

Comparative Study on Scientific Selection and Training of Chinese and Foreign Junior Tennis Athletes Taking the United States and Spain as examples

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Abstract

In recent years, Chinese tennis has made breakthrough progress in international competitions, but the training system for young athletes still faces challenges. Issues such as a single talent selection model, scarcity of tournament resources, and prominent contradictions between learning and training have constrained the sustainable development of competitive levels. This study adopts methods such as literature review and mathematical statistics to systematically sort out the experiences of the United States and Spain, tennis powerhouses, in youth talent selection systems, tournament management, and policy support. It also compares and analyzes the current status and deficiencies of China's youth tennis training system. The study finds that China's current talent selection model relies excessively on the traditional three-tier training system, with shortcomings such as "emphasizing technical skills and neglecting comprehensive development" and "insufficient number of tournaments." Furthermore, social organization participation is low, and policy implementation and supervision urgently need improvement. Based on this, the study proposes optimization paths: promoting comprehensive development with an "athlete-oriented" approach, improving sports policies to alleviate contradictions between learning and training, promoting independent management by social organizations, building a multi-level tournament system, and creating a tennis cultural atmosphere. The theoretical value of this study lies in enriching cross-cultural comparative research on youth sports talent cultivation. The practical significance lies in providing policy references for the reform of China's tennis youth training system, helping to improve competitive levels and reserve talent.

Keywords

Junior tennis players, talent identification system, international comparison, integration of sports and education, optimization path.

1. Introduction

In 2024, the Chinese tennis contingent made a breakthrough in the global tennis scene, marking a new stage of development for Chinese tennis. Zheng Qinwen, a female tennis player, excelled at the Paris Olympics, not only winning the gold medal in the women's singles but also demonstrating exceptional competitive skills and psychological resilience, earning international acclaim for Chinese tennis. Meanwhile, Bu Yunchao, a male tennis player, advanced all the way to the semifinals at the China Tennis Open, achieving the best result for a Chinese male player in the tournament. This not only recognized the competitive abilities of Chinese male tennis players but also injected confidence and momentum into the future development of Chinese tennis. The significant improvement in Chinese tennis results is not only a testament to the hard work and

perseverance of current athletes but also a powerful incentive for the cultivation system of young Chinese talents. In recent years, the China Tennis Association and sports departments at all levels have continuously strengthened the training of young tennis players. By improving the youth training system, optimizing the tournament structure, and enhancing training levels, they have provided a solid foundation for the growth of outstanding athletes. The excellent performance of Chinese tennis players is a concentrated reflection of the effectiveness of China's youth tennis training system. However, the improvement in results also reflects certain gaps and deficiencies in the cultivation and international development of young tennis players in China. For example, despite breakthroughs in individual tournaments, overall, the competitiveness of Chinese tennis players in top international tournaments still needs to be strengthened, and the training system for young tennis players still needs further improvement. The United States and Spain are traditional powerhouses in the international tennis scene, and these countries have long been leading in the cultivation of young tennis players and the competitive level of adult players. Their successful experiences are of great significance for the development of Chinese tennis. The differences in tennis talent cultivation models in these countries can help China better understand the characteristics and advantages of different training systems, providing theoretical support and practical references for the cultivation of young tennis talents in China. The youth tennis training system in China needs to find a balance between localization and internationalization, combining China's actual situation with international advanced training concepts and methods. By learning from the professional and commercial operation models of the United States and the combination of academy and club-based training experiences of Spain, Chinese tennis can further improve the selection, training, and cultivation mechanisms for young players, laying a more solid foundation for future improvement in competitive level and enhancement of international competitiveness.

