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Molecular & Cellular Biomechanics 2025, 22(1), 982.
https://doi.org/10.62617/mcb982

Article

The effects of core stability training on stroke accuracy and spin control in tennis players

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CITATION

Chen C. The effects of core stability training on stroke accuracy and spin control in tennis players. Molecular & Cellular Biomechanics. 2025; 22(1): 982. https://doi.org/10.62617/mcb982

ARTICLE INFO

Received: 3 December 2024
Accepted: 27 December 2024
Available online: 8 January 2025

Abstract: Tennis players face many challenges in actual combat, such as fatigue, physical discomfort, unstable sports skills, etc., these factors may affect the performance of athletes. Therefore, core strength training is very important for tennis players. A systematic overview of the theoretical connotation of core stability and the design of a core stability training program for tennis. A sample of 20 tennis players was randomly divided into two groups (experimental and control) and a 16-week double-blind experiment was conducted, in which the experimental group underwent core stability training and the control group underwent traditional training, and at the end of the training, the 20 experimental players were tested for stroke accuracy and spin control. After 16 weeks of training intervention, there was a significant difference between the two groups of athletes in the testing of stroke accuracy and spin control, meeting the $P < 0.05$ condition, and the core stability training was more effective in the application of the athletes' stroke accuracy and spin control.

Keywords: core stability training; stroke accuracy; spin control; tennis players; double-blind experiment

1. Introduction

In recent years, with the promotion of national health sports, the amateur tennis training market has been further developed, and the number of tennis clubs has increased sharply [1–3], tennis has become more and more popular among young people, and the number of people who regard tennis as a form of entertainment and leisure and future employment has risen significantly, and the increase in the number of people engaged in tennis has also provided a new and broader development space for China's tennis industry [4–6].

With the development of competitive sports, the scientific and technological level in competitive sports is getting higher and higher, which makes the athletes' competitive level increase [7,8]. The scientific level of competitive sports is not only reflected in the competitive games, but also in the physical training of athletes. Core training, as a large part of physical training, has also been widely studied at home and abroad. Core stability training is the most basic part of core training, which is commonly used in the training of competitive sports reserves [9,10]. Core stability training is a training method that utilizes the principles of exercise physiology and anatomy. By strengthening the training of core muscles, the balance and stability of athletes can be improved, thus making it easier for them to move to the correct position [11,12]. Therefore, from the scientific point of view, core stability training is feasible for the improvement of mobility, and the training means is operable. In addition, the training time and training intensity can be adjusted appropriately according to the age and level of the trainer to ensure the operability and

effectiveness of the training [13,14].

All sports involve a chain of movements centered on the core muscles, and a strong core plays a role in supporting and stabilizing movement ability and body posture. Tennis cannot be performed by a single muscle group, but rather it uses many muscles in the player's body to work together. The core muscles play a central role in this behavior by coordinating the body and gathering the strength of the whole body [15,16]. For tennis, core stability strength can be increased by proximal fixation, such as the tennis racket swing, volleyball ball, etc., these programs have a "whiplash" action during the force generation process, which requires the participation of core stability strength. It can quickly transfer the reaction force of the foot to the ground through the lower limbs to the upper limbs through the waist and abdomen and through the "whipping" action to utilize the strength of the whole body, according to the research, the core region accounts for 50% of the tennis player's total hitting (forehand hitting) power [17,18].

As the most important hitting technique in tennis, forehand and backhand hitting technique is the most frequently used technique in the game, and the good or bad hitting can often decide the result of a game [19,20]. In tennis, an excellent tennis player can often rely on excellent forehand and backhand techniques to ensure the stability of the ball, so that the ball has a precise landing point, tricky angle, so as to create difficulties for the opponent, forcing the opponent to cause errors, so as to take advantage of the game [21,22]. Therefore, the research of core stability training around tennis hitting accuracy is very necessary.

