EFFECTIVENESS EVALUATION OF PROFESSIONAL PHYSICAL FITNESS DEVELOPMENT EXERCISES FOR MALE TAEKWONDO ATHLETES AGED 15-17 IN HO CHI MINH CITY

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Abstract:
Using conventional research methods in sports to build, apply and evaluate the effectiveness of professional physical fitness development exercises for male Taekwondo athletes at the age of 15 – 17 in Ho Chi Minh City.
Keywords: Taekwondo, Physical Fitness, Exercises.

INTRODUCTION

Besides the objective causes such as selection of athletes, coaches' influence, facilities, nutrition, athletes' compensation, etc., the system of physical fitness exercise is also the cause of training efficiency for Ho Chi Minh City Taekwondo team. Currently, Ho Chi Minh City Taekwondo team has applied physical fitness exercises for male athletes of Taekwondo team at the age of 15 – 17 but the building of the exercises is unscientific. The coaches evaluates the effectiveness mainly based on the achievement of the annual National Youth Taekwondo Championship, most of whom have not yet arranged, selected and built appropriate professional physical fitness exercises to improve their performance. This has led to the effect of physical strength training for male Taekwondo athletes at the age of 15 – 17 in Ho Chi Minh City not as expected. Thus, we have carried out a study on "Application of professional development exercises for male athletes aged 15 - 17 of Ho Chi Minh City Taekwondo team ".

RESEARCH METHODS

The research has used the methods of document analysis and synthesis, interview, pedagogical examination, pedagogical experiment and statistical mathematics.

RESULTS AND DISCUSSION

1. Actual physical fitness of male athletes aged 15 - 17 of Ho Chi Minh City Taekwondo team

From the general results of professional physical strength tests for male Taekwondo athletes at the age of 15 – 17 in Ho Chi Minh City, we have selected 20 tests. Through the steps of interviewing and selecting tests, analyzing the reliability and informative of selected tests, we have enough bases to use 9 tests to assess the professional physical fitness for male athletes of Ho Chi Minh City Taekwondo team ages 15 - 17. The tests include Hexagonal jump (second); Speedy jump rope for 10 seconds (times); Push up for 10 seconds (times); Crunches for 30 seconds (times); Standing roundhouse kick into face with stronger leg for 10 seconds (times); Standing axe kick into face with stronger leg for 10 seconds (times); Standing roundhouse kick into face with weaker leg for 10 seconds (times); Standing axe kick into face with weaker leg for 10 seconds (times); Body punch with stronger hand for 10 seconds (times). Then, we have evaluated the actual physical fitness of male athletes of Ho Chi Minh City Taekwondo team at the age of 15 - 17 as shown in Table 1.

The results from Table 1 show that the

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Table 1. Actual physical fitness of male Taekwondo athletes aged 15 - 17 in Ho Chi Minh City

No	Criteria	$\bar{x}$	S	Cv%	P
1	Hexagonal jump (second)	10.02	0.6	6.31	0.01
2	Speedy jump rope for 10 seconds (times)	30.50	2	6.42	0.01
3	Push up for 10 seconds (times)	10.30	0.9	9.21	0.02
4	Crunches for 30 seconds (times)	28.20	1.2	4.36	0.01
5	Standing roundhouse kick into face with stronger leg for 10 seconds (times)	19.10	1	5.21	0.01
6	Standing axe kick into face with stronger leg for 10 seconds (times)	15.80	0.9	5.82	0.01
7	Standing roundhouse kick into face with weaker leg for 10 seconds (times)	18.00	0.9	5.24	0.01
8	Standing axe kick into face with weaker leg for 10 seconds (times)	14.90	1.1	7.39	0.02
9	Body punch with stronger hand for 10 seconds (times)	23.40	1.3	5.77	0.01

criteria of professional physical strength by male athletes of Ho Chi Minh City Taekwondo team at the age of 15 - 17 achieved through professional physical fitness tests are relatively equal because all coefficients of variation Cv% are less than 10%. The relative error ($P \leq 0.05$) indicates the average value of the achievement of the research contents is representative.

