



**DEVELOPING SPECIALIZED PHYSICAL FITNESS  
EXERCISES FOR MALE VOLLEYBALL ATHLETES AT VINH  
LONG UNIVERSITY OF TECHNOLOGY EDUCATION, VIETNAM**

**Vo Minh Trung<sup>1</sup>,  
Huynh Hoang Buu<sup>2</sup>,  
Diep Xuan Tai<sup>3</sup>,  
Huynh Hai Son<sup>3</sup>,  
Nguyen Thi Hong Trang<sup>3</sup>,  
Cao Thanh Thuc<sup>3</sup>,  
Nguyen Nhut Khang<sup>3</sup>,  
Tran Hoang Thien<sup>3</sup>,  
Huynh Tan Binh<sup>3</sup>,  
Tran Thong Minh<sup>3</sup>,  
Co Thi Yen Nhi<sup>3</sup>,  
Nguyen Quang Vinh<sup>4i</sup>**

<sup>1</sup>Head,  
Center for Physical Education and National Defense and Security,  
Vinh Long University of Technology and Education,  
Vietnam

<sup>2</sup>Vice Head,  
Center for Physical Education and National Defense and Security,  
Vinh Long University of Technology and Education,  
Vietnam

<sup>3</sup>Lecturer,  
Vinh Long University of Technology and Education,  
Vietnam

<sup>4</sup>Vice Principal,  
Ho Chi Minh City University of Physical Education and Sports,  
Vietnam

**Abstract:**

Volleyball is played between two teams, each consisting of six players on the court. The goal of the game is to send the ball over the net and make it land in the opponent's court. The sport requires its players not only teamwork but also strength and reflexes, which makes physical fitness vital in the success of modern volleyball athletes. Hence, the study aims to select a set of exercises to improve the specialized physical fitness of male volleyball athletes at Vinh Long University of Technology Education, Vietnam. To do it,

<sup>i</sup> Correspondence: email [buuhh@vlute.edu.vn](mailto:buuhh@vlute.edu.vn)

the researchers use methods involving document synthesis, survey, pedagogical testing, experimentation, and statistical analysis. The participants include 20 male volleyball athletes from the university's team and 24 experts and lecturers with experience in volleyball training. As a result, the study successfully selects 25 exercises to develop the specialized physical fitness of the male volleyball athletes at Vinh Long University of Technology Education, Vietnam.

**Keywords:** exercises, specialized physical fitness, male athletes, volleyball, Vinh Long University of Technology Education, Vietnam

## 1. Introduction

Volleyball is a popular team sport enjoyed around the world for its competitiveness, agility, and sense of teamwork. It was invented in 1895 by William G. Morgan in the United States and was originally called "mintonette." Over more than a century of development, volleyball has become an official Olympic sport and is now widely included in physical education programs across schools and universities.

Performances of the players are determined by a range of abilities, among which physical fitness serves as the foundation. It plays a critical role in supporting and enhancing other components of competitive capacity, such as technical and tactical skills. A solid foundation in physical fitness is essential not only for developing technique and strategy but also for sustaining and improving performance levels [1], [2]. Competitive capacity is a comprehensive combination of qualities that every athlete must develop to achieve high-level performance. These abilities directly contribute to favorable changes in the athlete's overall skill development. In volleyball, three key elements, namely physical fitness, technical skills, and tactical execution. They are considered more essential than other factors such as psychological readiness, physiological function, or cognitive ability.

The increasing standards of high-performance sports today demand that athletes in all disciplines possess advanced levels of physical fitness. Achieving top results in any sport is now seen as inseparable from a high level of physical preparedness. This reality pushes both athletes and coaches, especially in team sports like volleyball, to continuously seek the most effective training solutions and find ways to integrate physical fitness development with sport-specific training [3], [4].

Modern volleyball competition is becoming more intense and fast-paced, requiring athletes to perform at high physical capacity. Key fitness attributes such as explosive power, quick reaction time, coordinated movement, flexibility, agility, and precision are vital. It is widely admitted that physical fitness is the primary foundation for competitive success in volleyball [5]; hence, preparing for performance involves both general physical fitness and specialized physical fitness.

