



**RESEARCH ON THE FITNESS ASSESSMENT
TESTS OF 9-10-YEAR-OLD MALE TENNIS ATHLETES
IN DISTRICT 3, HO CHI MINH CITY, VIETNAM**

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Abstract:

The goal of this article is to identify suitable fitness assessment tests so that a realistic and scientific description of the physical conditioning of male tennis players aged 9 to 10 in Ho Chi Minh City can be provided. The author employed common sports research methods involving document synthesis, interviews, test reliability, and validity to select the 6 most popular tests to quantitatively assess the professional fitness of young male tennis players in District 3, Ho Chi Minh City, Vietnam.

Keywords: professional fitness, fitness test, tennis, Ho Chi Minh City

1. Introduction

Tennis is a ball sport with no direct touch because of the net separation. Its intense rivalry presents itself in both defense and offense, as seen by missed shots and poor scores. According to the regulations, the goal of a tennis competition is to strike the ball over the net and then into the opponent's court with a racket. Athletes are expected to have a good feel for the ball movement and perform a variety of set skills, including the forehand stroke, backhand stroke, overhead smash, ball serve, and so on. At various locations and distances, the athletes must make deft movements in line with the direction, speed, spin, and drop point of the ball. Its objective is to organize a variety of techniques so that the opponent is unable to cope. A typical tennis match is notable for its quick, unpredictable tempo, which is geared toward speed power and speed endurance. As a result, playing tennis necessitates strong mobility abilities to successfully return the opponent's strokes without wasting energy on unnecessary motions.

Physical strength, along with methods, tactics, psychology, morals, and spirit, is one of the most essential aspects that define an athlete's success in modern tennis. There is little question that a tennis player who lacks proper physical condition will not be able

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to compete at a high level, even if his talents are great. Thus, fitness, or physical strength, is a critical component of sports practice and competition, particularly professional fitness. When the athletes' physical conditioning is in good shape, they can maneuver around the court quickly and flawlessly. This is also good for tactics. Players with good fitness may get at the ball's drop point earlier, handle the situation with the greatest accuracy, and then choose the best method to fit the set strategies. As a result, it goes without saying that good knowledge and evaluation of young tennis players' professional fitness is necessary. To do so, the first step is to identify reliable fitness tests that can be used to measure athletes scientifically and precisely in light of their current circumstances and age-related psychophysiological characteristics. Be aware of its importance, this paper was written: "Research on the fitness assessment tests of 9-10-year-old male tennis athletes in District 3, Ho Chi Minh City, Vietnam".

1.1 Objectives

To identify suitable fitness tests to assess the physical conditioning of male tennis players at the age of 9 and 10, who are in the team of District 3, Ho Chi Minh City.

2. Methodology

The researchers made use of document references, pedagogical tests, questionnaires, interviews, and statistical math. The research subjects were 10 male tennis athletes aged 9 - 10 years old in the team of District 3, Ho Chi Minh City. The interviewees were 2 experts, 28 coaches, 7 referees, 3 managers, and 2 tennis instructors in Ho Chi Minh City, Hanoi, Soc Trang, Da Nang, Kien Giang, and Vinh Phuc.

3. Results

Three steps were involved to identify the fitness tests for the research subjects as follows:

Step 1: Synthesize different fitness tests applied to assess the professional fitness of tennis athletes from both domestic and international research works.

Step 2: Questionnaire and interview experts, coaches, and trainers.

Step 3: Test reliability and validity.