2. Efficiency of professional physical fitness development exercises for male Taekwondo athletes aged 15-17 in Ho Chi Minh City

2.1 Selection and application of professional physical fitness development exercises for male Taekwondo athletes aged 15-17 in Ho Chi Minh City

Through the study of the above documents, we have collected 45 exercises to develop the professional physical fitness of male athletes of Ho Chi Minh City Taekwondo team at the age of 15 - 17. Then we have conducted interviews with experts, specialists, teachers, coaches and referees about the exercises. The interview was conducted 2 times, 2 weeks apart. Interview results are presented in Table 2.

We conducted Wilcoxon test to ensure a consistent agreement between the two interviews. The testing results presented in Table 3.

Hypothesis H_0: The two means are the same. From the above results, we see that the observation significance of the test between the two interviews is sig. = 0.55> 0.05. Therefore, we accept the hypothesis H0. Conclusion: according to Wilcoxon test, there is coincidence and stability between the 2 interviews. From the results of the two interviews, in principle, we only select the exercises with 75% or more of opinions agreed in both interviews, and there is homogeneity between the two interviews. Therefore, we have identified 36 qualified exercises for the experimental program.

Table 3. Results of Wilcoxon test between 2 interviews

Test Statistics[a]	
	Second time – First time
Z	-.597[b]
Asymp. Sig. (2-tailed)	0.55

2.2. Application of physical fitness development exercises for male Taekwondo athletes aged 15 - 17 in Ho Chi Minh City.

To achieve high efficiency in training, we have used the principles and methods of the sports training into the experimental process. The experiment time is 6 months (from the end of July 2017 to the end of January 2018).

The training program is compulsory for the experimental group (10 athletes) with 6 sessions per week. Thus, the amount of time spent for experiment and practice is a six lesson plans per week. The total time has taken 144 lesson plans.

The training program is divided into 3 stages:

Table 2. Results of interview to select system of professional physical fitness development exercises for male Taekwondo athletes aged 15 - 17 in Ho Chi Minh City

