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Original Article

Identifying the Level of Balance Manifestation in Acrobatic Dancers Aged 12-14

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Abstract

In order to verify the hypothesis that the level of static and dynamic balance capabilities of girls who practice acrobatics at the age of 12-14 do not correspond to the performance of competitive choreographies on a national and international level, we analyzed both the subjects, 100 girls who. this activity branch of sports to the criterion of difficulty in the competitions they participated in 2023, as well as the level of their balance capabilities.
We studied the scores obtained by sportswomen in competitions, identified the scores according to the degree of difficulty and used three tools to determine the capacities of general static and dynamic balance, bipedal and unipedal. The results highlight their shortcomings, especially in dynamic balance, and modest scores, in the difficulty criterion, which are not compatible with their qualification for international competitions, strategies to remedy these aspects highlighted objectively by our research.

1. Introduction

Acrobatic dance originated in the United States and Canada in the early 1900s as one of the types of acts performed in Vaudeville. In the last 10 years, acrobatic dance has evolved all over the world, including Romania, being present in sports clubs, studios, children's palaces, dance schools and, most importantly, in national and international competitions. In Romania, acrobatic dance has been practiced for a long time, but officially it was finalized as a structure and form of judging in competitions by dance specialists in 2009 (Dobrescu, 2006; Prală, 2020). The comprehensive technique-focused acro-dance program has been developed alongside professionals and experts in ballet, modern dance, jazz, contortionism, artistic and rhythmic gymnastics, acrobatic gymnastics, yoga, pilates, physiotherapy and more (Zgreaban, 2024).

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In conducting our research we took into account the characteristics of the evaluation expressed in 2000 by Radu according to which evaluation is an act of specific knowledge of phenomena or results aimed at improving them, influencing the situation and regulating it and defining motor capacity, sharing Dragnea's opinion that considers it "a complex of mainly motor manifestations conditioned by the level of development of motor qualities, morpho-functional indices, mental processes, biochemical and metabolic processes, all summed up, correlated and mutually conditioned resulting in the efficient performance of motor acts and actions required by the specific conditions in which motor activity is practiced." (Dragnea et al. 2006; Lloyd, Oliver, Hughes & Williams, 2012; Cunningham, Mergler, & Wattie, 2020). Balance, psychomotor aptitude, is the ability to maintain or restore a static or dynamic position, of a segment of the body or of the body as a whole and develops from the age of 4-5 years. (Picq &Vayer, 1985; Smoll, & Smith, 2002, Ricotti, 2011).

In sports training in acrobatic dance, the relationship between the technical level, artistic training, motor communication mode and expressiveness level are dependent on the directions of action of sports tactics. According to J. Weineck, (1980), quoted by Dragnea, Bota & Teodorescu (2002), the directions of action of sports tactics "determine the technical procedures with spatial and dynamic parameters", in order to ensure the success of participation in a competition. The originality in acrobatic dance is represented by the unique combinations of acrobatic and artistic elements, the unique manners of execution of technical elements, the choreography highlighting the personal mark of the dancer. (Vlăduțu, 2005, Teixeira, Loureiro, & Costa, 2020). Choreography is the dynamic expression of the composition that gives life to the exercise through introduction, a central part and a conclusion, which is realized in relation to the elements of space-time (Abruzzini, 1977; Năstase, 2010; Năstase, 2011; Vișan 2005).

The use of evaluation tests in sports training is more than necessary in achieving performance goals by presenting real values in terms of time, number of successes, measurements, all of which are information without which neither correct training nor results can be built good.

Tests measure a wide variety of response and intermediate variables. Knowledge, psychological, psychomotor and motor physiological functions, ways of reaction and adaptation, more or less manifest traits of individuality, psychosocial attitudes, etc. are measured. However, the measurement of the tests is less precise than we would expect, in this field the number of executions is calculated or different parameters are measured, but these can be influenced by some somatic peculiarities or motivation - thus mostly it is investigated according to the quality of the execution. (Epuran, 2005)

2. Materials and methods

The purpose of the research is to identify the level of balance capacity required in the execution of the connecting elements in the choreography of female acrobatic dance at the age of 12 -14 years.

The study was conducted based on the hypothesis that the level of balance, static and dynamic capacity of girls practicing acrobatic dance at the age of 12-14 years does not correspond to achieving competitive choreographies nationally and internationally, according to the scoring code.