3.1 Synthesize different fitness tests applied to assess the professional fitness of tennis athletes from both domestic and international research works

To fully synthesize the available fitness tests, a vast number of papers and research works generated by reputable researchers and organizations from across the world were collected including: Miguel Crespo and Dave Miley (2002), Tran The Giang (2007), Tran Trong Anh Tu (2017), Brian Mackenzie (2005), ITF Advanced Coach Manual (2008), United States Tennis Association (2000), Charles Applewhaite Book (2000), Cao Chi Cuong (2011), Tennis Textbook (2008); Teaching materials of Lam Quang Thanh - Tran Trong Anh Tu (2002); Research works of Pham Ba Cuong (2010), Tran Trong Anh Tu

(2009), Nguyen Tien Tien - Dang Ha Viet (2008), etc. Moreover, the author consulted the selections of tennis players at certain places in Ho Chi Minh City and other provinces and cities where tennis has grown considerably such as Hanoi, Ca Mau, Soc Trang, Da Nang, Kien Giang, Vinh Phuc, and so on.

As a consequence, 15 fitness tests were chosen to assess the professional fitness of tennis players at various ages and genders.

Nevertheless, there are many different fitness test systems with different units of measurement, making it difficult for researchers to choose test items, discuss, and compare the results.

According to Professor and Doctor Le Van Lam, test-makers should consider two more characteristics in addition to test stability, relevance, reliability, and validity: (1) be easy to measure using available units, (2) be possible to compare and evaluate by individual, area, and country.

Based on the above theoretical basis, five criteria were offered to pick the fitness assessment tests:

- Being published in reputable documents from domestic as well as foreign countries and being proven its credibility.
- Having domestic means of inspection to verify and trace.
- Having an official score scale or the representative tennis teams' results around the world to make a proper comparison (the data on high-level athletes of different countries is very rarely published).
- Being capable to assess fully and comprehensively all aspects of the athlete's professional fitness capabilities.
- Being neat, easy to organize and implement, assured the features of professional fitness in tennis and suitable for practical conditions.

From a pedagogical standpoint and pedagogical observation, 15 selected tests all match the requirements outlined above. These assessments may be used to identify the essential professional competencies for the physical development of 9–10-year-old male tennis players in District 3, Ho Chi Minh City.

3.2 Questionnaire and interview with experts, coaches, and trainers

The questionnaire and interview were conducted twice a month apart, with the same assessment method, contents, and participants who were the experts, referees, and coaches. The article then proceeded to examine the outcomes of two interviews using the index χ^2 (when squared) in Table 2.1 to see if they were similar.

Table 2.1 shows both the interviews have χ^2 calculated $< \chi^2$ table (=3.84), which suggests that the difference between the two observations of the sample is not statistically significant at the 5% probability threshold. Therefore, it could be concluded that the experts, coaches, managers, referees, and tennis instructors had a high consensus on their answers.

Table 2.1: Comparison of the results of two interviews of professional fitness assessment tests for 9-10-year-old male athletes in District 3, Ho Chi Minh City

Test		Results				χ^2	P
		First (n = 38)		Second (n= 37)			
		Agree	%	Agree	%		
Test of professional fitness	10m sprint (s)	35	92.11	33	89.19	0.19	>0.05
	20m sprint (s)	28	73.68	26	70.27	0.11	>0.05
	400m run (s)	36	94.74	37	100	2.03	>0.05
	800m run (s)	28	73.68	24	64.86	0.69	>0.05
	High jump (cm)	21	55.26	18	48.65	0.33	>0.05
	Long jump (cm)	38	100	36	97.30	1.03	>0.05
	5-point run (s)	25	65.79	27	72.97	0.46	>0.05
	20-yard run (s)	28	73.68	25	67.57	0.34	>0.05
	Forehand throwing (m)	36	94.74	37	100	2.03	>0.05
	Backhand stroke (m)	6	15.79	8	21.62	0.42	>0.05
	Ante weighting in one minute (times)	28	73.68	22	59.46	1.70	>0.05
	Forward bend (cm)	35	92.11	36	97.30	1.01	>0.05
	Crunch (times)	28	73.68	23	62.16	1.01	>0.05
	Rope jumping in 1 minute (times)	30	78.95	32	86.49	0.75	>0.05
Rope jumping in 2 minutes (times)	28	73.68	27	72.97	0.75	>0.05	

Then, the article would choose the test items that were agreed by $\geq 75\%$ of the interviewees as follows:

- 10m sprint (s);
- Long jump (cm);
- Forehand throwing (m);
- Forward bend (cm);
- Rope jumping in 1 minute (times);
- 400m run (s).

