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Research on physical selection tests for Vietnamese female gymnastics athletes at the age of eight (Bone Age)

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Abstract
Based on the systematization of selection tests of various countries in the world, interview results, validity and reliability tests, and results of the test application in the practice of our country, 5 tests were selected and the athlete selection criteria was developed for Viet Nam Gymnastics women athletes at the age of 8.

Keywords: Selection test, physical fitness, female athletes, Gymnastics

Introduction
Physical fitness is a fundamental factor for athletes' acquisition and development of difficult and new techniques. It is a key for the training success to selecting athletes born with good physical components that are suitable for specific purposes right in the initial period [3]. Gymnastics is (gym) is a sport in which athletes are required to have fully physical elements of speed, strength, endurance, cleverness, flexibility and balance to implement difficult and complicated techniques. Particularly, specific physical components are essential [4]. As a result, this study concentrates on physical tests and criteria for selecting Vietnamese female gymnasts at the age of 8.

Methodology
In the research process, following methods were employed to identify the system of physical tests for female athletes of gymnastics at the age of 8: document analysis and synthesis, survey, pedagogical tests, and statistics. Research subjects included 20 female athletes of athletes at the age of 8. Interviewees included 50 experts, coaches and teachers of physical education.

Results
Physical selection tests for 8-year-old female gymnasts
The basis of test selection: Based on the science of athlete recruitment, characteristics of the gymnastics, references of selection experiences of nations in the world and domestic studies [1, 2, 4, 5], 15 physical tests were systematized for seleting gymnasts as follows: 20m print (second); 30m print (second); standing long jump (cm); vertical jump test (cm); push up (reps); bar pull up (reps); 30 second L hang (reps); straddle - splits (cm); bridge (cm); bending (cm); standing on one leg (minute); scales (minute); backbend (reps); rope climb (second).

Expert interview: For the test selection which was objective, effective and suitable with the facility condition of Vietnam, an interview was carried out with 50 top specialists, coaches and teachers of gymnastics. Results showed over 70% of agreement for 5 tests: 30m print (second); standing long jump (cm); bar pull up (reps); 30 second L hang (reps); backbend (reps).

Test reliability: The the reliability of physical tests for selecting 8-year-old female gymnasts was checked with 20 athletes twice in same test conditions with a 5-day time gap. Correlation coefficients (r) of the two tests are presented in Table 1.

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Table 1: Correlations between two tests for 8-year-old female gymnast

No.	Test	r	P
1	30m print (second)	0.89	< 0.01
2	Standing long jump (cm)	0.88	< 0.01
3	Bar pull up (reps)	0.95	< 0.01
4	30 second L hang (reps)	0.96	< 0.01
5	Backbend (reps)	0.98	< 0.01

Table 1 shows that the correlation coefficients of all tests are over 0.8 (r > 0.8) which proves they are reliable in physical selection for female gymnastics athlete at the age of 8.

Validity test: To check the validity of physical selection tests for 8-year-old female gymnastics athletes, the correlation between the athletes' physical test, competition performance (total scores) using the C. Spearman rank correlation. Generated results are in Table 2.

Table 2: Ranking of correlations between physical tests and competition performance of 8-year-old female gymnasts

STT	Test	Rank correlation coefficient (r)
1	30m print (second)	0.71
2	Standing long jump (cm)	0.73
3	Bar pull up (reps)	0.80
4	30 second L hang (reps)	0.82
5	Backbend (reps)	0.86

Table 2 shows that above physical test are well correlated with the athletes' competition performance (r > 0.6). As a result, it can be confirmed that these tests are valid and reliable for use in selecting 8-year-old female gymnastics athletes.

Initial application of physical test system for 8-year-old female gymnasts
Participant grouping: The grouping of participants was done before tests. Based on their levels, the athletes were divided into 02 groups (group 1 with good and excellent ones, group 2 with average and fairly good ones) following the assessment criteria for 8-year-old female gymnasts suggested by Nguyen, Kim Xuan (2001).

Physical tests for 8-year-old female gymnasts: Results of the 05 chosen tests are presented in Table 3.

