<td>0.848</td>
<td>0.112</td>
<td>0.521</td>
<td>0.154</td>
<td>0.141</td>
<td>0.918</td>
<td>0.789</td>
<td>0.764</td>
<td>0.468</td>
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<tr>
<td>Lower limit</td>
<td>0.67</td>
<td>0.84</td>
<td>0.10</td>
<td>0.51</td>
<td>0.14</td>
<td>0.13</td>
<td>0.91</td>
<td>0.78</td>
<td>0.75</td>
<td>0.45</td>
</tr>
<tr>
<td>Upper limit</td>
<td>0.70</td>
<td>0.86</td>
<td>0.12</td>
<td>0.53</td>
<td>0.16</td>
<td>0.15</td>
<td>0.92</td>
<td>0.80</td>
<td>0.78</td>
<td>0.48</td>
</tr>
</tbody>
</table>
Table 3  

Results of factor analysis of futsal player testing indicators (n=21)

<table>
<thead>
<tr>
<th>Name of the factor</th>
<th>Indicators</th>
<th>Factor</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>Explosive power</td>
<td>Weight, kg</td>
<td>0.876</td>
</tr>
<tr>
<td></td>
<td>Stand on the non-leading leg, (s).</td>
<td>0.867</td>
</tr>
<tr>
<td></td>
<td>Ball passes for 30 s, number of times</td>
<td>0.855</td>
</tr>
<tr>
<td></td>
<td>High jump from a place, cm</td>
<td>0.796</td>
</tr>
<tr>
<td></td>
<td>Running 30 m, s</td>
<td>0.623</td>
</tr>
<tr>
<td></td>
<td>Jump in length from a place, cm</td>
<td>0.498</td>
</tr>
<tr>
<td>Technical capabilities</td>
<td>Kicking the ball with not leading foot, number of repetitions</td>
<td>0.887</td>
</tr>
<tr>
<td></td>
<td>Shots on a goal from a run-up, points</td>
<td>0.812</td>
</tr>
<tr>
<td></td>
<td>Height, cm</td>
<td>0.653</td>
</tr>
<tr>
<td></td>
<td>Kicking the ball with the leading foot, number of repetitions</td>
<td>0.501</td>
</tr>
<tr>
<td>Special endurance</td>
<td>Stand on one leg of a leading leg, s</td>
<td>0.877</td>
</tr>
<tr>
<td></td>
<td>Driving the ball in a straight line, (s);</td>
<td>0.819</td>
</tr>
<tr>
<td></td>
<td>Speed of a complex visual-motor reaction, ms</td>
<td>0.687</td>
</tr>
<tr>
<td>Coordination capabilities</td>
<td>Passing the ball for 30 s, (points)</td>
<td>0.902</td>
</tr>
<tr>
<td></td>
<td>Ball driving by a &quot;snake&quot;, s</td>
<td>0.819</td>
</tr>
<tr>
<td></td>
<td>Shuttle run 3 on 10 m, s</td>
<td>0.816</td>
</tr>
<tr>
<td>Reaction speed</td>
<td>Speed of simple visual-motor reaction, ms</td>
<td>0.802</td>
</tr>
<tr>
<td></td>
<td>Shots on the goal, (number of times)</td>
<td>0.776</td>
</tr>
</tbody>
</table>

The number 1 factor includes: weight (r=0.876), stand on the non-leading leg, (r=0.867), passing the ball in 30 seconds, (r=0.855), high jump from a standing position, (r=0.796), 30 m run, (r=0.623), long jump from a standing position, cm (r=0.498). According to the indicators included in this factor, it was named "Explosive power". Explosive power is an important aspect of the game, as it allows players to accelerate effectively, avoid defenders, create space for passes and shots on goal.

The number 2 factor includes of kicking the ball with the non-leading foot (r=0.887), shots on goal from the run-up (r=0.812), height (r=0.653), and kicking the ball with the leading foot (r=0.501). The second factor was called "Technical capabilities". It should be noted that this is an important element of game preparation for both forwards and defenders, as high technical skill allows them to effectively interact with opponents and control the playing space, provides players with the tools to effectively interact with the ball and teammates. Technically trained players control the ball more precisely, make accurate passes and shots, which makes them more effective both in attack and defense.

The number 3 factor includes as a one-legged stance of the leading leg (r=0.877), driving the ball in a straight line (r=0.819), and the speed of a complex visual-motor reaction (r=0.687). By the most significant indicator this factor was named "Special endurance".

Special endurance in futsal means the ability of a player to maintain a high intensity of activity throughout the match, performing fast running movements, sudden changes of direction, fighting for the ball and other physically intense actions. This is an important aspect because futsal is a fast-paced and dynamic game where players must constantly move, attack, and defend in a limited space.

The number 4 includes factor includes of ball passing in 30 seconds (r=0.902), ball handling "snake" (r=0.819), shuttle run 3 by 10 m, s (r=0.816). Therefore, the fourth factor was characterized as...
"Coordination capabilities".

The number 5 factor includes indicators of the speed of simple visual-motor reaction ($r=0.802$), shots on goal ($r=0.776$). According to the most significant indicator, this factor was named "Reaction speed".

