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EFFECTS OF A 6-MONTH CONDITIONING PROGRAM ON MOTOR AND SPORT PERFORMANCE IN THE GROUP OF CHILDREN'S FITNESS COMPETITORS

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Summary: The aim of our study was to determine changes in sport and motor performance of competitors in the category of children's fitness as a result of conditioning training intervention. We conducted a two-group simultaneous experiment. Experimental group (EG) and control group (CG) consisted of 18 girls competing in the 12 to 15 years old age categories. EG performed supervised conditioning program over a period of 25 weeks with training frequency 3 times per week. Based on the results of physical tests, competitive and expert assessments of sport performance in the children's fitness category we found significant effect of our conditioning program to increase sport and motor performance in the experimental group. Subsequently, these improvements could lead to success in domestic and international competitions where they occupied the leading positions. Significant relationships (EG = 19; CG = 10) were found between competitive and expert assessments as well as physical tests results, between expert and competitive assessments of physiques and routines. These changes manifested positively not only in the competitive assessment of the physique but also in the expert "blind" assessment in the competitive discipline of the physique presentation in quarter turns where we observed significant improvements in the EG. Based on the obtained results we recommend to increase the ratio of conditioning training to gymnastic-dance training to 50 %, inclusion of strengthening and plyometric exercises into the training process and monitor regularly the level of general and specific abilities of the competitors in the individual mezocycles of the annual training cycle.

Key words: fitness training, children competition, sport performance in fitness, quarter turns, fitness routine, assessment

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Introduction

Many people have tried to define the term fitness but any definition have not been satisfactory enough (SCULLY 1992). Fitness as a sports event is based on a presentation of physique in quarter turns and routines. The choreography of fitness routines is presented in competitions and is based on the level of exercise and quality execution of strength and acrobatic exercises as well as compositional representation. The limiting factor of success in routine assessment in fitness category is high level of specific condition and coordination abilities emphasising the quality and technique of executed exercise and dance figures and sequences. The competitive routines should contain: swing exercise figures, pull exercise figures, strength elements and elements of flexibility, acrobatic jump and dance motive (Mlsnová 2007; Mlsnová 2010). The routine should be executed with fair amount of showmanship that will resolve the placing in case of deuce. The second competitive discipline a presentation of physique is assessed in 4 basic figures – quarter turns. The competitor is assessed by point system. In each round of the competition, the competitor gets certain number of points that are summed up from referees. The competitor with the smallest number of points wins.

Buzgó et al. (2010) researched the effectiveness of fitness programs in a group of 21 young weight lifters aged 11 – 16 years old. The influence of condition preparations in Latin-American dances was handled by Chren (2008). Faigenbaum and Westcott (2005) conducted research monitoring with 64 boys and 32 girls at the age of 6 – 12 years old that performed weight lifting with maximum effort. Vanderka et al. (2010) researched the adaptation effect of explosive strength training with and without countermovement on a group of 30 students of Faculty of Physical Education and Sports of Comenius University in Bratislava. Implementation of fitness and strength training for young athletes was performed by Hahn (2009), Bompa (2000), Vedral (2002), Lancaster & Theodorescu (2008), Kraemer & Fleck (2004). There are no other research papers, published thesis or methodical instructions by other authors on children's fitness sport discipline.

The aim of our research was to determine changes in motor and sport performance of competitors in the category of children's fitness as a result of conditioning training intervention. In our research we employed conditioning program in order to improve indicators of motor and sport performance and somatic development that influenced positively shaping of ideal „fitness physique" with sufficient concordant development of

muscle and desirable proportionality of individual segments of body considering particularity of child's physique.

Our hypothesis was that conditioning program would have a significant impact on motor and sport performance in the experimental group. We assume that these changes in motor performance (physical tests) could positively affect evaluation process of sport performance during the children's fitness competition.

Methods

We conducted a two-group simultaneous experiment. We intentionally selected 36 participants who participated in our training program. They were selected according to their competition results. Subsequently, whole group was divided into 2 subgroups: experimental group (age: 13.23 ± 1.83 years; body height: 148.2 ± 8.9 cm; body weight: 40.7 ± 8.1 kg) and control group (age: 13.20 ± 1.82 years, body height: 152.6 ± 11.5 cm, body weight 41.44 ± 4.5 kg). Both groups actually compete in the age category of 12 – 15 years old. Experimental group (EG) performed supervised conditioning program over a period of 25 weeks with training frequency 3 times per week (total training days was 68 and the duration of one training session was 90 minutes). However, applied experimental stimulus lasted 45 minutes per one training session. The research was conducted through regular training process and during children's fitness competitions. Both groups had the same amount of training sessions per week. Conditioning program (Table 1) included basic gymnastic exercises such as exercises with own body weight and also we focused on strength development, aerobic endurance, explosive strength of lower-body extremities and flexibility by using gymnastic equipment and specific exercises with external load. The control group (CG) performed standardized training program during the whole study duration.