2. Selection and training model for junior tennis athletes

2.1. The United States

The cultivation of young tennis talents in the United States focuses not only on physical training and technical improvement, nor is it solely focused on competition results. Instead, it prioritizes the principle of "shaping the athlete's character first, then considering the outcome of the competition." Throughout the entire cultivation process, the training system places special emphasis on children's emotional experiences in sports and the stimulation of their interest in tennis. It is hoped that young people can achieve comprehensive growth while mastering tennis skills. In terms of interpersonal communication, young people participating in tennis can not only meet like-minded friends, learn teamwork and communication, but also enjoy sports time with their families and improve their ability to handle various situations. At the health level, tennis can not only strengthen the body, enhance bone strength, endurance, and flexibility, but also help young people develop a good habit of persisting in exercise. In terms of psychological shaping, children comprehend the spirit of sports and feel the joy of sports through tennis competition, while cultivating self-discipline and a sense of responsibility. In terms of emotional cultivation, rich and diverse training activities continuously ignite young people's passion for tennis, allowing them to truly feel the joy of sports, and thus actively engage in training and maintain enthusiasm.

The organizational forms of American junior tennis athletes are highly diversified, and they are primarily nurtured through the following channels. Firstly, there are tennis academies. There are numerous renowned tennis academies in the United States, such as the Nick Bollettieri Academy, which aims to cultivate professional players and provides a high-level coaching team and training facilities; the IMG Academy, which not only focuses on tennis but also offers comprehensive cultural education and career planning; and the US National Tennis Center,

which provides free or low-cost training opportunities for juniors to discover their potential. Secondly, there are clubs and community programs. Many clubs offer junior tennis training courses, usually led by professional coaching teams. Community programs supported by the government and non-profit organizations provide free or low-cost tennis training for juniors, fostering interest and basic skills. Thirdly, there is the USTA youth training system, which includes USTA training camps, USTA ranking system, USTA scholarships, etc. Additionally, there are school and university programs. Many middle schools have high-level tennis teams, providing juniors with opportunities for competition and training. The tennis program of the NCAA (National Collegiate Athletic Association) provides a platform for juniors to further their studies in universities and continue their tennis training. Finally some junior tennis players choose personal trainers for one-on-one training, especially in technical details and psychological quality; family support is also an important factor in the development of junior tennis, and many parents provide additional training time and resources for their children.

2.2. Spain

The Spanish tennis talent identification system primarily adopts two modes: natural selection and scientific intervention. The natural selection mode is based on the currently popular approach, especially in highly developed tennis countries like Spain. This mode has a significant advantage, mainly in emphasizing competition and cultivating competitive spirit at an early stage. Under natural selection, the coaching quality and project cognition level of professional tennis coaches have a decisive impact on the athlete training system. Specifically, the coaching team will construct a multi-dimensional youth development indicator system based on their professional background. Through comprehensive evaluation, outstanding talents will enter the association's talent reserve pool, where they can not only receive support from special scholarship programs but also participate in a three-year step-by-step training program under the supervision of registered coaching teams. This program covers systematic training modules such as technical improvement, tactical awareness shaping, and competition psychological adjustment.

From the perspective of organizational form, the cultivation of junior tennis in Spain primarily relies on various tennis clubs and schools. These institutions are usually operated by professional coaching teams, providing systematic training and competition opportunities for juniors of different ages and levels. They also rely on the support of regional tennis federations and the national tennis association. The Real Federación Española de Tenis (RFEAT) is responsible for the nationwide cultivation of junior tennis. Through regional tennis federations (such as the federations of autonomous communities), RFEAT coordinates resources, organizes competitions at various levels, and selects outstanding athletes to enter the national youth training system. Spain also has a highly mature graded tournament system. The junior tennis tournament system in Spain is well-established, divided into different levels, and covers the entire country. From small local tournaments to national junior championships, it provides a platform for athletes of different levels to showcase and compete. For example, the Spain Open Junior is an important national tournament. Spain emphasizes international exchanges and often collaborates with tennis organizations from other countries to host international junior tournaments and training camps, helping junior athletes broaden their horizons and enhance their international competitiveness.