The subjects of the research are 100 girls aged 12-14 who practice acro-dance in different sports structures of public and private law: C.S. Ritmica - 7; Ballet Dance Studio Heart & Soul Association - 12; Athletic Dance Sports Club Association - 41; Straja Hojam Dance School -15, Millenium Art Association Giurgiu – 25.

In order to assess the level of choreographic accuracy, we analyzed the score achieved in competitions by the subjects of our research at the Difficulty criterion, comprising: the degree of difficulty of the elements included in the choreography, the execution skills, the ability to combine the elements and the transition or fluidity of the executed elements, which have as value 50% of the maximum score of 100 points.

To assess the level of balance capacity of the subjects we used:

a) *The Sensamove balance platform*, with which we measured and assessed*:*

- bipodal balance – maintaining balance on both legs, with arms sideways, execution time of 30 seconds, trying to keep the red dot in the middle of the circle.
- unipodal balance – performed on the right leg, the other leg raised with arms raised at shoulder level, execution time of 30 seconds with the attempt to keep the red dot in the middle of the circle.
- unipodal balance - performed on the left leg, the other leg raised with arms raised to shoulder level, execution time of 30 seconds with the attempt to keep the red dot in the middle of the circle.
- lateral dynamic bipodal balance – executed on both legs, with lateral arms, execution time of 30 seconds with the attempt to keep the red dot in the middle of the circle without exceeding the border while swinging the balance board right and left.
- dynamic bipodal balance back and forth – executed on both limbs, with lateral arms with execution time of 30 seconds with the attempt to keep the red dot in the middle of the circle without exceeding the border while swinging the balance board front and back.

b) *General coordination test Matorin*

The Matorin test measures overall coordination and balance and consists of a jump with a return around the longitudinal axis of the body (left or right). Calibrating it, Matorin equated performance above 360 degrees with "very good", 270 degrees with "good", 180 degrees "mediocre" and below 180 degrees "very poor".

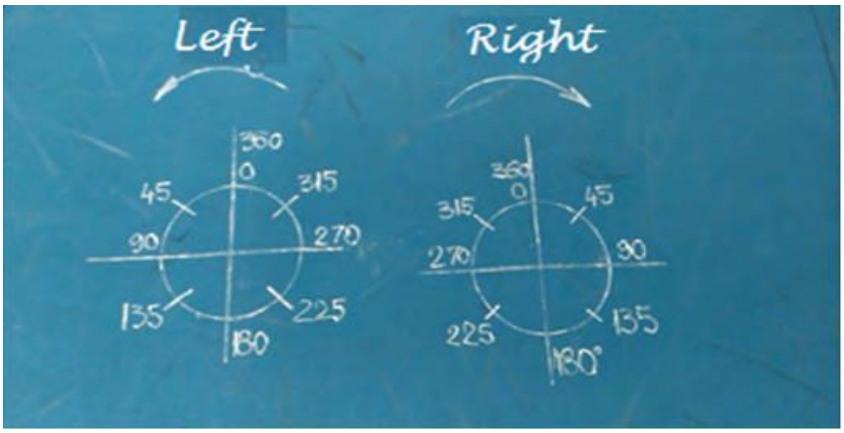

Figure 1. *Matorin Test*

c) *Dynamic balance measurement (Bass test)*

The test measures dynamic equilibrium. The subject stands with their right foot on the starting point (mark) and then jumps on the first mark with their left foot and tries to maintain the static position for 5 seconds. The subject will continue alternating legs by jumping and holding the static position for 5 seconds until they finish the route. The tip of the sole (sole) must completely cover the mark so that it is not visible.

A good performance consists of covering each brand with the pen without touching the floor with the heel or other part of the body and maintaining the static position for 5 seconds with covering each brand. 5 points are awarded for each correct landing and coverage of the mark, and one point is added for every second of static equilibrium.

A subject can get a maximum of 10 points for each brand and a total of 100 points for the complete course.

Each of the 5 seconds of balance attempt will be counted aloud, with one point awarded to each second and recording the score(s) for each mark. The subject is allowed to rebalance, trying to maintain balance for 5 seconds, after landing correctly.

