

Feasibility Study on the Implementation of the Two-Phase Teaching Method of "Short Tennis + Standard Tennis" in General Colleges and Universities

Yu Ke¹ & Jiraporn Chano²

¹Curriculum and Instruction Department, Faculty of Education, Mahasarakham University, Thailand

²Faculty of Education, Mahasarakham University. 79/2 Nakhon Sawan Road, Talad, Mueang, Maha Sarakham 44000, Thailand

Correspondence: Jiraporn Chano, Faculty of Education, Mahasarakham University.79/2 Nakhon Sawan Road, Talad, Mueang, MahaSarakhm 44000, Thailand. Tel:66-43-754-321. E-mail: jiraporn.j@msu.ac.th

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Abstract

With the extensive development of various tennis events, tennis is gradually gaining popularity among the masses in China. Many colleges and universities have also introduced specialized tennis courses. However, as the education system undergoes deepening reforms, the traditional teaching methods are no longer able to meet the demands of education. In light of this, we propose implementing the Two-Phase Teaching Method of "short tennis + standard tennis" in colleges and universities to cultivate students' interest in tennis, enhance the overall teaching quality of tennis, and promote its development in the academic setting.

Keywords: college tennis teaching, short tennis, Two-Phase Teaching Method

1. Introduction

The objective of physical education at the college level is to encourage students to engage in their preferred physical activities and develop lifelong habits of physical activity. Physical education focuses on specialization to foster one or more fundamental motor skills or habits. The sports programs offered by colleges and universities are increasingly diverse and aligned with the goals of college physical education. Tennis has become an essential component of college physical education programs. However, due to its unique nature, tennis requires a high level of physical fitness and technical skills, which deter many college students from participating. The traditional teaching methods are also inadequate in meeting the requirements of college teaching reforms. It is therefore crucial to teach college students the technical aspects of tennis and stimulate their interest in the sport. This paper aims to explore the feasibility of implementing the Two-Phase Teaching Method of "short tennis + standard tennis" in colleges and universities by combining the program characteristics of short tennis with the current situation of tennis teaching in China.

2. Method

2.1 Analysis of Concepts

Short-tennis: Also known as mini-tennis, short tennis originated in Sweden in the late 1970s and is primarily used to introduce children and teenagers to tennis. Considering the physical and mental development of individuals and the principle of load capacity, it reduces the size of the court and racket proportionally, providing a more enjoyable tennis experience. Short tennis is recognized as the most effective method of scientifically initiating modern tennis by the leading tennis nations. It was introduced to China in 1993 and was officially promoted nationwide in 1996. It was later determined by the former National Sports Commission to be the Hope Project of Chinese Tennis.

2.2 The Two-Phase Teaching Method

This teaching strategy divides the teaching and learning process into two distinct phases to enhance teaching effectiveness and learning efficiency. The method places emphasis on how different content is addressed in each phase and establishing a meaningful connection between them. The main features of the Two-Phase Teaching Method are as follows:

Introduction and Basic Concepts: In this phase, the teacher introduces the concepts and foundational skills of

short tennis, providing students with necessary theoretical knowledge and background. The aim is to establish a solid technical foundation that enables students to understand and master the theoretical aspects and technical movements of standard tennis.

In-depth Study and Application of Standard Tennis: This phase focuses on a comprehensive study and practical application of standard tennis after students have gained proficiency in short tennis. They delve deeper into learning and practicing various tennis techniques through activities such as multi-ball practice, skill combination practice, and teaching matches. The teacher assumes a more supportive and guiding role during this phase.

2.3 Characteristics of Short Tennis

Short tennis, derived from the principles and mechanics of tennis, encompasses all the attributes of the sport. Its technical movements are consistent with those of standard tennis, with the main difference being found in the size of the court, lighter rackets, and foam-textured balls used. These unique characteristics result in low air pressure, slower ball speed, and lower bouncing height. Short tennis offers greater flexibility in terms of organizing games and defining rules. It can be conducted on open and flat surfaces, allowing for adjustable game duration, scoring system, and formats. Consequently, short tennis is suitable for both tennis beginners and individuals with no prior knowledge of the sport. Once students have mastered the basic skills of short tennis, they can seamlessly transition to standard tennis, with the focus remaining on fundamental skills, fostering a sense of ball control. Additionally, due to its moderate intensity and ease of control, short tennis minimizes the risk of injury and provides an entertaining platform for training tennis enthusiasts.