Good core stability of athletes can help athletes to obtain excellent performance, around the assessment of the impact of core stability on athletes as well as core stability training methods proposed and optimized, many scholars in the field of physical training combined with theoretical analysis methods, literature review methods and empirical comparative research methods to carry out a comprehensive study. Majewska et al. [23] conducted a test study to assess how core stability training affects the movement of tennis players, and based on the results of the study, it was learned that core stability training effectively improves athletes' FMS performance, and at the same time reduces the risk of athletes' injuries. Myers and Kibler [24] describe the core stabilization musculoskeletal components of the body, including the lumbar spine, abdominal wall muscles, posterior extensors, lumbar square muscles, diaphragm, and pelvic floor, which are effective in stabilizing the body's movement stability and balance. Tsartsapakis et al. [25] elaborated on the importance of core stability for athletes and comparatively investigated the effects of one of the trunk stability exercises, muscle thickness of the abdominal and lumbar multifidus (LM) muscles, and found that the hollowing maneuver demonstrated the most pronounced increase in total muscle thickness when performing the Bird Dog and Lateral Plank Support exercises, while the cavitation maneuver was more effective than the brace maneuver in promoting transversus abdominis (TrA) strengthening Effectiveness. Mornieux et al. [26] empirically explored the positive effects of a dynamic and functional core stability (CS) training program on the strengthening of core muscle endurance and strength, which can also be used to explain the more flexible body change of direction in lateral reactive jumps (LRJs), and the study informs research on core stability training in humans. Wang and Li [27] proposed a core strength and

stability training strategy based on tennis players' speed and stroke success rate, and conducted a comparative study to verify the plausibility of the proposed strategy, and the results of the study confirmed the validity of the proposed training program, which improved tennis players' serve rate and stroke success rate. Kumar [28] investigated how sling training affects the core stability and shoulder strength of tennis players, and based on the controlled experimental method, it was revealed that sling training promotes the improvement of shoulder strength and core stability of tennis players. Ahmed et al. [29] systematically reviewed the research on core stability training, pointing out that most of the results of the research have clarified that core stability training significantly affects the athlete's performance, especially for racket sports (tennis, badminton, etc.), and that core stability training is of great benefit to the upper limb kinetic energy. Shi et al. [30] based on random sampling method empirically analyzed the impact of rope skipping training on the dynamic balance of tennis players and the stability of the ball, comprehensive research and analysis of the results can be seen, rope skipping helps tennis players to cultivate the dynamic balance ability as well as the stability of the ball to improve, that can be introduced into the rope skipping training in the tennis special technical training courses.

Ganser et al. [31] introduces a neural network-based tennis stroke evaluation tool, and through practice feedback confirms the reliability of the tool, which can be used to assist tennis stroke analysis and training, in order to promote the improvement of tennis players' stroke level. González et al. [32] examined the correlation between anthropometrics, athleticism, and batting speed and accuracy of tennis players, and analyzed the study in the context of tennis practice, pointing out that the tennis skill level of athletes is reflected in batting speed and batting accuracy. Kwon et al. [33] identified five indicators of racket kinematics and investigated the association between ball topspin angular velocity (TAV) and forehand accuracy through biomechanical experiments and tennis court practice. Based on the correlation analysis, it was learned that the racket head impact angle and the racket head vertical velocity were correlated with the TAV, whereas there was no significant correlation between the measurement of forehand accuracy and the indicators of racket kinematics. Sangkaew et al. [34] tried to analyze the accuracy and speed of tennis landing stroke, and based on the analysis of the results of tennis practice, it was shown that the accuracy of forehand landing stroke was higher than that of backhand, and the speed of forehand was higher than that of backhand, which deepened people's knowledge and understanding of the differences between different landing runs in tennis, and provided certain references for tennis-related training. Delgado-García et al. [35] based on standardized test and video analysis method to study the difference between forehand and backhand in tennis hitting accuracy, found that tennis hitting accuracy shows bivariate normal distribution, similar to other throwing sports, and there are differences in the hitting accuracy of tennis forehand and backhand, and it is considered that it is necessary to take further research to discover the reasons for the bivariate normal distribution of tennis hitting. The performance of tennis players is mainly reflected in the performance of tennis strokes, including stroke accuracy, stroke speed, stroke technique (spin control), etc. Therefore, in the process of tennis training, it is necessary to observe, evaluate and target training of players' stroke performance.

First of all, many studies have shown that core strength training can improve the strength and quantity of athletes in the core area, which directly affects the overall level of play. Therefore, it is necessary to introduce core strength training into the daily training of tennis players. Secondly, compared with traditional strength training, research shows that core strength training has a stronger pertinence, can better improve the athletes' basic physical quality and balance, but it does not mean that it can completely replace traditional strength training. Finally, although many studies have shown that core strength training has a positive effect on the stability of tennis players' shots, there are still gaps in the research on the stability of baseline moving shots.