Materials: a stopwatch or clock with a second hand, 11 marks of 2.54 cm x 2cm (can be made of gum paper or tape) and a metric tape. See below:

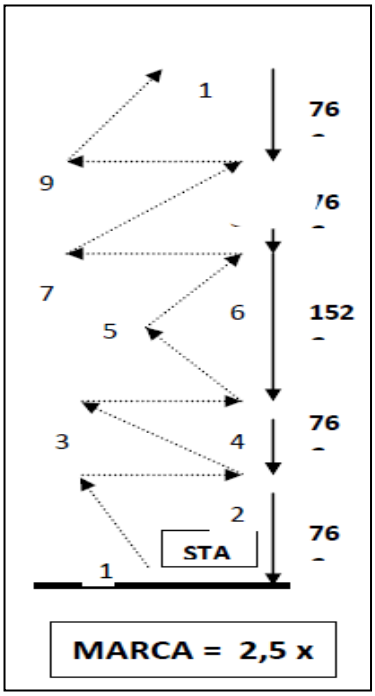

Figure 2. *Bass test*

3. Results and discussions

From the analysis of the scores obtained by the subjects of our research in the 2023 competitions, we found (Fig. 4) that none of the athletes obtained maximum points, over 50% of them achieve poor scores, below 50 points and only 20% register satisfactory scores, over 70 points.

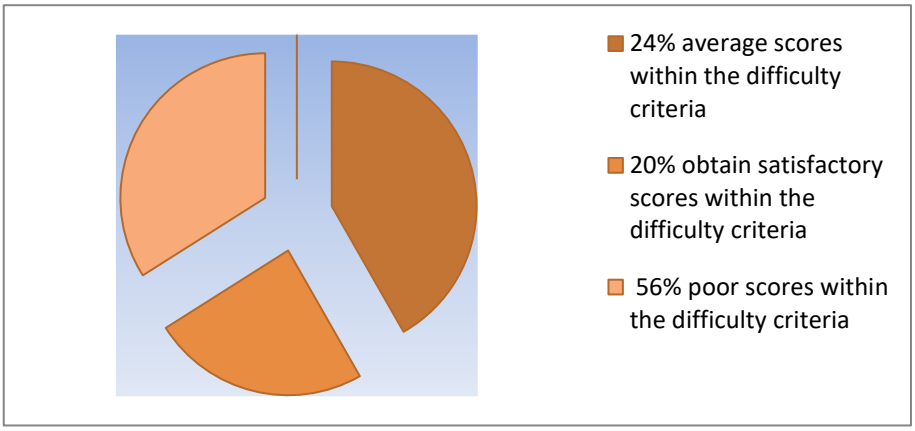

Figure 3. *Classification of subjects as a percentage according to the score obtained at the technical difficulty*

We believe that without a very good motor capacity, acquired through physical training, a main factor in the formation at high levels of all components of psychomotor and coordination capacity, balance being a very important component, the correct execution of the mandatory elements in creating choreographies to ensure successful participation in competitions for acrobatic dancers is not possible.

The statistical indicators of the results determined in the evaluation tests are recorded in the following table:

Table 1. *The values of the statistical indicators at the balance tests*

Statistical indicators	Determinations on the Sensamove Balance Board					BASS test (points)	Matorin Test	
	Bipodal (%)	Unipodal right (%)	Unipodal left (%)	Bipodal back-forth (%)	Bipodal left-right (%)		Right (degrees)	Left (degrees)
Average	76.1%	73.9%	74.6%	77.3%	75.0%	43.95	370.55	333.00
95% CI Average-Upper limit	78.2%	75.6%	76.3%	79.6%	77.3%	49.06	408.45	363.62
95% CI Average-Lower limit	73.9%	72.2%	72.9%	75.1%	72.7%	38.84	332.65	302.38
Middle	76.0%	73.0%	75.0%	78.0%	76.0%	55.00	360.00	315.00
Dispersion	1.2%	0.8%	0.8%	1.3%	1.3%	664.29	36484.80	23809.09
Standard Deviation	11.0%	8.7%	8.8%	11.3%	11.5%	25.77	191.01	154.30
Variation Coefficient (%)	14.4%	11.8%	11.7%	14.6%	15.3%	0.59	52%	46%
Minimum value	37%	48%	53%	46%	41%	5	90	135
Maximum Value	94%	93%	93%	100%	100%	100	720	720
Amplitude	57%	45%	40%	54%	59%	95	630	585

