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AN INVESTIGATION INTO THE SELECTION OF SPECIALIZED PHYSICAL FITNESS DEVELOPMENT EXERCISES FOR MALE ATHLETES OF THE TRA VINH UNIVERSITY FOOTBALL TEAM

Nguyen Van Chinh[1],
Nguyen Quang Vinh[2i]
[1]Faculty of Physical Education,
Tra Vinh University,
Vietnam
[2]Ho Chi Minh City University of
Physical Education and Sport,
Vietnam

Abstract:
Football has been included in the Olympic Games since 1900. It is considered the "King of Sports" and widely popular worldwide, especially in Europe and the Americas. Modern football demands athletes to have a strong physical foundation. Physical fitness is the primary determinant for modern football players. The purpose of this study is to select specialized physical fitness development exercises for male athletes of the Tra Vinh University football team. To do this, the study utilizes research methods in sports science, including literature review, interviews, pedagogical testing, and statistical analysis. Through these methods, the study identified and selected 18 specialized physical fitness exercises. The results of the training application showed significant improvement in the performance metrics of the research group, with statistically significant growth (sig<0.05).

Keywords: exercise, physical fitness, football athletes, Tra Vinh University

1. Introduction

Football can be traced back to ancient times in the state of Tê in the Warring States period. The modern game of football that we know today originates from Cuju, an ancient Chinese football game recognized by FIFA. Despite facing many challenges over the decades, football has continuously strengthened and expanded across provinces and cities nationwide.

[i] Correspondence: vinhqn@upes.edu.vn

Modern football today demands a high level of physical fitness. To actively participate, both defensively and offensively, throughout the 90 or 120 minutes of a match, players more than ever need to maintain peak physical condition. To outplay opponents in ball contests or with long-range shots that challenge goalkeepers, players must possess robust stamina, maintaining strength throughout the game. High-level players typically cover over 10km, with 80% of that at high-speed bursts exceeding 80 minutes. To effectively execute techniques and tactics in constantly evolving game situations, players must be comprehensively prepared physically. Physical fitness forms the foundation of all football activities. Training the physical attributes of players typically includes speed training, explosive power, agility, flexibility, and endurance, among others. To ensure high and match-appropriate effectiveness in football competitions, the training process for physical attributes must adhere strictly to principles of suitability and comprehensive development. Suitability entails aligning training requirements, objectives, and levels with the characteristics and genders of individual players. Comprehensive development involves harmoniously integrating general and specialized attributes, thereby promoting the holistic development of each attribute, and reinforcing and perfecting others in the process.

Alongside the high achievements in physical education and sports, developing physical education within schools is equally crucial. Physical education is a broad and comprehensive concept that varies across different educational levels and programs. This requires schools to have well-designed teaching programs that not only promote holistic development but also instil a desire for exercise in students.

In line with the general trend of physical education nationwide, Tra Vinh University has gradually enhanced the quality of physical education teaching. Since the academic year 2006-2007, the physical education curriculum has transitioned from compulsory to elective courses. Each elective course includes two basic and advanced modules. In addition to core curriculum activities and extracurricular activities, the university has also established clubs and teams to participate in local tournaments, regional student competitions, and nationwide events. During the observation of training and competitions, there is a subjective assessment that the specialized fitness and technical skills of the male football athletes of Tra Vinh University are still insufficient. Hence, the results of the recent competition have not met expectations despite the team's potential and aspirations. With the aim to assess the current situation and implement specialized fitness and technical development exercises for the male athletes of the Tra Vinh University football team, the goal is to enhance performance and achievements in competitions. Training these football athletes to a level capable of competing in provincial and national tournaments requires coaches to accurately assess each athlete's capabilities and prescribe suitable exercises to improve both fitness and technical proficiency across the team. Given its importance, the team selected the article "An investigation into the selection of specialized physical fitness development exercises for male athletes of the Tra Vinh University football team”

Therefore, the purpose of this study is to select specific exercises to develop specialized physical fitness for male football athletes from Tra Vinh University's football team.