This study takes the effect of core stability training on tennis players' stroke accuracy and rotation control as the research object, and screens 22 tennis players with the same level of tennis sports from a sports school's tennis team, and further screens 20 athletes among these 22 experimental personnel whose indexes are in line with the requirements of this experiment, setting up the research experimental group and the control group. The basic situation of the 20 tennis players before the experiment is summarized and analyzed to check whether there is any difference in the basic situation, and the test is an important part of the experimental research. After passing the test, the experimental program was formally implemented, and it was verified that the core stability training could effectively improve the tennis players' hitting accuracy and rotation control level.

2. Tennis training guided by core stability theory

2.1. Connotations of core stability theory

The connotation of core stability theory includes three parts: the concept, the classification of the core area, and the exercise methods to improve core stability [36,37]. First applied in the field of medical rehabilitation, focusing on improving the basic core stability of the human body, mostly non-weight-bearing and light weight-bearing functional training methods to help patients in rehabilitation to be used, nowadays, the core stability theory and the combination of strength training and other elements of competitive sports to produce the concept of core strength and related training methods, and this paper mainly explores the core stability training for tennis players to hit the ball with precision and rotation control.

2.2. Functions and roles of core stability training

Functionally, core stabilizing strength allows tennis players to improve accuracy and spin control. Many athletes have strong limbs, but because of the weakness of the core, the accuracy and spin control of tennis players are not high. In specific technical movements, they can't concentrate all their energy effectively, which affects the performance of the overall strength and reduces the efficiency of the application of specialized strength. Uncorrected or even the formation of the wrong stereotype or direct injury, or even lead to athletes after hard work out of the power quality in the game or application process cannot be fully demonstrated, in fact, this is related to the human body's core area of weak muscle power.

Core stabilizing strength can also affect the accuracy and spin control of a tennis

player's stroke through the scope of muscle stabilization and whether or not the application is balanced and coordinated. The stability and balance of the core area is usually the key to special techniques related to the control of the center of gravity, he can make effective synergistic control and response to the various situations encountered in rapid movement, and the formation of a reasonable muscle movement process, coordinated mobilization of all parts of the joint force. This is especially true for many sports that require the whole body to coordinate the force, the same movement surface is no difference, the excellent athletes on the body of the relevant muscle mobilization efficiency is much higher than others, more conducive to improve the accuracy of the tennis player's batting and spin control.

2.3. Forms of delivery of core stabilization training

Core stabilization training should be a new component of teaching and training. First, it is important to ensure that students have an understanding of the specific technique (e.g., tennis) and that the technique is mastered to a certain degree before proceeding to supplemental pedagogical instruction in core stability training and exercises to stimulate proprioception [38]. It helps them to get started quickly and improve their awareness of correct and reasonable movements. Secondly, core stabilization training is only a supplement and improvement of traditional strength training [39]. It can never replace traditional strength training, and should never blindly increase the load of strength training under instability to avoid injury. However, core stabilization training in the development of balance and the development of the deep spine near the control of the body posture of the subtle muscle groups of the exercise, has the advantages of traditional training is incomparable, on the tennis player hitting the ball accuracy and spin control effect is particularly obvious.

2.4. Core stability training methods in tennis

Tennis core stabilization training in general can be classified into several different categories as follows:

First, the category of external conditions (stable or unstable training environment), second, the category of load size (unarmed and weight-bearing), third, the category of movement paradigm direction (one-dimensional unidirectional and multi-dimensional multi-directional), and fourth, the category of the mode of exertion (kinetic, static and static alternating type). In practical application, coaches have two or more comprehensive exercises in addition to training each type separately. It enriches the form of training, and also achieves the training purpose that traditional training cannot reach, and improves the accuracy and rotation control of tennis players.

