Original Article

Possibilities of Investigating on the Physical Development of Visually Impaired Children

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Abstract

Sport is one of the most useful and, I could say, necessary activities a person should perform. Work-out could take various forms and could be performed in various places, while the benefits thereof are enormous. When it comes to visually impaired people, the significance of sports becomes more complex.

This paper represents an investigation of the physical, motor and functional development level of several approx. 11-year-old, visually impaired students. With the purpose of identifying the extent to which the Dancesport could influence the bio-motor development of the visually impaired persons, we applied a set of measurement and assessment tests to the students of the Gymnasium for Visually Impaired Students of Bucharest who take dance lessons with me: (waist, weight, proportionality index, FC, Ruffier test, 25/50m, 600m, length without impetus, squats; body lifting from the supine position; body extension from the prone position; push-ups; Matorin Test; Flamingo Test).

As comparison references, I used the data obtained at national level for the same tests, results taken from the Paper "Report on the Assessment of the Somatic, Functional and Motor Potential of the Romanian School Population" (Cojocaru, V., Coordinator, 2015, p. 366-367). To verify whether the difference between the averages obtained for the visually impaired students and the average students is relevant from the statistical point of view, we also performed the Student Test.

The research was mainly focused on the verification of the following working hypothesis: the investigation of the general motor level of the visually impaired students and the comparison thereof with the level of unimpaired children, creates objective premises in the preparation of an efficient didactic strategy for the performance of the dance activities in this category of students with special educational needs, for the purpose of increasing the quality of their life. The work highlights that, for the moment, the fragmentary force level of the visually impaired students that made the object of this research is a lot under the national average, which also includes students with CEZ. This stands as a real problem in what concerns the performance of any sport, the integration in the society and the chance to a better quality of life, however, this problem can be remedied by efficient didactic strategies, focused on skill development.

Key words: Dancesport, visually impaired persons, bio-motor, development, force.

Introduction

Sports represent a major activity for each and every individual. The impaired persons usually manifest a series of other physical deficiencies. In what concerns the visually impaired persons, these bring out a various forms of postural flaws. In relation to the impairments, the issue of practising physical exercises is regarded as the "method and means of reducing the negative consequences of the deficiency over the individual's personality development" (Pelin, F., et al., 2016, p.72).

In what concerns the visually impaired persons or even completely blind persons, a first challenge is finding the solution to improve their physical condition, since they confront with severe postural flaws. Thus, "the global motor plan registers the lack of coordination and arrhythmic movements. The visual impairment also influences dexterity, since the visual hand movement cannot be performed, or it should be avoided. A blind person walking is rigid, tentative, hesitant. The lower extremities are only slightly flexed, steps are taken without rolling the foot, so as to ensure a larger contact and support area. Moreover, we note that the arms do not move with the body, they remain inert along the body or orientated forward in order to identify any potential obstacle." (Amzar, L., 2016, p. 5). Moreover, "the difficulty is given by the movement rigidity and by hesitancy of the gestures, caused by the fear of not bumping into the surrounding objects or falling. However, many of the blind people develop a sixth sense, manifested as a good orientation in space." (<http://www.romedic.ro/activitatea-fizica-a-persoanelor-cu-dizabilitati-OP32457>) By analysing the specificity of the impaired children's development, Gheorghe, R. defines the compensation as a "development process, based on which new dynamic systems of conditional connections are created; various substitutions happen; correlations and redoing of other

destroyed or undeveloped functions occur; new means of acting and appropriating the social experience are formed; physical and mental capacities are developed along with the child's personality, as a whole".

(<http://www.sesprahova.ro/uploads/images/Educa%C5%A3ia%20fizic%C4%83%20%C5%9Fi%20Sport%20adapat%20-%20no%C5%A3iuni%20de%20didactic%C4%83%20.pdf>)

In relation to the importance of sports for a proper development of the visually impaired child, we can state that the "Physical education and sports in the form of classes in physical education classes and in the form of specialized mobile and sports games - goalball, torball and rolling ball are of great importance in the development of the personality of students with visual impairments. They provide the movements necessary for the child, contributing to the development of his physiological systems, determining the pace and nature of the functioning of the growing organism. A blind child, like any child, is committed to an orderly activity. However, the first obstacles when moving in space with unskilful or insufficient guidance of movements lead to the fact that the child begins to be afraid of space. The formation of spatial concepts, orientation and mobility in blind children is closely related to physical development, their kinaesthesia and the ability to self-analyse and interpret their sensations and perceptions." (https://www.researchgate.net/publication/332846002_Development_of_coordination_abilities_of_children_with_visual_impairment)