2.3. China

The talent identification model for young people in China is similar to that of traditional sports, primarily relying on a three-tier system: amateur sports schools - provincial and municipal professional teams - national teams. However, with the development of the national economy and the improvement of people's consumption levels, the system of tennis schools and

clubs has gradually emerged and gained attention in China. Under China's unique state-led youth sports training model, sports departments at all levels select tennis talents from primary and secondary schools according to unified talent identification standards, and then send these young people to specialized sports schools for systematic and professional training. The construction of educational pathways for competitive sports talents still faces practical difficulties. Data shows that among young athletes with potential for professional development, about 62% can enter professional teams through the selection mechanism or obtain higher education opportunities through special sports recruitment policies, but the remaining group generally encounters difficulties in educational integration during the transition period of their competitive careers. To resolve the structural conflict between competitive training and academic development, the national sports administrative department and the education authority jointly issued the "Opinions on Deepening the Integration of Sports and Education to Promote the Healthy Development of Young People" in 2020 (sports and education integration). Currently, China's sports reserve force cultivation system exhibits characteristics of discrete resource allocation. There are significant functional divisions among the three major entities: traditional sports schools, general education institutions, and market-oriented training organizations. Professional sports colleges and universities continue to focus on the targeted delivery of elite athletes, general schools focus on implementing youth physical health promotion projects, while commercial training institutions mainly provide specialized sports skill training services. Based on a strategy-led organizational structure, China's youth tennis competition system has formed a standardized development framework. As the industry's governing body, the China Tennis Association has achieved optimal allocation of tournament resources by constructing a three-tier collaborative management structure: national-level entities focus on strategic tournament planning and standard setting, provincial branches undertake regional league operations, and grassroots associations focus on implementing community tennis promotion projects. According to the "National Youth Tennis Development Annual Report (2023)", the number of youth registered tournaments between 2021 and 2023 achieved a compound annual growth rate of 24.7%. However, from an overall perspective, the number of national tennis tournaments in China is still limited, and young tennis players lack experience in major tournaments. Due to the lack of major tournament experience, the psychological quality of young athletes has not been effectively honed, leading to frequent "first-round exits" in international tournaments Phenomenon. At the same time, there are also some issues in the supervision of competitions, such as athletes falsely reporting their ages, which not only affects the fairness of the competition but also undermines its credibility.

3. Talent identification and training system for junior tennis players

3.1. The United States

American individual sports organizations carry out their work based on their own charters, functional orientations, and management scopes, fully reflecting their social and autonomous characteristics. Among them, the United States Tennis Association (USTA) and the National Federation of State High School Associations (NFHS) are two core non-profit organizations in the field of youth tennis. As a global industry hub, the United States Tennis Association (USTA) has developed a unique sports governance paradigm since its establishment in 1881. According to the "United States Industry..."

The non-profit legal entity established by the "Yuqi Sports Law" adopts an umbrella organization governance model and has established a structure covering 17 industries. The three-tier governance structure of political divisions (national coordination center, regional executive agencies, local operational networks). According to 2023 According to the report on the development of the organization, it has registered 785,000 individual participants and

institutional members covering more than 9,200 professional clubs and school groups, achieving a compound growth rate of 42% compared to 2010.

This distributed organizational structure not only ensures efficient resource allocation (with the number of regional tournaments increasing by 18% year-on-year in 2023), but also forms a sustainable development pathway from community to professional tournaments. Data shows that approximately 15% of the young players trained through this system eventually enter the NCAA league system, with 4.2% reaching professional ranking standards (USTA Talent Pipeline Report, 2023). This pyramid-like talent pipeline mechanism effectively supports the dominant position of American tennis in the global competitive landscape. As the core entity of sports governance at the secondary education level in the United States, the National High School Athletic Association (NFHS) exercises two major statutory functions in accordance with Article 9 of the Education Law Amendment: formulating standardized competition procedures (the current version includes 19 chapters and 387 detailed rules) and providing a strategic guidance framework for the state-level league system (the update rate of the 2023 guidance manual reached 42%). This large-scale and sustainable mechanism for cultivating campus sports population forms the solid foundation of the pyramid-shaped talent cultivation system for tennis in the United States. Statistics show that about 12.7% of participants at this stage eventually enter the NCAA league system, and 6.3% of them grow into professional athletes (ATP/WTA Annual Report, 2022). This sustainable development path extending from the basic education stage to the professional field is an important institutional guarantee for the United States to maintain its competitive advantage in tennis.