2. Methodology

2.1 Research Design

To address the research objectives, the author utilized the following research methods below:

In terms of literature review method, this method involves gathering information through reading, note-taking, analyzing, and synthesizing relevant literature related to the study. It was employed throughout the research process to compile documents pertaining to specialized physical fitness in football, thereby establishing the theoretical foundation of the article and guiding the selection of research purposes, objectives, and discussion of research results.

Regarding Interview Survey Method: This method involved using questionnaires to gather opinions from experts, professionals, lecturers, and managerial staff with experience in football coaching in Trà Vinh province and some lecturers at Ho Chi Minh City University of Physical Education and Sport, and Ho Chi Minh City University of Sport. Respondents were asked to mark (x) in either of two boxes: Agree or Disagree to select assessment tests and some specialized physical fitness exercises for male athletes of the football team at Tra Vinh University. The interview results led to the selection of specific exercises to develop specialized physical fitness for the football team athletes at Tra Vinh University.

Concerning Pedagogical Testing Method: This method aimed to assess the specialized physical fitness assessment tests for male football athletes of Tra Vinh University, comprising 4 tests: (1) 30-meter sprint (seconds), (2) 25-meter agility run (seconds), (3) 1-minute jump rope (repetitions), (4) Cooper 12-minute run (meters).

2.2 Participants

The research participants are 22 male football athletes from Tra Vinh University's football team for the survey, and 20 professionals, including managers, coaches, lecturers, and referees for the interviews.

2.3 Data Collection

This method involved processing, analyzing, evaluating, comparing, and discussing the data collected in the study using SPSS 20.0 software.

3. Findings and Discussion

3.1 Selection of Specialized Physical Fitness Development Exercises for Male Football Athletes of Tra Vinh University's Football Team

To select a system of specialized physical fitness development exercises for male football athletes of Tra Vinh University's football team, a synthesis of exemplary exercises from published scientific works was conducted. This involved referencing lesson plans and documents containing specialized physical fitness and technical exercises for male football athletes from various authors, including: John Jaman (1976), Nguyen Thiet Tinh (1997), Alagich.R (1998), Nguyen The Truyen, Le Quy Phuong, Nguyen Kim Minh, Nguyen Duc Nhuan, Nguyen Thi Tuyet (1999), Ma Thuyet Dien (2001), Thanh Huyen (2001), Nguyen The Truyen, Nguyen Kim Minh, Tran Quoc Tuan (2002), Vietnam Football Federation (2004), Nguyen Hoang Yen (2015), Vo Van Quyet (2016), Duong Van Hien (2018), Trịnh Hữu Lộc – Ngô Hữu Phúc – Lâm Văn Vũ – Phạm Thái Vinh (2015), "Football Textbook"; Nguyen Quyet Thang (2015), "Research on the Selection and Application of Specialized Physical Fitness Development Exercises for Male Athletes of the Western Construction University Football Team, Vinh Long". Le Ngoc Han Thuyen (2017), "Research on the Application of Exercises to Improve Physical Fitness for the Male Football Team of Tien Giang University after One Year of Training" Nguyen Phuong Lam (2015), "Research on Building a System of Specialized Physical Fitness Development Exercises for U17 Male Football Athletes of Binh Thuan according to the Training Plan".

By synthesizing exercises from these and other sources, the author identified a comprehensive set of specialized physical fitness development exercises tailored for male football athletes at Tra Vinh University.

To proceed with selecting specialized physical fitness development exercises for male athletes of Tra Vinh University's football team, the article follows the following principles:

- **Principle 1:** The selected exercises must clearly aim to develop specialized physical fitness and technique for male football athletes of Tra Vinh University's football team.
- **Principle 2:** Exercise selection must be feasible, meaning they can be realistically performed by the athletes under the training conditions at Tra Vinh University.
- **Principle 3:** The exercises must be effective, meaning they should contribute to the development of specialized physical fitness and technique for the athletes.
- **Principle 4:** The exercises should be diverse to maintain training interest among the athletes.

Through their training and coaching experience, the author has compiled a total of 28 commonly used exercises for developing specialized physical fitness for the football athletes of Tra Vinh University's football team.