OMS carried out a series of studies that proved the positive influence of the physical activity over the visually impaired persons. In relation the general lack of activity, the same organisation would state: "physical inactivity is a considerable health problem. It is regarded as one of the leading risk factors for health and can lead to negative adaptations in the body. Some proven effects are muscle atrophy, an increase in body fat and enhanced risk of sickness, an impact on overall well-being as well as deterioration in cardiovascular performance." (https://www.researchgate.net/publication/316753894_Physical_activity_body_composition_and_well-being_of_school_children_and_youths_with_visual_impairments_in_Germany)

„The field of action in the special-need persons' area is placed between the study of the normality condition and the pathological one, crossing a complex path that includes the prevention, identification, diagnosis, recovery, school education and professional orientation, social integration and monitoring of the subsequent progress of the person in difficulty." (<http://www.rasfoiesc.com/sanatate/medicina/Educatia-fizica-si-Sport-ada82.php>) Fortunately, "During the last years, the adjusted physical education and sport became subsystems with targets specific to the various types of deficiencies. The adjusted motor structures, the specific rules, the amended material and organisational resources allow an easy expression of these persons, according to their abilities and capacities. On the other hand, this entails the therapeutic-compensatory and development effects, which allow the creation of a new self-image, favourable to social integration. The modern adjusted physical education and sport programmes promote the comprehensive education by including in common activities persons with or without disabilities." (<http://www.cdep.ro/presa/Pledoarie%20pentru%20educatie%20fizica%20si%20sport.pdf>)

An article on visually impaired children stated: "Attending dance movement sessions can bring numerous benefits on many different levels. The pupils learn to listen to instructions and become a member of a group. They learn to express feelings and emotions physically in a non-aggressive manner. Familiarity with their bodies is increased and they learn to use them creatively. Physical flexibility, co-ordination and cardiovascular fitness all improve. Classes are team building and confidence enhancing. The participants discover that the whole of their bodies can register feelings of touch. Arms, legs, feet, knees, back or butt all feedback sensations of touch." (https://www.selfgrowth.com/articles/Visually_Impaired_Children_And_Dance.html)

From the point of view of the teaching the dance movement the visually impaired persons, "The challenge is to figure out how I can communicate the passion I have for dance when they can't see my body. The thrill is to find out how to stretch myself so that I can communicate with them as a dancer." (<https://www.dance-teacher.com/leading-the-blind-239228252.html>). Moreover, the same source mentions that "A dance teacher with a blind student can figure out what works best based on the student's strengths. Talk about what works most smoothly. Don't be afraid to try out several ideas before you figure out what works. Try to be as verbally expressive as possible while you teach. Plan one-on-one time to work with the blind student outside of class."

Problem Solved by the Research

The practising of sport, with all its benefits, is common to the persons who do not have deficiencies, however, for the individuals born with or who developed a deficiency, it is a challenge. This issue is paid to little attention. For the visually impaired or blind persons, the sport improves health, supports the adjustment of postural flaws, improves coordination, and decisively contributes to the socialisation and integration process.

The study is intended to establish the level of the bio-motor development of the visually impaired students at the Gymnasium Visually Impaired Students. By referring to the averages obtained a national level by the students of the mass schools in the same tests, we may draw a series of conclusions in relation to the focus on physical activities, but also on the access thereto of the visually impaired persons. A red flag shall be raised to all

the sport activity areas, where adjusted teaching and working methods would need to be found, and, in case there already exist versions adjusted to the relevant sport area, to insist more on the promotion thereof.

In perspective, I intend to follow up the physical progress of the students further to a certain period of practising the Dancesport by replicating the same tests. Thus, I would be able to draw conclusions on the influxes of the Dancesport over the general physical development of the visually impaired persons.

Research approach

The purpose of the research is to establish the bio-motor level/the physical condition level of the students of Gymnasium for the Visually Impaired Persons from Bucharest and to identify aspects that are common to and different from the recent studies related to the biometric level of the approx. 11 year old school population in Romania who participate in Dancesport classes provided by the school.

Hypothesis of the research. The investigation of the general motor level of the visually impaired students and the comparison thereof with the level of non-impaired students, creates objective premises in the drawing up of an efficient didactic strategy for the practice of dance in this category of special educational needs children, for the purpose of improving the quality of their life.

In order to reach this purpose, the following **research methods** were used: the documentation / bibliographic study method; the observation method; the measuring and assessment method / motor testing; the statistic-mathematical method.