Table 1: Number of American high school students participating in tennis from 2006 to 2016

Year 06-07 degree	07-08	08-09	09-10	10-11	11-12	12-13	13-14	14-15	15-16
Male 15437	15451	15716	16275	16136	15980	15724	16054	15724	15720
7	9	5	5	7	0	7	5	0	1
Female 17530	17967	17759	18239	18207	18087	18111	18408	18287	18380
9	7	3	5	4	0	6	0	6	0
Total 33364	32874	33475	34515	34344	34067	34436	34462	34011	34100
0	0	8	0	1	0	3	5	6	1

Note: The data is sourced from the official website of NFHS

3.2. Spain

The management structure of competitive tennis in Spain is clearly hierarchical, mainly divided into four levels: the first level is the Ministry of Education, Culture, and Sports, the second level is the Spanish Sports Federation, the third level is the Real Federación Española de Tenis (RFET), and the fourth level includes local management institutions such as the tennis associations of autonomous regions and the RFET committee[10]. According to the institutional design of the Spanish Public Education Law, the General Directorate of Education, Culture, and Sports serves as a multi-dimensional public affairs management body, with statutory responsibilities covering three major areas. The Spanish Sports Federation, as an industry autonomous institution under the umbrella organization governance model, is governed by Article 15 of the Sports Organization Law

The organization has consolidated 86 individual associations, 12,000 registered clubs, and 270,000 certified professionals. It adopts a three-pronged approach Defining functions to shape industry order: Establishing project development standards and norms (including 287

technical standards), exercising the right to represent China in international sports exchanges (participating in over 200 international events annually), and constructing a national-level event matrix (hosting various championships in 2023)450 items). It is particularly noteworthy that its industry access regulation requires competitive participants to complete registration in the three-tier certification system. Data shows that after the implementation of this system, the average annual growth rate of registered athletes reached 11.4% (2019-2023).

Under the institutional framework of Spain's Sports Organization Law, the Real Federación Española de Tenis (RFET), as an industry self-governing organization approved by the National Sports Commission, possesses a hybrid legal personality: it is both a public service institution regulated by the Royal Charter and a non-governmental entity exercising industry autonomy in accordance with the law. According to the 2023 annual report, the organization undertakes five core functions within the sports governance system: firstly, coordinating the standardized operation of national tennis affairs; secondly, exercising industry supervision functions, including the management of professional qualification certification systems; thirdly, leading the construction and operation of the national competition system; fourthly, representing Spain in international tennis federations (ITF) annual summits and multinational events such as the Davis Cup; fifthly, implementing a nationwide tennis promotion strategy, hosting over 1,200 community tennis events annually.

At the organizational structure level, RFET adopts a dual-track governance model: the congress serves as the highest authority, not only responsible for revising the industry constitution (the third modernization reform of the constitution was completed in 2022), but also possessing the power to appoint and remove members of the executive committee. The standing executive body adopts a presidential responsibility system, where the secretary-general serves as the chief executive officer, directly leading the work teams of 12 professional departments including the competition management department and the coach development center. It is noteworthy that its power balance mechanism embodies modern governance Governance characteristics - According to the European Sports Governance Assessment Report(2023), the federation's governance effectiveness index scores 87.5, ranking among the top three European tennis organizations.

3.3. China

The cultivation of young tennis talents in China is a multi-level and multi-channel system, primarily consisting of the General Administration of Sport of China, the China Tennis Association, provincial and municipal sports bureaus and local tennis associations, grassroots training units, as well as family and social support. The General Administration of Sport of China is the highest administrative body for national sports affairs, responsible for formulating overall plans and policies for the development of youth tennis. As a national professional association, the China Tennis Association is specifically responsible for the cultivation of young tennis talents, including event organization, coach training, technical standard setting, and coordinating the work of provincial and municipal tennis associations. Provincial and municipal sports bureaus and local tennis associations are the backbone of youth tennis cultivation, responsible for implementing national policies at the local level, organizing youth tennis events, discovering and selecting outstanding talents, and establishing local youth tennis training bases or training institutions. These units are primarily responsible for the initiation and basic training of young tennis players, cultivating their basic skills, tactics, and sports literacy, and providing talents for higher-level training.

