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Research on the development of specialized physical fitness and techniques for male karate athletes aged 9-11 in Thai Nguyen city club, Thai Nguyen Province

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Abstract

This study evaluates the effectiveness of a specialized physical fitness and technical training program for male Karate athletes aged 9-11 at the Thai Nguyen City Club, Thai Nguyen Province. Utilizing a sample of 20 athletes, the research employed various methods, including literature review, expert interviews, and practical tests, to measure the development of physical fitness and technical skills over a six-month training period. The results indicated significant improvements in all measured indices. Physical fitness tests showed increases in standing high jump, 10 m speed run, 800m run, sit-ups, and single-leg hopping, with growth rates ranging from 4.79% to 12.1%. Technical skill tests, including roundhouse kicks, backward roundhouse kicks, sliding roundhouse kicks, and thrust kicks, demonstrated growth rates up to 16.39%. All results were statistically significant ($p < 0.05$), confirming the effectiveness of the training program. These findings suggest that early attention to specialized physical fitness and technical training is crucial for young athletes, providing a solid foundation for future development and performance enhancement. The study provides a scientific basis for improving and adjusting local sports training programs, contributing to the development of the Karate movement in the region.

Keywords: Development, specialized physical fitness, techniques, male Karate athletes, 9-11 years old, Thai Nguyen City Club

Introduction

Karatedo, often referred to simply as Karate, is a traditional Japanese martial art developed from unarmed combat techniques from Okinawa. Karatedo combines offensive and defensive movements, including punches, kicks, blocks, and locks. According to the International Karate Association, "Karate is not just a method of self-defense but also a way to train oneself to develop confidence, patience, and strong spirit".

Research on the development of specialized physical fitness and techniques for Karate athletes aged 9-11 is crucial for several reasons. Firstly, at this age, the body and skills of the athletes are rapidly developing, and applying appropriate training methods can lay a solid foundation for future progress. Specialized physical fitness, including strength, endurance, and flexibility, plays an important role in enhancing performance and preventing injuries.

According to Feld *et al.* (1975) ^[5], Karate athletes can achieve peak speeds of 10-14 meters per second and generate forces exceeding 3000 newtons (equivalent to 675 pounds) without injuring themselves. This highlights the importance of developing specialized physical fitness to help athletes perform techniques effectively and safely (Unterharnscheidt & Taylor-Unterharnscheidt, 2003) ^[6]. Additionally, techniques are decisive factors in Karate matches. An athlete with good techniques can focus force on a small target area, causing damage to the opponent's tissues and bones without requiring large forces, unlike other combat sports (Unterharnscheidt & Taylor-Unterharnscheidt, 2003) ^[6].

Moreover, early development of techniques helps athletes master and perfect movements, creating conditions for further skill enhancement. Capulis *et al.* (2014) ^[7] emphasized that Karate is not only an effective martial art but also a system of education and health improvement. Karate-Do helps form a consistent worldview, develop moral qualities, and strengthen willpower (Capulis *et al.*, 2014) ^[7].

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Researching the development of specialized physical fitness and techniques also helps evaluate the effectiveness of training programs, providing necessary improvements and adjustments. This not only enhances individual performance but also contributes to the development of the local Karate movement. According to Capulis *et al.* (2014) [7], Karate classes organized with a humanistic approach improve students' emotional and mental states, demonstrating the effectiveness of training programs designed for comprehensive student development (Capulis *et al.*, 2014) [7].

Additionally, Schwartz *et al.* (1986) [8] found that in full-contact Karate, punches and kicks are performed with high intensity, requiring athletes to have good physical fitness and techniques to ensure safety and effectiveness in competition (Unterharnscheidt & Taylor-Unterharnscheidt, 2003) [6]. This further underscores the importance of early development of specialized physical fitness and techniques to prepare athletes with the necessary skills.

In summary, research on the development of specialized physical fitness and techniques for male Karate athletes aged 9-11 not only has scientific significance but also provides practical values, supporting comprehensive training and development, enhancing individual performance, and promoting the Karate movement locally.

Research Methods

This research employs various methods to evaluate the development of specialized physical fitness and techniques for male Karate athletes aged 9-11 at the Thai Nguyen City

Club. Due to the inability to precisely determine the number of Karate athletes aged 9-11, the author used the convenience sampling method. The author contacted clubs in the province to collect a list of Karate athletes aged 9-11. From this list, 20 participants were selected.

