MUSICAL-MOTOR TRAINING OF JUNIOR RHYTHMIC GYMNASTS

(Original scientific paper)

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Abstract

The musical accompaniment in rhythmic gymnastics is vital for the judgment. The creation of methods for musical-motor training with 12-14-year-old gymnasts is based on a set of particular exercises, arranged in the weekly training cycle, and executed with competitive musical accompaniment. The research was done among 8 gymnasts; the subject of the research is mistakes made during the execution of: 1) different exercises without apparatuses, 2) parts of the competitive compositions, 3) the entire compositions, 4) exercises with apparatuses. The results from the conducted pedagogical experiment showed that the number of the mistakes made in the relation music-movements decreased progressively throughout the researched period. The established increase of the results along all indexes is of great practical importance; Cohen's d for the entire period is between 2.18 and 3.39. The suggested set of exercises, executed in connection with the competitive musical accompaniment, proved to be successful and applicable for musical-motor training with 12-14-year-old gymnasts.

Keywords: *music, training, exercises, mistakes*

INTRODUCTION

The historical reference shows that the origin of rhythmic gymnastics was based on dances with musical accompaniment (Naypak (Найпак), 19850, and according to the retrospective analysis of the competitive codes of rules (Palmero, 1966; Gantcheva, (Ганчева), 2008), the musical accompaniment is a genuine and characteristic feature of this sport. Music has vital importance for the style of the combinations (Biruk & Ovchinakova (Бирюк, Е. В., & Овчинникова), 1983) Shuliko (Шулико), 1986). It is the base of the idea and the style of the links between the exercises and combinations (Mendizábal, 2001); it stimulates the gymnast's expressiveness (Gantcheva, (Ганчева), 2008), it reveals the inner peace of the gymnast, not just her technical skills or physical qualities (Robeva (Робева), 1981). The guarantee for the success of a certain composition is based on the correct choice of a musical work, which corresponds to the individual features of the gymnast. (Lisickay (Лисицкая),1981). Most of the gymnastics events use musical accompaniment for all their competitive disciplines – aerobics Mineva, Kaneva, & Marinova (Минева, Канева, & Маринова) 2007), acrobatics and the connection music-movement is perfected.

In the competitive code of rules from 2013-2016, the International Gymnastics Federation paid special attention to musical accompaniment and set the requirements for its qualities and interpretation in 12 rules (table 1) as a component in judgment of the composition and execution of the competitive compositions.

The leading schools in contemporary rhythmic gymnastics, in compliance with the requirements of the event, pay special attention to musical preparation by placing it together with the other kinds of training – physical, technical, psychological, and theoretical (Karpenko (Карпенко), 2003).

Despite the increased requirements for the musical accompaniment in the education-training process in the sports clubs, because of technical reasons no live music, performed by a rehearsal pianist, is used. The musical-motor training, as an important part of the creation of basic habits and skills with the beginners, is practically missing, and the continuous underestimation of this vital task in the training of the gymnasts could lead to great impediments in their successful future sports realization.

METHODS

The aim of this paper is to create methods for musical-motor training with 12-14-year-old gymnasts (juniors). This aim is realized by realizing following tasks:

- To prepare a set of particular exercises for musical-motor training of gymnasts;
- To arrange the exercises in the weekly training cycle;

■ To use the possibilities of the competitive musical accompaniment.

The research was done among 8 gymnasts, competing in 12-14-year-old age group. Subject of the research is the mistakes, connected with the musical accompaniment and made during the execution of: 1) different exercises without apparatuses, 2) parts of the competitive compositions, 3) the entire compositions, 4) exercises with apparatuses.

The research was conducted in the period 1st-30th October, 2014. Researched individuals: 8, aged between 12 and 14. The following methods were used:

■ Execution of exercises with the competitive musical accompaniment by each gymnast:

■ Raising and lowering toes while leaning against gymnastics wall bars, and without support (two or three figure-eights are alternated with different tempo)

■ Clapping hands at the loud times

■ Marching on one spot or in movement

■ Undulations with arms

■ Short distance running

■ Exercises with apparatuses – (clubs – knocking, ball – bouncing)

■ Execution of series of rhythmical steps

■ Marking the loud and weak times of the musical accompaniment of the competitive compositions (in parts)

■ Marking the loud and weak times of the musical accompaniment of the competitive compositions (repetition of some parts with more complex structure)

The exercises are executed throughout 15-20 minutes at the end of the preparatory and the beginning of the main part of each training session.

