

MOVEMENT COORDINATION AND EARLY SPECIALIZATION IN RHYTHMIC SPORTIVE GYMNASTICS

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INTRODUCTION

Rhythmic sportive gymnastics is an event which requires early specialization. Girls start training when they are six. Considering the complexity of a dancing technique and manipulation of the apparatus such an early specialization is not justified. The aim of this investigation was to find such a phase in the process of the forming of coordination of movement in which the influence of training stimulus improves movement coordination.

The method of evaluation of movement coordination presented in this paper has been worked out on the basis of the theory of movement coordination formulated by Bernstein (1975). It was assumed that the process of coordination takes the proper course when the planned movement is precise and moreover, when it takes place in limited time and irrespective of external disturbances.

METHOD

The investigation have been conducted on MRP - electronic indicator of the error of movement - (Bober et.al.1982) (Fig. 1). The subject was required to lead the slider so that the tip of the indicator travelled precisely along the path. The task was performed with the upper extremity while in a standing position. Each subject was to lead the slider along the path precisely and fastly and the motion was disturbed by external forces created by the electromagnets. Evaluation of the test was based on the readings of the counters as follows:

- time of errors
- number of errors
- errors coefficient

Each test consisted of three trials, proceeded by two dry runs.

The test was performed during five years by four groups of 150 girls. Because the experiments always took place in May and June, the mean age of the girls was from seven and a half to fifteen and a half.

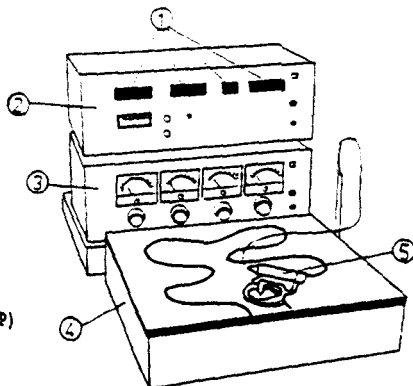


Figure 1: Electronic indicator of the error movement (MRP)
- an indices of the test (1)
- a counter unit (2)
- a supply unit (3)
- an operational panel with a path (4)
- a slider with an indicator (5)

RESULTS

The results obtained during five years have been divided into four groups (A,B,C,D). The division was introduced in order to separate the sets of continuous results compiled during experiments conducted on the same subjects. Group A comprises the results achieved by children who were seven and a half years old when the first measurements were taken, group B - children at the age of eight and a half and groups C and D, nine and a half and ten and a half respectively. The coordination of movement was evaluated on the basis of the time of errors, the number of errors and the errors coefficient.

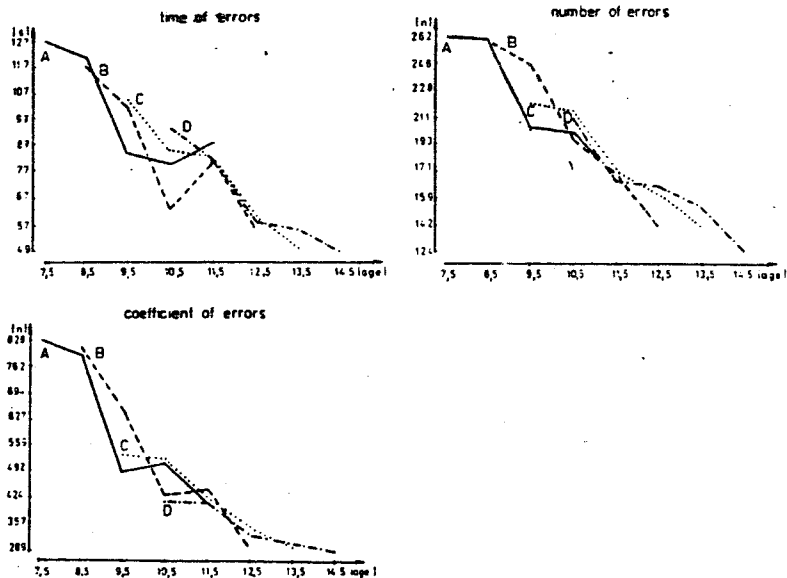


Figure 2: Change of time of errors number of errors and errors coefficient in four (A,B,C,D) groups continuously results in separate category of age.