Following the regulations set by the World Anti-Doping Agency, the primary limiting factor for achieving high-level athletic performance, especially on the international stage, lies in the athlete's level of physical fitness and functional capacity [3], [6].

Volleyball is a non-cyclic sport. During a match, players rotate continuously through designated positions from the back row to the front row. This constant shift between defensive and offensive roles requires each player to be comprehensively prepared in both attacking and defending skills. The rule of rotation means that teams must prepare six different formations for serve-receive-attack, and defense-counterattack. For this reason, elite teams tend to specialize their players' functions according to tactical needs. Each tactical position demands a different set of movement models, which leads to varying requirements in strength, speed, and agility.

The fundamental nature of volleyball competition lies in the direct confrontation between attack and defense, primarily through spiking and blocking at the net. Therefore, height, vertical power, muscular strength, and speed are essential for players. Ball contact in volleyball occurs almost exclusively with the hands, without holding the ball, and is limited by a set number of touches before it must be returned over the net. As such, advanced technical and tactical skills are crucial for elite players.

In modern volleyball, offensive play has significantly outpaced defensive capability. The speed and force of spikes and serves are increasingly difficult to react to, especially as the ball trajectory often exceeds the visual tracking and reflex capacity of both front- and back-row defenders. This results in frequent interruptions in play, with ball-in-play time often shorter than the recovery period between rallies.

Volleyball is played on a relatively small court with many players, and the ball moves extremely fast. At the elite level, the speed of spikes and serves can exceed 130 km/h for men and 100 km/h for women. Therefore, the ability to anticipate, move quickly, and coordinate effectively with teammates becomes vital. Furthermore, matches are not time-limited, and point margins between winning and losing teams are often narrow. To meet these demands, athletes must also possess strong psychological resilience, cognitive ability, and tactical thinking [7], [8], [9], [10].

Physical fitness is the foundation for performing technical and tactical skills in volleyball. Enhancing fitness levels to meet the demands of competition has become one of the key trends in modern volleyball training [11], [12], [13]. To develop it effectively, exercises should be appropriate to the characteristics of the target group and the specific training phase. This had motivated the researchers to carry out the study below. "Developing Specialized Physical Fitness Exercises for Male Volleyball Athletes at Vinh Long University of Technology Education, Vietnam".

## **2. Methodology**

### **2.1 Research Methods**

#### **2.1.1 Document Synthesis**

This method is used to gather and synthesize information from both domestic and international sources. Through the analysis and integration of relevant materials, the study establishes a theoretical foundation, formulates scientific hypotheses, and identifies key research objectives. This method also helps to verify and interpret the results during the research process.

#### **2.1.2 Survey**

This method is to collect the agreements from experienced specialists, coaches, and professionals in volleyball training. Their responses were to help select and validate exercises aimed at improving the specialized physical fitness of male volleyball athletes at Vinh Long University of Technology Education, Vietnam.

#### **2.1.3 Pedagogical Testing**

This method is used to assess the athletes' specialized physical fitness at both the initial stage and after the treatment intervention.

#### **2.1.4 Pedagogical Experimentation**

This method aims to test the effectiveness of the selected exercises. A parallel comparative experimental design is used, with a sample of 20 male volleyball athletes from the university divided into two groups: an experimental group and a control group. The experimental period lasts 8 months and is conducted at the university.

#### **2.1.5 Statistical Analysis**

Collected data were processed and analyzed using statistical formulas, with the support of SPSS version 24.0.

### **2.2 Participants**

#### **2.2.1 For the Experiment**

20 athletes of the men's volleyball team at Vinh Long University of Technology and Education, Vietnam.

#### **2.2.2 For the Survey**

24 experts and lecturers from universities who are experienced in training volleyball.