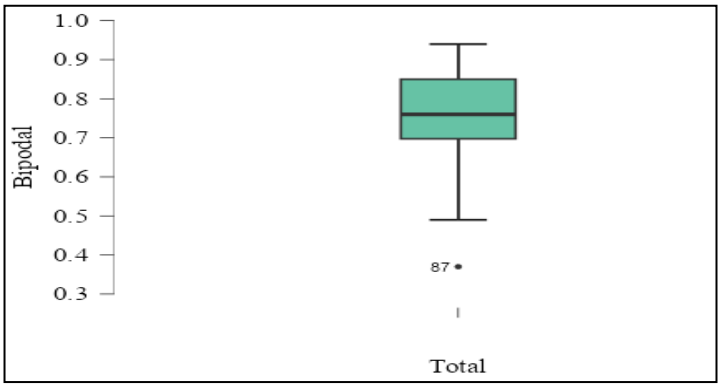

Figure 4. *Bipodal static balance*

The arithmetic mean obtained by athletes in the bipodal static balance assessment test has the value of 76.1%. The median is 76%. The results are homogeneously dispersed. The minimum result is 37% and the maximum is 94%, resulting in an amplitude of 57%.

With the maximum percentage for this evaluation sample of 100%, the subjects recorded, on average, 23.9% less than the maximum value.

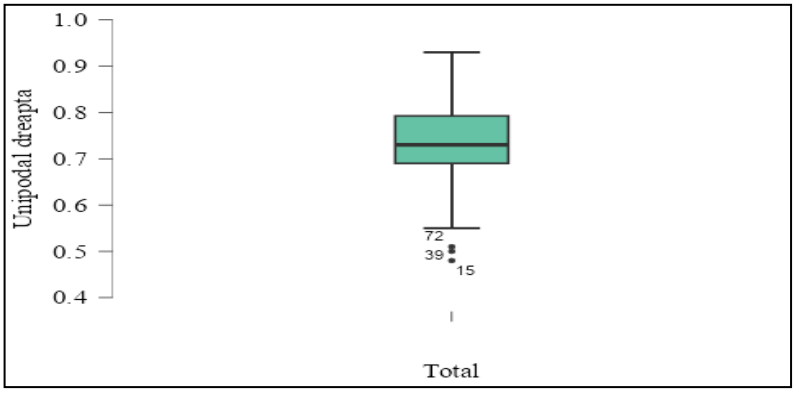

Figure 5. *Right unipodal static balance*

In the right unipodal static balance assessment test, the arithmetic mean achieved by athletes has the value of 73.9%. 73.9%, 26.1% less than the maximum value. The median is 73%. The results are homogeneously dispersed. The minimum result is 48% and the maximum is 93%, resulting in an amplitude of 45%.

Having as the maximum percentage for this evaluation sample the value of 100%, according to the coefficient of variability our subjects obtained or arithmetic mean in the right unipodal static balance test of 73.9%, i.e. 26.1% less than maximum value.

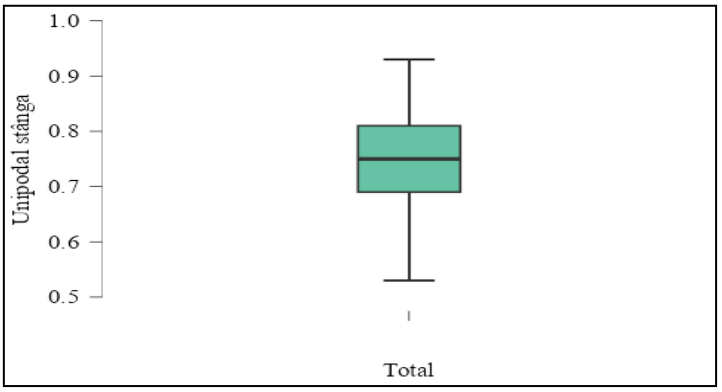

Figure 6. *Left unipodal static balance*

As for the left unipodal static equilibrium, the arithmetic mean determined has the value 74.6%., 25.4% less than the maximum value. The median is 75%. The results are homogeneously dispersed. The minimum result is 53% and the maximum is 93%, resulting in an amplitude of 40%.

Having as the maximum percentage for this evaluation sample the value of 100%, depending on the coefficient of variability, our subjects obtained an arithmetic mean in the left unipodal static balance test of 74.6%, 25.4% less than the value maximum.