No.	Exercises	Interview results							
		First time (n=30)				Second time (n=30)			
		Agreed		Not agreed		Agreed		Not agreed	
		m_i	%	m_i	%	m_i	%	m_i	%
1	30m full standing start running	21	70.00	9	30.00	22	73.30	8	26.70
2	Standing long jump	16	53.30	14	46.70	17	56.70	13	43.30
3	Speedy pull up	19	63.30	11	36.70	21	70.00	9	30.00
4	Shuttle run 10x3 times	23	76.70	7	23.30	23	76.70	7	23.30
5	High knee jump	23	76.70	7	23.30	24	80.00	6	20.00
6	Squat	24	80.00	6	20.00	25	83.30	5	16.70
7	Leg press	26	86.70	4	13.30	28	93.30	2	6.70
8	Hexagonal jump	27	90.00	3	10.00	23	76.70	7	23.30
9	Speedy jump rope	28	93.30	2	6.70	24	80.00	6	20.00
10	Speedy high knee run	23	76.70	7	23.30	24	80.00	6	20.00
11	Speedy bench press 30kg	30	100.00	0	0	29	96.70	1	3.30
12	Push up	30	100.00	0	0	30	100.00	0	0.00
13	Upper back lift	23	76.70	7	23.30	25	83.30	5	16.70
14	Leg lift on ladder	18	60.00	12	40.00	20	66.70	10	33.30
15	Crunches	26	86.70	4	13.30	23	76.70	7	23.30
16	Backbend	20	66.70	10	33.30	17	56.70	13	43.30
17	Forward bend	23	76.70	7	23.30	23	76.70	7	23.30
18	Flexible groin stretch (Hip flexibility)	25	83.30	5	16.70	24	80.00	6	20.00
19	Stair running	27	90.00	3	10.00	29	96.70	1	3.30
20	1500m run on sand	30	100.00	0	0	27	90.00	3	10.00
21	12 minute running	23	76.70	7	23.30	25	83.30	5	16.70
22	Continuous right (left) leg high knee jump	30	100.00	0	0	30	100.00	0	0.00
23	Continuous right (left) leg high knee jump with elastic band	29	96.70	1	3.30	27	90.00	3	10.00
24	Right (left) kick-sit	28	93.30	2	6.70	30	100.00	0	0.00
25	Right (left) kick-sit with lead wear	24	80.00	6	20.00	29	96.70	1	3.30
26	Stronger-leg (weaker) roundhouse kick when there is a signal	26	86.70	4	13.30	30	100.00	0	0.00
27	Stronger-leg kicks into 3 targets	24	80.00	6	20.00	26	86.70	4	13.30
28	Weaker-leg kicks into 3 targets	22	73.30	8	26.70	23	76.70	7	23.30
29	Standing body roundhouse kick with stronger leg	27	90.00	3	10.00	24	80.00	6	20.00
30	Standing high knee jump and continuous double kick	25	83.30	5	16.70	26	86.70	4	13.30
31	Standing face roundhouse kick with stronger leg	26	86.70	4	13.30	24	80.00	6	20.00
32	Standing face axe kick with weaker leg	30	100.00	0	0	28	93.30	2	6.70
33	Standing face axe kick with stronger leg	30	100.00	0	0	30	100.00	0	0.00
34	Face front kick	24	80.00	6	20.00	21	70.00	9	30.00
35	Face front kick with ankle weight 0.5kg	21	70.00	9	30.00	18	60.00	12	40.00
36	Standing body roundhouse kick with weaker leg	25	83.30	5	16.70	23	76.70	7	23.30
37	Continuous double roundhouse kick into face	29	96.70	1	3.30	29	96.70	1	3.30
38	Continuous double roundhouse kick into body with ankle weight 0.5kg	29	96.70	1	3.30	27	90.00	3	10.00
39	Standing face roundhouse kick with weaker leg	25	83.30	5	16.70	24	80.00	6	20.00
40	Standing face roundhouse kick with weaker leg with ankle weight 0.5kg	24	80.00	6	20.00	25	83.30	5	16.70
41	Continuous one-leg roundhouse kick to face in backward move	29	96.70	1	3.30	28	93.30	2	6.70
42	Body stronger hand punch	24	80.00	6	20.00	27	90.00	3	10.00
43	Speedy 2-hand punches to body	27	90.00	3	10.00	29	96.70	1	3.30
44	Speedy 2-hand punches to body with wrist weight 0.5kg	26	86.70	4	13.30	26	86.70	4	13.30
45	Body weaker hand punch	23	76.70	7	23.30	19	63.30	11	36.70

Specialized physicality development is a fundamental condition to improve the training effectiveness for young Taekwondo athletes (photo source: http://kickfitvietnam.com)

Stage 1: Anatomical adaptation; Stage 2: General physical fitness development (maximum); Stage 3: Professional physical fitness development.

Experimental time is from 25 July 2017 to 25 January 2018 with the following plan:

The stage of anatomical adaptation (weeks 1 to 6).

Purpose: develop general physical fitness. Strengthen muscle groups, tendons and ligaments to withstand the volume of movement in the later stages.

The exercises are arranged according to the rotational working of muscle groups, facilitating better and faster recovery.

Number of groups: 3 groups

Practice 6 sessions per week with normal speed

Training time is 90 minutes per session (including warm up and relax time). 30 second rest between repetitions, 2 to 3 minute rest between groups.

The stage of maximum physical fitness development (weeks 7 to 16)

Purpose: develop maximum muscle power to the highest level of athletes, especially in the main muscle groups. At this stage, depending on the physical condition of the athletes, there are appropriate exercises and number of repetitions and breaks.

Number of groups: 3-5 groups

Practice 6 sessions per week with as much as possible speed and physical strength

Training time is 90 minutes per session (including warm up and relax time). 30 second rest between repetitions, 3 to 5 minute rest between groups.

The stage of professional physical fitness development (week 17 to week 24)

Purpose: transfer from general physical fitness to professional physical fitness (reduce weight, increase intensity)

Number of groups: 3-4 groups

Practice 6 sessions per week

Training time is 90 minutes per session (including warm up and relax time). Exercises are performed in circular or spaced rotation manner.

