

Original Article

**Influence of dance sport on the development of the capacity for ambidexterity and laterality of juniors I (12-13 years old)**

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**Abstract**

*Problem Statement.* The current performances in dance sport bring to light the amazing level of human motor excellence as a synthesis of the manifestation of the bio-psycho-motor skills with ample resonance in sports show. Given the place and importance of the psychomotor skills for the technical and artistic achievement of dance steps and figures, we are interested in estimating the dance influence on these components of junior's motor skills, both as a result of the specific training and a conditional support of dancer's capacity for performance.

*Purpose.* This paper highlights the development of laterality through the efficient use of the specific means with influence on psychomotor skills in dance sport at Junior I level (12-13 years old).

*Methods.* The research was conducted in „Two Step” Dance Sport Club of Bucharest. The experiment aimed to estimate the influence of dance on the psychomotor skills at the age of 12 to 13 years. This approach lasted for a period of 12 months, from March 2010 to February 2011. During this research there were applied 3 tests for manual laterality and 4 tests for podal laterality. In the experimental group, specific means of dancing (grouped into actuation systems) were introduced for strengthening the technique and developing the psychomotor skills, in addition to the specific means of training in dance sport.

*Results.* The results obtained by the dancers of the experimental group prove the advantages of sports training planning which implies the rational combination of the exercises intended for the development of psychomotor skills. This fact demonstrates the positive influence of sports dance on the improvement of manual and podal laterality indicators.

*Discussion.* The value of manual ambidexterity was identified as smaller at the beginning of the research – 33.33%, compared to the value of 58.33% recorded at the end of the experiment. The performance difference of 25.0% for the share of ambidextrous subjects in the two tests proved that dance sport motor tasks in the experimental group were significantly influenced in terms of development of laterality ability depending on the psycho-functional progressive dominance of the brain hemispheres manifested by using the means of dance sport.

*Conclusions.* Dance sport, through the specificity of the motor actions of its component means, has a positive influence on the development of the manual and podal laterality. The research confirmed that many of the right-handed dancers shown a predilection to the equal use of both hands in dance sport. The quality of podal laterality with the right foot has a higher calculated value, of 83.33% in initial testing, while in the final testing there is a decrease up to 75% ; the increase in favor of ambidexterity is from 8.33% up to 16.67% at the end of the pedagogical experiment.

**Key words:** ambidexterity, dance sport, junior, laterality, psycho-motricity.

**Introduction**

The current performances in dance sport bring to light the amazing level of human motor excellence as a synthesis of the manifestation of the bio-psycho-motor skills with ample resonance in sports show.

„Dance is a form of communication: between you and your body, between you and the other people. It is a non-verbal, spontaneous communication that involves the participation of both the consciousness and the subconscious, a communication in a relaxed, secure situation created by music rhythm and social convention that associate dance with moments of entertainment and fun” (Dobrescu, 2006). The technical virtuosity, artistic mastery and harmony of dance couples on the dance floor are the result of a rigorous training process conducted in accordance with scientifically established laws and requirements in terms of optimum strain and effort (Rinderu & Rinderu, 1997; Fomin, 1987; Chikalova, Terezova, 2001; Jonathan, 2008; Zafiorski, 1998).

The sports category Junior I (12 to 13 years old) in dance sport corresponds to the puberty age when the most intense structural and functional changes occur in child's body. Thus, in order to keep under control the training stimuli effects on the performance capacity, a good knowledge of the growth and development laws and also of the manifestations accompanying this period is required (Filin & Fomin, 1980). Regarding the basic

components of psychomotricity, the child must adjust his body scheme following up the somatic and functional changes (Bonchiș, 2000). Although psychology remarks that the body scheme reaches the maturity level around the age of 12, it is known that changes of body scheme occur after this stage too as a result of conditional factors action (Horghidan, 2000).

The predominance of one of the brain hemispheres, right or left, when the individual performs a motor act is called laterality (DEX, 2009). Epuran M. and Horghidan V. (1994) present laterality as „linked to the dominant function of a brain hemisphere, function that determines the inequality of the right and left halves of the body”. Other definitions of the specialists show that laterality is in fact „the functional predominance of one part of the body over another, especially the hand, resulting from the preferential use of this one” (Mitrache & Tudos, 2004, p. 90) or „the functional inequality of body right or left part” (Horghidan, 2000, p. 80).

