ФІЗИЧНА КУЛЬТУРА І СПОРТ

ASSESSMENT OF THE EFFICIENCY OF USING AN EXPERIMENTAL METHOD OF TEACHING ATHLETES THE BASIC TECHNIQUES OF THE SQUASH GAME AT THE STAGE OF INITIAL TRAINING

ОЦІНКА ЕФЕКТИВНОСТІ ВИКОРИСТАННЯ ЕКСПЕРИМЕНТАЛЬНОЇ МЕТОДИКИ НАВЧАННЯ СПОРТСМЕНІВ БАЗОВОЇ ТЕХНІКИ ГРИ ЗІ СКВОШУ НА ЕТАПІ ПОЧАТКОВОЇ ПІДГОТОВКИ

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Abstracts

Background and Study Aim. Analyzing recent studies, squash can be called a unique sport for achieving the full development of a person's physical capabilities, taking into account the number of qualities that develop during this game (attention, reaction, flexibility, dexterity, tactical thinking, coordination, endurance, etc.). **The purpose of the study** – to find out the effectiveness of the application of the experimental method of teaching athletes the basic technique of playing squash at the stage of initial training. **Material and methods.** The study was conducted on the basis of the Inter Athletics Fitness Club in Lutsk. 20 squash players (20 boys) aged 9–13 years (4 squash players of each age group) took part in the research. For the purpose of qualitative organization of experimental and research work, the following methods were chosen: theoretical analysis of educational and methodological literature, methods of monitoring the organization of the educational and training process, methods of pedagogical testing, methods of mathematical statistics. **Results.** The analysis of the results of the physical condition of squash players shows that 80–90% of young athletes, as of the final period of the study, had an average and high level of dexterity (the result of the tests "Run for 30 m" and "Shuttle run 6 x 8 m"). The "Standing long jump" test also shows a positive dynamic of change, indicating an improvement in the physical and coordination skills of young squash players. Coordination skills and reaction, at the final stage of the study, improved significantly during the training period. **Conclusions.** At the final stage, an analysis and comparison of the results was carried out, which showed that the level of physical and technical training improved significantly. The 30 m Run test improved by 40% in Excellent and 45% in Fair, and the Shuttle Run improved by 3x. Regarding the development of reaction and coordination in the test «Hexagon», the level of unsatisfactory scores decreased to zero, in "Catching a stick" – the low level improved from 75% to 24%.

Key words: cycle of the training process, athlete, tests, physical and technical preparation, player.

Передумови та мета дослідження. Аналізуючи останні дослідження, сквош можна назвати унікальним видом спорту для досягнення повного розвитку фізичних можливостей людини, враховуючи низку якостей, які розвиваються під час цієї гри (увага, реакція, гнучкість, спритність, тактичне мислення, координація, витривалість тощо). **Мета дослідження** – виявити ефективність застосування експериментальної методики навчання спортсменів базової техніки гри зі сквошу на етапі початкової підготовки. **Матеріал і методи.** Дослідження проводилося на базі Фітнес-клубу «Інтер

Атлетика» у м. Луцьку. У дослідженнях взяли участь 20 сквошистів (20 хлопців) віком 9–13 років (4 сквошисти кожної вікової групи). З метою якісної організації експериментально-дослідної роботи були обрані такі методи: теоретичний аналіз навчально-методичної літератури, методи спостереження за організацією навчально-тренувального процесу, методи педагогічного тестування, методи математичної статистики. **Результати.** Аналіз результатів фізичного стану гравців у сквош показує, що 80–90% юних спортсменів станом на завершальний період дослідження мали середній та високий рівні спритності (результат тестів «Біг на 30 м» та «Човниковий» біг 6х8 м). Тест «Стрибок у довжину з місця» також показує позитивну динаміку зміни, що вказує на покращення фізичних та координаційних навичок юних сквошистів. Координаційні вміння та реакція на завершальному етапі дослідження суттєво покращилися протягом навчального періоду. **Висновки.** На завершальному етапі був проведений аналіз та порівняння результатів, які показали, що рівень фізичної та технічної підготовки суттєво покращився. Тест «Біг 30 м» покращився на 40% оцінки «відмінно» та на 45% знизилася кількість оцінок «задовільно», а «човниковий біг» покращився у 3 рази. Щодо розвитку реакції та координації у тесті «Hexagon» рівень незадовільних оцінок знизився до нуля, у «Ловля палиці» – низький рівень покращився з 75% до 24%.

Ключові слова: цикл тренувального процесу, спортсмен, тести, фізична і технічна підготовленість, гравець.