### 3. Results and Discussion

#### 3.1 Selection of Exercises to Develop Specialized Physical Fitness for Male Athletes of the Volleyball Team of Vinh Long University of Technology and Education, Vietnam

In order to select exercises to develop specialized physical fitness, the researchers conduct the following steps:

- **Step 1:** Collect fitness exercises from research works of domestic and foreign papers of Nguyen Thanh Lam (1998) [14], Charles H. Cardinal (1998) [15], Tran Duc Phan (2001) [16], Nguyen Huu Hung (2001) [17], Bui Trong Toai (2006) [18], Tran Thanh Tuyen (2011) [19], Nguyen Thi Kieu Thu (2017) [20], Phan Ngoc Huy (2017) [21], Do Xuan Duyet (2018) [22], Tran Thi Cang (2021) [23].

The selected exercises must meet the following three principles:

- They must be suitable for the practical conditions and training facilities available at Vinh Long University of Technology Education (e.g., courts, equipment, etc.).
- They must align with the physiological characteristics and skill levels of the target population.
- They must be effective in enhancing the specialized physical fitness of the university's male volleyball team.

Based on these principles, the selection of exercises is carried out through the following steps:

- 1) **Step 1:** By reviewing relevant literature and observing volleyball training sessions, the researchers compile an initial list of 40 exercises.
- 2) **Step 2:** From this compiled list, a survey form is created and used in two rounds of expert surveys, with 15 days apart. The process uses the same set of exercises, the same group of participants, and consistent responding methods.

The survey participants include 24 experts and lecturers with extensive experience in selecting and training volleyball athletes. The results of the survey are presented in Table 1.

**Table 1:** Results of the expert survey on selecting exercises to develop specialized physical fitness for the male volleyball team at Vinh Long University of Technology Education, Vietnam

No.	Exercise	1st (n=24)		2nd (n=24)		Average (%)
		Agree	%	Agree	%	
1	Alternating split jumps	17	70.83	18	75	72.92
2	Continuous high-knee jumps	19	79.17	20	83.33	81.25
3	Inward high-knee jumps	15	62.5	17	70.83	66.67
4	Frog jumps for 30 meters	17	70.83	17	70.83	70.83
5	Continuous box jumps on a 60cm platform for 1 minute	18	75	19	79.17	77.08
6	Single-leg zigzag hops	16	66.67	18	75	70.83
7	Double-leg zigzag hops	23	95.83	23	95.83	95.83
8	Continuous block jumps	19	79.17	18	75	77.08
9	Block jump followed by dive and roll for dig	22	91.67	23	95.83	93.75
10	Approach jumps to touch the basketball rim	18	75	19	79.17	77.08
11	Drop jump from box, followed by a hurdle jump	14	58.33	16	66.67	62.5
12	92m Illinois agility run	21	87.5	23	95.83	91.067
13	Variable-speed running 4 x 100m	23	95.83	23	95.83	95.83
14	30m sprint	19	79.17	22	91.67	85.42
15	60m sprint	15	62.5	15	62.5	62.5
16	9-3-6-3-9 agility run	24	100	24	100	100
17	1500m run	22	91.67	23	95.83	93.75
18	Pull-ups (front grip)	13	54.17	12	50	52.08
19	Pull-ups (behind-the-neck grip)	12	50	14	58.33	54.17
20	Lateral shuffle for forearm passing	17	70.83	18	75	72.92
21	Run from the baseline to dig a short drop ball	22	91.67	22	91.67	91.67
22	Lateral block movement across positions 2, 3, and 4	15	62.5	17	70.83	66.67
23	Repeated step jumps in 1 minute (from hole or box)	17	70.83	18	75	72.92
24	Continuous spiking: 15 spikes from position 4	20	83.33	19	79.17	81.25
25	Standing two-handed basketball throw over the net	21	87.5	21	87.5	87.5
26	Wheelbarrow walk (with hands)	17	70.83	16	66.67	95.75
27	Barbell step-ups	23	95.83	23	95.83	95.83
28	Barbell lunges (light weight, 10 reps)	19	79.17	22	91.67	85.42
29	Barbell squats - 15 repetitions	24	100	23	96	97.92
30	Barbell split jumps with 10kg bar	24	100	24	100	100
31	Hanging leg raises on stall bars - 20 reps	17	70.83	18	75	72.92
32	Resistance band pulls behind the head with both hands	22	91.67	24	100	95.83
33	Spike jump	20	83.33	20	83.33	83.33
34	Stair jumps	21	87.5	23	95.83	91.67
35	Jump rope	19	79.17	22	91.67	85.42
36	Push-ups	16	66.67	17	70.83	68.75
37	Decline push-ups (feet on bench)	18	75	18	75	75
38	Supine barbell press	22	91.67	23	95.83	93.75
39	Barbell clean to chest	17	70.83	15	62.5	66.67
40	Forward roll combined with approach and jump throw over the net	21	97.5	23	95.83	91.67