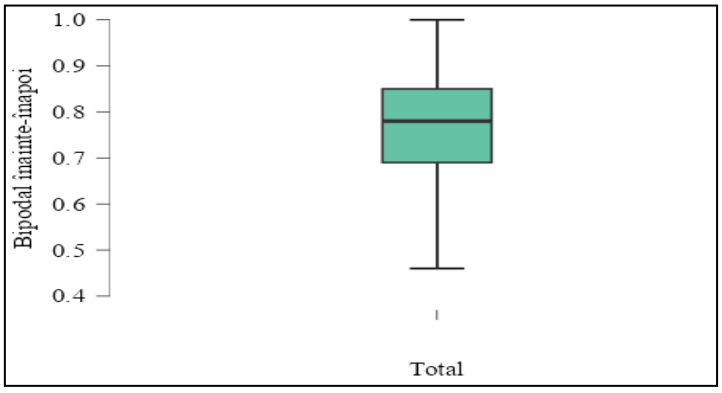

Figure 7. *Forward-Backward Bipodal dynamic balance*

The evaluation of the Bipodal dynamic balance forward - backward, shows an arithmetic average in the amount of 77.3%, 22.7% less than the maximum value.

The results are homogeneously dispersed. The minimum value is 46% and the maximum 100%, resulting in an amplitude of 54%.

Having as the maximum percentage for this evaluation sample the value of 100%, depending on the coefficient of variability, our subjects obtained an arithmetic mean in the right unipodal static balance test of 77.3%, 22.7% less than

the value maximum.

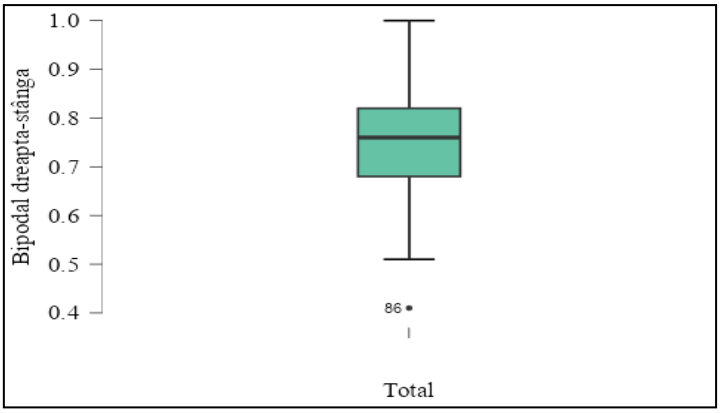

Figure 8. *Right-Left Bipodal dynamic balance*

The arithmetic mean obtained by athletes in the right-left Bipodal dynamic balance assessment test is 75.0%, with a deficit of 25% / The median is equal to 76%. The results are dispersed relatively homogeneously. The minimum result is 41% and the maximum is 100%, resulting in an amplitude of 59%.

Having as the maximum percentage for this evaluation sample the value of 100%, depending on the coefficient of variability, our subjects obtained a median value in the right bipodal dynamic balance test of 76%, 24% less than the maximum value.

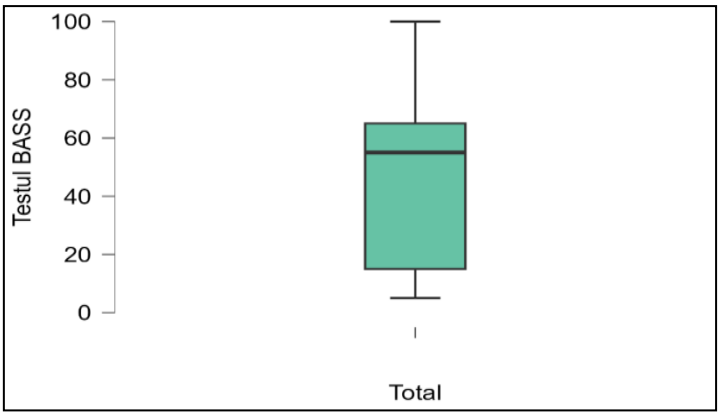

Figure 9. *Dynamic balance – BASS Test*

In the dynamic equilibrium assessment test with the BASS test, the arithmetic average obtained by athletes has the value of 43.95 points. The results are dispersed inhomogeneously around the mean. The median value is 55 points The lowest result is 5 points and the maximum is 100, resulting in an amplitude of 95 points.

With the maximum score for this evaluation sample being 100 points, depending on the coefficient of variability, our subjects achieved an arithmetic average on the test of 43.95%, which is less than half of the maximum value.

