

Science, Movement and Health, Vol. XX, ISSUE 2 Supplement, 2020
September 2020, 20 (2 Supplement): 335 - 341
Original article

RESEARCH ON THE OPTIMIZATION OF THE CURRICULAR REPERTOIRE FOR CHILDREN WITH INTELLECTUAL DISABILITIES THROUGH THE IMPLEMENTATION OF TRAINING PROGRAMS WITH MULTIMEDIA SUPPORT

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Abstract

Objective. The purpose of the research consists in the validation of new methods of applying the therapeutic physical exercise associated with exercises of general development through the elaboration of a complex intervention program. Our proposal consists of an intervention program with multimedia support of Brain Breaks type as well as screening and diagnostic analysis regarding the particularities related to growth and development. All of these are customized to facilitate the access and participation of children with intellectual disabilities in programs and activities that promote movement for prophylactic and therapeutic purposes.

Methods. The study was conducted at an Inclusion School Center where students are enrolled with: mild, moderate, severe mental impairment, associated disorders, learning disorders, neuro-motor deficiency (non-relocable students, through home schooling); mental deficiency, through a support teacher; continuously, for two months during May-June 2019, with a frequency of 3 sessions / week, the duration of a session being 45 minutes.

The independent variables pursued were: the level of similar IQ, school age and a good health condition. Dependent variables covered: global motricity, functional balance, joint mobility,

In order to carry out the experimental study, 5 children with intellectual disabilities participated, the age of the children was between 12-13 years.

Multimedia programs consisted of exposing the 4-minute video-audio material in the kineto-therapy room, which served as a support for the execution of complex movements by children in a game form.

For the evaluation of the results we used functional tests for balance assessment, coordination, cardio-respiratory functional capacities, ADL screening tests, as well as assessment of the physical activity attitude).

Results. Regarding the results, the development of personal autonomy and independence, creativity and imagination, self-confidence and social interaction ability and improved communication skills of children with special educational needs were observed.

Conclusions. Participation in the kineto-prophylaxis program with the multimedia support proposed was followed by the stimulation of the functional capacity, the increase of the confidence and the self-esteem and an increased degree of autonomy.

The results of this study are part of a preliminary research and will be expanded by increasing the number of participants, but also by diversifying the multimedia content.

Key words: multimedia support, social inclusion, kineto-prophylaxis, children, intellectual disabilities.

Introduction

Data on all aspects of disability and contextual factors are important for building a complete picture of disabilities and functions. Without information on health conditions, which interact with environmental barriers or facilitators that can affect people in everyday life, it is difficult to establish the true size of disabilities (Georgescu, Tudor)

Globally, during this period there are debates regarding the role of environmental and attitude factors, precisely to highlight the fact that disability is not an attribute of the person, but of the relationship between the person with a certain impairment / deficiency and the environment. It has been estimated that 1-2% of the world's population is diagnosed with

intellectual disabilities (Maulik, Mascarenhas, Mathers, et al., 2011).

The topicality of the approached theme reflect in the national and international literature an essential interest of the specialists involved in the recovery process of school-age children with intellectual disabilities, the emphasis being on integration in the community and removing social barriers.

An important role in this generous approach belongs to doctors, psychologists, physiotherapists, physical education teachers and other specialists who have continuously diversified and perfected their means of action, they are increasingly being requested and capitalized for the benefit of those with special needs (Ciucurel, Georgescu, Iconaru et al., 2006).

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*the abstract was published in the 20th I.S.C. "Perspectives in Physical Education and Sport" - Ovidius University of Constanta, May 28-29, 2020, Romania

Received 1.04.2020 / Accepted 05.05.2020

Methods

Applied research methods were: Investigation method, Case study method, Test method, Experiment method, Graphic method (Albu, M., 2000).

The study was conducted at an Inclusion School Center where students with: mild, moderate, severe mental deficiency, associated disorders, learning disorders, neuromotor deficiency (students not displaced, through home schooling); mental deficiency, through supportive teachers;

Within the school unit, a series of specific therapies are performed: Therapy of language disorders; Physical Therapy; Psychomotor education; psycho-diagnosis; Counseling, School and career guidance; stimulation, compensation, integration; Educational therapy through personalized intervention programs; Behavioral disorder therapy. (Ordinul Ministrului Educației, Cercetării și Tineretului, nr.5235, 2008)

Presentation of the group of subjects For the experimental study participated 5 children with mild intellectual disabilities, who attend courses at an Inclusion School Center, Argeș county. The age of this 5 children was between 12-13 years; 3 of them come from rural areas and 2 of them from urban areas. The average IQ of the identified children was 69.8, representing a slight mental retardation, they have a hyperkinetic behavior with a slight deficit of attention.