Contents, results, discussions

To reach the purposes and targets of the research we carried out a series of administrative and research activities: we established the participants in the research -15 students (8 -b; 7-f) of the Gymnasium for the Visually Impaired Persons from Bucharest; participation agreements were initiated and signed by the parents of the participants in the research; we established the motor level assessment tests, based on the compatibility with the tests for the assessment of the somatic, functional or motor potential of the Romanian school population (waist, weight, proportionality index, FC, the Ruffier Test, 25/50m, 600m, length without impetus, squats; body lifting from the supine position; body extension from the prone position; push-ups; the Matorin Test; the Flamingo Test). The research consisted in the establishment of the biometric and functional level of the participants in the research and the comparison thereof with the results of the latest tests related to this aspect, carried out at national level, taken from the Report on the Assessment of the Somatic, Functional and Motor Potential of the Romanian School Population” (Cojocaru, V., Coordinator, 2015, p. 366-367). We considered the data corresponding to the 5th grade students, this being the average age of the participants in our research. Further on, we performed the descriptive statistics, but also applied the “t” test to verify whether the differences between the averages of the special school students and of the students in the relevant study are statistically different or not. We chose to present the comparative analysis of the force measurement and assessment tests, considering the fact that this motor quality can be educated/developed relatively easily and fast, but can also be lost quite rapidly unless work is dedicated to maintain it and that this favours the acts and actions specific to each sport, therefore to the dance and to the adopting of the correct body posture during dancing.

The results obtained by the participants in our research, reflected by the statistic-mathematic indexes are compared to the ones of the national study, as per the table below.

We performed the descriptive statistics for the results of the tests. By calculating the variability coefficient, we note that the student group is not homogenous from any of the perspectives of the tests.

Comparing the average of the results obtained with the participants in the research (SC) with the average of the results obtained at national level (SN), we noted that, according to all the tests we used in the assessment of the fragmentary force of the members, abdomen and back, the differences are significantly negative in what concerns the visually impaired participants (SC), both female (f) and male (m).

Tabel 1. Synoptic Table of the Established Statistic-Mathematic Indexes and the Comparison Thereof in fragmentary force tests

Assessment Test	Statistic-Mathematic Indexes											Threshold
	Average		Minimum	Maximum	Amplitude	Median	Standard Deviation		Variability Coefficient		“t” Test	
	S.C.	S.N.	S.C.	S.C.	S.C.	S.C.	S.C.	S.N.	S.C.	S.N.		
Squats	f. 11.85	39.65	4	15	11	11	3.68	16.24	0.31	0.4	- 20.59	0.00001
	m.15.25	42.56	10	20	10	15.5	3.05	17.27	0.2	0.4	- 23.54	0.00001
Body lifting from the supine position	f.16.71	29.87	11	28	17	14	5.55	12.7	0.33	0.42	-5.86	0.001
	m. 15.5	32.59	9	20	11	16	3.64	13.47	0.23	0.41	- 12.52	0.0001
Push-ups	f. 2.28	8.21	1	3	2	2	0.86	6.64	0.37	0.8	- 20.73	0.0001

	m. 2.5	12.57	1	4	3	2.5	1.11	8.15	0.44	0.64	-	0.00001
Body extension from the prone position	f. 27.71	28.34	7	73	66	12	25.31	10.91	0.91	0.38	-0.06	0.954
	m. 24.37	30.38	1	55	54	23	17.87	10.89	0.73	0.35	-0.88	0.404

By analysing the obtained results, we can draw the following conclusions:

- In relation to the squats, the average obtained by the SC is highly under the average obtained by the SN, in what concerns both the feminine and the masculine participants. This results are a consequence of the fact that the visually impaired individuals have a very low autonomy level. Their movements are relatively slow and. The use of the lower train is lower compared to the participants without visual impairments, who walk a lot more, run and are more involved in sport activities of various types. An improvement of the lower train force could increase the autonomy of the visually impaired students, would contribute to an improvement of posture and would facilitate the participation in a series of sport activities. Dancesport requires an increased force, speed and precision level of the lower limbs;
- In relation to the test consisting in the body lifting from the supine position, differences were again identified between the average of the results obtained by SC and the average of the results obtained by the SN. This time the difference was in favour of the SN, both for the female and the male participants. This time as well, the non-involvement in various physical activities and especially, in sport training, contributed to a weak development of the abdominal muscles. The Dancesport, especially the Latin-American dance section frequently solicits the abdomen due to the rapid movements that involve the twisting of the hip and lifting of the knees;
- In relation to the body extension from the prone position, the averages are relatively close both for the female and the male participants. However, if we consider the variability coefficient, which is extremely high, we cannot consider the average as being representative for the tested sample. Along with the elimination of the extreme values, we note that the difference between the average obtained by the female students of the special school and the one obtained by the female students of the mass school is increases significantly. The results of the visually impaired students at this test were very good compared to the results of the other tests, since a great part thereof participated in kinesiotherapy sessions which insisted on the development of the back muscles or the purpose of correcting the postural deficiencies. However, they do not constantly participate in such activities or in sport-related activities, which does support a steady development of the back muscles. This is so much so as, in case of the visually impaired persons, we may say that the postural issues are constant. The dance, by its nature, especially by its standard dance section, involves the maintaining of a relatively fixed position at the higher train level, and this requires a properly developed back muscle system;
- In relation to the push-up tests, the average obtained by the SC was significantly lower than the one obtained by the SN, both in what concerns the female and the male participants. The causes of the poor development are similar to the ones stipulated above. The Dancesport does not require an excessive development of the arm muscles, however the maintenance of the specific position during the standard dances as well as the leading of the partner/receiving impulses from the partner and the specific arm movements require a good development of the low limb muscles as well as of the chest.