Table 1. Comparative analysis of the characteristics of short tennis + standard tennis

Characteristics	Standard Tennis	Short Tennis
Game Duration	Games are usually long, with men's matches going three out of five and women's matches going two out of three.	The game duration has been significantly shortened, with the possibility of only one set tiebreaker or two out of three and fewer games won per set.
Scoring System	Traditional scoring system, including Deuce and Advantage.	Possible "No-Ad" scoring system, i.e., in case of a 40-40 tie, the next point will decide the winner directly.
Tie-Break	Usually, start the tiebreaker at 6-6.	The rules may be tweaked, such as starting at 5-5.
Game Format	Single or double matches in a fixed format.	It may include more variations of the tournament format, such as team competitions.
Population	Typically suited to experienced athletes and professional competition.	It is better suited for amateur athletes, children, beginners, and players looking for a fast-paced game.
Pace of Game and Spectacle	The pace of the game is relatively stable, with classic competitive tennis characteristics.	Faster-paced, tighter, and more exciting games for increased spectatorship.
Ease of Organization and Participation	Requires longer games and specialized court setups.	Competitions are easier to organize for time and court constraints.
Court	Length: 23.73 Width: 8.23 Center Height: 0.914	Length: 13.4 Width: 6.1 Center Height: 0.8
Racket Length	Length: 47cm 49 cm 55 cm 57 cm	Length: 27-27.5 cm
Racket Weight	270-320g	160-220g
Ball Material	Rubber liner with plush covering	Sponges

2.4 The Current Status of Tennis Education in General Higher Education Institutions Insufficient Tennis Fundamentals among College Students

Compared to basketball, soccer, table tennis, and badminton, tennis struggles to gain popularity among college students. The sport's requirements for specific facilities, such as tennis courts, and specialized equipment like rackets and balls, pose challenges for its widespread adoption. Many schools, especially at the primary and secondary levels, lack the necessary infrastructure for tennis, thereby limiting students' exposure and access to the sport from an early age. In our interviews with students, we discovered that 95% of them had no prior experience with tennis before entering college. While some obtained limited knowledge through reading

magazines, newspapers, books, and watching television, very few students had practical experience playing the sport. Tennis courts require substantial space and investment for construction and maintenance, making it a "luxury sport" in the eyes of many families and schools due to China's large population. Additionally, public tennis courts are scarce, particularly outside of provincial, municipal, and district sports centers, as well as colleges and universities. Consequently, most college students start their tennis journey from scratch.

2.5 Inadequate Tennis Facilities and Overcrowded Classes

The availability of suitable tennis courts, facilities, and equipment is crucial for improving tennis education in colleges and universities. Tennis imposes strict requirements on court conditions, especially for beginners who rely heavily on the venue for developing their tennis techniques. As the popularity of tennis elective courses grows, many higher education institutions have started offering tennis classes. However, the average class size ranges from 35 to 50 students, with only 2-3 outdoor tennis courts available on most campuses. This means that each court is shared by at least eight students, compromising the quality of tennis instruction. Moreover, some college tennis courts are inaccessible to the public outside of class hours, which not only raises safety concerns but also hampers the effectiveness of practice sessions. The combination of limited court resources and a large number of students results in their movements, racket swings, and ball hits interfering with each other, increasing the risk of accidents.

2.6 Insufficient Physical Fitness of University Students

Upon entering university, students gain more autonomy in managing their daily activities. However, this newfound freedom often leads to irregular work schedules, unbalanced eating habits, and reduced physical activity, all leading to a decline in physical fitness. College students frequently face high academic pressure, particularly during final exams and paper writing, causing them to prioritize academic performance over exercise.

Sedentary lifestyles, including attending classes, studying, and prolonged computer usage, contribute to insufficient physical activity, negatively impacting both health and fitness. With the advancement of technology, college students increasingly rely on electronic devices for learning and entertainment, leaving them with less time for outdoor activities and physical exercise. Unhealthy eating habits, such as excessive consumption of fast food, high-sugar, and high-fat foods, coupled with a lack of sufficient fruits and vegetables, further exacerbate the decline in physical fitness. Additionally, many students lack regular exercise since childhood, and this trend continues into their college years. Poor physical fitness hinders students from developing proper technical movement structures, making it challenging for them to control the ball during practice sessions, resulting in frequent mishits and an increased risk of sports injuries.

