ФІЗИЧНА КУЛЬТУРА І СПОРТ

PHYSICAL AND TECHNICAL PREPAREDNESS OF SQUASH PLAYERS AT THE STAGE OF INITIAL PREPARATION

ФІЗИЧНА І ТЕХНІЧНА ПІДГОТОВЛЕНІСТЬ СКВОШИСТІВ НА ЕТАПІ ПОЧАТКОВОЇ ПІДГОТОВКИ

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Abstracts

Background and Study Aim. The search for gifted, capable, promising children, who are able to achieve high sports results at the national and international level, is one of the directions for improving the training system in modern high-achievement sports. **Purpose** – to reveal the level of physical and technical preparation of squash players 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. 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. 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. 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. **Results.** The results of movement tests at the stage of initial training showed that the majority of young squash players had a low and average level of physical fitness. The motor test "Run for 30 m" showed that more than half of the study participants have satisfactory results. The "standing long jump" and "shuttle" test showed a low level of this skill among the test participants. The result of the stick catch test showed that 75% of all tested squash players had a satisfactory result. Also, a low level of physical development of coordination was revealed after the "Hexagon Test", which revealed even unsatisfactory results of the exercise, which was 10% of the total number of participants. The technical training of young squash players is directly proportional to their physical fitness, but without developing squash skills. So the following movement tests in the initial training phase provided us with a reference point to improve during the research period. It is possible to abstractly assess the initial level of development of the "Strike Drive" test by paying attention to the areas in which young squash players most often hit. Most of their shots are hitting the first and second scoring zones, front wall and bounce length. Only two participants managed to get into the zone of the highest score several times, which indicates a rather low level of technical skills of the participants at the initial stage of training. The analysis of the results of the volley drive test showed that the average result of all participants was approximately 53 forehand and 44 backhand strokes during 3 minutes, which is 17 and 15 strokes / min, respectively. **Conclusions.** All the results of the experiment conducted at the stage of initial training reveal the need to improve the physical and technical preparation of athletes. They proved that young squash players who do not systematically engage in any sports have an average and low level of general physical fitness. Technical skills were better in several children who had previously played racquet sports, which once again proves that muscle memory and physical fitness affect the result of professional skills and abilities of a squash player.

Key words: squash, athlete, test, shot, court.

Передумови та мета дослідження. Пошук обдарованих, здібних, перспективних дітей, здатних надалі досягати високих спортивних результатів на вітчизняному та міжнародному рівнях є одним з напрямів удосконалення системи підготовки у сучасному спорті вищих досягнень. **Мета** – виявити рівень фізичної і технічної підготовленості сквошистів на етапі початкової підготовки. **Матеріал та методи.** Дослідження проводилося на базі Фітнес-клубу «Інтер Атлетика» у м. Луцьку. У дослідженні взяли участь 20 сквошистів (20 хлопців) віком 9–13 років (4 сквошисти кожної вікової групи). Усі спортсмени належали до основної медичної групи. Усім було призначено одне і те саме експериментальне завдання. У цьому експерименті інформована згода була отримана від усіх учасників. З метою якісної організації експериментально-дослідної роботи були вибрані такі методи: теоретичний аналіз навчально-методичної літератури, методи спостереження за організацією навчально-тренувального процесу, методи педагогічного тестування, методи математичної статистики. Для визначення рівня фізичної підготовленості нами були проведені такі тести: біг на 30 м, стрибок у довжину з місця, «човниковий» біг 6х8 м, ловля палиці, стрибки на координацію «Hexagon Test», біг до 6 позначок «Ghosting». Для визначення рівня технічної підготовленості ми провели такі контрольні вправи: удар «Drive» та удар «volley-drive». **Результати.** Результати рухових тестів на етапі початкової підготовки показали, що більшість юних гравців у сквош мали низький та середній рівні фізичної підготовленості. Руховий тест «Біг на 30 м» показав, що більша половина учасників дослідження мають задовільні результати. Тест «стрибок у довжину з місця» та «човниковий» біг показав низький рівень цього вміння серед учасників тестування. Результат тесту «ловля палиці» показав, що 75% всіх перевірених гравців у сквош отримали задовільний результат. Також низький рівень фізичного розвитку координації виявився після проведення «Hexagon Test», який показав навіть незадовільні результати виконання вправи, що становило 10% від загальної кількості учасників. Технічна підготовка юних сквошистів прямо пропорційно залежить від фізичної підготовленості, але без напрацювання навичок гри у сквош. Тож наступні рухові тести на етапі початкової підготовки дали нам точку відліку, яку необхідно покращити протягом дослідницького періоду. Абстрактно оцінити початковий рівень розвитку тесту «Удар Drive» можна, звернувши увагу на зони, в які найчастіше влучають юні сквошисти. Більшість їхніх ударів – це потрапляння у першу і другу зони оцінки, передньої стінки та довжини відскоку. Лише двом учасникам вдалося кілька разів потрапити в зону найвищого балу, що свідчить про досить низький рівень технічних навичок учасників на початковому етапі підготовки. Аналіз результатів тесту удару «volley drive» показав, що середній результат усіх учасників приблизно 53 удари з forehand та 44 – з backhand протягом 3 хв., що становить 17 та 15 уд/хв відповідно. **Висновки.** Усі результати експерименту, проведеного на етапі початкової підготовки, виявляють необхідність покращити фізичну та технічну підготовленість спортсменів. Вони довели, що юні сквошисти, які не займаються систематично будь-якими видами спорту, мають середній та низький рівні загальної фізичної підготовленості. Технічні ж навички були кращими у кількох дітей, які раніше займалися ракетковими видами спорту, що ще раз доводить, що м'язова пам'ять та фізична підготовленість впливають на результат професійних умінь та навичок гравця зі сквошу.