Introduction. One of the most urgent problems of modern sports is the preparation of athletes for the professional arena. It is important to choose training methods that will correspond to the initial level of training of young athletes [1; 2]. Analyzing recent studies [4; 5], squash can be called a unique sport for achieving the full development of a person's physical capabilities, taking into account the number of qualities that develop during this game (attention, reaction, flexibility, dexterity, tactical thinking, coordination, endurance, etc.) [19; 20].

Squash is an indoor game sport with a racket and a ball. The name of the game (from English Squash) is related to the use of a relatively soft ball. The game (singles – two players, or doubles – four) is played in a court enclosed on four sides by walls with special rackets and a ball. The ball is bounced from any of the four walls with a mandatory hit into the main wall, without falling above or below the two main boundaries of the court [7; 8].

The originality of the game of squash lies in the combination of movements and features of many sports, from choreography to accompanying racket sports (badminton, tennis, etc.). At the same time, it requires mental work and decision-making speed, developing intelligence and coordination. The safety feature cannot be overlooked as it is non-contact, making it one of the safest sports in the world. Therefore, a comprehensive approach to the development of these abilities requires the use of a wide range of teaching methods. At the same time, there are a large number of questions regarding the development of the basic physical abilities of young squash players, which need to be investigated and substantiated [10; 11].

The study was built based on the following assumptions:

1) the result of technical abilities and skills of young athletes directly proportionally depends on their physical and technical preparation. In order to perform a technically and tactically correct shot, a clear balanced position is required, for which the physical capabilities of the player are responsible [3; 6];

2) fatigue and lack of developed endurance and dexterity reduce the chances of striking a clear blow, so the physical meaning of these concepts are equivalent to each other, which can be considered equivalent during the training process [22; 23].

Therefore, in our opinion, the level of physical and technical preparation of children who play squash at the stage of initial training will contribute to the strengthening of health and the growth of sports skills of young squash players.

The purpose of the study – to reveal the effectiveness of the application of the experimental method of teaching athletes the basic technique of playing squash at the stage of initial training.

Materials and methods. *Participants.* The study was conducted on the basis of the "Inter Athletics" fitness club in Lutsk. 20 squash players (20 boys) aged 9–13 years (4 squash players

of each age group) took part in the research. All athletes belonged to the main medical group. All were assigned the same experimental task. In this experiment informed consent was obtained from all participants.

Procedure. For the purpose of qualitative organization of experimental and research work, the following methods were chosen: theoretical analysis of educational and methodological literature, methods of monitoring the organization of the educational and training process, methods of pedagogical testing, methods of mathematical statistics.

The analysis of educational and methodological literature was carried out taking into account the multifaceted nature of the problem under study. Both fundamental works on human physiology and those relating to individual aspects of the subject of research were analyzed. Special attention was paid to the publications of the world's leading experts in the field of special physical training of qualified squash players. Unfortunately, there are no translations of leading experts in the field of squash in Ukraine, so the material was used to study English-language books and articles, abstracts of seminars by prominent squash coaches, and practical materials of coaches.

The method of pedagogical observation is an organized study of the training process. It is a common method of the investigated problem. Its essence lies in the deliberate, systematic and purposeful perception of psychological and pedagogical phenomena. The method of observation has a purposeful nature, is subject to the purpose of the study. Its main requirements are: clarity, systematicity, versatility, a sufficient number of recorded facts, timeliness, objectivity, economy of recording techniques, careful, thoughtful and painstaking processing of the collected material, taking into account all influences on the course of the investigated phenomena, separating essential, stable, repeated facts from secondary and accidental elements, impartiality in the interpretation of the material, in the assessment of facts and conclusions about them.

Pedagogical testing included a set of tests to identify the level of physical and technical preparedness of young squash players. To determine the level of physical fitness, we conducted the following tests: 30 m run, standing long jump, 6x8 m "shuttle" run, catching a stick, jumping to the "Hexagon Test" coordination, running to 6 "Ghosting" marks. To determine the level of technical preparation, we conducted the following control exercises: a "Drive" shot and a "volley-drive" shot.

Characteristics of motor tests:

1. Running 30 m. It was conducted by a competitive method, the time was recorded using an electronic stopwatch with an accuracy of 0.1 s.

2. Long jump from a standing position. The length of the jump is measured in centimeters, the best result from three attempts is recorded.

3. "Shuttle" run 6x8 m (carrying squash balls from one hole to another, performed 6 times for 8 meters each) was conducted by a competitive method, the time was recorded using an electronic stopwatch with an accuracy of 0.1 s.