The kinetic program was drawn up on the basis of the initial assessment which consisted of: battery of eurofit tests, somatoscopic, coordination assessment, balance assessment, BMI, breath test, respiratory rate, heart rate, blood pressure, Dorgo index.

A. Eurofit test battery: "Flamingo" balance test, mobility test, bending the torso forward from the sitting position, jumping lengthwise from the seat, lifting the torso from the sitting position, running "5 x 2 x 10m shuttle run" (Gherguț A. 2005).

Below we present the table with the result of Eurofit test batteries for selected children (table.1):

Table 1. The result of eurofit test batteries for selected children

Subjects / Tests	"Flamingo" Balance Test	Mobility Test Bending the torso forward from a sitting position	Long jump from the spot	Lifting the torso from a sitting position	Running "Shuttle run 5 x 2 x 10m"
R. M. O	3 attempts	9cm	102 cm	7 lifts	70 sec
Z.M.G	2 attempts	20 cm	112 cm	15 lifts	50 sec
D.O.G	6 attempts	2 cm	102 cm	6 lifts	60 sec
L.A.I	3 attempts	8 cm	113 cm	16 lifts	65 sec
R.M.G	1 attempt	10 cm	110 cm	10 lifts	50 sec

B. Somatoscopic evaluation. We applied the evaluation: Waist, Nutrition status, Body attitude, distribution and degree of development of subcutaneous cellular tissue, distribution and degree of development of muscle tissue, head and neck position, chest conformation, shoulder position, shoulder blade position, the conformation of the

spine, the symmetry of the thorax, the angles of the waist, the conformation of the abdomen, the position of the pelvis in the frontal plane, the conformation of the leg, the plantar arch (Dragnea, A., Bota, A., 1999). Below we present the table with the result of the evaluation of somatoscopy in selected children (table 2):

Table 2. The evaluation of somatoscopy in selected children

	1. R.M.O	2. Z.M.G	3. D.O.G	4. L.A.I	5. R.M.G
Waist, (small medium, large, very large, very small)	medium	very small (below stature)	medium	medium	medium
Body attitude (correct, kyphotic, lordotic, scoliotic, kypholordotic and flat)	scoliotic attitude in C dr thoracic, lordotic attitude	kypho-lordosis attitude	kyphotic attitude	kyphotic attitude	kyphotic attitude

	1. R.M.O	2. Z.M.G	3. D.O.G	4. L.A.I	5. R.M.G
Distribution and development of excess subcutaneous cellular tissue, normal. Minus, evenly or unevenly distributed) and muscular	normal, uniform and muscular	normal, uniform and muscular	normal, uniform and muscular	normal, uniform and muscular	normal, uniform and muscular
Distribution and degree of development of muscle tissue (weak, normal, very well developed, harmoniously developed, with predominance on certain segments)	normal, harmoniously developed	normal, harmoniously developed	normal, harmoniously developed	normal, harmoniously developed	normal, harmoniously developed
Head and neck position (correct, tilted forward or sideways)	correct	correct	forward tilted	forward tilted	forward tilted
Chest conformation (normal, frontal diameter larger than sagittal, flat with small sagittal diameter, round or in barrels of equal diameters)	normal, with a frontal diameter larger than the sagittal one,	normal, with a frontal diameter larger than the sagittal one,	normal, with a frontal diameter larger than the sagittal one,	normal, with a frontal diameter larger than the sagittal one,	normal, with a frontal diameter larger than the sagittal one,
Shoulder position (correct, raised, lowered, brought forward or backward, asymmetrical)	asymmetrical, left shoulder lowered	forward shoulders	forward shoulders	forward shoulders	forward shoulders
Shoulder blades (away from the chest wall, uneven, away from the spine)	away from the chest wall, asymmetrical	away from the column and detached	away from the column and detached	away from the column and detached	away from the chest wall
Conformation of the spine, the appearance of physiological curves (scoliosis, lordosis and kyphosis), their location and degree	scoliotic attitude in the C thoracic	kyphotic and lordotic attitude	kyphotic attitude	kyphotic attitude	kyphotic attitude
Chest symmetry, presence of gills or depressions	chest symmetry, presence of gills	chest symmetry, presence of gills	correct symmetry	correct symmetry	correct symmetry
Waist angles (equal or unequal)	equal	equal	equal	equal	equal