Tennis core strength is different from the traditional tennis strength training exercises on trunk strength and waist and abdominal strength. It incorporates the characteristics of trunk and lumbar-abdominal strength exercises to a certain extent, but unlike them, the importance of synergistic stabilization of the lumbar spine, pelvis, and hip joints is more clearly defined [40]. The relevance of the middle part of the core to the upper and lower joints is also specified, as well as the prevention and treatment of sports injuries. These are the essentials that are not found in general strength exercises. The training methods of core region strength are mainly divided into the

following two kinds: static (isometric), dynamic (isotonic) and static-motor combination (isometric-isotonic) exercises, regardless of which method is used, the purpose is to strengthen the nervous system through training for the muscular The purpose of either method is to strengthen the nervous system's ability to recruit and synergistically regulate muscle power through training. The achievement of a stable core requires the simultaneous mobilization of multiple muscles according to the needs of different movements. It is important to mobilize the muscles as well as the synergistic muscle groups in order to improve the accuracy and spin control of the tennis player's stroke. These static balances that rely on stabilizing the body in a postural manner are established in favor of improving the economy with which the muscles work. The process relies on the nervous system to accurately recruit muscle strength and coordinate the contraction of muscles to ensure effective execution of the movement. This not only strengthens core stabilization, allowing stability to be maintained for longer periods of time, but also ensures a minimum of unnecessary energy expenditure when the body encounters a similar stabilizing environment.

Tennis core stabilization training loads are mostly carried out with small loads, light weights and some exercise movements to overcome their own weight. The purpose of the training is to establish a connection between the upper and lower extremity muscles, and to build a platform to ensure the transfer of power and articulation. The main way to complete the establishment of this connection is to play the coordinated control of the nervous system, the recruitment of multiple muscles in order to complete the movement. The exercise of this ability must create an unstable training environment or require the practitioner to adapt to the dynamic and equilibrium states of the rapid transition between each other. Therefore, in an uncertain training environment, the load should be reduced accordingly or no load, which can effectively improve the accuracy and spin control of tennis players.

3. Research subjects and methods

3.1. Objects of study

The present study was conducted to investigate the effects of core stability training on stroke accuracy and spin control in tennis players.

3.2. Research methodology

(1) Literature method

According to the demand for information in this paper, with the help of platforms such as Knowledge.com and the library of a teacher training university, a large amount of information required for this paper has been searched and reviewed. A total of 376 pieces of related information and literature on core stability, tennis player's hitting accuracy and spin control were organized, including 137 pieces of literature on core stability, 42 pieces on tennis player's hitting accuracy and 75 pieces on tennis spin control training, which, combined with the knowledge of other related aspects, provide a scientific theoretical basis for this study.

(2) Interview method

This study conducted interviews with relevant professionals and listened to

valuable suggestions for the problems of stroke accuracy and rotation control commonly found among tennis players. The interviews were conducted with 7 professors, 4 associate professors, 9 senior coaches who have been engaged in tennis for more than 15 years, totaling 20 experts in related fields. The interviews provided help and practical suggestions for the experimental design and experimental steps of this study, and laid the foundation for the smooth progress of this study.

(3) Experimental method

From a sports school tennis team screened out 22 tennis players with the same level of tennis sports, including 14 boys and 8 girls. And these 22 tennis players with the basic conditions of the test, the data obtained after the test to collect and analyze, found that the 22 experimental personnel in 20 athletes of the indicators meet the requirements of the experiment, 2 boys do not meet the requirements of the experiment. These 20 people were divided into two groups, one is the experimental group, the specific number of 10, including 6 boys and 4 girls, and the second is the control group number is also 12, including 8 boys and 4 girls. The experimental and control groups were trained for a period of 16 weeks on Mondays, Wednesdays, Fridays and Sundays for core and traditional strength training and the data obtained was analyzed to obtain the data needed for this experimental study.

(a) Experimental design

The main purpose of this experiment is to study the effect of core stability training on tennis players' stroke accuracy and spin control. The experimental steps are divided into two parts, first of all, the basic situation of 20 tennis players before the experiment is summarized and analyzed, combined with the age definition and the principle of tennis players tennis training to the age of 17 years old or less as the cut-off point experimental personnel for the age of 14 years old-16 years old tennis players, and experimental testing of the experimental personnel's hitting accuracy and spin control, the experimental process, experimental group and the control group, except for core During the experiment, the experimental group and the control group had the same training content except for the different core strength training methods. Then 20 tennis players were randomly divided into two groups (experimental group and control group) and carried out a 16-week double-blind experiment, the experimental group carried out core stability training, and the control group carried out traditional training, and at the end of the training, the hitting accuracy and spin control of the 20 experimental personnel were tested, and the data were summarized and analyzed, and the following are the basic data on the age, years of participation in training and the athletes' grades of the experimental and control groups. The basic statistics of the experimental group and the control group are shown in **Figure 1**, where **Figure 1a–c** are the years of training, age, and athlete level, respectively. There is no significant difference between the results of the indicators on the basic situation of the two groups, which satisfies the judgment condition of $P < 0.05$, indicating that the basic situation of the research samples is not statistically significant, so controlling the two groups before the experiment that there is no difference between the two groups on the basic situation is the basis and guarantee to ensure that the experiment is carried out.

