ASYMMETRY IN THE DEVELOPMENT OF THE MOTOR QUALITIES

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Summary:

The rhythmic gymnastics is a sport associated with beauty and grace (Gantcheva, G., 2013), including a large variety of exercises, which continually complicated by the increased requirements to the performance and justified the possession of motor qualities largely within maximum human capabilities (Gantcheva, Loquet, 2012). The purpose of this study was to determine to what extent there is synchronization in the development of the physical qualities of the left and right side, does it work in practice evenly on both sides. We consider that the results of the study are very important for achieving high sports achievements and as a factor determining health of locomotors system and the future sports development of young rhythmic gymnasts.

Key words: rhythmic gymnastics, left, right side.

Introduction:

An important place in the structure of sports training takes physical preparation. It is the main factor for the realization of movements and actions. Through it not only develop, but also improve the mobility of human (Aladzhov, 1992).

The evolution of gymnastic sports, which is a natural process (Dimova, Dobрева, 1985) and the changes in the rules, specifically for the rhythmic gymnastics, require precise and flawless performance during a competition, a higher difficulty of the exercises a high level of development of motor skills, such as the need for better ranking and winning a medal (Gantcheva, 2002). The development of motor skills and the formation of motor skills are closely interrelated. The development of new qualities is accompanied by the improvement of motor skills (Kotz, 1998). Different abilities selectively affect human movement, but it is essential that their balanced development of both the right and the left side. In practice, however, this is a rare occurrence. Most gymnasts, regardless of their age group, have asymmetry in the development of individual motor skills, with increasing age being more pronounced. Probably the reason for this is the work of mostly the comfortable side, and this process is impossible to avoid in the training program (the gymnasts play their combinations on one side only). It is important to trace how much the physical training methods compensate for these differences in the asynchronous development of motor skills on the both sides.

Let us not forget that these differences not only influence the improvement of the technical training,

the beautiful and difficult game, where the exercises are performed with ease, but also with the most valuable in the life of the human being – health. Asymmetry in the development of motor skills is a major factor in spinal distortion, with almost every gymnast having it to a greater or lesser extent. This defines the aim and the objectives of this study:

Aim: The aim of this study was to determine to what extent there is synchronization in the development of the physical qualities of the left and right side, does it work in practice evenly on both sides.

Objectives:

1. To determine the degree of asymmetry in the development of speed between the left and right arm.
2. To determine the degree of asymmetry in the development of speed between the left and right lower limb.
3. Determine the degree of asymmetry in the development of flexibility in hip joints between left and right lower limb.
4. Determine the degree of asymmetry in the development of balance and coordination between the left and right side.

Methods:

Methods, which are used for the aim of the study, are monitoring, testing, statistical procession of the results with SPSS Statistics, a comparative analysis of results between left and right leg, left and right hand.

Results:

Speed of upper limbs:

T1- "Temping" test.

Fig. 1 Speed of upper limbs – T1

Fig. 1 shows that the experimental group coped much better than the control group, by showing higher average values for both arms (116.4 against 109.4 for the right arm, and 101 against 99.5 for the left arm). The difference in the average results for left and right arm (15.4 – experimental group) is bigger than the average results for both arms with the control group (9.9) which leads to the conclusion that the achievements of the control group are closer to the mean value. This is not proven by the statistical processing, where the deviation from the average results with the experimental group are $S_{\text{right arm}} = 11.96$, $S_{\text{left arm}} = 11.98$, and with the control group – $S_{\text{right arm}} = 14.02$, $S_{\text{left arm}} = 16.36$. From the differences in the results for the two arms (15.4 and 9.9) for both groups it can be seen that the left arm lags behind as regards speed in comparison with the right arm. These differences could be explained by the fact that bigger part from the kids in both groups work mainly with the 'convenient' (right) arm, in the majority of cases the movements of the left arm are difficult and less coordinated, and the tiredness in it occurs faster.

Speed of the lower limbs:

T6- Raising one's leg to 180°.

Fig. 2 Speed of the lower limbs – T6

Fig. 3 Control group T6

Fig. 4 Experimental group T6

With T6, the smallest numeric value is the best result. Two measurements of the time were made with this test:

1. After the first 15 raisings
2. After all the 30 raisings

It can be seen on fig. 5 the experimental group has better results after the first 15 raisings, compared with the control group. This makes us believe that the researched individuals from the experimental group start with higher speed and quickness of reaction and less latent time. After all the 30 raisings the experimental group has again better results for both legs (34.3 sec. and 37.2 sec.). Fig. 6 and 7 show the graphs of the time and the way it changes during the execution of the exercise. The numeric results are counter proportional of the duration – the higher the duration, the lower the achievement. The difference in the times after the first 15 raisings and all the 30 raisings show how the speed endurance changes (Fig. 7). With the experimental group it is 18.5 sec. for the right leg, and 19.2 sec. for the left leg, which shows that the left leg has lower time values and maintains the speed harder than the right leg. With the control group the difference in times for the right leg is 18.5 sec., for the left leg – 18.8 sec. The obtained results lead to the conclusion that despite the better values of the experimental group, the control group shows the same level of speed endurance for right leg and better endurance for left leg. We consider this a normal phenomenon, since the speed start in the beginning leads to the faster appearance of tiredness with the individuals from the experimental group, unlike those from the control group who start in moderation and maintain this level.