Ключові слова: сквош, спортсмен, тест, удар, корт.

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]. Analyzing recent studies [5; 19], 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.).

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 [17].

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 [17; 20].

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;

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.

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.

Purpose – to reveal the level of physical and technical preparation of squash players at the stage of initial training.

Material 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.

Observations are distinguished: direct, indirect and self-observation. In our study, we used indirect observation. Indirect observation is a type of observation that does not involve the researcher's direct participation in the process being studied. It is more effective than direct observation, as it makes it possible to record the natural behavior of athletes, making it impossible for the coach to influence 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 meters. 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 (Fig. 1).

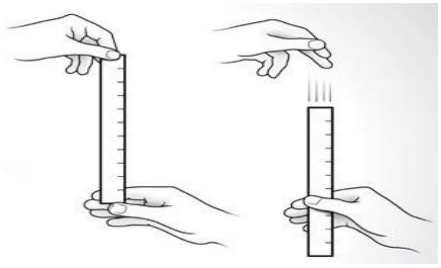

Fig. 1. Catching a stick

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 (Fig. 2).

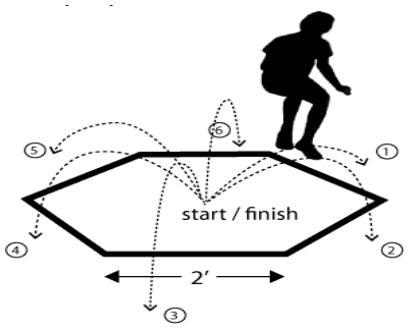

Fig. 2. "Hexagon Test"

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 (Fig. 3).

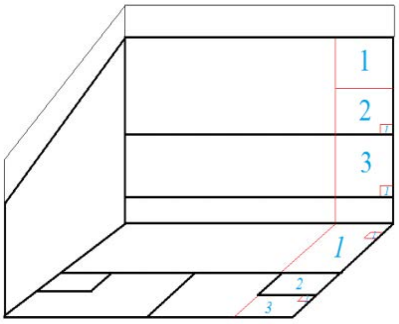

Fig. 3. Hit "Drive"

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 (Fig. 4).

Fig. 4. Volley-drive shot

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. 5).