Table 1

Experimental factor – conditioning program (1st-25st week)

				Condition program No. 1			Condition program No.2			Condition program No.3		
			Warm up	jumping on skipping rope			jumping on skipping rope			jumping on skipping rope		
Term	**Sets**	**kind of resistance**		**1st-9th week**			**10th-18th week**			**19th-25th week**		
1st week	1	without external resistance **	**No.**	**Exercise**	**Sets**	**Reps**	**Exercise**	**Sets**	**Reps**	**Exercise**	**Sets**	**Reps**
2nd week	2	without external resistance **	1	Chin-ups	1-3	8	Reverse chin-ups	1-3	8	Chin-ups	1-3	8
3rd week	3	without external resistance **	2	Push-ups	1-3	12	Rows with abdominal support	1-3	12	lat pull-downs	1-3	12
4th-5th weeks	2	*,**	3	lateral bumbbell raisees	1-3	12	Push-ups	1-3	12	Push-ups	1-3	12
6th - 9th week	3	*,**	4	alternate front arm raises	1-3	10	Upright rows	1-3	10	Seated bent-over dumbbell raises on ball	1-3	12
10th- 12th week	3	*,**	5	bent-over lateral raises	1-3	12	Low-pulley front raises	1-3	12	Handstand	1-3	10s
13th-15th week	3	*,**	6	sit-ups	1-3	10	Hanging leg raises	1-3	10	Crunches	1-3	15
16th- 18th week	3	*,**	7	standing calf raises	1-3	15	Donkey calf raises	1-3	15	Drop jump from 20cm height with jump	1-3	10
19th- 21st week	3	*,**	8	back extensions	1-3	10	back extensions	1-3	10	Prone back expension on ball	1-3	12
22nd - 23rd week	3	*,**	9	Bench step	1-3	8	Lunges	1-3	8	Back lunges	1-3	8
24th- 25th week	3	*,**	10	Squats	1-3	15	Squats	1-3	15	High jumps from a squat	1-3	10
* expander, steps, fitballs, medicine ball,dumbbell, skipping rope				** bench, wall bars, vauting box, horizontal bar								

We have been constantly pointing out the significance of healthy diet that is necessary for development of young organism during our work with participants in the research. At the same time we used other method of expert assessment also known as blind assessment that was carried out by means of assessing the sport performance of probands in experimental and control group from DVD recording of children's fitness competition by five international judges of according to the competitive rules of Slovak Bodybuilding, Fitness and Powerlifting Association and International Federation of Bodybuilding. To assess the motor performance we applied standardised physical tests (Moravec 1996; Měkota & Blahuš 1983; Sedláček & Cihová 2009). All physical tests were carried out at the same place and were evaluated by the same qualified person (standard conditions). We focused on the assessment of general and specific motor skills. These tests included: pull up endurance, sit-ups, push-ups on a mat, standing long jump, 50 m sprint, shuttle run 10 x 5 m, standing forward bend, „flamingo" balance test, countermovement vertical jump and squat jump using FITRO JUMPER (Zemková & Hamar 2004).

To compare differences between input and output values (pre- and post-training values) non-parametric Wilcoxon t-test for dependent variables was used. Non-parametrical Mann-Whitney u-test to compare differences between EG and CG was also calculated. Spearman's rank correlation coefficient analysis was used to determine the relationship between variables. Effects sizes according to Cohen´s *d* whereas, ≤ 0.2 is a small, 0.2 – 0.8 are a moderate and > 0.8 is a large effect are calculated and positioned inside of the bar charts. Alpha was set at ≤ 0.05 and ≤ 0.01.