Flexibility of coxofemoral joints.

T8- Raising legs from a standing position.

T9- Raising the leg from the first position – back-bend.

T10- Transverse straddling sitting position from two chairs.

With T8, T9 and T10 (the minimum numerical result is the best achievement only for T10) the experimental group has performed better than the control one with greater mean values for both legs (Fig. 5).

Fig. 5 Flexibility of coxofemoral joints T8, T9, T10

With both groups the difference in the results for both legs for T8, T9, and T10 is impressive (Fig. 6). Although the flexibility of coxofemoral joints has been surveyed with three non-identical tests, the mean values confirm one and the same, namely the great differences in the development of the motor quality in left and right leg for both groups. The right leg does not reach 180° which is a necessary minimum according to the requirements of the modern rhythmic gymnastics, and the left leg lags behind in the results.

Fig. 6 Differences between right and left leg T8, T9, T10

Balance and coordination:

1. Test for balance on one leg.

Fig. 7 Balance on one leg

From fig. 7 it becomes clear, that the gymnasts in both groups maintained a stable balanced position longer in the left leg (2.19 sec.; 2,8sek vs. 2.09 sec.; 2.42 sec. for the right balance). This is explained by the fact that for the most of researched person raised right leg is convenient, therefore left balance

in raised clenched leg is more comfortable side, although the differences between the two legs are not big and it gives reason to believe that the results for a comfortable supporting leg are unsatisfactory. The coefficients of variation for both groups in right balance (29%; 28%) and left balance (24%; 26%) indicate that dissipation is middle and the sample is approximately homogeneous for this test. T-criterion of Student for independent samples, showing, that at the right balance between the two groups there were no statistically significant differences ($P = 87.8\%$), but at the left balance results show, that the difference between the control and the experimental group is significant ($P = 99.49\%$). The difference in right balance is accidental and it can be assumed, that the two groups have approximately the same level of development of balanced stability of this leg, however, does not refer to balance of the left (comfortable side), where the differences are significant.

2. Test for total-motor coordination.

Fig. 8 Total motor coordination

Fig. 8 presents the difference in the averages of the two groups of test for total-motor coordination at the maximum right and left rotation in stretched jump. The results are in favor of the experimental group, as its average for left rotation is better, and the control group was better average for right rotation. The differences between the two sides of the rotation at the time of jump (C.G. – 7,2°; E.G. – 7,7°) of the two groups are small and approximately identical, which could be considered as a lack of sharp boundary between the performances of left / right. Experimental group and both sides perform the test with higher achievements than control one. This can be attributed to the fact that most of the children in the control group trained in a club and work, using the same methods. It is possible to they do the same flaws and this to prevent the group to surpass the results of the experimental children, working with different methodologies. Aggregation of individual methods in an orderly system for developing of the quality coordination could

fill gaps and in this way the experimental group to both sides. shows better average.

Discussion: The results of motor tests for speed of upper limb and numerical differences between left (101.1 pcs.) and right arm (113.1 pcs.) show that, the left arm is lagging behind in terms of speed compared to the right. According to most experts in practice this is normal in view of the fact that children write training and work mostly with his right arm. It is important, nonetheless, to seek to unify in the development of the motor quality speed of the both arms. For this purpose, the Code of Points (2017–2020) imposed the requirement for a uniform playing with the apparatus for right and left arm. Test results for speed of lower limb of right leg (37.1 sec) and left leg (39.6 sec) show, that the difference in speed of the two legs is not large and can be regarded as normal, given that the gymnasts play their compositions only “comfortable” side, the time for the development of speed of “uncomfortable” side is significantly less. The differences in the results of right (24.5 cm) and left leg (33.3 cm) give reason to believe, that in the practice lacks harmony in the work for flexibility in the hips, the development of quality is not complex and markedly one-sided. This gives reason to believe that work in practice is contradictory to the methodologies proposed in the specialized literature for the symmetrical development of flexibility in hip joints for left and right legs or the methodologies are ineffective. Tests for balance (2.2 sec for right leg; 2.5 sec left leg) and total motor coordination (right side 361,5°; left- 361,7°) prove, that the motor skills are developed comparatively harmonious on

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