2.3. Test reliability and validity

2.3.1 Test reliability

To measure the reliability of the tests, test subjects were tested twice, the interval was 5 days apart, and the test settings were the same. Then, by using Pearson's formula, the article aimed to determine the correlation coefficient (r) shown in Table 2.2.

Table 2.2: The reliability coefficient of fitness tests to assess professional fitness of 9-10-year-old male tennis athletes in District 3, Ho Chi Minh City

N.	Test	First		Second		r	p
		\bar{X}	δ	\bar{X}	δ		
1	10m sprint (s)	2.07	0.14	2.08	0.08	0.89	<0.05
2	400m run (s)	2.39	0.11	2.36	0.10	0.92	<0.05
3	Long jump (cm)	143.07	10.47	144.73	9.22	0.88	<0.05
4	Forehand throwing (m)	18.80	2.56	18.77	2.58	0.82	<0.05
5	Forward bend (cm)	3.93	3.69	4.33	4.08	0.91	<0.05
6	Rope jumping in 1 minute (times)	70.93	6.37	70.47	5.68	0.86	<0.05

If the correlation coefficient $r \geq 0.8$, $P \leq 0.05$, the test is reliable enough. If the correlation coefficient $r < 0.8$, $P > 0.05$, the test is not reliable.

The outcomes suggest that all the six items of professional fitness tests have sufficient reliability to meet the needs of sports assessment when $r \geq 0.80$, $P < 0.05$.

The reliability coefficient between the two tests could be seen in Table 2.2 ($r > 0.9$ and $p < 0.01$). This demonstrates that the test technique described above is trustworthy and practical enough to evaluate the professional fitness of the research subjects.

2.3.2 Test validity

The goal of test validity is to ascertain the degree of accuracy of each test in determining a certain feature related to quality, aptitude, trait, or other aspects. To check the validity, the author used the Spearman hierarchical correlation formula to calculate the correlation coefficient between the test results and the round-robin competition achievement rankings. The answers are shown in Table 2.3.

Table 2.3: Correlation coefficient between the professional fitness tests and performances of 9–10-year-old male tennis athletes in District 3, Ho Chi Minh City

	Test	r	p
1	10m sprint (s)	0.66	<0.05
2	400m run (s)	0.61	<0.05
3	Long jump (cm)	0.85	<0.05
4	Forehand throwing (m)	0.78	<0.05
5	Forward bend (cm)	0.73	<0.05
6	Rope jumping in 1 minute (times)	0.68	<0.05

As shown in Table 2.3, the six tests all have a good association with the competition performances ($r > 0.6$, $P < 0.05$). Hence, these test items may be stated to be adequately informed and be properly employed in the professional fitness evaluation of young boy tennis players aged 9 and 10 in District 3, Ho Chi Minh City.

In a nutshell, 06 tests were found to be acceptable for assessing the professional fitness of 9–10-year-old male tennis players in District 3, Ho Chi Minh City, through the procedures of document synthesis, questionnaires, reliability, and validity testing.

- 10m sprint (s);
- Long jump (cm);
- 400m run (s);
- Forward bend (cm);
- Forehand throwing (m);
- Rope jumping in 1 minute (times).

