
Original Article

The Development of Motor Balance in Physical Education Lessons for Pupils with Borderline Mental or Intellectual Disorders

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DOI: 10.29081/gsjesh.2026.27.1.11

Keywords: *Balance, mental disorders, borderline intelligence, physical education, mainstream schools*

Abstract

The study presents a reflection on the action strategies on the development of balance, applied in physical education lessons, to students with mental disorders or borderline intellect in mainstream schools, the high school cycle. The purpose of this work is to highlight the contribution made by physical exercises, on improving motor skills, respectively on balance, which is often deficient in these students. The proposed objectives refer to the identification and analysis of the specific needs of students with mental disorders or borderline intellect in the context of developing balance. The development and implementation of personalized programs involving activities and physical exercises adapted to the individual needs necessary to improve balance. Improving motor skills, emotional state, well-being of these students. The results of the study are based on the analysis of the data obtained from the initial and final assessments obtained after the application of the intervention programs.

1. Introduction

Physical education is an organized and carried out process aimed at physical development, motor skills, improvement of motor potential, according to age, gender, level of training. Physical education, as a subject, means activity, physical exercise. It is a bilaterally organized instructional-educational process, carried out in time, permanently and led by a competent, specialized specialist who must have specialized scientific knowledge and use teaching strategies that allow him to process students efficiently and correctly in the educational process (Cârstea, 2000, p.10). Although compulsory as a subject, physical education, students are trained not

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only for compulsory content, but also to create a framework that satisfies optional content (Scarlat & Scarlat, 2003, p.3). Physical education plays an essential role for all members of society and is very important for people with special needs. Thus, within physical education a new branch, special or adapted physical education, is emerging, which has as its main goal recovery. (Cristea, Ștef, & Dragos, 2014, p. 33; Furrer, Valkanover, Eckhart, & Nagel, 2020). Through the contribution it brings, in motor, physical, affective-emotional, adapted physical education is a necessity for all individuals in society, especially for those with special educational needs and is an important requirement for the integration of students with (CES) in mainstream schools and society (Dragnea, et al., 2006, p. 281;). Adapted physical education and sport activities bring out the motor skills, attitudes, values and behaviors of people with special needs, enabling them to integrate and actively participate as members of the community of which they are a part. Mental disorders can be the result of unconscious disharmonies between the individual's desires and internal reactions, tensions that produce psychological stress manifested by emotional discomfort, anxiety, neurotic symptoms. In fact, it is the struggle that arises between the threshold imposed by the conscience and the individual impulses, which if not properly managed creates suffering (Freud, 2017., Fuchs, Breyer, Mundt, 2014) states that mental disorders are transformations in the way a person creates his or her reality and the way he or she expresses internal experiences.

In the school environment, pupils with mental disorders often face borderline situations, the support provided by including them in the ESC category is essential and gives them equal opportunities in development and education. At the same time it enables them to reach their full potential through individualized learning support measures. These disorders are characterized by difficulties with attention, hyperactivity, impulsivity (attention deficit and hyperactivity), impaired communication, behavior, relationships autism), restlessness, fear (anxiety), withdrawn, irritable, lack of motivation, emotional, learning difficulties (depression), defiance, aggression (conduct disorder), obsessions, compulsions (obsessive-compulsive), lack of concentration and avoidance of participation in activities (bulimia, anorexia), difficulty concentrating, anxiety (post-traumatic stress disorder). According to him (Cristea, 1998, p.33), the learning limit is the maximum potential for assimilation of knowledge, delimited by the characteristics of learning processes and the structure of cognitive skills. Borderline learning disabilities are situated between normal intellectual development and severe intellectual disabilities. These impairments affect their ability to learn and acquire knowledge in the same way as their peers of the same age, but they are not so severe that they are classified as major intellectual disabilities. They are called: 'mild mental retardation' or 'borderline learning' and categorized according to IQ. These students face problems in understanding, applying the information learned, slow pace of learning, abstract thinking, poor memory, poor attention, low attention span, distracted by what is going on around them, social difficulties, poor adaptability (Hansen, Nordén, & Ohlsson, 2021).

Specialized studies emphasize the importance of adapted physical education

through balance-oriented interventions on improving motor skills, cognitive abilities, self-confidence in students with mental disorders or borderline intellect.