Doron R. & Parot F. (1999) address laterality in combination with the manual one which refers to the functional predominance of one of the hands in the human being. One can also mention the podal, ocular and acoustic laterality or combinations of these ones. Laterality at puberty is already known, the predominance of one the cerebral hemispheres manifesting itself since earlier stages. The next issue is to develop dancers' ambidexterity, taking into account that the steps and figures are executed with both right and left foot, the turns are to the right and to the left as well and the hold between partners is changing( mainly in Latin dances). The motor intelligence develops due to nervous system maturation and cognitive processes improvement.

The area of psychomotor skills, developed as a result of dance sport influence, remains less approached in the specialized literature. Although one of the objectives of sports training stage II (basic period of training) is the development of motor skills, the psychomotor capacities are ambiguously and insufficiently delimited. Directly involved in the technical executions of dance steps and figures, the psychomotor skills must be seen as priority aspects of juniors' training, especially at the age of 12 – 13 years, when the change in the proportion of segments and the temporary destabilization of the functional parameters are reflected in the technical executions and the evolution in competition, as confirmed by the authors Klimov, 1981; Guy & Brown, 2007; Potop, 2008; Grigore, Potop & Marinescu, 2011 etc. Taking into account the place and importance of the psychomotor skills for the technical and artistic achievement of dance steps and figures, we are interested in estimating the dance influence on these components of junior's motor skills, both as a result of the specific training and a conditional support of dancer's capacity for performance. Drăgan, 1994; Străuț, 1995; Rinderu & Rinderu, 1997; Zafiorski, 1998; Haulică, 2007; Năstase, 2011 show that the dance sport at juniors' level requires a complex physical and mental effort that simultaneously acts on the motor, somatic, functional and mental area of the athletes. That is why the training approach raises issues of finesse in terms of specific demand and skills that must be developed (Imperial Society of Teachers of Dancing, (1994; National Ballet School, 2009; Pozo & Dulaine, 2007).

*The purpose of the research* is to point out the influence of dance sport on the development of the ambidexterity in the dancers of 12-13 years old.

*Hypothesis of the research:* we believe that dance sport influence on the development of ambidexterity is a priority in the training of dancers aged 12-13 and will stimulate the fluency, ease and smoothness of movements.

## Methods

Our research was carried out in „Two Step” Dance Sport Club of Bucharest. The experiment aimed to estimate the influence of dance on the psychomotor skills at the age of 12 to 13 years. This approach lasted for a period of 12 months, from March 2010 to February 2011. In order to validate or invalidate the hypothesis of the research, two groups of subjects were formed – an experimental one and a control one, each consisting of 12 subjects aged 12 - 13 years. The groups were established by drawing lots. All subjects are members of „Two Step” Dance Sport Club and have practiced the dance sport for 3-4 years, on an average.

The following tests were made during the study:

### 1. Test of manual laterality:

- a) Test of fingers joining. Write down in the record sheet the preference for right hand (if the right thumb is put on top) or left hand (if the left thumb is put on top).
- b). Test of clapping hands. Write down in the record sheet the preference for the right hand (if the right hand is active) or left hand (if the left hand is active).
- c). Tennis ball throw test. Write down in the record sheet the preference for the right hand (if the throw is performed only or better with the right hand) or left one (if the throw is performed only or better with the left hand).

### 2. Podal laterality:

- a) Ball kicking test. Write down in the record sheet the right podal predominance (if the ball is successively or efficiently kicked with the right foot) or the left one (if the ball is successively or efficiently kicked with the left foot).
- b) Walk test. Write down in the record sheet the right podal predominance (if the walk starts with the right foot) or left (if the walk starts with the left foot).
- c) Jumping beat with one leg. Write down in the record sheet the right podal lateral predominance (if the beat is on the right leg) or the left one (if the beat is on the left leg).

d) Heel cracking nuts test. Write down in the record sheet the right podal lateral predominance (if the right heel is used for cracking) or the left one (if the left heel is used for cracking). These events were a preliminary test of subjects' laterality, a mandatory stage in the assessment of the psychomotor skills. We also considered appropriate to investigate the laterality both in the beginning of our experiment and at the end of it, in order to have a clearer picture of the ambidexterity of the subjects.

**Results**

The statistical indicators shown in Tables no. 1 and 2 were analyzed for identifying the dance influence on the development of ambidexterity of Junior I in the control and experimental group.

In terms of laterality (Tabelul 1 și 3.2.) it should be noted that in dance sport, especially the Standard dances section, the individual's preference for a part of the body is turned to good account. However the development of ambidexterity remains a priority in dancers' training because this aspect of psycho-motricity will influence the fluency, ease and smoothness of movements.