Based on the results from Table 1, the study selects exercises that achieved a total score greater than 75% in both rounds of the expert survey. Following this principle, 25 specialized physical fitness exercises are chosen for the male volleyball team at Vinh Long University of Technology Education, Vietnam.

## **3.2 Evaluation of the Effectiveness of Selected Exercises for Improving Specialized Physical Fitness in Male Volleyball Athletes at Vinh Long University of Technology Education, Vietnam**

### **3.2.1 Experimental Program**

Based on the training schedule of the men's volleyball team at Vinh Long University of Technology Education, and the set of 25 exercises derived from the survey, the researchers implemented an 8-month training program with the chosen exercises integrated into the regular training sessions. Training is held three times per week, and in each 90-minute session, four selected exercises are applied over 45 minutes. The exercises are applied only to the experimental group, while the control group continues training under the standard program.

#### **3.2.1.1 Participants**

A total of 20 male volleyball athletes from the university team, divided into two groups, namely the experimental group with 10 athletes and the control group with the others. Tests that are used to assess the specialized physical fitness: 20m sprint (s), 4 x 10m shuttle run (s), 9-3-6-3-9 agility run (s), Standing broad jump (cm), Vertical jump - static (cm), Vertical jump - with approach (cm), Handgrip strength - dominant hand (kg), Sit-ups in 30 seconds (reps), Overhead medicine ball throw (two hands, overhead, forward) (m), 1500m run (minutes), Sit and reach (cm), 92m Illinois agility run (s).

#### **3.2.2 Evaluation of the Effectiveness of the Exercises to Develop the Professional Physical Fitness of Male Athletes of the Volleyball Team at Vinh Long University of Technology and Education, Vietnam**

To assess the effectiveness of the selected exercises, the study compares the mean scores of the physical fitness test results between the experimental group and the control group before and after the training intervention. The results are presented in Table 2 and Table 3.

The comparison results in Table 2 indicate that before the experiment, the mean scores of all specialized physical fitness tests between the experimental and control groups showed only minimal differences, which can be considered equivalent ( $P > 0.05$ ).

**Table 2:** Comparison of the average specialized fitness performances between the experimental group and the control group before the experiment

No.	Test	Experimental group		Control group		t	P
		Mean	SD	Mean	SD		
1	30m sprint (s)	4.42	0.09	4.4	0.05	0.61	>0.05
2	4 x 10m shuttle run (s)	12.26	0.22	12.13	0.48	0.78	>0.05
3	9-3-6-3-9 agility run (s)	8.87	0.48	8.96	0.41	0.45	>0.05
4	Standing broad jump (cm)	246.73	7.71	247.2	7.19	0.14	>0.05
5	Vertical jump - static (cm)	69.87	2.61	70.53	2.64	0.56	>0.05
6	Vertical jump - with approach (cm)	74.33	3.72	74.33	3.94	0.00	>0.05
7	Handgrip strength - dominant hand (kg)	36.73	4.95	37.27	4.79	0.25	>0.05
8	Sit-ups in 30 seconds (reps)	17.80	1.15	18.27	0.88	1.03	>0.05
9	Overhead medicine ball throw (two hands, overhead, forward) (m)	14.22	0.84	14.54	0.66	0.95	>0.05
10	1500m run (minutes)	5.50	0.09	5.5	0.07	0.00	>0.05
11	Sit and reach (cm)	18.33	1.69	17.69	1.74	0.83	>0.05
12	92m Illinois agility run (s)	25.21	1.34	25.25	0.83	0.08	>0.05