The analysis of the sets of results presented in Figure 2 shows some regularities. Two characteristic periods of the statistically significant change of the results can be distinguished for three indices of the test (time of errors, number of errors, errors coefficient). The time of errors decreases significantly, for the first time at the age of nine and a half and for the second time at the age of twelve and a half. Whereas, the number of errors decreases significantly, for the first time at the age of ten and a half and for the second time at the age of twelve and a half. Errors coefficient dependent on the number of errors and the time outside the path improves significantly at the age of nine and a half and then at twelve and a half.

Comparing the results compiled for the same age categories in different years we can notice that the biggest differentiation takes place at the age between nine and a half and ten and a half. This regularity refers to all indices of the test. One can assume that is the age when the improvement of coordination processes takes place and the cause of great differences in the achieved results is the individual genetic code of each subject. At the age between eleven and a half and twelve and a half those differences significantly decrease with regard to all test indices.

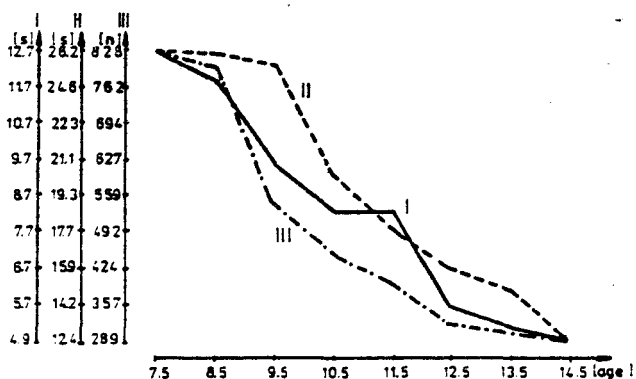


Figure 3: Dynamics of changes of the movement coordination test indices in each age group.

Mean of the results in each age category allowed to show the dynamics of changes of the test indices (Fig.3). The greatest improvement of the errors coefficient took place at the age of nine and a half whereas the greatest decrease of the number of errors took place at the age of eleven and a half. The time of errors improves significantly, at the age of ten and a half. This improvement is followed by a period of stabilization and then again the improvement can be found at the age of twelve and a half.

CONCLUSIONS

In the existing literature (Barre,1982) it is stressed that experiments on the formation of movement coordination in man's ontogenesis are necessary. This results from the necessity of confirming the existence of sensitive periods during which considerable reaction of an organism to the influence of training stimuli which are stimulators of movement coordination takes place. An initial training of the muscle system (strengthening of muscles stabilizing ankle joint, abdominal muscles, muscles of lower extremities; increase of flexibility in joints) preparing it for the performance of complicated dance elements up to the age of nine and a half can be suggested. The teaching of technique of an apparatus manipulation combined with dancing exercises should comprise easy movement subjects. The proper planning of a training cycle will shorten the time needed or the teaching of technically complex exercises. If the technique training starts with girls at the right age (supposed 9,5 - 10,5 years old) then it is possible to shorten the time of the teaching of sports technique, as well as, to prevent from acquiring bad movement habits which are later difficult to eliminate.

REFERENCES

1. BERNSTEIN N.A. (1975), *Bewegungsphysiologie*, Leipzig: Johan Ambrosius Barth.
2. BOBER T., RUTKOWSKA-KUCHARSKA A., KULIG K. (1982) Investigation of the consistency of movements of elite judo athletes. In: P.V.Komi (ed.) *Exercise and Sport Biology*. Illinois: Human Kinetics Publishers, 176-182.
3. HARRE D. (1982), *Principles of sports training*, Sportverlag, Berlin.