Discussion

As practice shows, coaches can choose the optimal means and methods depending on the age, training and skill of the players due to the determination of the factor structure of the athletes' readiness [8,11,12,13]. The correct selection of means and methods of sports training of athletes will allow to optimize the training process at various stages of long-term training and to adjust it when any training conditions change. The authors' statements in [14] show that the use of multivariate analysis methods helps to determine both the general and individual structure of athletes in different sports. Looking at a wider range of factors that influence sports performance, the authors of the study identified several aspects that have an impact on the outcome of football matches, including aspects of technique, tactics, physical fitness and refereeing decisions. To test the scientific validity, the authors defined their task as identifying the main influencing factors on soccer match outcomes and the quantitative relationships between these factors and in-game performance. This was done with the aim of creating a point of reference for research, training and analysis in the field of football. In the course of the analysis, the authors came to the conclusion that an important competitive factor that affects the outcome of the game is the technical and tactical skills of individual players and teams [15,16,17].

Factor analysis was also applied in the work of Indonesian specialists [4]. The main purpose of this study was to investigate anthropometric indicators and physical fitness as factors that influence dribbling and passing skills in futsal. The use of the program was due to the fact that multivariate statistics requires a lot of mathematical calculations that cannot be performed manually. The results of the study show that general anthropometric characteristics and the level of physical fitness correlate with the skills of ball handling and passing in futsal. The authors' conclusion is that the determining factor in the development of these skills among young athletes is the length of the foot.

Factor analysis can be useful for analyzing game data, and can be used to investigate game statistics such as goals, assists, shots on goal, and other metrics [7,11]. This will help identify the main influencing factors that determine the outcome of matches and establish the most optimal strategies. Also, this method can reveal the most effective training methods for developing specific skills and aspects of the game, such as ball control, passing, hitting technique and others. Factor analysis can identify the key skills and technical characteristics of players that have the greatest impact on team performance, helping coaches focus their efforts on developing those skills. Investigating fitness using factor analysis can help reveal the relationship between players' fitness and on-court performance, optimizing training programs for maximum results [15,16,17].

Factor analysis can provide a deeper understanding of how different factors are interrelated and how they affect futsal play and training. This can help coaches and players make more informed decisions and improve their performance on the field [18].

The study showed that the leading factors of futsal are, first of all, the development of explosive power. The researchers note that the most significant type of speed and power abilities is "explosive" power, which is defined as "the ability to exert large amounts of force in the shortest possible time." It can also be said that it is the player's ability to accelerate quickly and move over short distances. Explosive power is an important aspect of the game because it allows players to accelerate effectively, avoid defenders, create space for passes and shots on goal. Explosive power depends on many factors, including a player's physical fitness, leg strength, reaction time, movement technique, and other aspects. Training to improve explosive power includes exercises to develop leg power muscles, coordination, and reaction speed [19,20,21].

Technical training is one of the key elements of a successful futsal game, as it allows players to make quick decisions on the field. If players are confident in their skills, they can adapt to different game situations more quickly. A strong technical base gives players more opportunities to be creative in their play. They can perform complex dribbles, unexpected passes and shots, which contributes to a variety of attacks. When players are confident in their skills, it helps to increase their psychological stability on the field. They are more likely to make decisions without hesitation and with confidence. Strong technical skills of the entire team can raise the
level of play, as the team can interact more effectively and execute tactical tasks. In general, technical training is one of the key elements of a successful futsal game, as it provides players with the tools to interact effectively with the ball and teammates [22-25].

Specific endurance includes not only physical aspects such as cardiovascular endurance and muscle strength endurance, but also qualities such as the speed of recovery from physical effort, adaptation to changes in the pace of the game, and the ability to make the right tactical decisions in the face of fatigue. Special endurance is found to be a key factor in success in futsal, as it allows players to maintain a high level of activity throughout the match and perform their tasks both offensively and defensively effectively.

To develop special endurance in futsal, players need to conduct specialized training, which includes running exercises, intensive interval training, game practice in conditions as close as possible to real matches, as well as work on breathing techniques and relaxation [26].

An important aspect is the level of development of coordination skills in futsal, which has an impact on technical and tactical preparedness and determines the player's qualification. In mini-football, experts focus on the development of the following specific coordination skills: the ability to distinguish between different movement parameters (e.g., "ball feel"), the ability to coordinate motor actions, the ability to adapt reactions and anticipation, spatial orientation, and the ability to maintain balance [27].

Futsal players and their coaches should pay considerable attention to the development of their speed of simple and complex reactions, as indicated in studies [16, 28]. After all, this game belongs to the group of situational sports where every motor action of a sportsman depends on a constantly changing situation on a site.

Conclusions

Factor analysis is used to research and analyze various aspects of the game, to study game statistics, and helps to identify key skills and technical characteristics of players that can influence the success of a team or player. Specific instructions are given on the use of the most effective means and methods in various aspects of training, which allow you to successfully solve specific problems and are available for use by students-football players.

Conflict of interest

The authors declare that there is no conflict of interest.

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