2.7 Limited Tennis Culture and Atmosphere

Developing a vibrant sports atmosphere is crucial for engaging participants and spectators, ultimately driving increased participation in sports activities. Basketball, soccer, table tennis, and badminton benefit from vibrant atmospheres in colleges and universities due to their large number of participants and frequent competitions. However, tennis, being introduced later in the academic journey, receives less recognition and promotion of its culture on campuses. Tennis courts lack visible promotional materials in their vicinity, further hampering the development of the tennis atmosphere. In terms of competitions, the need for specific venues and equipment can limit the availability of tennis activities in schools. Apart from the Freshman Tennis Cup organized by individual colleges, there are few tennis competitions, resulting in limited awareness and interest among students.

2.8 Insufficient Tennis Teachers and Limited Specialization

The scarcity of tennis teachers in most colleges and universities poses a significant challenge in the current state of tennis education. Limited opportunities for professional training and certification hinder the development of individuals aspiring to become tennis teachers. Consequently, colleges and universities struggle to attract and retain qualified tennis teachers, leading to educators from other fields, such as table tennis and volleyball, attempting to teach tennis without comprehensive training in tennis techniques or sufficient theoretical knowledge. This lack of specialized tennis teachers negatively impacts the quality and effectiveness of tennis instruction in colleges and universities. The shortage of skilled instructors, combined with a large number of students enrolling in tennis classes and limited court availability, results in overcrowded classes and heavy teaching burdens, ultimately affecting the overall quality of tennis education.

In conclusion, the current situation of tennis education in general colleges and universities in China faces several challenges. These include weak tennis fundamentals among students, inadequate tennis facilities and overcrowded classes, the weak physical fitness of university students, a lack of tennis culture and atmosphere,

and a shortage of specialized tennis teachers with limited specialization.

2.9 Feasibility of the Two-Phase Teaching Method of "Short Tennis + Standard Tennis" National Policy Support

On June 23, 2021, the Chinese Ministry of Education issued the Guidelines for the Reform of Physical Education and Health Teaching (for Trial Implementation), a significant document aimed at deepening the reform of physical education teaching. This guideline emphasizes the integration of physical education with general education and the need for scientific, standardized, and high-quality physical education at all levels and types of schools to promote students' overall physical and mental health development.

The guideline also encourages the adoption of more scientific and standardized teaching methods to enhance the effectiveness of physical education teaching. This includes updating curriculum content, teaching methods, and assessment standards to better align with the needs of students and changing times. Moreover, the guideline emphasizes the multifunctional role of physical education in promoting students' moral, intellectual, physical, aesthetic, and healthy lifestyle development. This policy support and guidance for reforming tennis teaching in colleges and universities and implementing the Two-Phase Teaching Method of "short tennis + standard tennis" provide crucial policy guarantees.

2.10 Characteristics of Short Tennis Program

Short tennis is typically played on a smaller court than standard tennis, allowing beginners to focus on a specific hitting point and requiring less movement. It employs a low-bounce, low-pressure tennis ball that offers a slower and more controllable bounce compared to a standard tennis ball, facilitating the learning of hitting techniques for novices. The pace of play in short tennis is generally slower than in standard tennis, providing college students with more time to react and make decisions, thus improving their technical and strategic understanding. Short tennis has simpler rules and technical requirements, making it easy for novices to learn and master, leading to quick success and enjoyable experiences. It plays a vital role in developing college students' interest and enthusiasm in learning tennis. Short tennis focuses on developing basic hitting skills and coordination, which is especially beneficial for beginners in building a solid foundation. Unlike standard tennis, short tennis does not require as much physical fitness and athletic ability, making it accessible for college students with varying fitness levels. The reduced speed and smaller court size of short tennis also contribute to a higher level of safety compared to standard tennis, minimizing the risk of injuries. Short tennis is an excellent choice for college students to learn and enjoy tennis, particularly suited for mastering tennis techniques, cultivating proper hitting habits, inspiring enthusiasm for tennis, and enhancing the quality of tennis teaching in higher education institutions.

2.11 Anatomical Factors of Movement

From an anatomical perspective, tennis places high demands on the strength and load resistance of the wrist flexor and extensor muscles in the racket holder. For college students learning tennis for the first time, using a large and excessively heavy racket can increase pressure on their forearm muscles. Insufficient strength may hinder students from executing correct hitting movements and gradually lead to an improper movement structure, resulting in sports injuries. Specifically, (1) when serving the ball, the sudden arm twisting and the presence of a heavy racket can cause excessive tension on the inner side of the elbow muscles and ligaments. (2) The wrist extensor muscles, attached to the lateral epicondyle of the humerus through the elbow joint, can be strained due to incorrect posture, improper hitting points, and excessive loads during the learning process. (3) The starting point of the forearm extensor muscle is characterized by chronic cumulative tearing and straining of the radial extensor carpi radialis brevis muscle, leading to adhesions and tissue lesions, which can cause pain in the area of the external epicondyle of the humerus, potentially leading to elbow joint injuries. The use of short tennis teaching, sponge balls, and lighter rackets is beneficial for tennis beginners to learn correct hitting actions. When students have mastered the hitting technique and transition to using standard tennis balls and rackets, their hitting action structure will be stable and the hitting point will be accurate, effectively avoiding sports injuries.