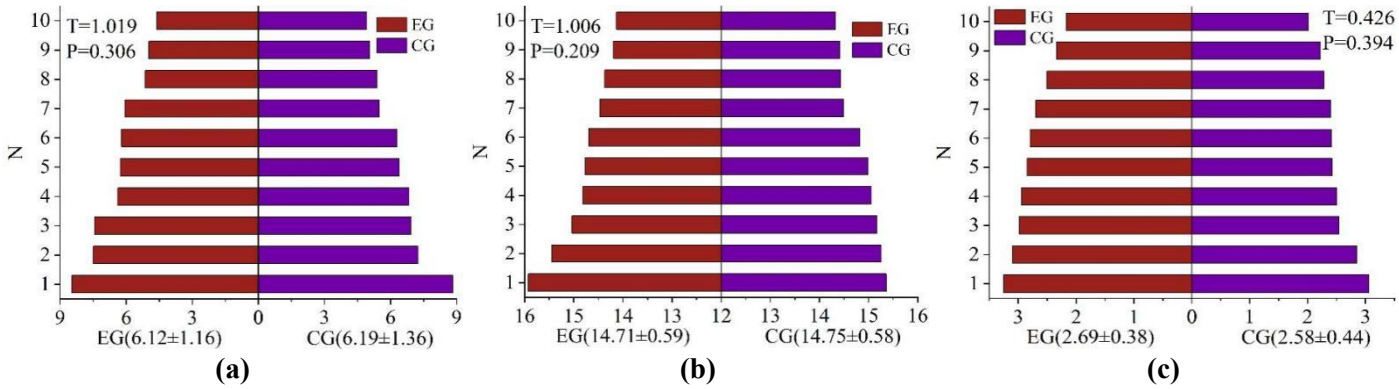

Figure 1. Basic information of experimental group and control group: **(a)** training years; **(b)** age; **(c)** class of player.

(b) Experimental time and place

The experimenters were divided into two groups and trained in a sports school for 16 weeks from June 2020–October 2020, and the athletes were trained on Monday, Wednesday, Friday and Sunday afternoons every week for 45 min.

(c) Experimental equipment

The main equipment for this experiment included several squat barbells, several bench press barbells, one squat barbell holder, one bench press barbell holder, several barbell plates, several dumbbells, one STALKER PRO II radar speed tester, one tee machine, several pieces of tape, a meterstick, a sponge mat, several pieces of yoga mats, 12 Swiss balls, two stopwatches, and eight soccer stakes.

(d) Experimental control

The experimental group and the control group consisted of 20 tennis players from a sports school, and the experimental personnel were all students living in the school, so as to ensure the uniformity of food and accommodation conditions. There is no significant difference between the experimental group and the control group in terms of the number of years of participation in training, age, professional level, these 20 experimental personnel are all instructed by the same tennis senior coach for training, the experimental group for core stability training, the control group for traditional stability training, the two training methods except for the core stability training method is different, the other stability training method is the same intensity, technical teaching and other training content arrangement is the same, to ensure the accuracy of the results of the experimental study. The intensity of the two training methods was the same except for the different core stability training methods, and the technical teaching and other training contents were the same to ensure the accuracy of the experimental results.

(e) Training methods

First of all, sit on the yoga mat with your feet crossed, knees slightly bent, upper body sitting up to maintain a neutral position, waist and abdomen tightened and hands clasped in front of the waist and abdomen. When all members of the experimental group are ready, give the command and turn your hands to the left and right sides.

(4) Mathematical and statistical methods

The data collected in the course of this research were analyzed by using SPSS 20.0 for paired samples *t*-test and independent samples *t*-test, etc., and were presented

with mean, standard deviation, *p*-value, and *t*-value in the writing of this project. Simple data organization was carried out through Origin software and finally presented in graphical form.