3.2 Interviewing Experts and Specialists, the Author Selected a Number of Exercises to Develop Specialized Physical Fitness for Male Athletes of the Tra Vinh University Football Team

Through synthesizing professional literature and research works from scientists, the study identified 55 exercises commonly used to enhance specialized physical fitness and technical skills for football team athletes. To ensure an accurate and objective selection of exercises, the study conducted two rounds of interviews using interview questionnaires. Each interview round was spaced two weeks apart. The results of these interviews on the selection of exercises for specialized physical fitness and technical skills for male athletes of the Tra Vinh University Football Team are presented in Table 1 as follows:

Table 1: Interview results on the selection of exercises for specialized physical fitness for male athletes of the Tra Vinh University Football Team

TT	Test	The results of interview								χ^2	P
		Round 1 (n=20)				Round 2 (n=20)					
		Agree		Disagree		Agree		Disagree			
		n	%	n	%	n	%	n	%		
1	Forward and backward run 10m	17	85	3	15	18	90	2	10	0.23	>0.05
2	Sprint 30m from a standing start	18	90	2	10	18	90	2	10	0.00	>0.05
3	Sprint 60m from a standing start	15	75	5	25	13	65	7	35	0.48	>0.05
4	Push-ups for 30 seconds	19	95	1	5	18	90	2	10	0.36	>0.05
5	Plank	19	95	1	5	18	90	2	10	0.36	>0.05
6	Superman exercise (prone position)	18	90	2	10	18	90	2	10	0.00	>0.05
7	Sit-ups	20	100	0	0	20	100	0	0	0.00	>0.05
8	Back extensions	20	100	0	0	19	95	1	5	1.03	>0.05
9	Body twists	18	90	2	10	18	90	2	10	0.00	>0.05
10	Agility ladder drills	20	100	0	0	19	95	1	5	1.03	>0.05
11	Side shuffles 20m	17	85	3	15	17	85	3	15	0.00	>0.05
12	High knees 20m	16	80	4	20	17	85	3	15	0.17	>0.05
13	Step-ups onto and down from a platform	12	60	8	40	14	70	6	30	0.44	>0.05
14	Box jumps alternating legs	17	85	3	15	19	95	1	5	1.11	>0.05
15	Jump rope	20	100	0	0	19	95	1	5	1.03	>0.05
16	Forward-backward jumps side to side around a ball	17	85	3	15	15	75	5	25	0.63	>0.05
17	Three-step sprint and heading exercise 20m	16	80	4	20	18	90	2	10	0.78	>0.05
18	Squat	16	80	4	20	15	75	5	25	0.14	>0.05
19	Hip flexibility exercises (horizontal sitting - vertical sitting)	17	85	3	15	17	85	3	15	0.00	>0.05
20	Dribble through cones 10m	17	85	3	15	14	70	6	30	1.29	>0.05
21	Dribble through cones 25m	19	95	1	5	20	100	0	0	1.03	>0.05
22	Run 5 rounds x 30m	13	65	7	35	11	55	9	45	0.42	>0.05
23	Run 4 x 10m	17	85	3	15	19	95	1	5	1.11	>0.05
24	800m run from a standing start	11	55	9	45	12	60	8	40	0.10	>0.05
25	1500m run from a standing start	13	65	7	35	14	70	6	30	0.11	>0.05
26	Yoyo run	13	65	7	35	14	70	6	30	0.11	>0.05
27	Cooper 12-minute run	18	90	2	10	19	95	1	5	0.36	>0.05
28	Beep test	16	80	4	20	15	75	5	25	0.14	>0.05

As can be clearly seen in Table 1, it is evident that in all observed results across two interview rounds for the exercises, $\chi 2$ ranges from 0.0 to 1.29 < $\chi 2$ table = 3.84 at the significance threshold P > 0.05, indicating that the differences in the observed values are not statistically significant. Therefore, there is a high consensus among experts, coaches, and lecturers regarding their responses.