Results

Comparing the pre- and post-training values (Table 2) we found significant improvements ($p < 0.01$) in EG in all assessed tests: pull-up endurance sit-ups , push-ups on a mat, standing long jump, 50 meters sprint, shuttle run 10 x 5 meters, standing forward bend, „flamingo“ balance test ($p < 0.05$), countermovement vertical jump and squat jump performance. We also observed significant improvements ($p < 0.01$) in repeated 10 seconds jump test where decline in ground contact time occurred (Table 3). These tests measure explosive strength of lower-body extremities and abilities to store and utilize elastic energy, static end endurance power of upper extremities and back muscle, dynamic and endurance power of abdominal muscles and rectus femoris muscle, velocity abilities, running acceleration ability with coordination abilities, complex running velocity and flexibility that are ranked among limiting factors of sport performance in children’s fitness and are implemented mainly in dynamic, swing and pull exercise figures, power figures, flexibility figures and acrobatic jumps presented in the competitive routines. We also observed significant improvements in all indicators, except flexibility test, static balance, countermovement and squat jump performance, and 10-second jump test in the CG. In all the examined parameters measured using jump ergometer we observed decline which might have been caused by traditional training routine in the CG and mainly because explosive or power-related exercises were lacking. By suitably selected resources and respecting didactic regulations and regularity of exercise execution, the experimental factor influenced also a development of explosive power in lower extremities and ability to store and utilize elastic energy that is considered to be a significant component of jumping abilities which was confirmed by the following researchers: Hamar (1991), Zemková (2004, 2006, 2007), Zemková & Hamar (2001), Mlsnová & Strešková (2010).

Table 2

The basic statistical characteristics of input and output parameters of EG and CG and statistical significance among input and output measurements of EG and CG (parametric t-test for independent selection).

	BMI		Pull-up		Sit-up		Push-up		SLJ		R50m		SR10x5		Bend.		Flam.	
	input	output	input	output	input	output	input	output	input	output	input	output	input	output	input	output	input	output
Experimental group																		
AV±SD	18,3±1,7	17,9±1,3	42,5±14,2	54,2±14,6	25,1±2,7	32,6±3,6	19,5±6,4	25,7±6,6	167,4±27,6	181,7±25,4	9,6±0,7	8,7±0,6	20,2±1,6	18,5±,7	16,6±5,5	18,5±5,3	1,3±0,5	1,1±0,2
Min.	15,4	15,8	13,9	32,0	21,0	28,0	11,0	13,0	120,0	130,0	8,3	7,5	18,0	17,2	7,0	10,0	1,0	1,0
Max.	21,8	20,8	68,3	78,0	30,0	39,0	30,0	36,0	220,0	225,0	10,8	9,5	24,4	20,0	28,0	30,0	2,0	2,0
***p* value**	0,00988 **		0,0002 **		0,0002 **		0,0002 **		0,00024 **		0,0002 **		0,0002 **		0,00288 **		0,04312 *	
Z value	-2,57990		-3,72360		-3,7236		-3,7236		-3,68000		-3,7236		-3,7236		-2,98320		-2,02260	
Control group																		
AV±SD	17,8±1,5	19,4±1,32	34,0±14,9	35,9±14,7	17,8±4,4	18,4±4,0	17,2±6,7	17,9±6,6	158,4±22,3	160,7±21,5	10,0±0,6	9,9±0,5	22,4±2,2	22,0±2,0	12,7±4,8	12,7±4,4	1,4±0,5	1,4±0,5
Min.	15,6	17,3	12,0	16,5	12,0	13,0	5,0	6,0	125,0	132,0	9,1	9,0	19,3	19,0	5,0	6,0	1,0	1,0
Max.	21,2	22,3	64,5	65,0	28,0	28,0	28,0	28,0	191,0	193,0	11,4	11,1	26,5	25,5	24,0	22,0	2,0	2,0
***p* value**	0,00020 **		0,00308 **		0,01428 *		0,00614 **		0,00042 **		0,00120 **		0,00228 **		0,88866		1,00000	
Z value	-3,72360		-2,96140		-2,44500		-2,74060		-3,52760		-3,23740		-3,04850		-0,13980		0,00000	

Notes: p - statistical significance; SD - standard deviation; AV - arithmetical average; Min. - minimum; Max – maximum ; SLJ- standing long jump; R50m- 50 meters sprint; SR10x5- shuttle run 10 x 5 meters; Bend.- standing forward bend; Flam.- "flamingo" balance test; **- the level of significance at $p < 0.01$; *- the level of significance at $p < 0.05$;

Table 3

The basic statistical characteristics of input and output parameters of EG and CG and statistical significance between input and output measurements