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;

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:

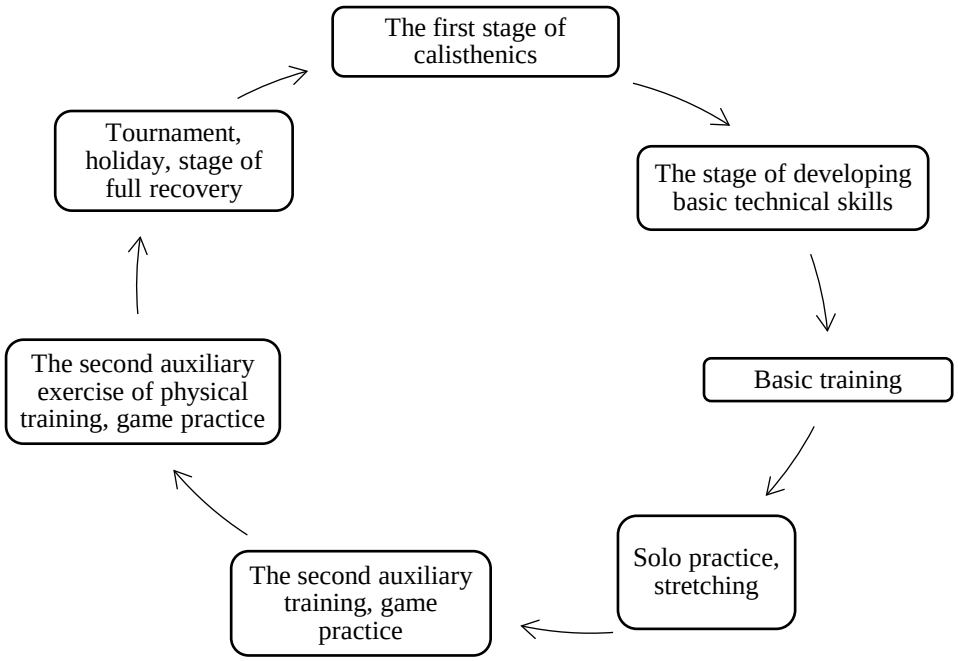

Fig. 5. Cycle of the training process

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.

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 ($\overline{x}$); calculation error of the arithmetic mean value (m). Systematization of the received data was carried out in Microsoft Office Excel spreadsheets. Statistical analysis was performed using the SPSS 22 program.

Results. The literature analysis was carried out taking into account the multifaceted nature of the problem under study. The publications of the world's leading specialists in the field of special physical and technical training of qualified squash players were analyzed. For beginner players, the above factors are not important, but at a higher level of play, when the power and speed of the shots increase, a player with a well-trained and strong body really has many advantages over a weaker opponent. However, even in this case, the speed of reaction and the ability to predict the opponent's behavior, as well as the ability to hit the ball at the last moment in the wrong direction that the opponent could assume, are more important than physical endurance [2; 6].

Squash is considered one of the most demanding sports. According to the latest data [18], one of the most authoritative magazines, "Forbes", interprets squash as a sport that has different requirements for the physical training of athletes. At the same time, the specificity of different sports requires focusing on certain features of physical training, for example, the need for marathon runners to have aerobic training, while squash players need both aerobic and anaerobic training, strength training, speed training, mobility exercises, etc., such thus, it has a complex character [3; 11].

The experience of outstanding coaches reveals the contradiction of approaches to the elementary level of training of young squash players. The well-known coach Philip Yarrow claims that novice athletes should pay special attention to the general training of physical skills [12].

In addition, it is important to develop endurance in combination with speed abilities. On the one hand, some specialists emphasize the importance of developing aerobic endurance [13]. Other specialists claim that a large number of physical exercises reduces the value of the level of initial training of children's sports, which gives pleasure in movements and ensures emotional comfort of children [4].

At the same time, another well-known coach Ian McKenzie claims that at the initial level of training for young squash players, more attention should be paid to the technique of mastering specific elements [10].