4. Discussions

A further discussion on each item of the fitness tests was provided based on the data acquired from the questionnaires and interviews with the experts:

- **10m sprint (s):** This test is meant to evaluate speed, and more especially, explosive agility in a short segment. This is the form of the complicated reflex. It may be separated into two categories: quick reaction to moving things (a ball with varied velocities and directions) and selective reaction to moving objects (the choice of appropriate movements and shots). The latent time of motor response is reflected in all actions that occur before a player makes a striking motion. The latent time of the motor reaction amounts to 10% of the total time of tennis players. This is simply one facet of speed, though. Athletes are believed to first go at least 2 or 3 steps and sometimes more than 10 meters at their fastest speed before making a stroke. This implies the athlete would have to take a few rapid steps to reach the ball. It also denotes a different feature of speed, known as speed quality. When an athlete takes only one step, he or she is said to be moving at a single movement speed. This step is frequently used when the athlete is playing a volley and receives the serve at a high ball speed, forcing the athlete to take a step and strike the ball. When athletes run 2 or 4 steps to hit the ball, however, they find another facet of speed: beginning speed. A frequency of movement or step frequency is necessary when going 6-7 steps or more to reach the ball drop point. Around 18% of competition performance is influenced by speed quality.
- **Long jump (cm):** The test aims to determine the spontaneous strength of lower limbs and back muscles. As widely accepted, tennis is a non-cyclical sport that involves a lot of movement pressure to defend, counterattack, or attack. Thus, the strength of the lower limb muscle groups determines the capacity to accomplish rapid acceleration. Furthermore, the strength and speed with which muscles contract determines running speed or acceleration. In other words, the arms and legs can attain their maximum step frequency, the feet can make the shortest contact with the floor, and the highest pedal power propels individuals ahead. In a nutshell, an athlete's acceleration is determined by both leg and arm strength, hence accelerated strength is required in many sports, even tennis.
- **Forehand throwing (m):** This test focuses on the explosive power of the racquet handle when making ball technical movements. To put it another way, it is a tool for assessing professional tennis strength. The continuous execution of multiple strokes with varying pressure and speed is one of the essential characteristics of tennis competition. Athletes would make between 300 and 1000 strokes every match on average. Movement technique is also influenced by upper limb strength. Without a strong foundation of upper limb strength, the tennis athletes may be hindered from mastering their basic skills and handling the high tempo like momentum movements, and broad momentum. In short, upper limb and muscular endurance are crucial for tennis players to fulfill their range of shots.
- **400m run (s):** This test is applied to assess the speed and endurance of athletes. In terms of speed, a typical tennis match is thought to be highly fast, unstable, and oriented to speed power, and endurance. Because of the ball's complicated spins and numerous variations, the movement distance is not always predictable,

and the manner of movement does not adhere to a set of rules since the velocity appears to be constantly fluctuating. Consequently, an experienced tennis player needs to frequently perform quick moves based on the match's specific scenario or set strategies. In the evaluation of sports in general, and tennis in particular, if the training does not create fatigue, the athlete's physical function will not be improved, as a result, the athlete's talent will drop and his potential will be limited. Therefore, testing the athlete's endurance aims to assess his ability to overcome fatigue as well as his willpower.

- **Forward bend (cm):** This test is designed to evaluate the flexibility, which allows athletes to complete motions with the greatest amplitude. Without flexibility, the amplitude of technical motions will be restricted, which will impair the movement's pace. Statistically, flexibility accounts for 9% of the overall performance.

Athletes competing in tennis are asked to make a variety of strokes of various heights. It necessitates athletes to bend very low and have a great degree of flexibility. Failure to achieve the necessary flexibility is the cause of injuries, muscle strains, and ligaments.

5. Conclusion

With the methods of document synthesis, questionnaires, interviews, reliability, and validity testing, the paper found 06 tests appropriate for assessing the professional fitness of the young male athletes aged 9 and 10 in the tennis team of District 3, Ho Chi Minh City, including:

- 10m sprint (s);
- Long jump (cm);
- 400m run (s);
- Forward bend (cm);
- Forehand throwing (m);
- Rope jumping in 1 minute (times).

Conflict of Interest Statement

The author declares no conflicts of interest.

About the Author

Le Minh Tuan has been a physical education teacher at Ho Chi Minh City University of Physical Education and Sport, Vietnam.

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