4. Catching a stick. The tester's task is to catch the ruler as quickly as possible, the result is recorded in centimeters at the top point of the thumb, the best result from three attempts is recorded.

5. Jumps for "Hexagon Test" coordination. Hexagon agility test involves jumping into and out of a hexagon shape within three circles. Purpose – testing the ability to move quickly while maintaining balance. The time was recorded using an electronic stopwatch with an accuracy of 0.1 s, the best result from three attempts was recorded.

6. Hit "Drive". Test participants make 10 shots from the forehand (shot from the right) and backhand (shot from the left) sides, receiving points for hitting the front wall of the court and for the length of the ball's bounce and its entry into the special zone. The result is the total number of all points for all shots.

7. Run to 6 "Ghosting" marks. Squash players reproduce movements that repeat real game situations and perform these exercises without the ball, but to specially established marks on the court. The time was recorded using an electronic stopwatch with an accuracy of 0.1 s.

8. Volley-drive shot within 3 min. Squash players hit the ball with forehand and backhand

for 3 minutes in the front part of the court, the total number of hits was recorded.

The research was conducted in three stages:

Stage I – study of scientific and methodical and special literature, namely the following data were characterized: sports training program for children and juniors (ages 6 to 17), squash program for children and juniors of Ukraine; foreign literature and online publications of trainers of the world.

Stage II – conducting pedagogical observations, analysis of documents for planning and recording the training process of squash players, interviewing coaches and athletes, physical qualities that ensure competitive and training activities of athletes were revealed. Pedagogical observation refers to the analysis of the influence of external factors on the training process, the psychological and emotional state of young athletes. At this stage, the training plan was written and recorded during the entire process, and its effectiveness was analyzed.

III stage – conducting an experiment, pedagogical control tests and processing the obtained data using statistical methods. Forming conclusions and summarizing the work done. The experiment consisted in repeating movement tests, analyzing the data obtained, comparing them and summing up mathematical statistics regarding the impact of this program on the level of physical and technical preparedness of young squash players.

To write the training program, the experience of outstanding specialists was used and a training program was developed for young squash players. This program makes it possible to develop the special physical skills of squash players with the help of a game method and a set of exercises for general physical training. Training sessions consisted of three cycles (4 weeks each), which were divided into microcycles (one microcycle is one week of training), after hich his cycle was repeated from the beginning (Fig. 1).

Each microcycle has 3–5 training sessions per week.

The training week is focused on the development of physical and technical readiness as follows:

Monday: the first main stage of calisthenics and exercises with additional squash equipment;

Tuesday: the first stage of developing the basic technical skills of playing squash;

Wednesday: the second basic training, studying the types of strikes and their combinations;

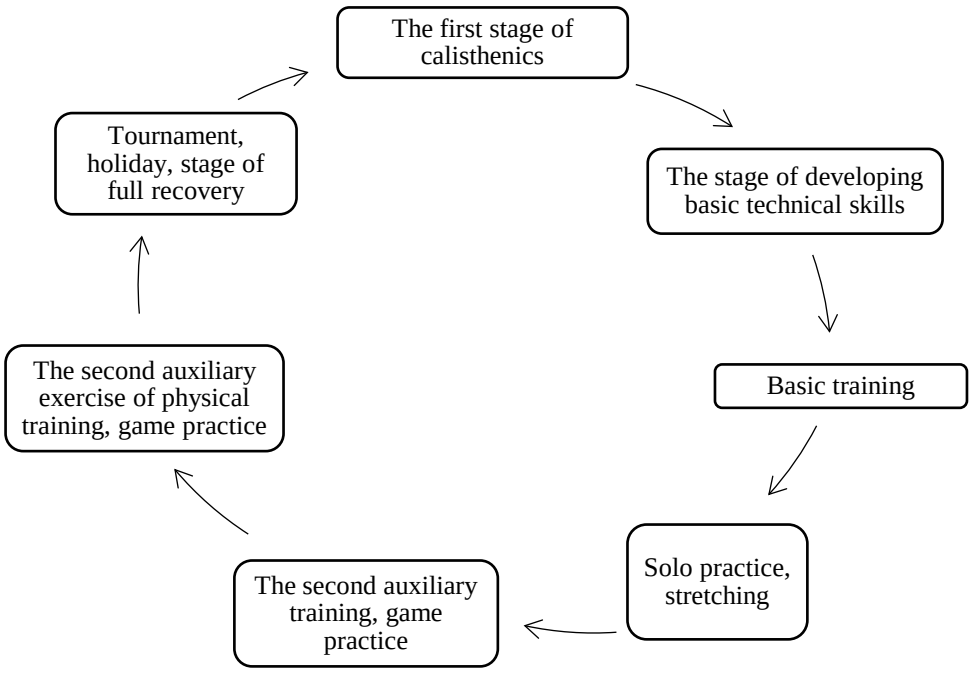

Fig. 1. Cycle of the training process

Thursday: rest from general physical training, solo practice, great emphasis on stretching;

Friday: the second auxiliary physical training, game practice;

Saturday and Sunday: tournament, holiday or full recovery stage.