	JE without. [cm]		JE with. [cm]		JE 10 sec. [s]	
	input	output	input	output	input	output
Experimental group						
AV±SD	18,8±4,0	18,8±6,8	24,9±7,3	2,2±0,4	0,23±0,05	0,20±0,05
Min.	12,20	9,60	16,30	1,64	0,16	0,15
Max.	28,70	33,90	48,20	2,79	0,32	0,26
***p* value**	0,56868		0,00758 **		0,0012 **	
Z value	-0,56620		-2,67460		-3,2374	
Control group						
AV±SD	18,60±3,95	18,11±4,22	24,94±7,45	23,34±5,92	0,21±0,04	0,22±0,05
Min.	12,20	11,60	16,30	14,60	0,14	0,17
Max.	28,70	27,90	48,20	38,70	0,27	0,40
***p* value**	0,68916		0,23404		0,98404	
Z value	-0,40240		-1,18930		-0,02180	

Notes: p - statistical significance; SD - standard deviation; AV - arithmetical average; Min. - minimum; Max – maximum ; JE without.- squat jump ;JE with.- countermovement vertical jump;

JE 10 sec.- 10 second jump test; **- the level of significance at $p < 0.01$; *- the level of significance at $p < 0.05$.

Table 4

The basic statistical characteristics of input and output parameters of EG and CG and statistical significance between input and output expert and competition assessment.

	CA-FR		CA-QT		EA-FR		EA-QT	
	input	output	input	output	input	output	input	output
Experimental group								
AV±SD	6,17±3,98	5,67±3,94	5,33±3,98	5,39±5,16	37,89±20,18	25,79±15,16	31,83±10,6	12,33±9,89
Min.	1,0	1,0	1,0	1,0	6,0	1,0	17,0	1,0
Max.	14,0	17,0	14,0	17,0	64,0	45,0	45,0	37,0
***p* value**	0,42572		0,1868		0,00020	**	0,00020	**
***Z* value**	-0,80570		-1,31860		-3,72360		-3,72360	
***W* value**	59,5		42,5		0		0	
Control group								
AV±SD	8,06±4,88	9,36±4,87	9,11±5,01	11,44±4,82	40,5±22,71	41,81±22,48	46,88±13,77	54,38±18,96
Min.	1,0	1,0	2,0	3,0	3,0	2,0	20,0	14,0
Max.	18,0	18,0	17,5	18,0	72,0	71,0	69,0	72,0
***p* value**	0,01078	*	0,0049	**	0,71138		0,02202	*
***Z* value**	-2,55080		-2,80900		-0,37020		-2,28640	

Notes: CA – competitive assessment; FR - fitness routine; QT - quarter turns; EA - expert assessment; p - statistical significance; AV - arithmetical average; Min. - minimum; Max - maximum;**- the level of significance at $p < 0.01$; *- the level of significance at $p < 0.05$.

During initial measurements we observed improvements in all participants from the EG (Figure 1, Figure 2). Positive changes of proportionality of individual muscle groups and changes in BMI in the EG positively affected assessment in competitive discipline of physique comparison (Table 4). Overall output assessment documents that the EG acquired significantly better results in the physique presentation at the end of the experiment. We observed significant improvement in the experimental group ($p = 0.0002$, $p < 0.01$) between input and output values of expert assessment of routines (Figure 3) and physiques (Figure 4). We also observed significant decrease ($p = 0.022$, $p < 0.05$) between input and output values in the control group after expert assessment in physique presentation discipline ($p = 0.022$, $p < 0.05$) as well as after competitive assessment in physique presentation discipline ($p = 0.01078$, $p < 0.05$) and decrease in competitive assessment in physique presentation discipline ($p = 0.0094$, $p < 0.01$). The improvements in the

experimental group through expert "blind" assessment were recorded as a result of the intervention of our conditioning program in the EG.

Table 5

Relationships between input and output parameters in competitive, expert assessment of routines and physiques and selected tests in the EG and CG.