In summary, through the two stages of research, the study has identified 28 exercises for developing specialized physical fitness for male athletes in the Tra Vinh University Football Team, including the following exercises:

1) Backward and forward running 10m (2 sets X 1 round, 30-second rest between sets),
2) 30m sprint from a standing start (2 sets X 1 round, 30-second rest between sets),
3) Push-up position hold for 30 seconds (15 sets X 2 rounds, 30-second rest between sets),
4) Plank (45 seconds X 2 sets, 30-second rest between sets),
5) Superman position (45 seconds X 2 sets, 30-second rest between sets),
6) Supine abdominal crunches (25 reps X 2 sets, 30-second rest between sets),
7) Prone back extensions (25 reps X 2 sets, 30-second rest between sets),
8) Hip flexor stretches (5 reps X 2 sets, 30-second rest between sets),
9) Rope ladder sprint (10 reps X 2 sets, 30-second rest between sets),
10) Single-leg hop 20m (2 reps X 2 sets, 30-second rest between sets),
11) Vertical jump 20m (2 reps X 2 sets, 30-second rest between sets),
12) Alternate leg jumps with a bench (100 reps X 2 sets, 30-second rest between sets),
13) Jump rope (1 minute X 2 sets, 30-second rest between sets),
14) Three-step sprint header from 20m (2 reps X 2 sets, 30-second rest between sets),
15) Hip joint flexibility exercises (Squat - Leg press) (2 reps X 2 sets, 30-second rest between sets),
16) Cone weave sprint 25m (5 reps X 2 sets, 30-second rest between sets),
17) 4 x 10m sprints (4 reps X 2 sets, 30-second rest between sets),
18) Cooper test 12 minutes (1 set).

The results above show that football is a complex sport comprising numerous factors (precision technique, diverse tactical strategies, high-intensity physical demands, speed, strength, endurance, coordination, and psychological aspects). It is a direct team sport with many unpredictable and varied elements, highly engaging and emotionally intense. The researched exercises provide the necessary diversity for the various capacities required in football, thereby laying the groundwork for enhancing specialized physical fitness to overcome complex challenges during competitions. Focus on muscle groups such as legs, thighs, back, and abdomen—the core muscle groups—facilitates the execution of different motor skills, thereby contributing to technical development. Through the research steps, it becomes evident that the selected exercises for developing specialized physical fitness for male football athletes at Tra Vinh University are highly diverse, specific to muscle groups and body parts, tailored to skill levels and age groups, and feasible and highly applicable given the available facilities.

3.2. Evaluating the Effectiveness of Specialized Physical Fitness Exercises for Male Football Athletes at Tra Vinh University Football Team

Applying selected specialized physical fitness exercises for male football athletes at Tra Vinh University Football Team.

- **Purpose and Objectives of the Training Plan**
  - **Purpose:**
    - Contribute to stabilizing and enhancing specialized physical fitness and techniques for male football athletes at Tra Vinh University Football Team, laying the foundation for developing a playing style, technical proficiency, and individual movements for each team member.
    - Achieve high performance in competitions.
    - Fulfill the professional tasks according to the plan of the Tra Vinh University Football Team.

  - **Objectives:**
    - Enhance specialized physical fitness and techniques for male football athletes at Tra Vinh University Football Team, establishing a playing style, technical proficiency, and individual movements for team members.
    - Continue developing specialized physical fitness and techniques for male football athletes at Tra Vinh University Football Team.

- **Characteristics of the Training Target**

Tra Vinh University is the regular training site for 22 male football athletes of the Tra Vinh University Football Team.

The training plan for male football athletes at Tra Vinh University Football Team is built upon the following factors:

Based on the research progress and the general plan of the Tra Vinh University Football Team outlined for the year, which includes participating in the National Student Football Tournament around November 2022 and March 2023, here is the training plan for developing specialized physical fitness and techniques for male football athletes at Tra Vinh University Football Team. This plan will span from late August 2022 to the end of February 2023, taking into account the training schedule and the suitability of the athletes.

- **Training Plan Outline**
  - **Time Allocation for Training Content:**

The specialized physical fitness and technique training plan for male football athletes at Tra Vinh University Football Team will span 24 weeks. Training sessions will be held three times a week on Mondays, Wednesdays, and Fridays, with each session lasting 120 minutes. The training will include general fitness exercises lasting from 25-35 minutes and specialized sessions focusing on technique for 35-40 minutes per session.

- **Content Distribution and Time Allocation**

The training plan specifies the allocation of time for each training component, adjusting as needed based on specific training periods without changing the duration of each training component.