**Table 3:** Comparison of the average specialized fitness performances between the experimental group and the control group after the experiment

No.	Test	Experimental group		Control group		t	P
		Mean	SD	Mean	SD		
1	30m sprint (s)	4.2	0.05	4.34	0.04	2.47	< 0.05
2	4 x 10m shuttle run (s)	11.59	0.35	12.02	0.44	2.82	< 0.05
3	9-3-6-3-9 agility run (s)	8.54	0.31	8.82	0.4	2.41	< 0.05
4	Standing broad jump (cm)	252.07	5.89	248.93	6.89	9.62	< 0.05
5	Vertical jump - static (cm)	79.6	4.48	73.07	2.09	15.22	< 0.05
6	Vertical jump - with approach (cm)	79.6	3.81	78.67	3.83	14.68	< 0.05
7	Handgrip strength - dominant hand (kg)	43.6	3.77	40.43	3.56	8.89	< 0.05
8	Sit-ups in 30 seconds (reps)	20.13	1.25	18.93	0.88	4.314	< 0.05
9	Overhead medicine ball throw (two hands, overhead, forward) (m)	15.47	1.03	14.73	0.63	2.88	< 0.05
10	1500m run (minutes)	5.32	0.14	5.46	0.04	1.42	> 0.05
11	Sit and reach (cm)	19.77	1.44	18.35	6.57	4.86	< 0.05
12	92m Illinois agility run (s)	23.93	1.16	24.55	2.33	2.29	< 0.05

The comparison results in Table 3 reveal that after the experiment, the mean scores of most specialized physical fitness tests between the experimental and control groups showed statistically significant differences ( $P < 0.05$ ). This suggests that the selected exercises from Section 3.1 had a positive impact on improving the specialized physical fitness of the study participants.

To further demonstrate the effectiveness of the selected exercises, the growth rates of the test results after the experiment were calculated, as shown in Tables 4 and 5.



**Table 4:** Professional physical development of the experimental group (n=10)

No.	Test	Before		After the experiment				
		Mean	SD	Mean	SD	w	t	P
1	30m sprint (s)	4.42	0.09	4.2	0.05	5.10	7.11	< 0.05
2	4 x 10m shuttle run (s)	12.26	0.22	11.59	0.35	5.62	6.27	< 0.05
3	9-3-6-3-9 agility run (s)	8.87	0.48	8.54	0.31	3.79	3.28	< 0.05
4	Standing broad jump (cm)	246.73	7.71	252.07	5.89	2.14	4.79	< 0.05
5	Vertical jump - static (cm)	69.87	2.61	79.6	4.48	13.02	9.45	< 0.05
6	Vertical jump - with approach (cm)	74.33	3.72	79.6	3.81	12.13	8.35	< 0.05
7	Handgrip strength - dominant hand (kg)	36.73	4.95	43.6	3.77	17.10	4.76	< 0.05
8	Sit-ups in 30 seconds (reps)	17.80	1.15	20.13	1.25	12.29	5.02	< 0.05
9	Overhead medicine ball throw (two hands, overhead, forward) (m)	14.22	0.84	15.47	1.03	8.42	5.24	< 0.05
10	1500m run (minutes)	5.50	0.09	5.32	0.14	3.33	6.03	< 0.05
11	Sit and reach (cm)	18.33	1.69	19.77	1.44	7.56	3.32	< 0.05
12	92m Illinois agility run (s)	25.21	1.34	23.93	1.16	5.21	3.71	< 0.05