Table 1. Comparative analysis of laterality between the experimental and control group

No	Categories of factors of psychomotor training		Control group (n=12)				Experimental group (n=12)			
			Subjects indicator		%		Subjects indicator		%	
			TI	TF	TI	TF	TI	TF	TI	TF
1.	Manual laterality	right	8	7	66.67	58.33	7	4	58.33	33.33
2.		ambidextrous	3	4	25.00	33.33	4	7	33.33	58.33
3.	Podal laterality	left	1	1	8.33	8.33	1	1	8.33	8.33
4.		right	10	10	83.33	83.33	10	9	83.33	75.00
5.		ambidextrous	1	1	8.33	8.33	1	2	8.33	16.67
6.		left	1	1	8.33	8.33	1	1	8.33	8.33

The initial testing of manual laterality revealed that there are differences between the subjects of the control group and experimental group regarding the share of right-handed and ambidextrous dancers. From the initial comparison (Table 1, Figure 1), it resulted that the control group had a percentage of 66.67% right-handed subjects and the experimental group had 58.33%, namely a difference of -8,34 between the two groups of subjects. The ambidextrous use of the hands had a share of 25% in the control group and 33.33% in the experimental group, namely a difference of +8.33. There is a relatively increased homogeneity of the two groups of subjects in the initial testing, with small differences between the right-handed and ambidextrous subjects.

The initial testing of podal laterality proved that there are small differences between the results of the subjects in the control group and the experimental group regarding the percentage of the right-handed, ambidextrous and left-handed dancers. Thus (Table 1, Figure 1) there were no differences between the two groups as for the achievement of the motor tasks with the lower limbs.

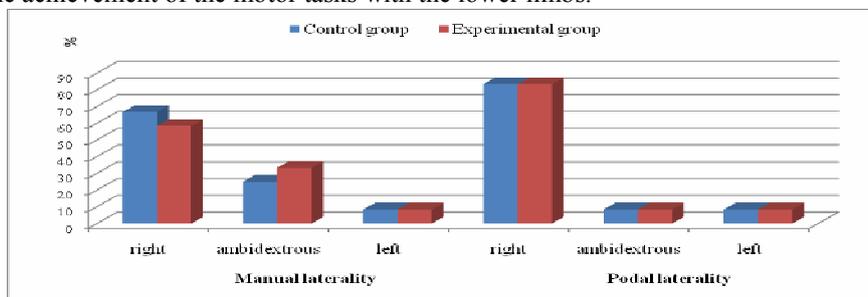


Fig. 1. Comparative analysis of laterality between experimental and control group in initial testing

In the final testing of the manual laterality (Table 1, Figure 2.), the share of the right-handed subjects decreased up to 58.33% in the control group and up to 33.33% in the experimental group, with a difference of -25% between groups. The ambidextrous subjects were 33.33% in the control group and 58.33% in the experimental group, indicating a difference of +25% between the two groups.

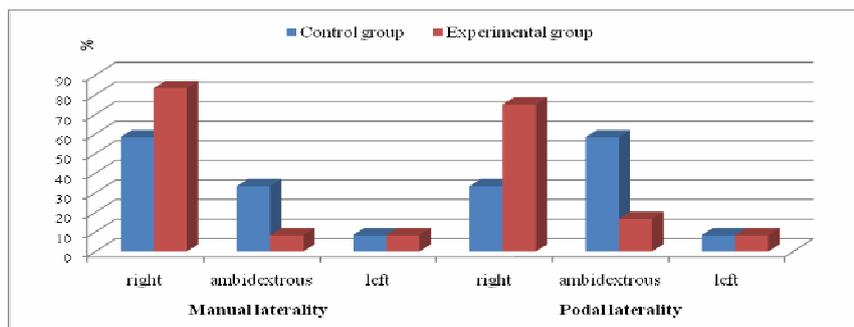


Fig. 2. Comparative analysis of laterality between experimental and control group in final testing

In terms of podal laterality, at the end of the experiment (Table 1, Figure 2), the number of the right-handed subjects in the experimental group dropped to 75%, resulting a difference of -8,33 related to the control group. There were 16.67% ambidextrous subjects in the experimental group, by 8.34% more than in the control group for which the same value of 8.33% was recorded as in the initial test. The percentage of the left-handed dancers did not change for any subject from one test to another.

### Discussions

According to the features of motor predominance dividing the individuals into right-handed, left-handed and ambidextrous, we can identify the following categories of subjects (Horghidan, 2000, p. 91):

- definitely right-handed – uses the right hand, foot or eye due to the left side brain predominance;
- definitely left-handed – uses habitually the left hand, foot or eye due to the right side brain predominance;
- with crossed laterality – right-handed or left-handed depending on the analyzed level;
- ambidextrous (Drăgan, 1994, p. 34) – has abilities in both symmetrical segments;
- mixed right-handed / left-handed – uses one of the body parts according to the situation;
- false left-handed – when uses the left segment as an effect of the training imposed by a paralysis or amputation.