	1. R.M.O	2. Z.M.G	3. D.O.G	4. L.A.I	5. R.M.G
Abdomen conformation (supple and elastic or convex anteriorly and in the lateral parts)	supple and elastic	supple and elastic	supple and elastic	supple and elastic	supple and elastic
Position of the pelvis in the frontal plane (iliac crests should be at the same height) and sagittal (the pelvis should be tilted forward by about 35 degrees)	the iliac crests are slightly asymmetrical right descended. the pelvis is tilted forward by over 35 degrees	the iliac crests are symmetrical	the iliac crests are symmetrical	the iliac crests are symmetrical	the iliac crests are symmetrical
Knee position (normal, lime, valgus)	normal	normal	hyper extension in the genus recurvatum	hyper extension in the genus recurvatum	Normal
Leg conformation (normal, curved laterally with outward connection (leg in lime) and curved with anterior connection and sharp anterior tibial margin (tibia in the javelin)	normal	normal	normal	normal	normal
Plantar arch (normal, diminished (flat foot), accentuated (hollow foot)	flat foot	normal	flat foot	normal	flat foot

C. Evaluation of coordination, Finger to nose test, index- physiotherapist, "Finger counting" test, "Puppet" test, Heel-knee test.

Below we present the table with the result of the coordination in the selected children (table 3):

Table 3. The result of the coordination in the selected children

Name	Finger to nose test	Testator index-physiotherapist	"Finger counting" test	"Puppet" test	Heel-knee test
R.M.O.	0	1	1	1	2
Z.M.G	1	2	2	2	2
D.O.G	0	2	0	1	1
L.A.I	1	2	1	2	2
R.M.G	1	2	1	1	2

D. **Balance assessment;** I applied: the Romberg test, the sensitized Romberg test, the "arm" test, the unipodal test, the rotation of the trunk from orthostatism, return to 360⁰, stretching forward from

orthostatism. step over obstacles. walking on peaks. walking on heels. Below we present the table with the result of the balance assessment in the selected children (table 4):

Table 4. The table with the result of the balance assessment in the selected children

Name	1	2	3	4	5	6	7	8	9	10
R.M.O.	2	1	1	1	2	1	1	2	2	2
Z.M.G	2	2	2	2	2	2	2	2	2	2
D.O.G	0	1	1	2	2	1	1	2	2	2
L.A.I	1	2	1	1	2	2	1	1	2	2
R.M.G	2	2	2	2	2	2	2	2	2	2

Note: 1. Romberg test, 2. Sensitized Romberg test, 3. "Gill" test, 4. Unipodal test, 5. Trunk rotation in orthostatism, 6. Return to 3600, 7. Stretch forward in ortho-statism. 8. Step over obstacles. 9. Walking on peaks. 10. walk on heels.

HopSports kinetic and multimedia program

The objectives of the program: In this program we aimed to improve the somatic-functional profile of children with mild intellectual disabilities; improving the cardio-respiratory parameters (HR, BP oxygen saturation, expiratory flow) improving the ability to concentrate from students with intellectual disabilities and learning basic learning skills;

The kinetic program took place continuously for two months, between May and June 2019, with a frequency of 3 sessions / week and 3 stages of difficulty. The HopSports multimedia program was integrated in the kinetic program 3 times in a session, the first integration was after the warm-up period between minute 7 and minute 11, the second time after the actual period of the physiotherapy program between minute 29 and minute 33 and the third time at the end of the recovery program between minute 41-45, the duration of a session being 45 minutes.

Stage 1 difficulty of the kinetic program took place over 20 days 3 times a week. The kinetic program contains 21 exercises of low difficulty, divided into 3 periods: warm-up lasting 7 minutes; the actual kinetic program lasting 18 min; return after 8 min.

Stage 2 difficulty of the kinetic program took place over 20 days 3 times a week. The kinetic program contains 24 exercises of medium difficulty, divided into 3 periods: warm-up lasting 7 minutes; the actual kinetic program lasting 18 min; return after 8 min.

Stage 3 difficulty of the kinetic program took place over 20 days 3 times a week. The kinetic program contains 23 exercises of greater difficulty, divided into 3 periods: warm-up lasting 7 minutes; the actual kinetic program lasting 18 min; return after 8 min.