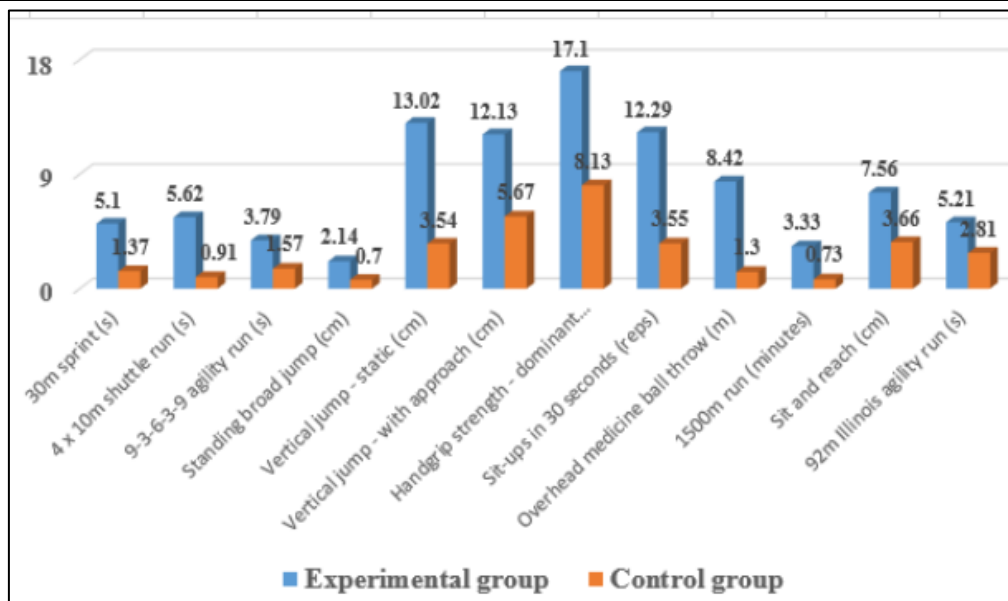
Data from Table 4 shows that the specialized physical fitness of the experimental group improves after the experiment, with statistically significant growth ( $P < 0.05$ ). Among the tests, handgrip strength - dominant hand (kg) shows the highest average growth rate at 17.10%, while the standing broad jump (cm) shows the lowest at 2.14%.

**Table 5:** Professional physical development of the control group (n=10)

No.	Test	Before		After the experiment				
		Mean	SD	Mean	SD	w	t	P
1	30m sprint (s)	4.4	0.05	4.34	0.04	1.37	3.31	< 0.05
2	4 x 10m shuttle run (s)	12.13	0.48	12.02	0.44	0.91	1.09	> 0.05
3	9-3-6-3-9 agility run (s)	8.96	0.41	8.82	0.4	1.57	1.98	> 0.05
4	Standing broad jump (cm)	247.2	7.19	248.93	6.89	0.70	3.67	< 0.05
5	Vertical jump - static (cm)	70.53	2.64	73.07	2.09	3.54	5.01	< 0.05
6	Vertical jump - with approach (cm)	74.33	3.94	78.67	3.83	5.67	6.79	< 0.05
7	Handgrip strength - dominant hand (kg)	37.27	4.79	40.43	3.56	8.13	2.03	> 0.05
8	Sit-ups in 30 seconds (reps)	18.27	0.88	18.93	0.88	3.55	2.47	< 0.05
9	Overhead medicine ball throw (two hands, overhead, forward) (m)	14.54	0.66	14.73	0.63	1.30	0.97	> 0.05
10	1500m run (minutes)	5.5	0.07	5.46	0.04	0.73	3.17	< 0.05
11	Sit and reach (cm)	17.69	1.74	18.35	6.57	3.66	1.46	> 0.05
12	92m Illinois agility run (s)	25.25	0.83	24.55	2.33	2.81	2.56	< 0.05

Table 5 shows that the control group also improves in all tests after the experiment. However, only seven out of twelve tests show statistically significant growth ( $P < 0.05$ ). The test with the highest average growth rate is handgrip strength - dominant hand (kg) at 8.13%, while the lowest is standing broad jump (cm) at just 0.70%.

The study compares the post-experiment growth rates of specialized physical fitness test results between the experimental and control groups in Figure 1.