Before conducting the survey, the author reviewed relevant literature and interviewed experts in Karate training to determine appropriate tests for the study subjects. Through this process, the author selected 5 specialized physical fitness tests: standing high jump (no run-up) (cm), 10 m speed run (seconds), 800 m run (minutes), sit-ups (reps/minute), and single-leg hopping (left/right) (cm). Additionally, 5 technical tests were selected: on-the-spot roundhouse kick (10s) (reps), backward roundhouse kick (15s) (reps), sliding roundhouse kick for 1.5 m with front leg switch (30s) (reps), on-the-spot back thrust kick (10s) (reps), and sliding roundhouse kick with both legs (30s) (reps).

The research was conducted over 6 months, during which the specialized physical fitness and technical achievements of the male Karate athletes aged 9-11 were recorded and compared between the initial stage and after the experiment. Comparing the two stages allows for a comprehensive and accurate assessment of the development of specialized physical fitness and techniques, providing a scientific basis for improving and adjusting training programs at the club.

Research Results

The characteristics of the study sample are presented in Table 1 below.

Table 1: The characteristics of the research sample

Category	Unit	Value
Gender	Male	12
	Female	8
Age	9	6
	10	7
	11	7
Weight	Kg	43.9
Height	cm	143

The research sample consists of 20 Karate athletes aged 9-11 from the Thai Nguyen City Club, with an even distribution of gender and age, demonstrating the sample's diversity and representativeness. Specifically, the sample includes 12 male and 8 female athletes, reflecting active participation from both genders in this sport. The age distribution is fairly even, with 6 athletes aged 9, 7 athletes aged 10, and 7 athletes aged 11. The average weight of the athletes is 43.9 kg, and the average height is 143 cm, indicating relatively uniform physical development appropriate for their age group.

These characteristics show that the research sample is diverse and representative enough to evaluate the development of specialized physical fitness and techniques in young Karate athletes. The inclusion of both male and female participants also helps the study accurately reflect factors affecting athletes' development in this sport.

The initial and post-experimental results of professional and technical physical testing of male Karate athletes aged 9-11 at the Thai Nguyen city club are shown in Tables 2 and 3.

Table 2: Development of specialized physical fitness for male Karate athletes aged 9-11 in Thai Nguyen City Club after six months of training (n=20)

TT	Test	\bar{X}_1	\bar{X}_2	W%	t	P
1.	Standing high jump (cm)	27.5	30.5	10.34	6.63	<0.05
2.	10 m speed run (s)	1.84	1.63	12.1	8.02	<0.05
3.	800m run (minutes)	3.85	3.67	4.79	3.99	<0.05
4.	Sit-ups (reps/minute)	44.5	49	9.63	8.19	<0.05
5.	Single-leg hopping (left/right)(cm)	102.45	114.5	10.23	8.43	<0.05

Table 2 presents the results of the development of specialized physical fitness for 20 male Karate athletes aged

9-11 at the Thai Nguyen City Club after 6 months of training, comparing the pre-training (X_1) and post-training

(X2) stages. The results show significant improvements in all measured indices. Specifically, the standing high jump increased from 27.5 cm to 30.5 cm, equivalent to a growth rate of 10.34% ($t=6.63$, $p<0.05$). The 10 m speed run time decreased from 1.84 seconds to 1.63 seconds, a growth rate of 12.1% ($t=8.02$, $p<0.05$), indicating a clear improvement in speed. The 800 m run time decreased from 3.85 minutes to 3.67 minutes, a growth rate of 4.79% ($t=3.99$, $p<0.05$), showing an improvement in endurance. The number of sit-

ups increased from 44.5 reps / minute to 49 reps/minute, a growth rate of 9.63% ($t=8.19$, $p<0.05$), indicating improved abdominal strength. Finally, single-leg hopping (left/right) distance increased from 102.45 cm to 114.5 cm, a growth rate of 10.23% ($t=8.43$, $p<0.05$), showing improved leg strength and flexibility. All measured indices had statistical significance ($p<0.05$), indicating that the training program significantly improved the specialized physical fitness of these young athletes.