During the study, 3 cycles of 4 microcycles were completed:

Cycle 1:

– basic calisthenics exercises, without additional squash equipment, training is built using the "Tabata protocol", regressive and progressive training methods;

– study and improvement of "drive" and "cross" shots, their combinations and combinations;

– solo training on the simplest shots (hitting on the racket in different variations, in a pair without a wall, with a wall in the front part of the court, etc.);

– studying and working out the technique of serving;

– mini-games, relays with balls and rackets;

– conducting motor tests.

Cycle 2:

– basic calisthenic exercises and exercises with additional squash equipment, use of a progressive training method;

– study and improvement of "drive", "cross" and "drop" shots, their combinations and combinations;

– solo training on the simplest shots, their minor complications and combinations (striking on the racket in motion, with the wall in the front part of the court "volley-drive" and "drive", etc.);

– practicing the technique of serving and receiving the ball, squash mini-games;

– relay races, judging practice, analysis of the concept of "Let";

– conducting motor tests;

– a tournament based on mini-games and squash exercises.

Cycle 3:

– basic calisthenics exercises, exercises with additional squash equipment, studying the concept of "Ghosting" and its variations;

– study and improvement of "drive", "cross", "drop" and "boost" shots, their combinations and combinations, execution of these "volley" shots, practicing "volley-drive", "volley-cross", "volley-boost", "volley-drop";

– solo practice (hits in one exercise from the forehand and backhand sides, hitting on the racket in motion from both sides of the racket, "volley drive" and "drive" in the front and middle part of the court, etc.);

– practicing the technique of serving and receiving the ball, analysis of tactically better shots at different moments of the game, squash mini-games with a slight complication;

– relay races, practice of refereeing, analysis of the concept of "Let" and "Stroke", watching matches of world tournaments, analysis of own matches on video.

– conducting motor tests;

– a tournament based on squash mini-games and exercises, independent refereeing.

The experimental group practiced according to this method, and the control group – according to the traditional one [21].

Statistical analysis. The results of the research were processed by the method of mathematical statistics. The following parameters were calculated: average arithmetic value of the value; standard deviation; t-test for independent samples. Systematization of the received data was carried out in Microsoft Office Excel spreadsheets. Statistical analysis was performed using the SPSS 22 program.

Results. The results of a preliminary study of the preparedness of young athletes, conducted at the beginning of the preparatory period, gave reason to establish that the majority of young squash players are characterized by indicators of physical preparedness below the average level [9].

O. V. Dorokhova & V. A. Berezovskyi [12] consider that physical training is an integral part of the process of sports improvement of athletes and provides a basis for technically complex competitive activities. Therefore, after the formative experiment, the number of athletes with an average level of physical and technical fitness increased significantly. Therefore, it is possible to state the high efficiency of the training program proposed by us at the stage of initial training of young squash players. The conducted analysis of the results of the exper-

imental work does not exhaust the solution of all aspects of the given problem [16].

The influence of squash classes on various indicators of the physical condition of athletes, the analysis of indicators of training and competitive activity of young squash players in the context of identifying leading and indifferent physical qualities, which is the perspective of further research in this direction, needs further study.

Analysis of the results of the physical condition of squash players shows that 80–90% of young athletes, as of the final period of the study, had an average and high level of dexterity (the result of the tests "Run 30 m" and "Shuttle run 6 x 8 m"). In the test exercise "Running for 30 m" – 50% of young athletes performed the exercise "excellently", 40% – "good" and 10% – "satisfactory". In the control exercise "Shuttle" running 6 x 8 m, 45% of the athletes performed the exercise "excellently", 35% – "good" and 20% – "satisfactory". At the same time, only 10–20% remained at the same level of development (Table 1).

The "Standing long jump" test also shows a positive dynamic of change, indicating an improvement in the physical and coordination skills of young squash players. Namely: 25% – performed the exercise "excellently", 40% – "good" and 35% – "satisfactory".

Coordination skills and reaction, at the final stage of the study, improved significantly during the training period. The stick catch test scores improved to 75% excellent and good scores. Young squash players demonstrated the following results: 10% received "excellent", 65% – "good", 25% – "satisfactory".