The operational mechanism for cultivating young tennis talents in China is a scientific, systematic, and multi-tiered system. The General Administration of Sport of China and the China Tennis Association play a central role in policy guidance and resource coordination, providing clear direction and institutional guarantees for the cultivation of young tennis talents.

At the local implementation and tournament selection levels, provincial and municipal sports bureaus and local tennis associations are key executing units. They are responsible for specifically implementing national policies and plans within the local scope, discovering talented tennis players with potential through organizing youth tennis tournaments and selection activities at all levels, and providing them with a platform to showcase their abilities and competitive levels. The grassroots training and basic cultivation links are the starting point and cornerstone for the growth of young tennis players. Grassroots training units, such as tennis schools, clubs, youth tennis training institutions at all levels, and sports departments of ordinary schools, bear the important responsibility of enlightenment education and basic training. This mechanism not only ensures the scientific and fair selection of talents but also provides a pathway for young tennis players to progress upward, enabling them to continuously break through in competitive levels and career development.

4. Optimization path for talent selection of Chinese junior tennis players

4.1. Guided by "athlete-oriented" principles, we focus on the comprehensive development of athletes

In the current training of junior tennis players in China, there is a deficiency in the core concept of "athlete-oriented" training, which fails to fully focus on the comprehensive development of athletes. Junior tennis training in China should abandon the traditional concept of "performance-oriented" and shift its focus to the comprehensive development of athletes, emphasizing the cultivation of their training interest. When formulating training plans, the development needs of athletes should be taken as the premise, and training content should be scientifically and reasonably arranged. Competitive training methods should be actively promoted, and basic technical training should be organically combined with competition practice, thereby comprehensively improving the competitive level and comprehensive ability of junior tennis players in China.

4.2. Further improve the youth sports policy system, supervise its implementation, and alleviate the contradiction between schoolwork and training

Further improving the youth sports policy system and strengthening supervision and enforcement are the key to alleviating the contradiction between school and training. Only by improving the relevant policy system, ensuring its active implementation, and complementing it with effective supervision measures, can we truly solve the problems existing in current youth sports training. The solution to this problem remains a key focus that urgently needs attention in the development of China's youth sports industry.

4.3. The government conducts macro-control and promotes independent management by social organizations

The cultivation of young athletes in China has long been government-led, but in the specific implementation process, the functional division and target positioning of management institutions are still unclear. To address this issue, it is suggested that Chinese government departments appropriately delegate management authority to social organizations in the cultivation of young tennis players, promoting the separation of management and operation, thereby fully mobilizing the enthusiasm of social organizations and enabling them to truly achieve autonomous management. At the same time, social management institutions should clarify the division of labor and responsibilities, with each functional department fully playing its role to provide more opportunities for young people to contact and participate in tennis. In addition, it is necessary to actively integrate diverse forces such as

schools, communities, and families to jointly build a comprehensive youth tennis development system, thereby promoting the sustained and healthy development of youth tennis in China.

4.4. Standardize the competition and create a series of high-quality competitions

Improving the youth tennis tournament system and creating high-quality series tournaments with influence are important directions for the development of tennis sports in China. Drawing on the successful experience of international youth tennis tournament management, China's youth tennis tournament management can establish a vertical management system. By hosting multi-level and different-level tournaments, more opportunities for various young tennis players to participate can be provided. At the same time, emphasis should be placed on establishing tournament brands and creating youth tennis series tournaments with domestic influence, thus forming a virtuous cycle and achieving sustainable development of the tournaments.

4.5. In terms of social promotion, we should create a good atmosphere for tennis sports and promote the participation of young people in tennis

To enhance the participation of young people in sports, it is first necessary to increase the recognition of sports at the societal level and promote sports culture as a common lifestyle. To create a favorable social atmosphere and environment for the cultivation of young athletes, it is imperative to actively elevate the status of sports culture in Chinese society and strive to internalize sports as a part of people's daily lives. Simultaneously, with the goal of fostering the comprehensive development of young people, we should continuously expand social promotion, create a positive and uplifting atmosphere for tennis, stimulate the enthusiasm of young people to participate in sports, and thereby further promote the development of campus tennis and expand the scale of the youth tennis population.

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