4. Study of stability training for stroke accuracy and spin control

4.1. Analysis of the impact of core stability training on stroke accuracy

4.1.1. Pre-experimental tennis players' stroke accuracy test

Before the experiment, two groups of tennis players' fore and backhand baseline in-situ hitting accuracy tests were conducted, and the results of the pre-experimental tennis players' hitting accuracy tests are shown in **Figure 2**, in which EG (experimental group) and CG (control group) denote the experimental group and the control group, respectively. From the results of the pre-experimental tennis players' hitting accuracy test, the two groups of subjects had similar technical scores of hitting accuracy, and the average score of the experimental group's forehand hitting scores was 87.43 ± 3.28, and the control group's score was 86.91 ± 4.68, and the *P*-value of the forehand scores of the two groups after the difference value test was 0.729 > 0.05, which did not have a significant difference. Therefore, the two groups of tennis players' mobile hitting accuracy did not have a technical gap before the intervention experiment, and the next training and testing can be carried out.

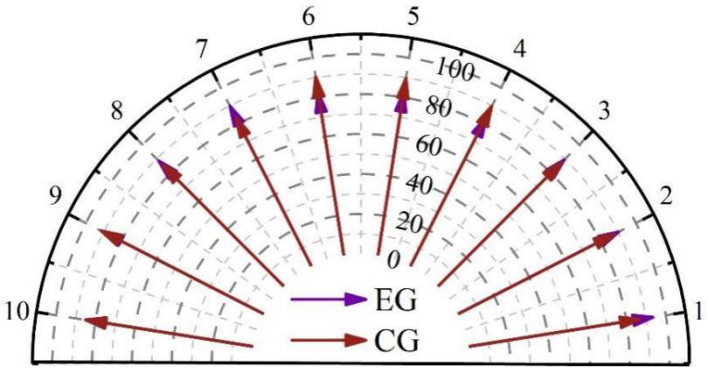

Figure 2. The accuracy test results of the tennis players' shots before the experiment.

4.1.2. Post-experimental tennis players' stroke accuracy test

Similarly, after 16 weeks of intervention experiments, two groups of tennis players were conducted to test the test of hitting accuracy test, the specific test results are as follows, the results of the test of hitting accuracy of tennis players after the experiment are shown in **Figure 3**, where **Figure 3a**,**b** are the experimental and control groups, respectively. From the results of statistical analysis of the data in **Figure 3**, the test results of the two groups of players after 16 weeks of intervention experiment are as follows:

The experimental group of tennis players hitting accuracy performance improvement effect is very significant, performance from the average score of 87.43 ± 3.28 points to 102.28 ± 2.49 points, the performance increase of 16.98%, after the differentiation test, the *p*-value is 0.008 < 0.05, with a significant difference.

In contrast, the control group's bottom line folding running forward and

backward straight diagonal stroke performance improvement effect is not obvious, performance from the average score of 86.91 ± 4.68 points to 88.33 ± 3.19 points, performance increase of 1.6%, after differentiation test, P value is 0.927 > 0.05, does not have a significant difference.

It can be seen that after 16 weeks of intervention experiments, core stability training has a significant effect on tennis players' performance improvement in hitting accuracy, and traditional strength training has little effect on improvement.

In conclusion. Through the controlled experiment, it is proved that core stability training has a greater effect on the tennis player's hitting accuracy performance enhancement, so as to put forward clear precautions for the tennis player's daily core stability training, and provide scientific training methods, which is conducive to the tennis player's reserve talent cultivation and reserve.