Unsatisfactory performance on the "Hexagon test" improved to good and excellent grades, and the overall percentage of good results, after the training period, increased to 75 % (30% – "excellent", 45% – "good", 25% – "satisfactorily").

The results of the 6-mark sprint or Ghosting test showed that almost every participant saw a decrease in performance time, indicating the development of dexterity and coordination during the training process. The best result is 17.6 seconds, the worst is 26,4 seconds.

The total number of points for the results of the "drive" test increased, which means that the study participants hit more difficult areas on the court, which were evaluated in 2 and 3 points.

Since the number of hits within 3 minutes increased, it can be concluded that the technical skills of the participants improved.

All the results obtained at the initial and final period of the study can be compared and relevant conclusions can be formulated regarding the effectiveness of the training process. The results of the study of special physical skills and elements of technique confirm positive changes in the physical and technical skills of young squash players.

Table 1

Average value, standard deviation and result of t-test of physical and technical fitness of squash players of experimental and control groups

No	Tests	Experimental group Mean ± SD			Control Group Mean ± SD		
		the initial stage	the final stage	Sig	the initial stage	the final stage	Sig
1	Run 30 m	5.235±4.4	4.88±4.3	0.070	6.174±3.6	6.56±4.7	0.398
2	Standing long jump	181.13±3.6	190.13±3.6	0.004	180.75±12.3	181.18±3.8	0.130
3	"Shuttle" run 6x8 m	14.67±2.3	13.98±1.7	0.001	14.35±2.5	14.27±1.8	0.204
4	Fishing stick	5.17±1.3	4.55±0.3	0.002	5.93±1.8	6.03±0.6	0.065
5	Jumps for coordination "Hexagon Test"	16.34±3.4	14.81±2.3	0.000	17.935±3.2	17.05±2.9	0.017
6	Shock "Drive" forehand	35.14±3.4	39.3±0.7	0.017	31.85±2.7	32.15±2.1	0.027
	backhand	30.27±2.8	35.2±1.1	0.043	27.15±1.7	28.2±0.3	0.045
7	Run to 6 marks "Ghosting"	23.137±2.0	22.485±2.3	0.025	25.685±2.9	24.705±2.6	0.35
8	Shock "volley-drive" forehand	54.13±1.9	56.15±1.7	0.047	52.18±2.3	53.15±1.8	0.029
	backhand	47.33±0.7	48.7±0.3	0.26	42.28±2.9	43.55±2.3	0.27

Comparing the results of the "run 30 m" and "shuttle run 6 x 8 m" tests, it is clear that the number of participants with excellent results has increased significantly, and the percentage of satisfactory grades has decreased by 3–4 times (Fig. 2).

Regarding the standing long jump test, it is worth noting that the number of participants with a "good" rating decreased by 5% in the final period, however, excellent indicators increased from 0 to 25%, and the indicator of satisfactory ratings decreased to 35% (Fig. 3). The overall result has improved significantly, which indicates the effectiveness of the training process.

The "catch the stick" test at the initial stage turned out to be quite difficult for young squash players. The reaction, as a physical property, in 75% of the participants was at a satisfactory level, which is completely contrary to the necessary skills for a good squash game. Therefore, its development was one of the key aspects during the training process, as a result, participants with a low level of reaction improved their performance by 51% (Fig. 3).

In Fig. 4 shows the improvement of the results of the test for the development of coordination "Hexagon test". An important achievement is the improvement of unsatisfactory rates at the end of the testing period, which dropped to zero, and the rate of "good" ratings decreased to 30%. At the same time, excellent indicators increased by 30%.

As it was indicated above in the work, the results of squash motor tests are mainly evaluated by comparing the initial and final results. Taking into account the individuality and style of each player, the goal of the following tests is to improve your own performance.

The "6-mark sprint" test, or as it is also called "Ghosting", improved in almost every study participant. The best result improved by 12% and the worst by 10%. The total test execution time decreased by 9% (Fig. 5).

The "volley-drive" and "drive" tests are among the most important in developing the technical skills of a squash player. Regarding the results of mastering the technique of young squash players, it is possible to note the positive dynamics of performing special exercises, "volley-drive" / forehand improved by 5%, while backhand – by 11%, and the performance of the "drive" shot increased by 19% and 20%, respectively. During the formation of the experiment, the participants reached an intermediate level of implementation of technical elements in two test exercises.