Concerning the evolution of the control group, there were initially 66.67% preferences for the execution of the tasks with the right hand; finally it was recorded an indicator of 58.33% dancers with right manual laterality. The difference of -8.34 between the initially and finally identified right-handed subjects can be explained by the change of laterality on one subject in this group. The manual ambidexterity was identified at the beginning of the experiment as the psychomotor skill of 25% of the components of the control group; at the end of the experiment it recorded a value of 33.33%. Given that the share of the left-handed subjects in the control group did not change between the two tests, having the value of 8.33 while the calculated difference was 0, we are entitled to assume that one of the right-handed subjects showed predilection to the equal use of both hands when solving the motor tasks especially created to this extent and therefore could be classified as ambidextrous. The difference of +8.33% between the share of ambidextrous subjects in the two tests demonstrates that the manual laterality of the control group was influenced positively by the dance sport traditional means of training, but in a reduced manner compared to the experimental group.

In the control group there were initially 83.33% predilections for executing the motor tasks with the right foot; the same percentage was recorded at the end of the experiment. The difference between the two tests, equal to 0, in the percentage of the dancers identified as having right side podal laterality, proves that this motor skill was maintained in the control group all along the experiment. The share of the left-handed subjects too, regarding the podal laterality, did not change from one test to another in the control group, keeping the value of 8.33. The dance sport training sessions with classic means did not entail the change of the podal laterality of the subjects included in the control group.

As for the evolution of the experimental group, there were initially 58.33% preferences for the execution of the motor tasks to the right; finally it was recorded an indicator of 33.33% dancers who showed predilection to the right in the given execution. The difference of -25% between the initially and finally identified right-handers is the result of the laterality change of several subjects of this group. The manual ambidexterity was identified at the beginning of the experiment as the psychomotor skill of 33.33% of the members of the experimental group, while the value recorded at the end of the experiment was of 58.33%. Taking into consideration the fact that the share of the left-handed subjects in the experimental group did not change between tests, having a value of 8.33% and the calculated difference equal to 0, we are entitled to assume that several right-handers showed predilection for using equally both hands to solve the specially designed motor tasks and therefore they could be included in the category of ambidextrous persons.

The difference of +25% between the share of manual ambidextrous subjects in the two tests highlights that the dance sport motor tasks belonging to the experimental group were significantly influenced by the experimental module of psychomotor skills development and by the training program followed by junior I dancers throughout our experiment.

The statistical calculations showed that in the experimental group there were initially 83.33% predilections for the execution of the motor tasks with the right foot; finally it was recorded a value of 75.0% of dancers with right side podal laterality. The difference of -8.33% between the two tests regarding the percentage of the dancers with right side podal laterality is the result of influencing the laterality of a subject in this group.

At the beginning of the experiment, the ambidexterity at podal level was identified as the psychomotor skill of 8.33% of the experimental group components; at the end of the experiment, the recorded result was of 16.67%. Given that the share of the left-handed subjects in the experimental group did not change between the two tests, having the value of 8.33% and the calculated difference equal to 0, we can believe that several right-handers manifested predilection for using equally both feet to solve the specially designed motor tasks and thus it was possible to include them in the category of ambidextrous persons.

The difference of +8.33% between the two tests regarding the share of podal ambidextrous subjects prove that the laterality of the experimental group was influenced positively by the implementation of the mode of intervention.

### Conclusions

In the training of dancers it is necessary to know as much as possible the dominant physical, functional and mental effort specific to each dance separately (Standard dances and Latino dances), so that the training stimuli „embrace” the parameters corresponding to the installation of psychomotor skills valences and to sports performance enhancement. Dance sport, through the specificity of its motor actions, has a positive influence on the development of the manual and podal laterality. The value of the manual ambidexterity was identified as smaller at the beginning of the research – 33.33% than the value recorded at the end of the experiment, namely 58.33%. The performance difference of 25.0% for the share of ambidextrous subjects in the two tests proved that dance sport motor tasks in the experimental group were significantly influenced in terms of development of laterality ability depending on the psycho-functional progressive dominance of the brain hemispheres manifested by using the means of dance sport. The research confirmed that many right-handed dancers showed a predilection to use both hands equally. The quality of podal laterality with the right foot has a higher calculated value, of 83.33% in initial testing, while in the final testing there is a decrease up to 75% ; the increase in favor of ambidexterity is from 8.33% up to 16.67% at the end of the pedagogical experiment.

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