The obtained results were processed using following statistics methods: dispersion analysis, partial Eta Squared and Cohen's d.

RESULTS AND DISCUSION

In order to check if the results change statistically during the whole experiment a dispersion analysis was used (RMANOVA). The conclusions are based on the value of the F-criteria of Fisher and its corresponding significance level (a). In order to find out the statistical significance of the differences between the numbers of the mistakes made in each of the researched periods, multiple comparisons with the correlation of Bonferroni were used. The extent of the differences is described by the indexes absolute (d), percentage increase (d%) and standardized difference of (Cohen's d) with serial (for each researched period separately) and serial (from the beginning of the researched period) base. In order to describe the percentage, explained with the dynamics of the results in the course of the experiment dispersion of the value, the partial determination coefficient ($Eta^2partial$) was used. The conditions for applying the above mentioned statistical methods were preliminary tested. It was found out the requirements were met – the researched indexes are characterized with normal distribution in each of the four consecutive measurements (Fig. 1).

The results from the research show that throughout the whole period the number of the mistakes made by the gymnasts decreases statistically significantly (F=22.14, a=0.000) from 11,13±2,70 to 4,75±1,17. The achieved advance in the accuracy of execution of the different exercises of 6,375 has a great practical significance (Cohen's d=2.18). The dynamics of the results in each researched period shows a few interesting conclusions. In each stage of the research the gymnasts show a positive change in the accuracy of the execution of the exercises. From the beginning until the first control measurement the number of the mistakes decreases with 1,25 (11,24%), in the second stage – with 1,25 (12,66%). In the next stages there is a progressive increase of the positive training effect – between the second and the third measurement the number of the mistakes decreases with 1,75 (20,29%)., and in the last period – with 2,12 (30,91%). The commented increase is of great value (Cohen's d is within 0,63 to 1,61), but it is not statistically significant, because the number of the researched individuals is small. Obviously, the duration of each research period is not enough for the gymnasts to improve significantly the accuracy of execution of the exercises.

Tracing the changes with permanent base (compared to those at the beginning of the experiment) shows that there is a statistically significant change in the accuracy of the execution of the exercises in the third mea-
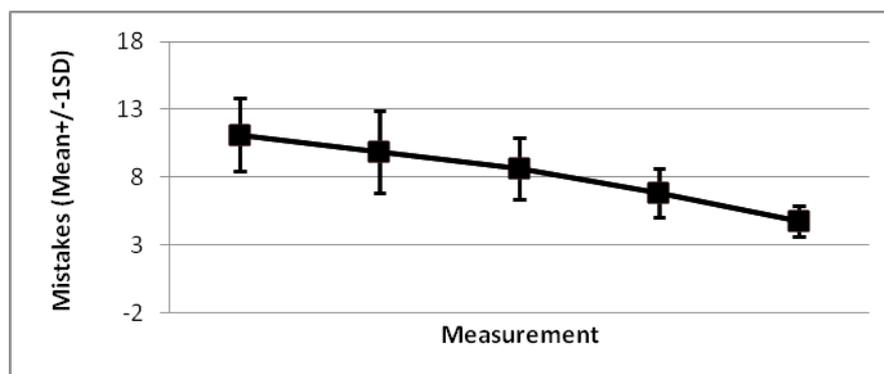

Figure. 1. Indexes of the four consecutive measurements

Table 1. Requirements for musical accompaniment (TC/RG of FIG – 2013-2016)

COMPOSITION	EXECUTION
	1. <u>Unity of Composition</u>
	The main objective is to create an artistic image, expressed through the body and apparatus movements and the character of the music. The character of the music should define the guiding idea/theme of the composition, and the gymnast must convey this guiding idea to the audience from the beginning to the end of the exercise.
Dance Steps Combination continuous connected dance steps (from ballroom, folklore, modern dance, *etc.*) showing different rhythmical patterns with the apparatus in motion during the entire combination and performed:	▪ The composition should be developed by the technical, aesthetic and connecting elements, where one movement passes smoothly into the next, including contrasts in the speed/intensity (dynamism), amplitude and levels of the movements, performed in relationship with the music.
	2. <u>Music and Movement</u>
▪ During a minimum of 8 seconds in accordance with the tempo and rhythm of the music	There should be a total correlation between the movements and the music, performed by: ▪ The contrast of movements in accordance with the tempo, rhythm and music accents
▪ To convey the character and emotional response of the music through body and apparatus movements	▪ The ability to express the character and emotional responses to the music through body movements and continuous apparatus work
	▪ An exercise which is connected to the music only in the beginning and the end is considered as the use of "background music." 3. <u>Body Expression is characterized by:</u>
	▪ The facial expressions must also communicate the theme of the music and the message of the composition
	▪ Variety in the speed and intensity (dynamism) of the gymnast/apparatus movements, which should reflect the dynamism of the movement (music)