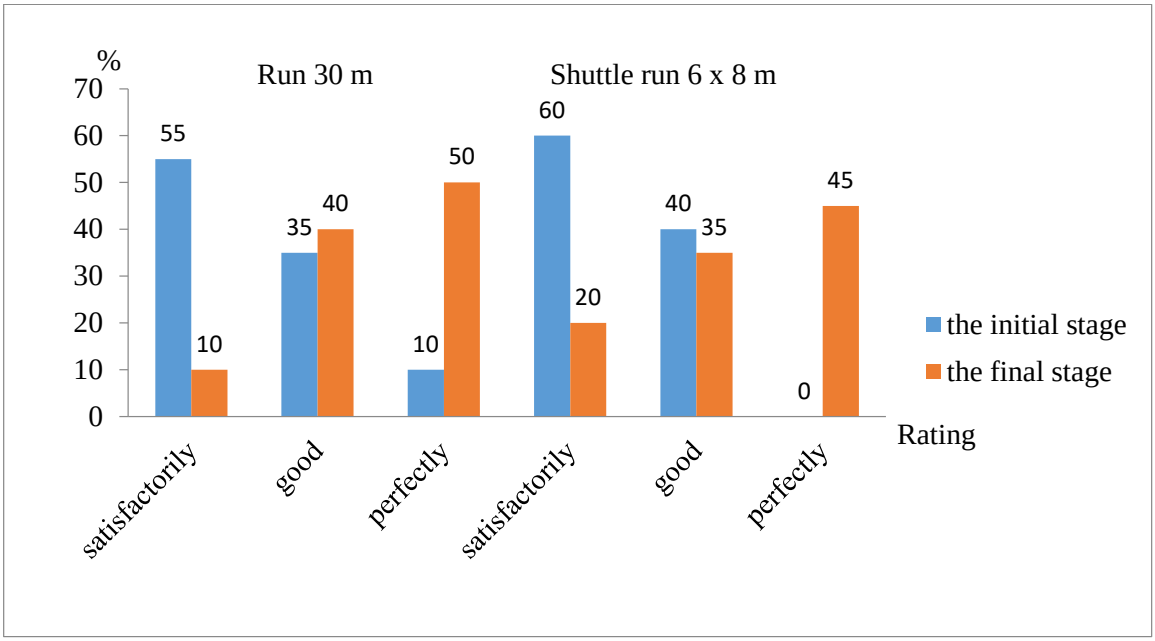

Fig. 2. Comparison of the results of the "speed run" and "shuttle run" tests of the initial and final stages of the study

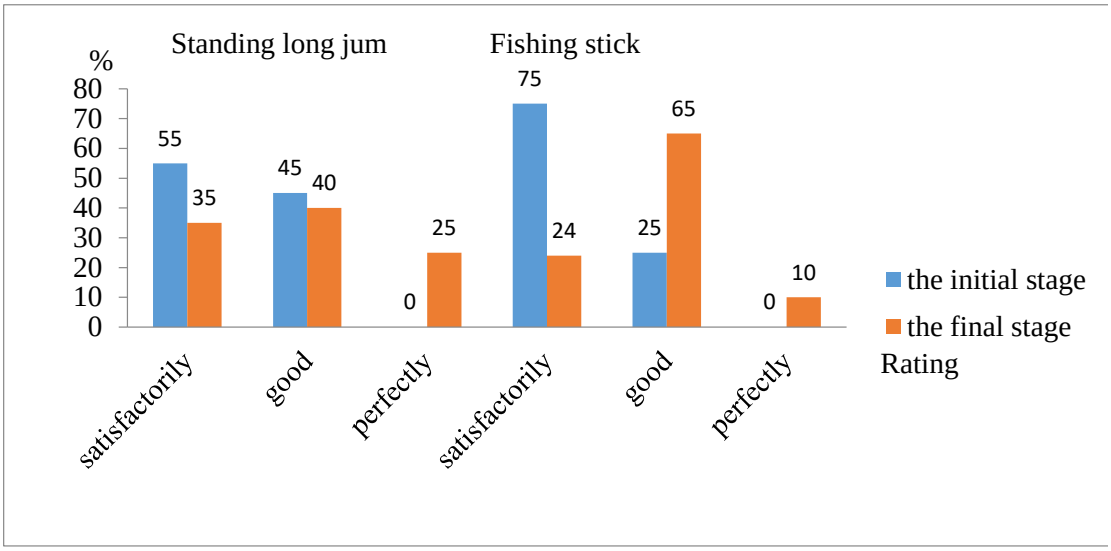

Fig. 3. Comparison of the results of the Long Jump and Stick Catching tests at the initial and final stages of the study