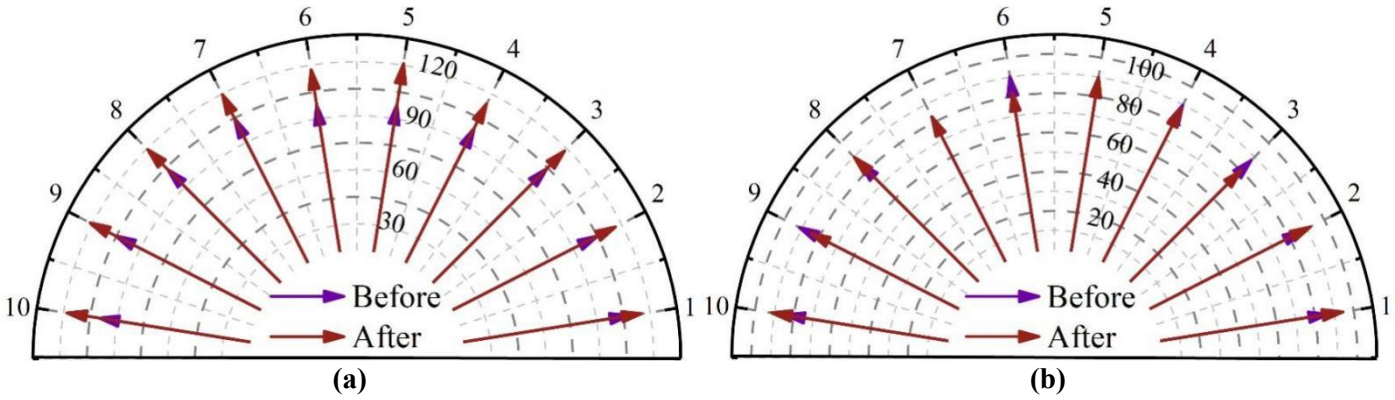

Figure 3. Test results of tennis players' hitting accuracy after the experiment: **(a)** EG; **(b)** CG.

4.2. Effect of core stability training on spin control of the stroke

4.2.1. Pre-experimental spin control test for experimental and control groups

The results of the test of spin control between the experimental group and the control group before the experiment are shown in **Figure 4**, from which it can be seen that the tennis teaching was carried out by the same tennis coach during the experiment to ensure the uniformity of the technical movements taught, and that there was no difference (P = 0.471 > 0.05), and that the spin control of hitting the ball was basically at the same level.

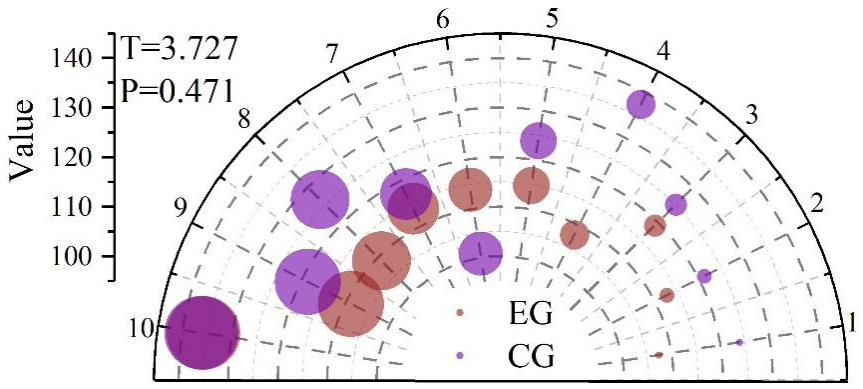

Figure 4. Experimental group and control group rotation control test results.

4.2.2. Tennis ball rotation control test before and after the experiment in the experimental group

The tennis ball rotation control test before and after the experiment of the experimental group is shown in **Figure 5**. After the experiment, the ball speed of the students in the experimental group increased significantly, and the spin control test data increased from 113.23 to 135.45. The analysis of the ball speed data between the pre-experiment and the post-experiment shows that there is a significant difference of $p < 0.05$, indicating that the spin control of the ball striking of the experimental group athletes has been significantly improved after 16 weeks of core stability training. When hitting the ball, many joints and muscle groups of the body are involved, and only when these joints and muscle groups are coordinated and integrated into an effective mechanical "chain of motion" can an effective stroke be accomplished, and the core muscles, which are not involved in the direct force generation, are the intermediate link in the integration of these joints and muscle groups, and they work together with the four limbs to generate force. Tennis hit is the leg stirrups turn force, arm whip force core muscles in this process and will not directly force, but the core parts of the stability of the enhancement can stabilize the core parts of the process of hitting the ball, more through the control of the muscles of the tennis ball rotating, but also as a fulcrum of the power of the ball. The torso is as the proximal attachment point and fixed point of the limbs, giving the support of the limbs movement force, is a kind of foundation, like the relationship between the tip of the whip and the whip pole in daily life. The successful completion of limb movements requires a stable torso as the fulcrum of limb power.