The kinetic program includes dynamic, analytical medical gymnastics exercises, meant to contribute to the formation of a correct body attitude by permanently educating the neuromuscular and psychic reflex, increasing mobility, balance, neuromuscular development and facilitating reflexes, increasing muscle tone, developing laterality, activation of general and fine motor skills;

The exercise complexes used in the kinetic program are from the position: standing, sitting, lying on your back, squatting, sitting on your knees.

The HopSport multimedia program contains a 4-minute video-audio material, author's own creation, promoted by the Brain-Breaks platform, which served

as a support for the children's execution of complex movements in the form of a game. The content of the video-audio material is a complex one, the rhythm of the music gradually increases so that it supports the gradual increase of the intensity of the effort, so at the beginning the song is slower which corresponds to the warm-up stage and the preparation of the body for the effort.

The movements are rhythmic and graded in complexity, performed on music, simpler movements at the beginning: lower limbs: step forward - step back, left side step - right side step, then coordination movements of the arms and lower limbs. In the second half of the film there are several exercises that include the lower limbs especially jumping on one leg and the other, which stimulates and contributes to the development of balance and strength in the lower limbs.

Both dance movements are integrated in the first part but then as the effort intensifies movements are involved that are related to different sports that have been identified as enjoyable for children with intellectual disabilities: football, volleyball, basketball; fine motor movements: coordination movements, rotations of the arms, the "mill", turns of the body that help with orientation, hitting movements, lateral movements.

The last part of the video includes the return part with breathing movements: inspiration and expiration exercises.

Results

The analysis and interpretation of the data collected during the research are presented as follows. Physical examination showed an improvement in the general position of the body for most children. Also, the results of balance and coordination tests improved significantly ($p < 0.01$), however BMI did not change significantly. The Ruffier index had a positive evolution (from an adaptation to low effort to an adaptation to moderate effort). The initial respiratory rate, even at rest, was higher due to a high level of anxiety and emotion, which was interpreted as a reaction to a new and unknown situation; after exertion, there was an average decrease of 15%. The resting heart rate had a parallel evolution with the respiratory rhythm, registering an average decrease of 17% at the end of the intervention. Systolic and diastolic blood pressure did not change significantly

(diastolic blood pressure increased or decreased by 10 mmHg, systolic blood pressure and differential blood pressure did not change). Regarding the functional recovery of the body after exertion, we registered, on average, an improvement of 20%.

The appreciation of the satisfaction regarding the results of the program, the desire of the children to participate in this program, the emotion for starting the program, the degree of socialization and the integration in the community / group were appreciated by applying a questionnaire. The questionnaire had 57 easy-to-follow and answer items, with a response ratio quantified in a minimum and maximum score, respectively. The results were then centralized and analyzed for further improvements in the content of the therapeutic program.

The questionnaire addressed to the students regarding the physical activities carried out in the complex program (R. K. Yin, 2002), contains a number of 57 items, each of which can be scored with total disagreement, partial disagreement, partial agreement and total agreement (M. M. C., Chin M., Chen S., Novak D., et al., (2015). Basically, the child is asked to appreciate the importance of physical activities in daily life, but also the experience gained from the implementation of the multimedia program.

Analysis and interpretation of the data from the questionnaire:

From the questionnaire that included 57 items, we selected the most important ones:

a) "I feel more confident after the physical activity.", the respondents answered: in proportion of 100% with total agreement. (figure no.1)

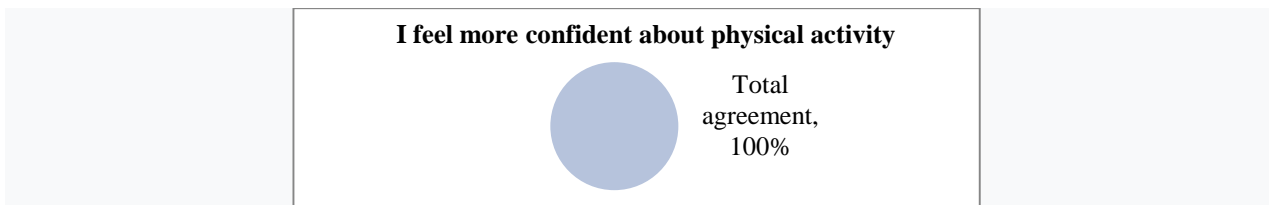


Figure no.1 - Graphic distribution of the answer to the statement: "I feel more confident after physical activity.