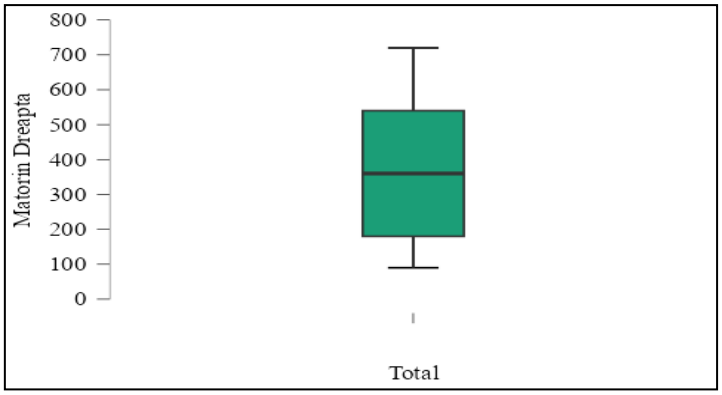

Figure 10. *Right Matorin test for coordination evaluation*

The average result obtained by the athlete in the right Matorin test for coordination evaluation is 370.55 degrees. The median is 360 degrees. The results are dispersed unevenly. The minimum result is 90 and the maximum is 720 degrees, resulting in an amplitude of 630.

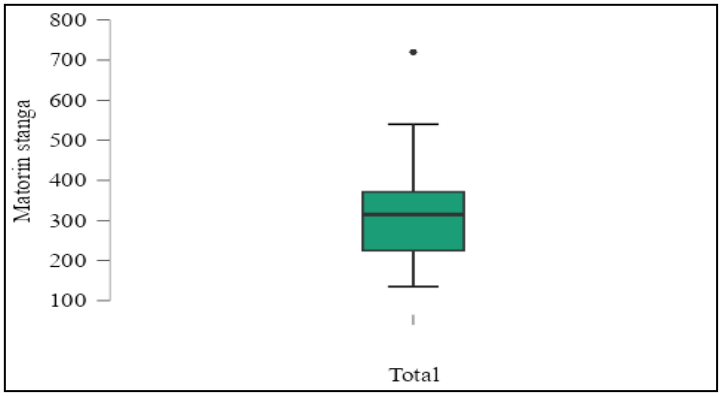

Figure 11. *Left Matorin test for coordination evaluation*

The results at Matorin left revealed an average of the results achieved by the athlete of 333.00 degrees. The results are dispersed inhomogeneously. The median is 315 degrees, The lowest result is 135 and the maximum is 720 degrees. The resulting amplitude is 585 degrees.

Given Matorin's calibration of the 360-degree result with the rating "very good", I believe that following the evaluation, the result obtained based on the median that resulted from the 360-degree evaluation, those who performed the Matorin test on the right side obtained the rating "very good", and the others

executed the test on the left side have the value of 315 degrees with the rating "good".

Based on the results recorded by the subjects of our research in the tests and tests of balance evaluation, the level shown by them cannot provide the support for the approach of some choreographies that ensure the participation with favorable results in the international competitions.

Discussions

The results of the study confirm "that the stability of actions is one of the important characteristics of motor control. There is a direct relationship between stability and the ability to quickly change movement" (Aman, Elangovan, I-Ling, & Konczak, 2015; Levin, 2020, p.8)

The role of the central nervous system as a regulator is confirmed through proprioceptive training in the direction of the rapid change of balance when this change becomes necessary in acrobatic dance, something supported by the results of other researchers.(Grigoroiu, 2015)

The results of the study objectively highlight the fact that the level of static and dynamic balance, but especially dynamic is a favoring or limiting factor of choreographies in acrobatic dance. This confirms the results disseminated in scientific research aimed at perfecting individual and pair techniques in sports dance (Potop, Toma, Grigore, & Grigore, 2010)

In conclusion, static and dynamic balance plays an important role in aesthetic sports, becoming an important criterion for achieving performance.

5. Conclusions

From the research we realised, we found that athletes practicing acrobatic dance show great deficiencies in terms of connecting elements in acrobatic dance choreographies at the age level of 12 and 14 years in Romania, in achieving which balance is a favored / limiting factor, which means that the arbitration requirements for participation in international competitions cannot be met.

The assessment, approved and standardized instruments used in the assessment of balance, static, dynamic and coordinated capacity are age-compatible and reliable for verifying the working hypothesis, providing objective results to identify the aspects evaluated.

Based on the results recorded by the research subjects, we consider that acrobatic dance in Romania is at a poorly developed level, lacking an index of well-rated connecting elements, against the background of a poor level of specific physical training, based on an unsatisfactory capacity of static and dynamic balance, unipodal and bipodal, necessary for their execution that favors arbitration scores compatible with qualification to international competitions and ranking on higher positions.

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