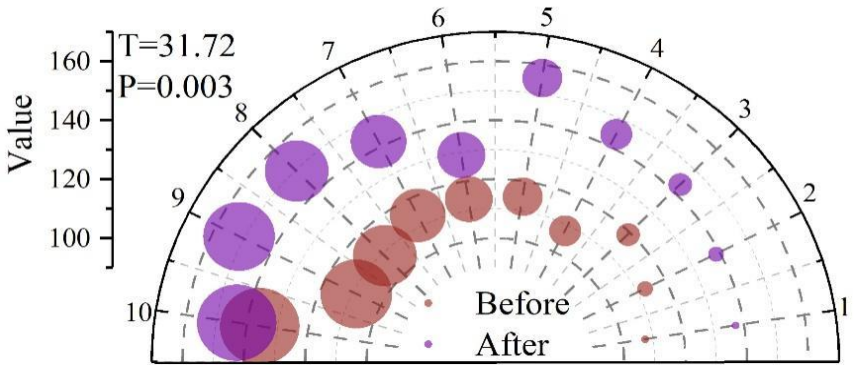

Figure 5. Experimental group before and after the tennis ball rotation control test.

4.2.3. Post-experimental test of spin control in experimental and control groups

The results of the spin control tests of the experimental group and the control group after the experiment are shown in **Figure 6**. The spin control of the tennis players in the control group after the experiment also improved significantly, which proves that the traditional stability training can also improve the spin control of tennis players. The control group tennis players' spin control ability improved, indicating that in the process of tennis spin control, traditional stability exercises also play an important role, traditional stability exercises for the lower limb leg strength, upper limb strength training for improving tennis spin control is very helpful. However, the statistical analysis of the ball speed data of the experimental group and the control

group after the experiment shows that there is a significant difference between the ball speed of the experimental group and the control group after the experiment, and the enhancement of the spin control of the experimental group is significantly higher than that of the control group. It shows that core stability training plays an important role in helping tennis players improve their spin control. Core stability not only maximizes the power from the lower limbs to the upper limbs during the serving process, but also the greater the rotation of the core, the greater the angle of rotation of the body and the power generated, and the more work done on the racket, so as to hit a high-quality rotating ball. As we all know, in tennis hitting, the core muscles do not directly act on the racket and the ball, but the important intermediate medium for transferring power in the whole serving process, in the process of tennis hitting, the effective rotation of the core muscles can increase the distance for the arm to hit the ball, and the larger the distance, the more work, the larger the hitting angular velocity, which corresponds to the tennis ball with a stronger rotation.

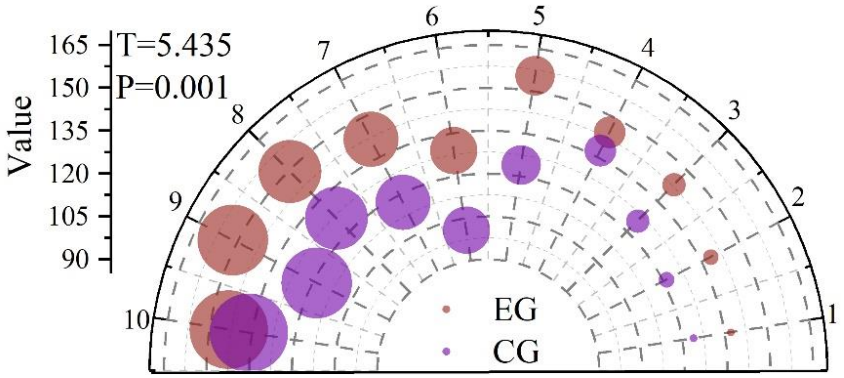

Figure 6. Experimental group and control group rotation control test results.

5. Conclusion

In this study, the effect of core stability training on tennis players' hitting accuracy and spin control was studied, and the data of hitting accuracy and spin control came to be tested by independent samples *t*-test. After the intervention, there was a significant difference between the experimental group and the control group in hitting accuracy and spin control test, $P < 0.05$, indicating that compared with the traditional stability training method, the core stability training method has a more obvious effect on the improvement of tennis players' hitting accuracy and spin control. This study is conducive to the cultivation and reserve of tennis players' reserve talents, and at the same time, it provides certain reference suggestions for tennis coaches to set up daily training programs. The sample selection in this study is limited to students with long training years and mature tennis skills, which may have selective bias and is also affected by factors such as individual differences and regional differences. Therefore, in future studies, it is suggested to expand the sample scope and increase the research objects to reduce sample bias and improve the representativeness and reliability of the study.

Ethical approval: Not applicable.

Conflict of interest: The author declares no conflict of interest.

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