- **Distribution of Training Time for Specialized Physical Fitness and Basic Technical Training**

The time allocation for specialized physical fitness and basic technical training will be adjusted according to the training phase:

  - Initial Phase (Late August - September): Emphasis on building foundational fitness and basic technical skills.
  - Pre-competition Phase (October - November): Intensification of technical training to refine skills and prepare for upcoming competitions.
  - Competition Phase (December - February): Maintenance of fitness levels with targeted technical drills tailored to match scenarios and tactical requirements.

This structured approach ensures that the training plan is comprehensive, adaptive, and geared towards enhancing the specialized physical fitness and technical abilities of the male football athletes at Tra Vinh University Football Team, aligned with their competitive goals throughout the specified period.

3.3 Evaluating the effectiveness of specialized physical fitness and technical skill development exercises for male athletes on the Tra Vinh University Football Team

To evaluate the effectiveness of the specialized physical fitness and technical training exercises for male football athletes at Tra Vinh University Football Team, the study assesses the improvement in physical performance over a 6-month experimental period. The performance before and after the experiment, along with the growth in specialized fitness assessment tests for male football athletes at Tra Vinh University Football Team, is presented in Table 2 below.

Table 2: Growth in Specialized Physical Fitness Assessment Tests for Male Athletes of the Tra Vinh University Football Team

TT	Test	Before experiment		After experiment		W%	t	P
		$\overline{X}$	S_x	$\overline{X}$	S_x			
1	30m High Start Run (seconds)	4.40	0.15	4.13	0.13	6.1	16.13	<0.05
2	25m Slalom Run (seconds)	6.44	0.13	6.23	0.10	3.4	13.06	<0.05
3	1-Minute Jump Rope (repetitions)	110.68	4.04	119.82	4.17	7.9	23.71	<0.05
4	Cooper Test 12-minute Run (meters)	2744.6	122.4	2908.1	110.3	6.0	8.94	<0.05
Notes: Df = 21, $t_{0.05} = 2.080$								

As illustrated by Table 2, it is evident that after the experimental period with the specialized physical fitness development exercises for the male athletes of the Tra Vinh University football team, all specialized physical fitness test results for these athletes' showed improvement. This improvement is statistically significant at the $P < 0.05$ level, with an average growth rate of 6.9%. The test with the highest growth rate is the 1-Minute Jump Rope test, with W% = 7.9%. The 25m Slalom Run test showed the lowest average growth rate of 3.4%.

Thus, after six months of implementing a set of specialized physical fitness development exercises for the male athletes of the Tra Vinh University football team, the study found that the athletes' specialized physical fitness performance improved post-experiment. This improvement is statistically significant at the $P < 0.05$ level. This indicates that the selected exercises for developing specialized physical fitness for the male athletes of the Tra Vinh University football team have been effective in enhancing their specialized physical fitness and technical skills.

The results demonstrate that the experimental program was scientifically constructed and adhered closely to the plan. The difference of this program compared to others is shown through the specific arrangement and detailed system of physical fitness development exercises within each curriculum, weekly, monthly, and specific training phases. Each exercise was meticulously determined with parameters such as volume, intensity, repetitions, sets, rest intervals, rest formats, and the sequence of exercise impact, all quantified and standardized appropriately. This is the advantage of this study over other works. After a 6-month experimental period aimed at developing specialized physical fitness for male football athletes from Tra Vinh University's team, the research results indicate significant development and growth in specialized physical fitness for these athletes. This suggests the effectiveness of the 18 specialized physical fitness exercises for male football athletes from Tra Vinh University's team, each exercise contributing to the development and impact on various muscle groups, specialized physical fitness attributes, different techniques, and different athletes, collectively contributing to the overall development and growth of Tra Vinh University's football team.

4. Conclusion

Through the research process, 18 exercises for developing specialized physical fitness for male athletes of the Tra Vinh University football team were identified. The results of applying these 18 exercises in practice showed a positive impact on the specialized physical fitness development of the male athletes in the Tra Vinh University football team.

Conflict of Interest Statement
The authors declare no conflicts of interest.

About the Author(s)

Nguyen Van Chinh completed his Master's degree and has been a physical education lecturer at the School of Physical Education, Tra Vinh University, Vietnam.

Nguyen Quang Vinh is the Vice Principal Ho Chi Minh City University of Physical Education and Sports, Vietnam.

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