No less valuable is the process of mastering tactical thinking, which is important precisely in competitive activities, where the squash player actually demonstrates all his physiological and technical skills. Without tactics, the overall result can be negative, because it is not always enough to perform a blow technically, if the moment is not chosen correctly, for which tactics are responsible. The degree of mastery of applied tactics allows the most effective realization of the level of technical skill of a squash player, therefore these factors are interrelated and the effectiveness of competitive actions depends on them to a decisive extent [7; 16].

The results of motor tests in the initial preparatory period showed that most of the young squash players had a low and average level of physical fitness.

Speed as a motor quality is the ability of a person to perform a motor action in a minimum period of time for the given conditions with a certain frequency and impulsivity [8]. So, speed is one of the main component skills that a squash player needs. The movement test "30 m run" showed that more than half of the study participants have satisfactory results (Fig. 6). Given the speed characteristic of the game of squash and running as an integral part of the game, and running fast is an important skill for a squash player. So the initial test results are unsatisfactory for a successful player.

Fig. 6. Results of the "30 m run" test

In squash, players do not often have to perform jumps, but the ability to perform them significantly improves the athlete's sports form, helps to develop mobility, dexterity and shock-absorbing properties of muscles. After conducting the «long jump from a standing» test, the following results were obtained, which show a rather low level of this skill among the test participants (Fig. 7).

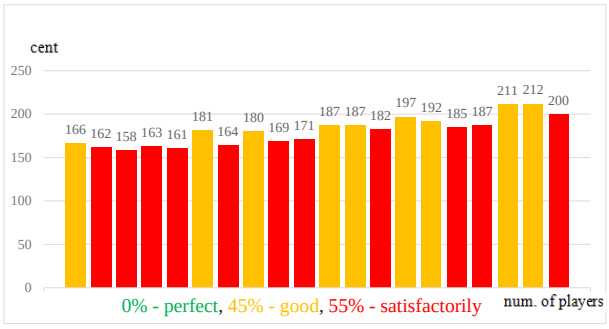

Fig. 7. Results of the "long jump from a standing" test

The use of "shuttle" running helps to increase the muscle mass and explosive power of the legs, which is necessary for the game of squash. This exercise strengthens the work of the heart and respiratory system, increases the overall endurance of the body. Through a quick change of direction – develops coordination and promotes learning to control the process and distribute one's own strength. The practical benefit of this test lies in the all-round physical development of

the athlete, the ability to quickly improve sports form during the recovery period after injuries (Fig. 8) [9].

Taking into account the effectiveness and functionality of this test, the result of 60% of unsatisfactory evaluations from all testing participants indicates a low level of coordination, dexterity and general physical development.

Fig. 8. Results of the test “Shuttle” run 6x8 m

The result of the “catch a stick” test showed a low level of development of the rapid motor reaction of the study participants. 75% of all tested squash players received a satisfactory result (Fig. 9).

Fig. 9. The result of the “catch a stick” test

Also, a low level of physical development of coordination was revealed after the “Hexagon Test”, which revealed even unsatisfactory results of the exercise, which was 10 % of the total number of participants (Fig. 10).

The technical training of young squash players is directly proportional to their physical fitness, but without developing squash skills. So the following movement tests in the initial training phase provided us with a reference point to improve during the research period.

Fig. 10. The result of the test “Jumps for coordination «Hexagon Test»”

It is possible to abstractly assess the initial level of development of the “Strike Drive” test by paying attention to the areas in which young squash players most often hit. Most of their shots are hitting the first and second scoring zones, front wall and bounce length. Only two participants managed to get into the zone of the highest score several times, which indicates a rather low level of technical skills of the participants at the initial stage of training (Fig. 11).

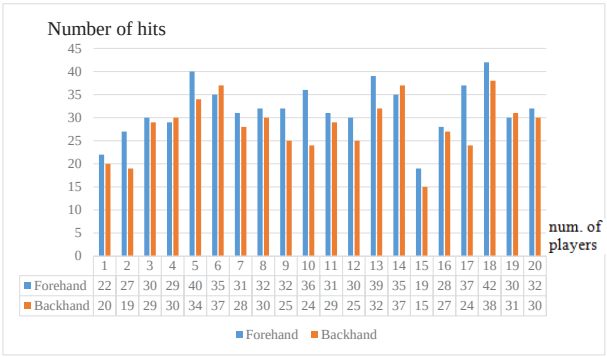

Fig. 11. Results of the “Impact Drive” test

The “Running to 6 marks” test requires participants to demonstrate not only fast running, but also frequent and different stops at the marks, running with their backs forward and a sharp change of direction, which significantly complicates the exercise. Having received the results of the test at the initial stage of preparation, it is possible to analyze the range of time during which the participants performed the exercise, it ranges from 19,9 s to 29,3 s (Fig. 12).