**Figure 1:** Comparison of the growth of specialized physical fitness of the experimental group and the control group

#### 4. Conclusion

The study has successfully selected 25 specialized physical fitness exercises for male volleyball athletes of Vinh Long University of Technology Education. The results of the experiment have proved that these exercises help the athletes significantly improve their specialized physical fitness.

#### Conflict of Interest Statement

The authors declare no conflicts of interest.

#### About the Author(s)

**Vo Minh Trung**, Head of Center for Physical Education and National Defense and Security, Vinh Long University of Technology and Education, Vietnam.

**Huynh Hoang Buu**, Vice Head of Center for Physical Education and National Defense and Security, Vinh Long University of Technology and Education, Vietnam.

**Diep Xuan Tai**, Lecturer at Center for Physical Education and National Defense and Security, Vinh Long University of Technology and Education, Vietnam.

**Huynh Hai Son**, Lecturer at Center for Physical Education and National Defense and Security, Vinh Long University of Technology and Education, Vietnam.

**Nguyen Thi Hong Trang**, Lecturer at Center for Physical Education and National Defense and Security, Vinh Long University of Technology and Education, Vietnam.

**Cao Thanh Thuc**, Lecturer at Center for Physical Education and National Defense and Security, Vinh Long University of Technology and Education, Vietnam.

**Nguyen Nhut Khang**, Lecturer at Center for Physical Education and National Defense and Security, Vinh Long University of Technology and Education, Vietnam.

**Tran Hoang Thien**, Lecturer at Center for Physical Education and National Defense and Security, Vinh Long University of Technology and Education, Vietnam.

**Huynh Tan Binh**, Lecturer at Center for Physical Education and National Defense and Security, Vinh Long University of Technology and Education, Vietnam.

**Tran Thong Minh**, Lecturer at Center for Physical Education and National Defense and Security, Vinh Long University of Technology and Education, Vietnam.

**Co Thi Yen Nhi**, Lecturer at Center for Physical Education and National Defense and Security, Vinh Long University of Technology and Education, Vietnam.

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

## References

1. FIVB (2002), Team System and Tactics for Advanced Teams, Chapter 8, FIVB Coaches Manual I, edited by FIVB.
2. Kinda S. Asher (1997), *Coaching Volleyball*, The American Volleyball Coaches Association, Master Press Publisher.
3. Hrynchenko, I. B., Isaiev, O. H., & Tykhonova, A. O. (2019). Improving the level of physical fitness of young volleyball players with the help of training equipment. *Health preservation technologies, rehabilitation and physical therapy*. 3, 26-31. <http://dx.doi.org/10.58962/HSTRPT.2019.1.1.25-29>
4. Boichuk, R., Iermakov, S., Kovtsun, V., Levkiv, V., Ulizko, V., Kryzhanivskiy, V., Kovtsun, Vit., & Kazmiruk, A. (2020). Relation of the competitive activity effectiveness of volleyball players (girls) at the age of 16-18 with the physical development indicators. *Journal of Physical Education and Sport*. 20 (2), 615-622. DOI:10.7752/jpes.2020.02090.
5. Oliinyk, M. O. (2021). Improvement of the training process of qualified volleyball players based on the use of model characteristics of competitive activity. Dnipro.
6. Bozzini, B. N., McFadden, B. A., Scruggs, S. K., & Arent, S. M. (2021). Evaluation of performance characteristics and internal and external training loads in female collegiate beach volleyball players. *The Journal of Strength & Conditioning Research*, 35(6), 1559-1567. <https://doi.org/10.1519/jsc.0000000000004051>
7. Nguyen Xuan Dung, Huynh Thuc Phong, Phan Ngoc Huy (2005), "BC Theory Curriculum", Ho Chi Minh City University of Physical Education and Sports.
8. Huynh Thuc Phong (2016), "Research on building a model of Vietnamese senior male volleyball players," Ph.D. thesis, Ho Chi Minh City University of Physical Education and Sports.