<u>I index – execution of certain exercises without apparatus (Table 2).</u>

Table 2. Results from the measurement along the I-st index

Measurement	Mean	SD	F	p	Partial Eta Squared	Increase of the results[a]						Cohen's d for the whole period
						In each of the stages				From the beginning of the research		
						d (numb)	d%	Cohen's d	p	d (numb)	p	
Beginning	11,13	2,70				-	-	-	-	-	-	
Measurement 1	9,88	3,00				-1,25	-11,24	-1,41	,053	1,25	,053	
Measurement 2	8,63	2,26	22,14	0,00	0,76	-1,25	-12,66	-0,63	0,118	2,5	,053	2,18
Measurement 3	6,88	1,81				-1,75	-20,29	-1,37	,062	4,25*	,004	
Measurement 4	4,75	1,17				-2,125	-30,91	-1,18	,127	6,375*	,005	

surement. Through rhythmical execution of difficulty exercises, an optimal correlation of the duration of their phases is achieved. With the balance exercises, the phase of the main actions is prolonged. With the jumping exercises from the structure group the acceleration, the optimal combination of the speed characteristics and the optimal angle of the dash are set, and this leads to jumps with good height and amplitude. Consequently, the exercises meet the requirements for the correct technical execution.

II index – performing parts of competitive compositions (Table 3)

The number of the mistakes made by the gymnasts along the second index decreases and is statistically significant (F=41.74, a=0.000) from 14,75±2,05 to 6,38±1,41. The achieved improvement of the performance of parts of the competitive compositions of 8,375 is characterized with great practical importance (Cohen's d=3.02). The dynamics of the results in each

research period shows that the gymnasts achieve positive change in the accuracy of the performance of parts of compositions in connection to the musical accompaniment. From the beginning to the first control measurement, the number of the mistakes decreases with 2,25 (15,25%), in the second stage – with 2,125 (17,00%). In the next stages there is a slight decrease of the positive training effect - 1,5 mistakes (14,46%), but in the last period there is again an increase of the effect of the applied methods with 2,5 (28,17%). The increase is characterized with great value (Cohen's d is within 1,05 to 1,98), but the small number of the researched individuals does not make it statistically significant. In order to greatly improve the execution of parts of compositions the results from the whole research period should be taken into consideration.

III index – performing entire compositions (Table 4)

The results from the research show that the number of the mistakes made by the researched individuals

Table 3. Results from the measurement along the II-nd index

Measurement	Mean	SD	F	p	Partial Eta Squared	Increase of the results[a]						Cohen's d for the whole period
						In each of the stages				From the beginning of the research		
						d (numb)	d%	Cohen's d	p	d (numb)	p	
Beginning	14,75	2,05				-	-	-	-	-	-	
Measurement 1	12,50	2,00				-2,25	-15,25	-1,93	,009	2,25	,009	
Measurement 2	10,38	1,60	41,74	0,00	0,856	-2,125	-17,00	-1,05	0,211	4,375	,004	3,02
Measurement 3	8,88	1,73				-1,5	-14,46	-1,98	0,008	5,875	,001	
Measurement 4	6,38	1,41				-2,5	-28,17	-1,56	0,031	8,375	,001	

Table 4. Results from the measurement along the III-rd index

Measurement	Mean	SD	F	p	Partial Eta Squared	Increase of the results[a]						Cohen's d for the whole period
						In each of the stages				From the beginning of the research		
						d (numb)	d%	Cohen's d	p	d (numb)	p	
Beginning	11,88	2,42				-	-	-	-	-	-	
Measurement 1	8,50	1,07				-3,38	-28,45	-1,35	0,07	3,38	,066	
Measurement 2	7,00	0,93	54,21	0,00	0,890	-1,5	-17,65	-1,40	0,05	4,88	,014	3,39
Measurement 3	5,50	0,76				-1,5	-21,43	-1,62	0,03	6,38	,000	
Measurement 4	3,38	0,74				-2,12	-38,55	-2,14	0,01	8,5	,000	