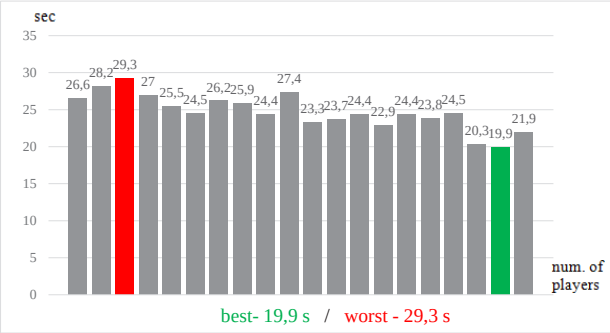

Fig. 12. Results of the "Run to 6 marks" test

The forehand is considered one of the most difficult strokes in squash, but it provides the best feel for ball control and a player's skill level. Regarding the analysis of the results of the volley drive test, it can be concluded that the average result of all participants was approximately 53 forehand and 44 backhand strokes during 3 minutes, which is 17 and 15 strokes/min, respectively (Fig. 13). Judging by this, it can be concluded that the number of blows per minute depends on the level of skill and experience of the player. Because better control of the ball allows you to execute the shot with a higher speed, and therefore, as a result, to get more shots in the specified time. Therefore, this test is not evaluated according to age characteristics, but the initial current result is compared with the past. Therefore, the assessment of the skill level of young squash players took place in a repeated study after completing three training cycles.

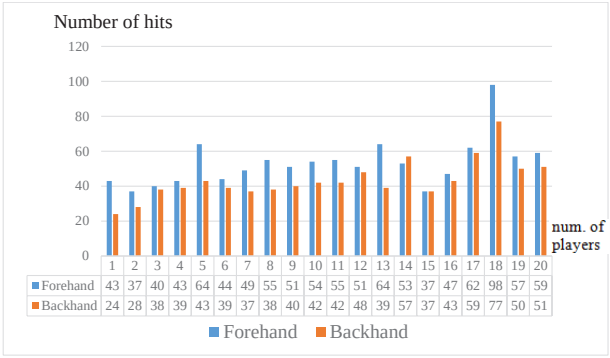

Fig. 13. Results of the "volley-drive" test

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 [9; 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 sport in Ukraine. As noted by scientists [14; 19], 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.

Conclusions. All the results of the experiment conducted at the stage of initial training reveal the need to improve the physical and technical preparation of athletes. They proved that young squash players who do not systematically engage in any sports have an average and low level of general physical fitness. Technical skills were better in several children who had previously played racquet sports, which once again proves that muscle memory and physical fitness affect the result of professional skills and abilities of a squash player.

References

1. Andreeva, R., Perun, A. (2013). The history of the origin and development of squash in Ukraine and the Kherson region. *Physical culture, sport and health of the nation*, 16, pp. 278–283.

2. Baik, M., Polishchuk, L., Nagornaya, V. (2014). Coordination abilities as the main component of the preparation of high-class athletes in game sports (for example, billiards and tennis). *Science in Olympic sports*, (3), pp. 8–12.

3. Boloban, V. (2017). Sovremennye tekhnologii formirovaniya dvigatel'nyh umenij i navykov v processe obucheniya slozhnokoordinacionnym sportivnym uprazhneniyam. *Nauka v olimpijskom sporte*, 4, pp. 45–55.

4. Bondar, I.R., Vinogradskiy, B.A., Pavlova, Yu.O. (editors). (2018). Assessment

of physical preparedness and health of different population groups: monografiya. 132.