Motor balance is the ability of the individual to maintain the body position in a stable position either when the person is at rest, in this case we speak of static balance, or when the person is in motion, and then we speak of dynamic balance. (Ciorbă, 2016, p. 106; Bahiraei, Daneshmandi, Norasteh, & Yahya, 2019). Keeping the body in optimal balance, whether static or in motion, depends on controlling the center of gravity. Balance instability causes disturbances in postural stability, coordination, produces imbalances in daily life, limits educational activity and physical performance. In students with borderline intellect and mental disorders, the education/development of balance occurs more slowly and requires individualized educational strategies that take into account individual needs (Blomqvist, Olsson, Wallin, Wester, & Rehn, 2013). The adaptation of the child with special needs to the demands imposed by the regular school needs to be complemented by effective strategies correlated with the child's age and developmental level. (Bodorin, et al., 2012, p. 36). In order to know and understand the special needs that affect the physical and motor development of pupils with Special Educational Needs (SEN) included in pre-university education in mainstream schools, it is first necessary to make a real analysis of the motor development of these pupils, an initial assessment.

The initial assessment is carried out through an initial testing, by direct observation, interview or questionnaire method. In the initial testing, standard tests are used that highlight the level of development of motor skills (e.g. balance, coordination). Observation can be used during direct activities. The data obtained in the initial assessment is the basis for the Personalized Intervention Plan (PIP) in which it is mandatory to include the objectives and interventions that are brought on the adapted activities, equipment used, exercises used. Adapted motor activities must follow the principle of accessibility, be effective and student centered. Group activities, movement and sports games, stimulating and safe exercises are all means that promote inclusion and are highly desired by students.

In order to ensure the progress and individual needs of the child, permanent monitoring is necessary. Adjustments to the personalized program, action strategies and objectives of the Individualized Education Plan are dependent on the outcome of periodic assessments, feedback received from parents, teachers or other specialists. On the basis of the analysis made periodically, new recommendations for improvement can be designed on motor interventions, on educational practices, on the equipment used, on the space and time used, on the language used. All these interventions can create an accessible inclusive school environment with equal opportunities for all pupils.

This paper focuses on the analysis of strategies and techniques for developing balance in physical education lessons for students with mental disorders or borderline intellect, emphasizing the importance of personalized educational interventions and their impact on students' overall development. The analysis of the findings was based on the indicators obtained from the Shark Skill test, a test that evaluates dynamic balance.

2. Material and methods

Our hypothesis suggests the importance of physical exercises, specifically designed for the development of balance, facilitates the improvement of motor skills and coordinative abilities (balance) in students with borderline mental and intellectual disorders and contributes to increasing confidence in their abilities and in the formation of autonomy. Developing balance for students with mental or cognitive difficulties can be achieved through the application of a well-adapted and personalized physical education program, according to the individual needs of the students.

The aim of this study is: To identify and apply the most effective pedagogical strategies and means of action for the development of motor balance in physical education lessons, adapted to students with borderline mental and intellectual disorders, in order to increase motor skill performance and quality of life. The study aims to: improve dynamic balance, increase self-confidence, develop autonomy through exercise, increase independence in participating in physical activities.

In the study we used as scientific research methods the method of specialized bibliographical study, the method of observation, the method of interviews and questionnaires, document analysis, the method of tests, the method of pedagogical experiment, the method of data processing and interpretation.

Observation is a method of ascertainment, the information collected is the basis for formulating hypotheses and conclusions, on the basis of observation, classifications and descriptions are made. (Epuran, 1976, p. 20).

The interview and questionnaire method is aimed at parents and teachers to familiarize themselves with the background and individual needs of students.

The interview is a method that provides essential, contextual indicators of both individual and group perspectives. The interview provides an opportunity to explore in detail the topics being analyzed, provides an opportunity to clarify answers.

The questionnaire method is applied to analyze the concordance, discordance or sometimes the variability of the answers to questions of echo, prospecting, feedback, etc. (Gagea, 1999, p. 227).

The study was conducted during one school year at the Technical College "Alexandru Ioan Cuza" Suceava, in vocational education classes with a 2 hours per week. The sample for the pedagogical experiment consisted of 3 girls in 9th grade Vocational Education, of which one girl with borderline intellectual disability, one girl with moderate intellectual disability, and one girl with mild intellectual disability and 3 boys of which one boy with borderline intellectual disability, one boy with mild intellectual disability and one boy with moderate intellectual disability.

From 10th grade Vocational Education 4 boys participated, of which 1 boy with moderate mental disorder, 1 boy with mild mental disorder and 2 boys with borderline intellectual disorder and 4 girls of which 2 girls with borderline intellectual disorder and 2 girls with mild mental disorder. From classes XI Vocational Education 3 girls and 6 boys participated in the study. Out of them 2 girls with borderline intellectual disability and one with moderate mental disorder and 6 boys out of which 4 boys with borderline intellectual disability, one boy with moderate mental disorder and one boy with mild mental disorder.