		BMI	Pull-up	Sit-up	Push-up	SLJ	R50m	SR10x5	Bend.	Flam.	JEwithout.	JE with	JE 10s.	CA-FR	CA-QT	EA-FR	EA-QT
Experimental group																	
CA-FR	Correl.c.	0,113	.-0,296	.-0,467	.-0,712**	.-0,118	0,454	.-0,088	.-0,482*	.-0,212	0,170	0,273	.-0,279	1,000	0,646**	0,865**	0,584*
	sign.	0,655	0,233	0,051	0,001	0,640	0,058	0,730	0,043	0,399	0,501	0,274	0,262		0,004	0,000	0,011
CA-QT	Correl.c.	.-0,059	.-0,153	.-0,166	.-0,590*	.-0,357	0,445	.-0,263	.-0,498*	0,258	0,402	0,498*	.-0,139	0,646**	1,000	0,690**	0,760**
	sign.	0,816	0,544	0,509	0,010	0,146	0,064	0,292	0,035	0,300	0,098	0,036	0,583	0,004		0,002	0,000
EA-FR	Correl.c.	0,187	.-0,294	.-0,380	.-0,759**	.-0,191	0,476*	.-0,122	.-0,507*	0,070	0,253	0,369	0,005	0,865**	0,690**	1,000	0,633**
	sign.	0,458	0,236	0,120	0,000	0,448	0,046	0,629	0,032	0,782	0,311	0,132	0,984	0	0,002		0,005
EA-QT	Correl.c.	0,112	.-0,371	.-0,327	.-0,544*	.-0,602**	0,430	.-0,324	.-0,503*	0,304	0,417	0,570*	.-0,288	0,584*	0,760**	0,633**	1,000
	sign.	0,657	0,13	0,185	0,020	0,008	0,075	0,189	0,034	0,220	0,085	0,014	0,246	0,011	0,000	0,005	
Control group																	
CA-FR	Correl.c.	0,006	.-0,056	.-0,119	.-0,167	.-0,268	0,254	0,146	.-0,248	0,552*	0,294	0,226	.-0,054	1,000	0,907**	0,796**	0,746**
	sign.	0,980	0,825	0,639	0,507	0,283	0,31	0,564	0,322	0,018	0,237	0,368	0,830		0,00	0,000	0,000
CA-QT	Correl.c.	.-0,059	0,007	.-0,186	.-0,111	.-0,273	0,260	.-0,001	.-0,363	0,331	0,339	0,166	.-0,147	0,907**	1,000	0,809**	0,905**
	sign.	0,816	0,977	0,460	0,660	0,274	0,297	0,998	0,139	0,18	0,169	0,510	0,561	0,00		0,000	0
EA-FR	Correl.c.	0,005	.-0,302	.-0,344	.-0,399	.-0,537*	0,509*	0,177	.-0,654**	0,516*	0,166	0,069	.-0,015	0,796**	0,809**	1,000	0,703**
	sign.	0,984	0,223	0,162	0,101	0,021	0,031	0,482	0,003	0,028	0,510	785	0,951	0,000	0,000		0,001
EA-QT	Correl.c.	.-0,042	.-0,053	.-0,122	0,116	.-0,305	0,299	.-0,043	.-0,403	0,253	0,340	0,087	.-0,148	0,746**	0,905**	0,703**	1,000
	sign.	0,868	0,835	0,629	0,647	0,219	0,228	0,864	0,098	0,312	0,168	0,732	0,559	0,000	0	0,001	

Notes: CA - competitive assessment; FR - fitness routine; QT - quarter turns; EA - expert assessment; p - statistical significance; SD - standard deviation; AV - arithmetical average; Min. - minimum; Max – maximum ; SLJ - standing long jump; BMI – body mass index; R50m - 50 meters sprint; SR10x5 - shuttle run 10 x 5 meters; Bend. - standing forward bend; Flam. - "flamingo" balance test; JE without. - countermovement vertical jump; JE with. - squat jump; JE 10 sec.- repeated 10 seconds jump test;****** - the level of significance at $p < 0.01$; ***** - the level of significance at $p < 0.05$.

Changes in training outcomes led to positive expert and competitive assessment in dance and sport training (Chren 2008), which is in line with the results of our study. Based on the output values of expert and competitive assessment of the sport performance of children's fitness, a significant influence and success of conditioning program has been confirmed by subsequent improvements of sport performance and physique in the experimental group leading to better results in domestic and international competitions.