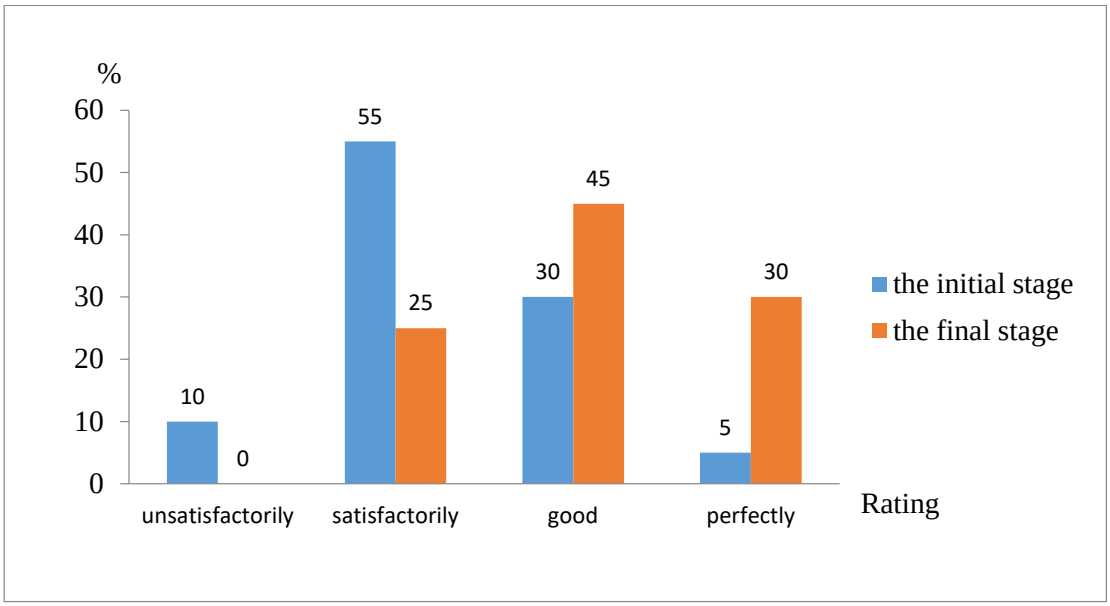

Fig. 4. Comparison of test results "Hexagon test" initial and final stages of research

At the same time, during the ascertaining experiment, low results were obtained for the majority of the athletes under study. After going through the training process, the players are much more confident and technically hitting. The final results showed an increase in the number of hits in the two – and three-point zone, an improvement in the length of the rebound (three-point zone), an accurate hit in special zones, for which an additional point was awarded. The dynamics of changes in the total number of hits is presented in fig. 6.

Discussion. The analysis of special scientific literature showed that there are many scientific works on the problems of improving individual components of the training system in complex coordination sports [14; 15], but not enough attention is paid to the study and improvement of the system of training squash players. This can be explained by the fact that squash is a young

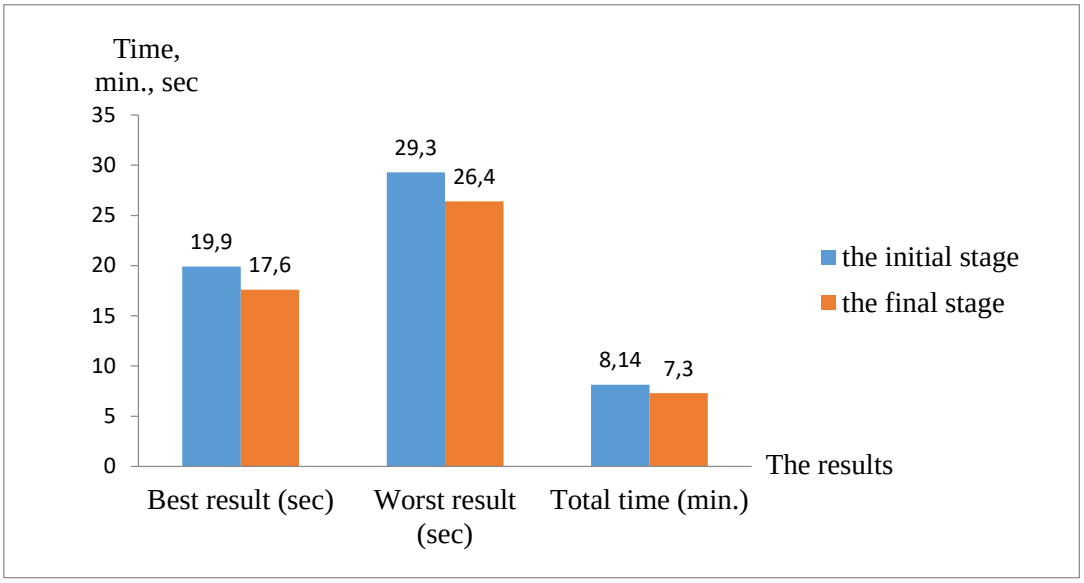

Fig. 5. Comparison of the results of the "speed run to 6 marks" test initial and final stages of research