Table 5. Results from the measurement along the IV-th index

Measurement	Mean	SD	F	p	Partial Eta Squared	Increase of the results[a]						Cohen's d for the whole period
						In each of the stages				From the beginning of the research		
						d (numb)	d%	Cohen's d	p	d (numb)	p	
Beginning	5,50	1,51				-	-	-	-	-	-	
Measurement 1	5,63	1,69				0,13	2,36	0,09	0,802	0,13	,802	
Measurement 2	4,38	2,07	11,98	0,00	0,631	-1,25	-22,20	-0,84	0,492	-1,12	,108	3,39
Measurement 3	2,63	1,06				-1,75	-39,95	-1,18	0,127	-2,87	,017	
Measurement 4	3,00	1,20				0,37	14,07	0,41	0,285	-2,5	,023	

decreases statistically significantly (F=54.21, a=0.000) from 11,88±2,42 to 3,38±0,74. The achieved advance in the accuracy of execution of entire compositions from the competitive program of 8,5 is characterized with great practical importance (Cohen's d=3.39). The dynamics of the results from the researched periods shows that in each of the stages of the research the gymnasts achieve positive change in the accuracy of execution of the entire compositions, and: from the beginning to the first control measurement the number of the mistakes decreases with 3,38 (28,45%), in the second stage – with 1,5 (17,65%), in the third stage - with 1,5 (21,43%), and in the last stage the mistakes decrease with 2,12 (38,55%). The positive training effect is confirmed with the value of the increase (Cohen's d is within 1,35 to 2,14). The duration of each research period is not enough for the significant improvement of the accuracy of execution of the competitive compositions. The changes in the results, compared to the ones at the beginning of the experiment, show there is a statistically significant change in the accuracy of execution of the entire compositions in the fourth measurement. It has been proven that the exercises from the suggested methods should be applied systematically and there is no quick effect from their short-term implementation.

IV – ability to follow the musical rhythm after a mistake in apparatus movement (Table 5)
The results from the research along this index show that throughout the research period the number of the mistakes made by the gymnasts decreases statistically significantly (F=11.98, a=0.000) from 5,50±1,51 to 3,00±1,2. The achieved advance in the ability to follow the musical rhythm after a mistake in apparatus movement 2,5 is characterized with great practical importance (Cohen'sd=3.39). The dynamics of the results in each research period shows a few more different conclusions. In the first and the fourth measurement the mistakes increase respectively with 0,13 (2,36%), and in the last period – with 0,37 (14,07%). In the other stages of the

research the gymnasts achieve positive change in the accuracy of their abilities. From the beginning until the second control measurement the number of the mistakes decreases with 1,25 (22,20%), in the third stage – with 1,75 (39,95%). The commented increase for the first and the fourth measurement is small and of moderate value (Cohen's is 0, 09 and 0,41), and significant and big with the second and the third measurement (Cohen'sd is 0,84 and 1,18). The duration of each research stage, as well as the whole research period, is enough for significant improvement of the accuracy in apparatus movement after making a technical mistake. Tracing the changes with permanent base shows there will be a statistically significant change in the accuracy of apparatus movement if a greater attention is paid to this index, when parts of the composition are performed. A new index for researching the effect of the applied methods should be implemented, namely execution of different exercises with apparatus.

CONCLUSION
The selected particular exercises are united in a set of exercises for musical-motor training of rhythmic gymnasts. Its difficulty and duration enable its daily implementation in the training sessions of the gymnasts from the researched age group.

The results from the conducted pedagogical experiment showed that the number of the mistakes made in the connection music-movements decreased progressively throughout the research period and the improvement along the different indexes is the following: I index d=6,375, (Cohen's d=2.18); II index d=8,375, (Cohen's d=3.02); III index d=8,5, (Cohen's d=3.39); IV index d=2,5, (Cohen's d=3.39).

The established increase of the results along all indexes throughout the research period is of great practical importance, Cohen'sd for the whole period is within 2,18 to 3,39. It can be claimed that the suggested set of exercises, executed in connection to the competitive musical accompaniment leads to great results and is

available for musical-motor training with 12-14-year-old gymnasts.

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