2.12 Course Instructional Design and Organizational Factors

Incorporating the Two-Phase Teaching Method of "short tennis + standard tennis" into the existing school schedule would involve optimizing the teaching content and designing the curriculum to ensure a progressive advancement for students, starting from simple to complex. During training, students can deepen their theoretical knowledge and establish an effective connection with practical application, thereby enhancing and improving their tennis skills. The method allows teachers to tailor instruction based on students' performance, considering their sports foundation, setting effective goals, and implementing hierarchical teaching, which better accommodates students' individual needs.

Short tennis teaching can focus on improving students' basic skills. Once students have mastered these skills, short tennis rules can be used to organize teaching competitions. A standard tennis court can be divided into four short tennis courts, facilitating the participation of more students in sports and providing them with an enjoyable tennis experience. Fun teaching methods are more conducive to maintaining and improving students' enthusiasm for learning tennis.

By designing targeted lesson plans and implementing group teaching for students of different ability levels, the unique characteristics of short tennis + standard tennis can be utilized effectively. Students with strong foundations can smoothly transition to standard tennis after completing short tennis lessons. On the other hand, students who progress at a slower pace can continue to consolidate their basic skills through ongoing short tennis lessons. Allocating part of the court for standard tennis and part for short tennis enhances the flexibility and relevance of the teaching process. This approach allows for differentiated instruction based on students' abilities and improves the overall quality of tennis teaching in colleges and universities.

2.13 Experimental Study

1) Research Subjects

This section describes an experimental study conducted at Xinxiang Medical University. The study utilized random cluster sampling to select two classes from the 2023 tennis elective course, with 30 students in each class. One class was assigned as the experimental group, whereas the other class served as the control group. Prior to the study, both groups of students were complete beginners in tennis. A comprehensive survey and tests were conducted to assess their basic tennis skills and general attributes, such as height, intelligence, and physical fitness. The results showed no significant differences between the two groups, meeting the objectives and requirements of the experimental study. The primary focus of the research was on the techniques of forehand stroke, backhand stroke, service, and movement for beginners.

2) Experimental Method and Design

This study employed a comparative experimental design with an experimental group and a control group. The control group received conventional instruction, amounting to a total of 20 hours. In contrast, the teaching process for the experimental group consisted of two distinct phases.

The first phase involved short-court tennis teaching, utilizing specialized equipment such as short-court tennis rackets, sponge balls, and a reduced-size court. This phase, spanning 10 hours, aimed to cultivate interest, standardize technical movements, consolidate basic skills, and improve proficiency in forehand and backhand strokes, service techniques, and movement skills.

The second phase focused on standard tennis instruction and involved the use of standard adult rackets, standard tennis balls, and a full-size court. This phase also lasted 10 hours and aimed to enhance tennis techniques and tactics, while also promoting a mastery of the essential rules and methods of tennis matches.

Throughout the experiment, both the experimental and control groups received an equal amount of instructional time and were taught by the same teachers.

3) Assessment method

The same assessment method was used for both the experimental group and the control group.

Assessment contents and scoring criteria: The assessment was based on a percentage system with a total score of 100 points: 25% for forehand stroke, 25% for backhand stroke, 25% for service, and 25% for physical fitness.

A. Stroking crosscourt shots with the forehand

Assessment method: In right-handed, for example, the student stood on the side of the Deuce Court near the baseline. The teacher repeatedly and steadily threw the ball in place 8 times, and the student used the forehand stroke technique to stroke the ball to the diagonally defined area (the effective court was the Deuce Court on the opposite side of the net).