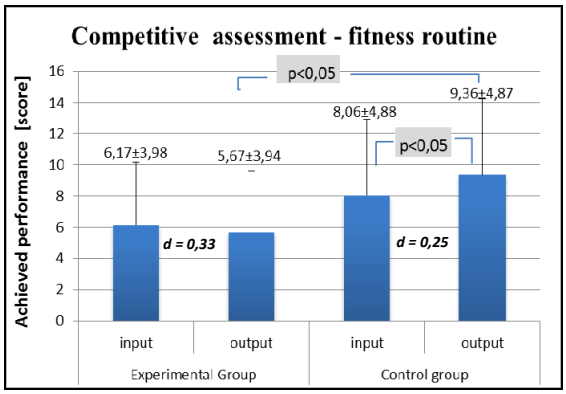

Figure 1

Statistical significance in competitive assessment in fitness routine

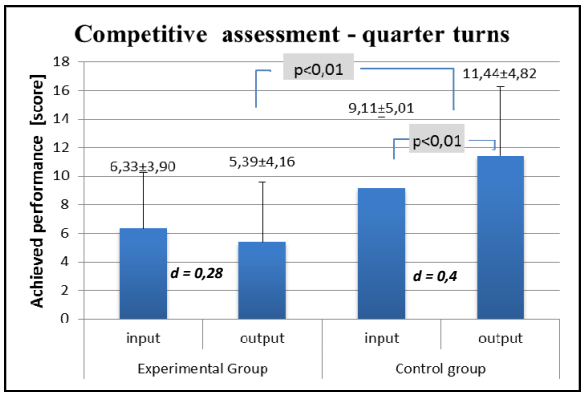

Figure 2

Statistical significance in competitive assessment in quarter turns

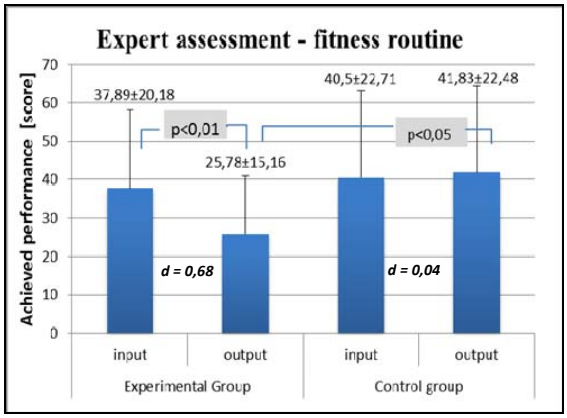

Figure 3

Statistical significance in expert assessment in fitness routine

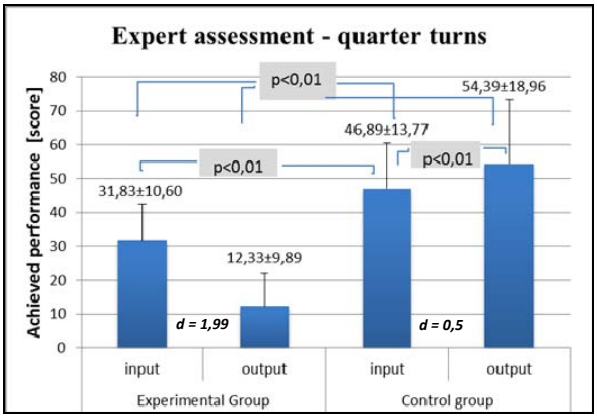

Figure 4

Statistical significance in expert assessment in quarter turns

Table 5 shows 19 and 10 significant relationships in the EG and CG between competition and expert assessment of sport performance. Comparing the output values of the tests, ranking after expert assessment and competition results we recorded positive relationship between the fitness routine in the competition and competitive assessment of the physique ($r = 0.646$, $p = 0.004$), expert assessment of the fitness routine ($r = 0.865$, $p = 0.00001$), the total number of push-ups ($r = -0.712$, $p = 0.001$), expert assessment of physique ($r = 0.584$, $p = 0.011$) and the standing forward bend ($r = 0.0482$, $p = 0.043$). When evaluating the physique we recorded positive relationship with competitive ($r = 0.646$, $p = 0.004$) as well as assessment of the fitness routines ($r = 0.690$, $p = -0.760$) and assessment of the physique ($r = 0.760$, $p = 0.0002$) and also with the total number of push-ups ($r = -0.590$, $p = 0.010$), standing forward bend ($r = -0.498$, $p = 0.035$) and