9. Mikko Häyrinen (2012), *Position-specific physical training for volleyball players*, Sports researcher, KIHU - Research Institute for Olympic Sports, Team sports, FIVB.
10. Top Volley (2002), *Technical Booklet, Men's Game, Technique and Tactics*.
11. Bompá T. (2002). "Cyclicalities in sports coaching". Translator: Lam Quang Thanh, Bui Trong Toai, Physical Education and Sports Publishing House, Hanoi.
12. Al Scates, Mike Linn & Karch Kiraly (2003), *Complete Conditioning for Volleyball*, Human Kinetics, USA Volleyball. Retrieved from [https://books.google.ro/books/about/Complete\\_Conditioning\\_for\\_Volleyball.htm?id=BQ4dL43ovPIC&redir\\_esc=y](https://books.google.ro/books/about/Complete_Conditioning_for_Volleyball.htm?id=BQ4dL43ovPIC&redir_esc=y)
13. Kinda S. Asher (1997), *Coaching Volleyball*, The American Volleyball Coaches Association, Master Press Publisher.
14. Nguyen Thanh Lam (1998), "Research on the typical physical qualities of female volleyball players 15-18 years old", Ph.D. thesis in education, Institute of Physical Education Sciences, Hanoi.
15. Charles H. Cardinal (1998), "Strength Training for Volleyball Players", Science Bulletin No., Institute of Physical Education and Sports, Hanoi No. 6, pp. 15-30.
16. Tran Duc Phan (2001), "Research on the application of exercise system to develop flexible capacity for female volleyball athletes aged 14-16 years", *Ph.D. thesis in education*, Institute of Physical Education Sciences, Hanoi.
17. Nguyen Huu Hung (2001), *Physical Training for Volleyball Players*, Physical Education and Sports Publishing House, Hanoi.
18. Bui Trong Toai (2006), *Effect of application of strength exercises for high-level female volleyball players*, Ph.D. thesis, Institute of Physical Education and Sports Sciences, Hanoi.
19. Tran Thanh Tuyen (2011), *Application of some exercises to improve the effectiveness of high-handed tee for the women's volleyball team*, Ho Chi Minh City University of Physical Education and Sports, Master of Education Thesis, Bac Ninh University of Physical Education and Sports.
20. Nguyen Thi Kieu Thu (2017), "Research and application of some exercises to improve professional physical fitness for the women's volleyball team of Tinh Bien High School, Tinh Bien District, An Giang Province", Master of Education Thesis, Ho Chi Minh City University of Physical Education and Sports.
21. Phan Ngoc Huy (2017), "Building a system of exercises to develop strength for men's volleyball players of the Sanest Khanh Hoa team", *Doctoral thesis*, Ho Chi Minh City University of Physical Education and Sports.
22. Do Xuan Duan (2018), "Research on professional physical development exercises for young female volleyball players in some clubs in Vietnam in the stage of deep specialization", *doctoral thesis in Education*, Institute of Physical Education Sciences, Hanoi.

23. Tran Thi Cang (2021), "*Research on the development of some standards for the assessment of physical training effectiveness in the preparation period of the Sanest Khanh Hoa men's volleyball team*", Ph.D. thesis, Ho Chi Minh City University of Physical Education and Sports.

Creative Commons licensing terms

Authors will retain the copyright of their published articles agreeing that a Creative Commons Attribution 4.0 International License (CC BY 4.0) terms will be applied to their work. Under the terms of this license, no permission is required from the author(s) or publisher for members of the community to copy, distribute, transmit or adapt the article content, providing a proper, prominent and unambiguous attribution to the authors in a manner that makes clear that the materials are being reused under permission of a Creative Commons License. Views, opinions and conclusions expressed in this research article are views, opinions and conclusions of the author(s). Open Access Publishing Group and European Journal of Physical Education and Sport Science shall not be responsible or answerable for any loss, damage or liability caused in relation to/arising out of conflict of interests, copyright violations and inappropriate or inaccurate use of any kind content related or integrated on the research work. All the published works are meeting the Open Access Publishing requirements and can be freely accessed, shared, modified, distributed and used in educational, commercial and non-commercial purposes under a [Creative Commons attribution 4.0 International License \(CC BY 4.0\)](https://creativecommons.org/licenses/by/4.0/).