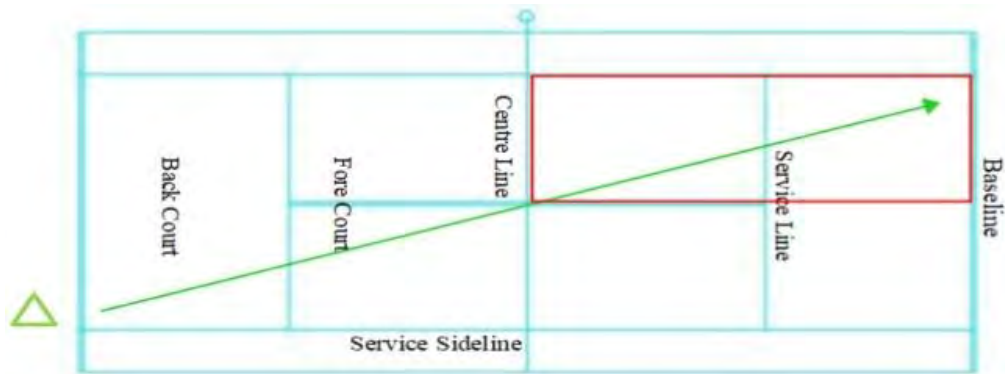


Figure 1. Tennis court's floor plan - Forehand stroke

Table 2. Scoring criteria - Forehand stroke

Score (point)	25	21	18	15	12	9	6	3
Achievements (number)	8	7	6	5	4	3	2	1

B. Stroking crosscourt shots with the backhand

Assessment method: In right-handed, for example, the student stood on the side of the Advantage Court near the baseline. The other student repeatedly and steadily threw the ball in place 8 times, and the student used the backhand stroke technique to stroke the ball to the diagonally defined area (the effective court was the Advantage Court on the opposite side of the net).

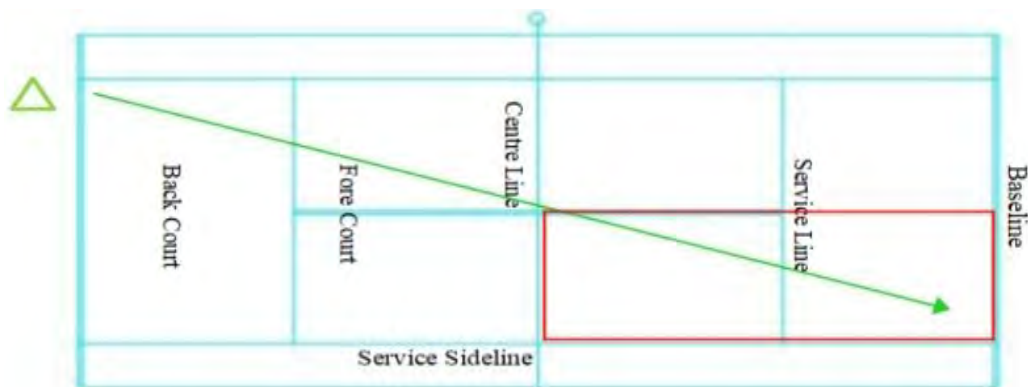


Figure 2. Tennis court's floor plan - Backhand stroke

Table 3. Scoring criteria - Backhand stroke

Score (point)	25	21	18	15	12	9	6	3
Achievements (number)	8	7	6	5	4	3	2	1

C. Basic specialized techniques: service assessment

Assessment method: Following the rules of the tennis service, the student needed to service 8 balls into the effective court (4 in the left court and 4 in the right court).

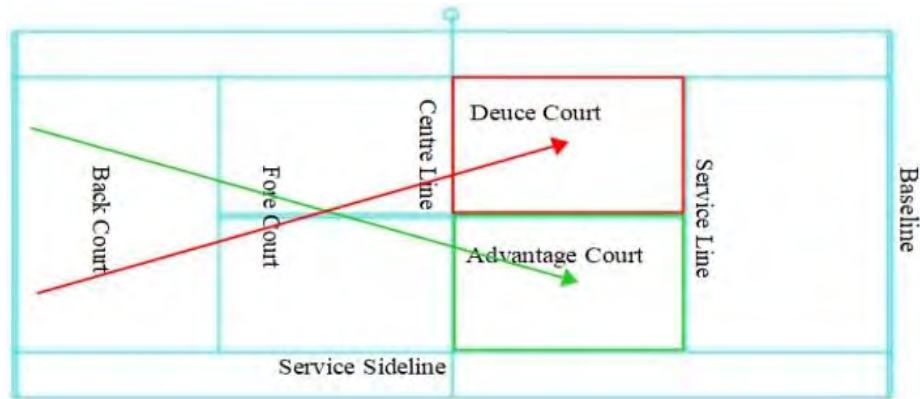


Figure 3. Tennis court's floor plan - Service

Table 4. Scoring criteria - Service

Score (point)	25	21	18	15	12	9	6	3
Achievements (number)	8	7	6	5	4	3	2	1

D. Movement assessment

Assessment method: The time it took for the assessment subject to retrieve each of the 5 tennis balls placed on the court to the specified position.