countermovement vertical jump performance (r = 0.498, p = 0.036). When evaluating the fitness routines we recorded positive relationship with competitive assessment of the physique (r = 0.865, p = 0.000) and fitness routine (r = 0.690, p = 0.002), with expert assessment of the physique (r = 0.63, p = 0.005) and the total number of push-ups (r = -0.759, p = 0.000) as well as with 50 m sprint time (r = 0.476, p = 0.046) and standing forward bend (r = -0.507, p = 0.032). In expert assessment of the physique we recorded positive relationships with competition assessment of the physique (r = 0.760, p = 0.0002), expert assessment of the fitness routine (r = 0.633, p = 0.005) and negative relationship in the standing long jump performance (r = -0.602, p = 0.008) and the total number of push-ups (r = -0.544, p = 0.20), standing forward bend (r = -0.503, p = 0.034) and the height of countermovement vertical jump (r = 0.570, r = 0.014) and competitive assessment of the fitness routine (r = 0.584, p = 0.011). We also observed positive relationships in the CG between all disciplines in competition assessment of the fitness routines and physiques (r = 0.907, $p < 0.01$), as well as expert assessments of the fitness routines and physiques (r = 0.703, p = 0.001) and standing forward bend (r = -0.654, p = 0.003) and between competition and expert assessment of the routine (r = 0.796, $p < 0.01$) and expert assessment of the physique and static balance test (r = 0.516, p = 0.028) and between expert assessment and of the routine and standing long jump performance (r = -0.537, p = 0.021) as well as 50 meter sprint time (r = 0.509, p = 0.031). Table 4 shows overall results of our correlation analysis where statistically significant values are marked as follows: * $p < 0.05$, resp. ** $p < 0.01$.

Discussion

The results of this study confirmed our hypothesis that appropriately selected conditioning program positively affected motor and sport performance in the category of children's fitness competitors. Despite the fact that specialised conditioning program was executed without focusing on technique training the intervention of the conditioning program manifested positively in the presentation on stage and difficulty of each exercise (competition line-up) that was confirmed by competition and expert assessment. At the same time it has been proven that implementation of our conditioning program positively influenced body shaping with harmonious and symmetrical development of upper and lower-body muscle groups. These changes manifested positively not only in the

competitive assessment of the physique but also in the expert "blind" assessment in the competitive discipline of the physique presentation in quarter turns where we observed significant improvements in the EG. The targeted strengthening of individual muscle groups and increased aerobic activity focusing on symmetrical muscle development positively affected body shaping in the EG which resulted in a positive competitive evaluation in the EG after the training period. The overturn exercise figures are part of the fitness routines and we noticed that participants in the EG included these exercises into their presentation on stage. They performed these exercises in a more challenging manner and gymnastics sequences. The conditioning program as an experimental factor influenced sport performance in the discipline of competitive routines presentation despite the fact that their statistical significance was not confirmed. Overall post-training evaluation revealed improved competitive assessment in the EG after the training period. Post-training evaluation in the CG showed worsening in competitions as well as in expert assessment that may look like performance degradation but they improved in other assessed parameters.

Spearman correlation analysis revealed relationship between expert and competitive assessment of the physiques and fitness routines, between competitive and expert results and strength endurance of upper extremities and flexibility and partially explosive strength of lower-body extremities and the ability to store and utilize elastic energy which is an important factor that affects for example jumping abilities.

We believe and it is well known that there are many factors (internal or external) which are connected with sport performance of children fitness competitors. This topic has particular importance in terms of development of movement or conditioning skills given the importance of genetic heredity, sensitive periods and others.

Conclusions

Taking into account the results of our research, we recommend:

- increase the ratio of conditioning training to gymnastic - dance training to 50 %,
- use various equipment in the first part of the training session,
- focus on the correct exercise technique with appropriate external load and progressively increase the number of repetitions and series.
- apply stretching and compensatory exercises in the final part of the training session,

- plyometric training could serve as a valuable training method to develop explosive strength of lower-body extremities,
- we recommend inclusion of strengthening and plyometric exercises into the training process (rope jumping, miscellaneous variations of jumps using equipment, squats, standing heel rise on a wall rack, jump squats, drop jumps, forward lunges) which are focused to develop explosive strength of lower - body extremities. This could help to execute gymnastic exercise figures in a more powerful manner and perform different (e.g. demanding) variations as well as to create safer landing conditions,
- monitor regularly the level of general and specific abilities of the competitors in the children's fitness in the individual mesocycles of the annual training cycle. We recommend regular expert assessment by Slovak Bodybuilding, Fitness and Powerlifting Association from the DVD recordings in selected competitors not only in the children's fitness but also in the categories of juniors and seniors as the gathered data contribute to the improvements of sport performance in domestic and international competitions.

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