Table 3: Development of techniques for male Karate athletes aged 9-11 in Thai Nguyen City Club after six months of training (n=20)

TT	Test		\bar{X}_1	\bar{X}_2	W%	t	P
1.	One-leg roundhouse kick 10s (reps)	Left	15.05	17.5	15.05	15.96	<0.05
		Right	15.4	18.15	16.39	17.17	<0.05
2.	One-leg backward roundhouse kick 15s (reps)		21.6	24.65	13.19	11.9	<0.05
3.	Sliding roundhouse kick 15m (front leg) 30s (reps)		30.1	33.7	11.29	19.62	<0.05
4.	Back thrust kick 10s (reps)	Left	23.6	26.45	11.39	15.68	<0.05
		Right	24.4	26.95	9.93	18.43	<0.05
5.	Sliding roundhouse kick 30s (reps)	Left	15.3	17.55	13.7	11.83	<0.05
		Right	15.75	18.25	14.71	13.52	<0.05

Table 3 presents the results of the development of techniques for 20 male Karate athletes aged 9-11 at the Thai Nguyen City Club after 6 months of training, comparing the pre-training (X1) and post-training (X2) stages. The results show significant improvements in all measured indices. Specifically, the on-the-spot roundhouse kick in 10 seconds for the left leg increased from 15.05 times to 17.5 times, a growth rate of 15.05% ($t=15.96$, $p<0.05$), and for the right leg increased from 15.4 times to 18.15 times, a growth rate of 16.39% ($t=17.17$, $p<0.05$). The backward roundhouse kick in 15 seconds increased from 21.6 times to 24.65 times, a growth rate of 13.19% ($t=11.9$, $p<0.05$). The sliding roundhouse kick for 1.5 m in 30 seconds increased from 30.1 times to 33.7 times, a growth rate of 11.29% ($t=19.62$, $p<0.05$). The on-the-spot back thrust kick in 10 seconds for the left leg increased from 23.6 times to 26.45 times, a growth rate of 11.39% ($t=15.68$, $p<0.05$), and for the right leg increased from 24.4 times to 26.95 times, a growth rate of 9.93% ($t=18.43$, $p<0.05$). Finally, the sliding roundhouse kick with both legs in 30 seconds for the left leg increased from 15.3 times to 17.55 times, a growth rate of 13.7% ($t=11.83$, $p<0.05$), and for the right leg increased from 15.75 times to 18.25 times, a growth rate of 14.71% ($t=13.52$, $p<0.05$). All technical indices had statistical significance ($p<0.05$), indicating that the training program significantly improved the technical skills of these young athletes.

In conclusion, the results from Table 2 and Table 3 show that after 6 months of training, the specialized physical fitness and techniques of the male Karate athletes significantly improved. This growth was statistically significant, with all indices showing increases above 9%. The highest growth rate was observed in the 10 m speed run at 12.1%, followed by the standing high jump at 10.34%, single-leg hopping at 10.23%, and sit-ups at 9.63%. The 800m run showed the lowest growth rate at 4.79%, compared to other indices. These results indicate significant development in speed and leg and abdominal strength, which are crucial aspects in Karate training.

The technical skill of the on-the-spot roundhouse kick in 10 seconds showed the highest growth, with the left leg increasing by 15.05% and the right leg by 16.39%. This technique was highly rated by experts as it is simple, easy to

perform, and effectively used to score points in Karate matches for athletes aged 9-11.

These findings demonstrate that the training program for specialized physical fitness and techniques for male Karate athletes aged 9-11 at the Thai Nguyen City Club has been highly effective.

Conclusion

This study evaluated the effectiveness of the specialized physical fitness and technical training program for male Karate athletes aged 9-11 at the Thai Nguyen City Club after six months of training. The results showed significant improvements in both the physical fitness and technical skills of the athletes.

Specifically, the specialized physical fitness indices, such as standing high jump, 10 m speed run, 800m run, sit-ups, and single-leg hopping, all showed marked improvements, with growth rates ranging from 4.79% to 12.1%. Technical skills tests, including roundhouse kicks, backward roundhouse kicks, slide roundhouse kicks, and thrust kicks, also demonstrated significant progress, with the highest growth rate reaching 16.39%. All results were statistically significant ($p<0.05$), indicating that these improvements were not random but a result of effective training.

These findings confirm that the training program was scientifically designed and effectively implemented, helping young athletes not only improve their personal performance but also develop comprehensively in terms of physical fitness and technical skills.

Through this study, we provide a scientific basis for improving and adjusting local sports training programs, contributing to the development of the Karate movement. These findings also suggest that early attention to specialized physical fitness and technical factors is crucial, helping young athletes build a solid foundation to develop and achieve high performance in the future.

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