In this study we analyzed the values obtained in the Shark Skill test, a test that evaluates both general coordination and motor balance.

Shaark Skill is a tool used to assess physical performance.

Objectives:

- to measure the agility of the lower body;
- to measure the dynamic balance of a single leg.

Materials:

Flat surface, tape measure, writing instruments (crayon, chalk), leucoplast.

Description:

A square with equal sides of 90 centimeters is drawn on the ground, which is divided into four squares with equal sides of 30 centimeters. The student in the middle square, standing on the right foot, with the leg flexed, hands on the hip. Perform jumps clockwise, starting from the right oblique square. Return each time to the middle square. The recording of the execution time starts from the first movement and stops after the nine squares have been completed. Penalties may be added to the recorded time due to lifting the hands off the hips, placing the foot on the ground in balance, incorrectly completing the squares, not returning to the center square each time. One tenth of a second is added for each mistake. The final time is given by the time taken to complete the nine squares, plus any penalties.

3. Results and Discussions

Table 1. Centralized results obtained of the Shark Skill test, in 9th grade I.P.

Subjects	Sex	Class	Type of disorder	TI right side	TF right side	Progress	TI right side	TF right side	Progress
B. M.	(F)	IX A I.P.	Easy psyche	13,08+6	12,04+3	1,34	18,09+6	17,26+3	1,09
			Recorded time	13,68	12,34		18,69	17,56	
H.C.	(F)	IX A I.P.	Moderate psyche	13,55+4	11,23+2	2,52	12,78+8	12,32+2	1,06
			Recorded time	13,95	11,43		13,58	12,52	
R.D.	(F)	IX D I.P.	Borderline intellect	-	16,26+6	16,86	15,69+5	14,35+4	1,44
			Recorded time	-	16,86		16,19	14,75	
S.A.	(B)	IX D I.P.	Moderate psyche	9,24+4	9,20+3	0,14	10,93+8	9,63+4	1,70
			Recorded time	9,64	9,50		11,73	10,03	
C.N.	(B)	IX D I.P.	Easy psyche	12,06+2	11,04+5	0,72	9,71+3	8,52+2	1,29
			Recorded time	12,26	11,54		10,01	8,72	
V.R.I.	(B)	IX B I.P.	Borderline intellect	17,31+7	15,62+6	1,79	-	18,49+8	19,29
			Recorded time	18,01	16,22		-	19,29	

Table 1 highlights the progress made by all ninth graders with borderline intellectual, mild psychiatric, and moderate psychiatric disorders. The Shark Skill test assessed the level of dynamic balance for both legs. The obtained indices certify the skillful leg of the students, once through the values of the better time obtained compared to the other leg, as well as through the errors made as a result of which the students were penalized. It was also found that students with mild and moderate mental disorders had higher values and were penalized more. Two of them, a girl and a boy, were not able to take the clumsy footed test in the initial test (I.T.). Following the intervention plan, both students were able to take the test with clumsy footedness.

Table 2. Centralized results obtained of the Shark Skill test, in 10th grade I.P.

Subjects	Sex	Class	Type of disorder	TI right side	TF right side	Progress	TI right side	TF right side	Progress
G.A.D.	(F)	X A I.P.	Borderline intellect	18,93+7	17,56+5	1,57	16,98+7	15,64+3	1,74
			Recorded time	19,63	18,06		17,68	15,94	
G.T.G.	(F)	X A I.P.	Borderline intellect	14,62+4	13,65+2	1,17	13,92+4	12,86+4	1,06
			Recorded time	15,02	13,85		14,32	13,26	
N.P.P.	(F)	X A I.P.	Easy psyche	13,32+4	12,63+3	0,79	13,41+3	13,36+2	0,15
			Recorded time	13,72	12,93		13,71	13,56	
S.C.V.	(F)	X B I.P.	Easy psyche	12,45+3	12,20+2	0,30	13,53+4	12,62+3	1,01
			Recorded time	12,75	12,40		13,93	12,92	
B.A.R.	(M)	X B I.P.	Easy psyche	14,26+7	13,75+6	0,61	13,28+4	13,20+2	0,28
			Recorded time	14,96	14,35		13,68	13,40	
B.C.B.	(M)	X B I.P.	Borderline intellect	16,27+3	15,56+4	0,61	17,48+2	16,42+2	1,06
			Recorded time t	16,57	15,96		17,68	16,62	
Z.D.	(M)	X C I.P.	Moderate psyche	13,18+6	12,75+3	0,73	13,46	12,63+4	0,43
			Recorded time	13,78	13,05		13,46	13,03	
R.D.A.	(M)	X D I.P.	Borderline intellect	16,39+8	15,45+6	1,14	18,48+7	17,22+6	1,36
			Recorded time	17,19	16,05		19,18	17,82	

In class X, the results obtained in the final test show progress for all students, which proves that the intervention plan was well designed, the methods and means used were effective and increased the performance of students regardless of their impairment. In contrast to ninth grade, all tenth graders were able to be assessed with both feet, both in the initial (I.T.) and final tests.