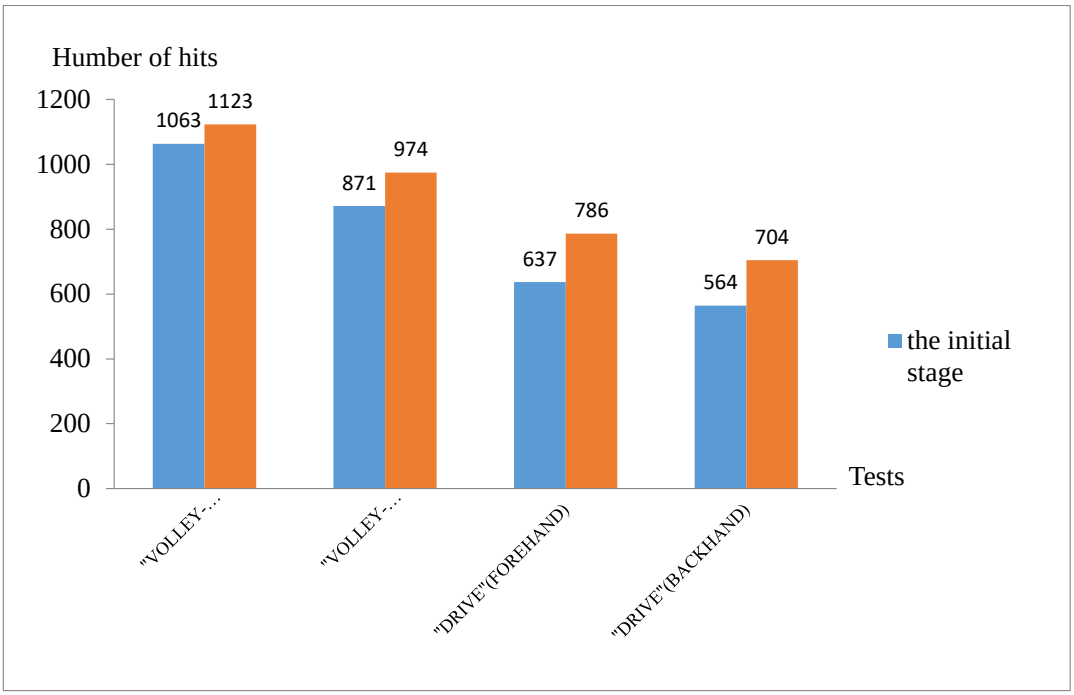

Fig. 6. Comparison of impact test results "volley drive" and "drive" at the initial and final stages of the study

sport in Ukraine. As noted by scientists [17; 18], the level of development of physical qualities affects the process of learning and improving the technical skill of performing physical exercises, therefore today coaches focus attention in the educational and training process on planning physical and technical readiness, sports training taking into account their functions, which performed by squash players on the court. Therefore, the physical load in the educational and training process should be aimed at improving the physical and technical readiness of squash athletes in combination with improving technical skills, in particular at the stage of initial training [13].

Conclusions. At the final stage, an analysis and comparison of the results was carried out, which showed that the level of physical and technical training had significantly improved. The

30 m Run test improved by 40% in Excellent and 45% in Fair, and the Shuttle Run improved by 3x. Regarding the development of reaction and coordination in the test "Hexagon", the level of unsatisfactory scores decreased to zero, in "Catching a stick" – the low level improved from 75% to 24%. The Standing Long Jump test in the initial period did not show any significant result, while after passing the training cycles this indicator increased to 25%.

"Ghosting" proved to be one of the most difficult tasks for the participants, as in addition to running fast, it was necessary to perform quick pauses and changes of direction, back running and returning to the center of the court. However, the level of the best result increased by 12%, and the worst improved by 10%, the overall level of exercise performance improved by 9%, which indicates the development of many physical qualities at once.

"Volley-drive" and "drive" shots increased from 5% to 20%, which also shows a positive trend in improving physical and tactical skills in the squash game.

The results achieved during the experimental study proved that during the initial period of physical training of young squash players, the proposed training method had a positive effect on increasing the level of development of special physical skills, which improved the level of technical training of squash players.

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