5. Borisova, O., Nagorna, V., Shutova, S., Shlionska, O., Mytko, A., Serebryakov, O. (2020). Characteristics of the competitive activity of national teams of Ukraine in sports games on the international arena. *Sports science and human health*, 2(4), pp. 32–9.

6. Deineko, A., Cieslicka, M., Krasova, I., Bilenka, I. (2022). Ukrainian folk outdoor games in the system of physical training acilities for gymnasts aged 6–7 years. *Slobozhanskyi Herald of Science and Sport*, 26(2), pp. 52–57. https://doi.org/10.15391/snsv.2022-2.004.

7. Deineko, A., Prusik, K., Krasova, I., Batieieva, N., Marchenkov, M. (2022). Game stretching as a modern means of developing the flexibility of 5–6-year-old female gymnasts. *Slobozhanskyi Herald of Science and Sport*, 26(3), pp. 88–94. https:/doi.org/10.15391/snsv.2022-3.005.

8. Dolbysheva, N., Kidon, V., Kovalenko, N., Holoviichuk, I., Koshcheyev, A., Chuhlovina, V. (2020). Improvement of technical skills of 14–16-year-old athletes who are engaged in aesthetic group gymnastics. *Journal of Physical Education and Sport*, ® (JPES), Vol. 20 (2), Art 82, pp. 554–563. URL: https://doi.org/10.7752/jpes.2020.02082.

9. Ibragimovich, A.E. (2022). Athletics at a Higher Educational Institution. *American Journal of Social and Humanitarian Research*, 3(10), pp. 83–88. https://doi.org/10.31150.

10. Information site. Retrrieved from: https://uk.wikipedia.org/wiki.

11. Kostiukevych, V.M. ta in. (2018). Teoretyko-metodychni osnovy upravlinnia protsesom pidhotovky sportsmeniv riznoi kvalifikatsii: kolektyvna monohrafiia.

12. Krutsevich, T.Yu. (2018). Theory and methodology of physical education.

13. Krutsevich, T., Trachuk, S. (2017). Normative foundations of the modern system of physical education of different population groups of Ukraine. *Sportivniy visnik Pridniprov'ya*, 1, pp. 184–188.

14. Lochman, V., Tyshchenko, V., Tovstopiatko, F., Pyptiuk, P., Ivanenko, S., Pozmogova, N. (2021). Use of innovative technical means to increase the training process effectiveness in handball. *Journal of Physical Education and Sport* ® (JPES), Vol. 21 (4), Art 215, pp. 1695–1704. Retrieved from: https://doi.org/10.7752/jpes.2021.04215.

15. Platonov, V. (2018). The structure and content of the direct training of highly qualified athletes for the main competitions. *Nauka v olimpiyskom sporte*, 2, pp. 17–41. Retrieved from: https://sportnauka.org.ua/wp-content/uploads/nvos/magazines/NvOS_2018_2.pdf.

16. Platonov, V.N. (2017). Motor qualities and physical training of athletes. Retrieved from: https://www.researchgate.net/publication/323880488_Dvigatelnye_kacestva_i_ fiziceskaa_podgotovka_ sportsmenov.

17. Squash Federation of Ukraine (FSU). Retrieved from: https://squash.ua/.

18. Terekhina, R.N., Medvedeva, E.N., Kryuchek, E.S. (2021). Sports science integration for progress of gymnastics disciplines. *Theory and Practice of Physical Culture*, 10, pp. 9–71. Retrieved from: https://cyberleninka.ru/article/n/sports-science-integration-for-progress-of-gymnastics-disciplines.

19. Trachuk, S., Gen Yan, Mamedova, I. (2020). Experience of testing the physical preparedness of schoolchildren of Ukraine and the People's Republic of China. *Theory and methodology of physical education and sports*, 4, pp. 96–100.

20. Verbitsky, S., Pityn, M. & Karatnyk, I. (2022). Prospects for improving the technical training of volleyball players at the stage of initial training through the use of interactive teaching methods. *Sports Games*, 3(25), pp. 4–16. doi: 10.15391/si.2022-3.01.

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