Table 3. *Centralized results obtained of the Shark Skill test, for students in 11th grade I.P.*

Subjects	Sex	Class	Type of disorder	TI right side	TF right side	Progress	TI right side	TF right side	Progress
P.D.A.	(F)	XI A I.P.	Borderline intellect	18,22+7	16,63+2	2,62	14,22+5	13,63+4	0,69
			Recorded time	18,92	16,83		14,72	14,03	
C.E.G	(F)	XI A I.P.	Borderline intellect	14,91+7	13,35+2	2,06	16,03+7	15,76+2	0,77
			Recorded time	15,61	13,55		16,73	15,96	
B.P.E.	(F)	XI A I.P.	Moderate psyche	15,75+6	14,43+2	1,72	16,31+7	15,32+5	1,19
			Recorded time	16,35	14,63		17,01	15,82	
A.I.B.	(M)	XI B I.P.	Borderline intellect	14,44+5	13,31+5	1,13	10,81+8	10,64+4	0,57
			Recorded time	14,94	13,81		11,61	11,04	
H.A.	(M)	XI B I.P.	Borderline intellect	10,20+6	9,63+2	0,97	9,86+7	9,25+4	0,91
			Recorded time	10,80	9,83		10,56	9,65	
P.P.I.	(M)	XI B I.P.	Borderline intellect	12,63+4	11,64+5	0,89	13,56+2	12,85+3	0,61
			Recorded time	13,03	12,14		13,76	13,15	
V.S.	(M)	XI B I.P.	Borderline intellect	10,64+6	10,36+2	0,68	12,32+2	11,32+4	0,80
			Recorded time	11,24	10,56		12,52	11,72	
V.A.D.	(M)	XI B I.P.	Easy psyche	14,32+3	13,52+4	0,70	13,34+5	12,53+4	0,91
			Recorded time	14,62	13,92		13,84	12,93	
I.C.A.	(M)	XI C I.P.	Moderate psyche	18,78+8	18,62+5	0,46	17,50+8	16,63+4	1,27
			Recorded time	19,58	19,12		18,30	17,03	

All the 8 students of the eleventh grade studied, following the application of the Personalized Intervention Plan (PIP), recorded higher values in the final test (F.T.) compared to the initial test (I.T.). Progress was evident even very few of them exceeded the one percent threshold.

Discussions

The results of the study confirm the effectiveness of adapted physical exercises in developing dynamic balance in students with mental disorders and borderline intelligence, highlighting significant progress between the initial and final tests. These findings are consistent with the literature, which emphasizes the role of adapted physical education and personalized interventions in improving postural control, motor coordination, and functional autonomy (Dragnea et al., 2006; Bodorin et al., 2012; Ciorbă, 2016). The individualized programs applied contributed not only to optimizing motor performance but also to increasing self-confidence and active participation of students in physical education classes (Horak, Wrisley, & Frank, 2019, Pitetti, Miller, & Loovis).

The results of the study confirm the opinions expressed in the analyzed literature, demonstrating that adapted physical education, applied in an inclusive setting and supported by personalized interventions, has a positive impact on the development of balance, autonomy, and integration of students with mental disorders or borderline intellectual functioning (Krutsevich et al.)

4. Conclusions

Motor balance has a fundamental role in improving motor skills and adaptation to the environment. The development of balance is essential in the acquisition of autonomy for both students with mental disorders and those with borderline intellect.

Through the adapted teaching strategies used, physical education provides a beneficial framework for the development of balance. Adapting physical activities for pupils with special needs, i.e. those with borderline intellect and mental disorders, must be done using accessible means, be carried out in an eloquent dynamic and stimulate pupils' active participation in the educational act.

Physical exercise also contributes effectively to the emotional and mental well-being of students, reduces stress, improves cognitive abilities, concentration, reduces anxiety.

Physical education lessons are significant means for the development of balance in pupils with mental or borderline intellectual disorders and play an important role in the process of school and social integration of pupils. In order for the integration process to be effective, there is a need for real cooperation between teachers, parents, psychologists, therapists, all the factors that play a determining role in this process.

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