3.3. Effectiveness evaluation of professional physical fitness development exercises for male athletes aged 15-17 of Ho Chi Minh City Taekwondo team

The results after 6 months of experiment are as follows:

- The test of hexagonal jump (second) of male Taekwondo athlete aged 15 – 17 in Ho Chi Minh City after 6 months of training has developed, the growth rate is W% = 4.5%, this growth is statistically significant with $t_{calculation} = 8.3 > t_{table} = 2.262$ at probability threshold $P < 0.05$.

- The test of speedy jump rope for 10 seconds (times) of male Taekwondo athlete aged 15 – 17 in Ho Chi Minh City after 6 months of training has developed, the growth rate is W% = 6.1%, this growth is statistically significant with $t_{calculation} = 7.5 > t_{table} = 2.262$ at probability threshold $P < 0.05$.

- The test of push up for 10 second (times) of male Taekwondo athlete aged 15 – 17 in Ho Chi Minh City after 6 months of training has developed, the growth rate is W% = 9.3%, this growth is statistically significant with $t_{calculation}$ =

34.1> t_{table} = 2,262 at probability threshold P <0.05.

- The test of crunches for 30 seconds (times) of male Taekwondo athlete aged 15 – 17 in Ho Chi Minh City after 6 months of training has developed, the growth rate is W% = 6.2%, this growth is statistically significant with $t_{calculation}$ = 8.4> t_{table} = 2.262 at probability threshold P <0.05.

- The test of standing roundhouse kick into face with stronger leg for 10 seconds (times) of male Taekwondo athlete aged 15 – 17 in Ho Chi Minh City after 6 months of training has developed, the growth rate is W% = 9.9%, this growth is statistically significant with $t_{calculation}$ = 9.8> t_{table} = 2.262 at probability threshold P <0.05.

- The test of standing axe kick into face with stronger leg for 10 seconds (times) of male Taekwondo athlete aged 15 – 17 in Ho Chi Minh City after 6 months of training has developed, the growth rate is W% = 7.4 %, this growth is statistically significant with $t_{calculation}$ = 8.5> t_{table} = 2.262 at probability threshold P <0.05.

- The test of standing roundhouse kick into face with weaker leg for 10 seconds (times) of male Taekwondo athlete aged 15 – 17 in Ho Chi Minh City after 6 months of training has developed, the growth rate is W% = 9.1%, this growth is statistically significant with $t_{calculation}$ = 10.5> t_{table} = 2.262 at probability threshold P <0.05.

- The test of standing axe kick into face with weaker leg for 10 seconds (times) of male Taekwondo athlete aged 15 – 17 in Ho Chi Minh City after 6 months of training has developed, the growth rate is W% = 8.4 %, this growth is statistically significant with $t_{calculation}$ = 8.2> t_{table} = 2.262 at probability threshold P <0.05.

- The test of body punch with stronger hand for 10 seconds (times) of male Taekwondo athlete aged 15 – 17 in Ho Chi Minh City after 6 months of training has developed, the growth rate is W% = 5.5 %, this growth is statistically significant with $t_{calculation}$ = 7.7> t_{table} = 2.262 at probability threshold P <0.05

The above research results show that, after 6 months of training and application of professional physical fitness development exercises for male Taekwondo athletes aged 15-17 in Ho Chi Minh City, the growth is statistically significant at probability threshold P <0.05. In particular, the test achieving the highest growth rate is standing roundhouse kick into face with stronger leg for 10 seconds (times) with W% = 9.9%.

CONCLUSION

The actual physical fitness level of male Taekwondo athletes aged 15 - 17 in Ho Chi Minh City is quite equal, the difference of professional physical strength between the athletes is not much. The study has selected 36 professional physical fitness development exercises for male Taekwondo athletes aged 15-17 in Ho Chi Minh City and organized the application in 6 months. The application results show that: After the experiment, all professional physical fitness tests for male athletes aged 15 - 17 of Ho Chi Minh City Taekwondo team increased significantly.

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