Table 3: Results of physical tests to Vietnamese female gymnasts at the age of 8

TT	Test	Parameter	8-year-old groups	
			Group 1	Group 2
1	30m print (second)	$\bar{X}\pm S$	5.18±0.11	5.53±0.12
		t	1.37	
		p	p>0.05	
2	Standing long jump (cm)	$\bar{X}\pm S$	183.96±2.49	169.5±2.48
		t	2.66	
		p	p<0.05	
3	Bar pull up (reps)	$\bar{X}\pm S$	21.4±0.98	16.75±1.07
		t	2.75	
		p	p<0.05	
4	30 second L hang (reps)	$\bar{X}\pm S$	23.75±0.99	19.9±0.97
		t	2.80	
		p	p<0.05	
5	Backbend (reps)	$\bar{X}\pm S$	16.1±0.94	12.45±0.98
		t	2.82	
		p	p<0.05	

Table 3 shows the followings
- 30m print: Group 1' means are better than those in Group 2. However, there was no significant difference with $p<0.05$. In other words, the two groups' speed components were similar.
- Other 04 tests: Group 1's means are better than Group 2's ones. There was the significant difference with $p<0.05$. Especially, tests of bar pull-up, L hang and backbend were of higher level of difference.

Standards of physical evaluation for 8-year-old Vietnamese female gymnasts
Based on results of participants' physical tests, the principle ± 2S was employed to form the scale for assessment as shown in Table 4.
There are 5 levels from 1 to 5 in the scale: Level 5-Excellent; Level 4- Good; Level 3- Fairly good; Level 2- average; Level 1- weak.

Table 4: Criteria of physical selection for 8-year-old Vietnamese female Gymnasts

No.	Test	Level									
		1		2		3		4		5	
		Standard	Score	Standard	Score	Standard	Score	Standard	Score	Standard	Score
1	30m print (second)	5"9~	1.0	5"7~	2.0	5"5~	3.0	5"3~	4.0	5"1~	5.0
2	Standing long jump (cm)	165~	1.0	170~	2.0	175~	3.0	180~	4.0	185~	5.0
3	Bar pull up (reps)	14~	1.0	16~	2.0	18~	3.0	20~	4.0	22~	5.0
4	30 second L hang (reps)	16~	1.0	18~	2.0	20~	3.0	22~	4.0	24~	5.0
5	Backbend (reps)	9~	1.0	11~	2.0	13~	3.0	15~	4.0	17~	5.0

The established criteria was applied later in the practice of athlete classification. Results are shown in Table 5.

Table 5: Results of physical classification of 8-year-old Vietnamese female gymnasts

No.	Test	Group 1		Group 2	
		Score	Classification	Score	Classification
1	30m print (second)	4.5	Good	3	Fairly good
2	Standing long jump (cm)	4.7	Excellent	2	Average
3	Bar pull up (reps)	4.5	Good	2.5	Average
4	30 second L hang (reps)	4.7	Excellent	3	Fairly good
5	Backbend (reps)	4.5	Good	2.5	Fairly good
	Total score	22.9/25		13/25	

It is shown in Table 5 that the average physical fitness of Group 1 (good and excellent athletes) was of levels 4 (good) and 5 (excellent); meanwhile, that of the Group 2 (average and fairly good athletes) was of the levels average and fairly good. This is the evidence for the matching result between the athlete selection and assessment. Also, this is a proof for the appropriateness of the criteria mentioned in Table 4 for Vietnamese athletes' level.

Conclusion
Through this study, 05 physical tests were chosen for selecting 8-year-old female athletes of gymnastics in Vietnam including 30m print (second), standing long jump (cm), bar pull up (reps), L hang (reps) and backbend (reps).
Base on Vietnamese athletes' physical fitness, the physical standard for selecting Vietnamese gymnastic athletes at the age of 8 (bone age) was established was established (presented in Table 4). Research results indicate that the standard presented in Table 4 is suitable for Vietnamese athletes' level. Hence, it is possible to apply this standard in the practical selection of 8-year-old Vietnamese female gymnasts.

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