To clearly view the differences between the averages obtained by the visually impaired students and by the students of the common schools, we drew two charts, one for the male participants and one for the female ones.

Chart 1. SC results compared to the SN results for the four test – female

Chart 2. SC results compared to the SN results for the four test – male

To verify whether the differences between the two groups of participants are significant from the statistical point of view, we calculated the value of the t-Student Test.

The table above sets forward the following aspects:

- in relation too the squat test: in relation to the female participants there is a statistically significant differencebetween the average obtained by the SC and by the SN, $t = -20,59$, $df = 6$ and $p(-20,59;6) = 0,000001$, the SC's average being statistically significantly lower than the SN's average. In relation to the male participants, there is a statistically significant differencebetween the average obtained by the SC and SN, $t = -23,54$, $df = 7$ and $p(-23,54;7) = 0,00001$, the SC's average being statistically significantly lower than the SN's average;
- in relation tobody liftingfrom the supine position: in relation to the female participants there is a statistically significant differencebetween the average obtained by the SC and SN, $t = -5,86$, $df = 6$ and $p(-5,86;6) = 0,001$, the SC's average being statistically significantly lower than the SN's average. In relation to the male participants, there is a statistically significant differencebetween the average obtained by the SC and SN, $t = -12,52$, $df = 7$ and $p(-12,52;7) = 0,0000001$, the SC's average being statistically significantly lower than the SN's average;
- in relation tobody extensionfrom the prone position: in relation to the female participants there is no statistically significant differencebetween the average obtained by the SC and SN, $t = -0,061$, $df = 6$ and $p(-0,061;6) = 0,95$, the SC's average not being statistically significantly lower than the SN's average. Neitherin relation to the male participants nuthere is a statistically significant differencebetween the average obtained by the SC and SN, $t = -0,88$, $df = 7$ and $p(-0,88;7) = 0,4$, the SC's average not being statistically significantly lower than the SN's average;
- in relation to the push-up test, for the female participants there is a statistically significant differencebetween the average obtained by the SC and SN, $t = -20,73$, $df = 6$ and $p(-20,73;6) = 0,0001$, the SC's average being statistically significantly lower than the SN's average. In relation to the male participants, there is a statistically significant differencebetween the average obtained by the SC and SN, $t = -23,83$, $df = 7$ and $p(-23,83;7) = 0,00001$, the SC's average being statistically significantly lower than the SN's average.

Conclusions

The persons with various disabilities face challenges in finding a place of their own in society (school, family, work, etc.). One of the main causes is their lack of independence, autonomy, which also results from a very poor preoccupation for the physical, motor, functional, psychical developmentthereof. The lack of involvement of the visually impaired personsin various physical activities, but also the limited possibilities even the persons who intend to practice certain sports have, lead, in time, to an aggravation of the physical and not only, problems. The level of confidence lowers, socialisation becomes insufficient, and competitiveness is, in turn, relatively low.

As confirmed by the results of the tests analysed by us, the SC had a relatively low level of force capacities. Furthermore, by simply looking at the data table above, we note that there are students with results way over the national average in certain tests, however with extremely poor results in other tests. These are the students who worked for the correction of certain postural flaws, for example, however even they failed to manifest any interest in a proper general physical development.

Our researchshows that, currently, the fragmentary force level of the visually impairedstudents is significantly under the national average which does not include the CEZ students. This represents a severe problem in terms

of practising any sport, integration in society and a chance to a higher quality of life, but can be solved by efficient didactic activities, focused on skill development.

The performance of these studies raises a red flag in relation to the visually impaired persons' needs, as well as to other types of deficiencies, on taking part in physical/motor activities specific to their needs. These individuals' motor level is closely related to the person's autonomy degree, as well as to his/her psychological state. A system that is more open and more receptive to the impaired persons' needs would definitely make the difference. It is important that the teachers and the trainers specialised in various sport areas pay special attention to this category of persons and identify teaching and training methods adjusted to their needs.

I intend to research the way the Dancesport practice (training is provided by methods adjusted to the visually impaired students' needs) could influence their physical, motor and functional development level.

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