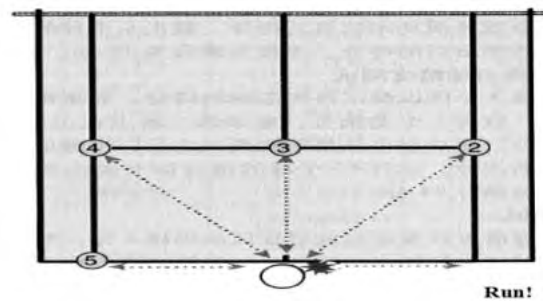


Figure 4. Schematic diagram of the movement assessment

Table 5. Scoring criteria - Movement

Time	30	29	28	27	26	25	24	23	22	21	20	19	18
Score	2	4	6	8	10	12	14	16	18	20	22	24	25

3. Result

3.1 Results and Analysis

Table 6. Experimental results and analysis

Content	Experimental Group	Control Group	P-value
	$\bar{x} \pm s$	$\bar{x} \pm s$	
Forehand stroke	18.83±3.27	15.53±4.1	p<0.01
Backhand stroke	15.8±2.94	10.3±2.91	p<0.01
Service	17.43±3.07	9.93±3.16	p<0.01
Movement	19.23±2.84	14.27±3.18	p<0.01

3.2 Comparison of Performance between the Experimental Group and the Control Group

After one semester of the teaching experiment, an evaluation was conducted to assess the learning outcomes of both the experimental and control groups. The results revealed a significant improvement in the performance of the experimental group across all aspects, with a notable difference ($p < 0.01$) when compared to the control group. These findings highlight the effectiveness of the teaching approach employed in the experimental group.

Upon analyzing the reasons for this discrepancy, it was evident that the teaching process for the experimental group was more systematic. In the initial phase of instruction, short-court tennis was introduced, which effectively reduced the learning difficulty for students. The utilization of sponge tennis balls, known for their lighter weight and lower elasticity, proved to be more suitable for beginners. This approach enabled students to master standard movements, enhance their overall ball sense, and develop a correct hitting mindset. Beginners were able to grasp key elements of the backswing, stroke, and positioning when hitting the ball, laying a solid foundation for accurate positioning and the standardization of their technical movements. Additionally, this teaching method had the dual benefit of increasing students' interest in tennis and boosting their confidence in learning, subsequently facilitating the transition to the subsequent phase of standard ball instruction. The experiment conclusively demonstrates that the teaching process implemented in the experimental group played a crucial role in helping beginners master the technique of the forehand stroke.

4. Conclusion

The reform of tennis teaching is supported by national policy documents. The implementation of the Two-Phase Teaching Method of "short tennis + standard tennis" aligns with the evolving trends in tennis teaching, emphasizing the optimization of teaching methods and the improvement of teaching quality. It presents a novel approach to tennis instruction.

The Two-Phase Teaching Method of "short tennis + standard tennis" effectively reduces the difficulty of tennis introduction, enabling college students to transition smoothly to standard tennis. This method enhances the overall sports experience and stimulates students' interest in learning, while also facilitating the cultivation of proper hitting habits.

From the perspective of sports anatomy and biomechanics, the Two-Phase Teaching Method of "short tennis + standard tennis" is well-suited for the physical qualities of college students who are new to tennis. It aligns with the laws of skill development in sports, offering a solution to many of the challenges encountered in college tennis teaching and ultimately improving teaching quality.

Compared to conventional tennis teaching methods, the design and organization of the Two-Phase Teaching Method provide more flexibility and targeted instruction. This approach allows for the development of tailored tennis teaching based on the specific circumstances of the school.

The Two-Phase Teaching Method of "short tennis + standard tennis" is not only theoretically feasible but also more practical compared to current tennis teaching methods in colleges and universities. However, further research and exploration are necessary in areas such as teaching management, time allocation, and evaluation of teaching outcomes in order to fully harness the potential of this method.

In conclusion, the Two-Phase Teaching Method of "short tennis + standard tennis" offers a promising and innovative approach to tennis instruction in colleges and universities. With its alignment with national policies, emphasis on proper technique development, and practical benefits for college students, this method has the potential to significantly enhance the quality and effectiveness of tennis teaching.

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Data sharing statement

No additional data are available.

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