b) "I enjoy doing physical exercises with my classmates", The respondents answered: in proportion of 100% with total agreement. (figure no.2)

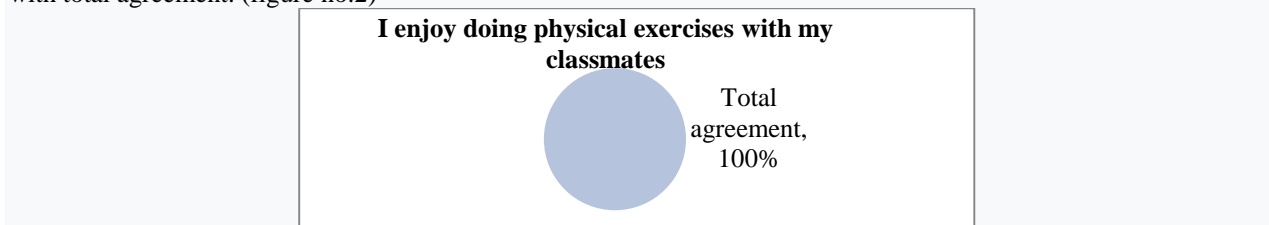


Figure no. 2- Graphic distribution of the answer to the statement: "I enjoy doing physical exercises with my classmates"

c) "I am confident in my strength", The respondents answered: in proportion of 80% with total agreement and 20% with partial agreement. (figure no.3)

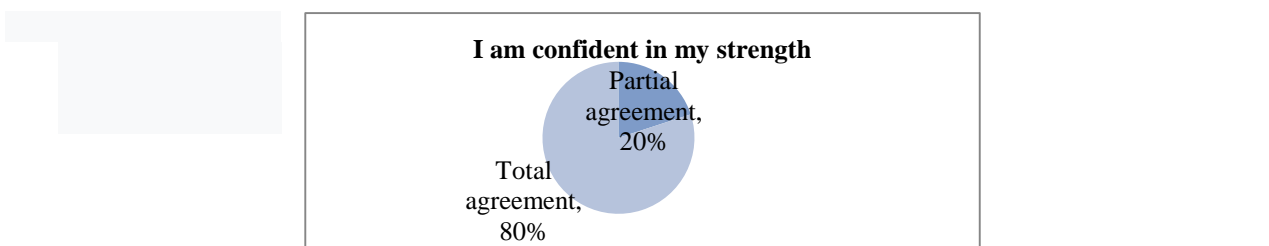
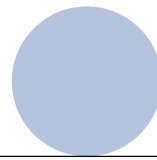


Figure no.3 - Graphic distribution of the answer to the statement: "I am confident in my strength"

d) "I'm sure of my endurance ", " I'm sure of my balance. ", " I'm sure of my agility", " I'm sure of my flexibility", " I'm sure of my pace", " I'm sure of my coordination hand-eye", "I am sure of performing physical activity with elegance", the respondents answered: in proportion of 100% with total agreement. (figure no.4)

"I'm sure of my endurance. ", " I'm sure of my balance.
 ", " I'm sure of my agility. ", " I'm sure of my flexibility.
 ", " I'm sure of my pace. ", " I'm sure of my
 coordination hand-eye ", " I am sure of performing
 physical activity with elegance"



Total
 agreement,
 100%

Figure no. 4 - Graphic distribution of the answer to the statement: "I'm sure of my endurance", " I'm sure of my balance", " I'm sure of my agility", " I'm sure of my flexibility. ", " I'm sure of my pace", " I'm sure of my coordination hand-eye", " I am sure of performing physical activity with elegance"

Conclusions

The development of autonomy and personal independence, creativity and imagination, ability to social interaction and communication skills are the main improved outcomes for the child with special educational needs by applying of the intervention program combined with video exercises such as Brain Breaks (Mok, M.M.C.; Chin, M.-K.; Korcz, et al., 2020)

Participation in the kinetic-prophylaxis program with the proposed multimedia support was followed by stimulation of functional capacity, increased confidence and self-esteem and a high degree of autonomy.

The kinetic program is applied to a study pilot, the result being suitable for the adaptation, correction and extension of a new experimental scientific research.

The results of this study are part of a preliminary research of my doctoral thesis and will be expanded by increasing the number of participants, but also by diversifying the multimedia content.

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