THE IMPACT OF SPECIALLY DESIGNED CORRECTIVE GYMNASTIC EDUCATION ON SOME OF THE MOTOR ABILITIES IN CHILDREN OF UPPER ELEMENTARY SCHOOL AGE

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SHORT SCIENTIFIC ARTICLE

Abstract: The determination of morphological properties and motor abilities when working with students poses itself as an important task so we can follow their growth and development. The goal of this paper is to determine up to what measure does the experimental program that had been applied in the course of 6 months affect the change of motor abilities in students. Moreover, it was necessary to answer whether the group of test subjects that were initially measured had different motor ability levels in the final measurement. Based on the results and discussion, the conclusion may be drawn that the experimental program had a positive impact on motor abilities.

Key words: physical education, morphological properties, initial and final measurement.

INTRODUCTION

During growth and development, in the overall organism of a child, there are certain major and minor changes (Bugler, Gaston, & Robb, 2019; Sudarov, & Fratrić, 2010). Since this development is individual, it is certain that in such development there are major or minor differences in motor functions of children (Schmidt et al., 2017; Houwen, Kamphorst, van der Veer, & Cantell, 2019; Džakula, Miljković, Pavičić, & Banjac, 2020).The goal of physical education is to have a positive impact on psychosomatic status, i.e. to provide normal growth and development of students as well as their capabilities to independently control and check their own health status and motor abilities (Hardman, 2007; Andriesse, Westbom, & Hägglund, 2009). Motor abilities are genetically predetermined properties that affect the realisation of movements, such as agility, coordination, flexibility, etc. (Ortega, Ruiz, Castillo, & Sjöström, 2008; Lidbeck, & Bartonek, 2021). They are permanent by themselves and are hardly changed in adults. These abilities are different from skills in terms that the skills are learnt, while the abilities are the result of both learning and genetic factors (Ortega, Ruiz, Castillo, & Sjöström, 2008; Ruiz et al., 2009; Ríos-Rincón, Adams, Magill-Evans, & Cook, 2016). The composition of the muscle tissue in humans shall surely have an impact on their physical abilities, such as strength,

flexibility, endurance (Hardman, 2007; Rosenblum, 2015; Almasri, Saleh, Abu-Dahab, Malkawi, & Nordmark, 2018). For example, the children that go to school shall continue to develop their verbal and logical abilities throughout the education, just like the children that engage in recreational or sports activities continue developing their motor abilities (Aleksic, Mekic, & Tosic, 2011; Reynolds, Licari, Elliott, Lay, & Williams, 2015; Lalor, Brown, & Murdolo, 2016). The speed of abilities' development changes during childhood and adolescence and both of these depend on the individual (Caine, Lewis, O 'Connor, Howe, & Bass, 2001; Piek, Hands, & Licari, 2012; Mensch et al., 2019). The observed quality, quantity and tendencies of such differences define the corresponding age and sex of children (Keawutan, Bell, Davies, & Boyd, 2014; Giles et al., 2018).

The early and varied movement experiences, teaching, adequate space and positive attitude from the parents and similar, all enable the optimal motor development in children (Wrotniak, Epstein, Dorn, Jones, & Kondilis, 2006; Werpup-Stüwe & Petermann, 2015). Motor abilities may be acquired only if the student possesses the basic abilities, however, a man may possess the basic abilities, but not acquire a certain motor ability ((Blank & Hermsdörfer, 2009; Müürsepp, Gapeyeva, & Pääsuke, 2012; Scott, Barbosa, Pan, & Heathcock, 2021). When one talks about physical exercise especially with children, it is important that it mostly includes natural forms of movement and it may be adapted to the specificities of each child, and then to make an impact on his or her motor abilities (Oja & Jürimäe, 2002; Giles et al., 2018).

The very subject of the research is to determine the effect of the application of the corrective gymnastic program on the transformation of motor abilities.

The basic goal of the research is to determine the contents of teaching corrective gymnastics to the motor abilities of students and their improvement. In order to achieve the aforementioned goal, it is necessary to establish the following tasks:

To measure the anthropometric properties of all test subjects before and after treatment

-Before and after the experimental programme, measure some of the motor abilities: speed, strength (explosive and repetitive) and flexibility;

- Devise a programme with corrective gymnastics exercises;

- Conduct the exercise programme within one semester;

- Process the obtained data and interpret them and based on these draw a conclusion;

- Based on the results obtained, define the effects of transformational processed and then based on that make the ultimate conclusions regarding the application of such programme in PE.

METHOD

Sample of respondents includes the population of students from the eighth grade of upper elementary school that attend the regular PE classes according to the Curriculum in the Republic of Serbia. The number of subjects tested under the research is 24. The experimental programme was conducted within one semester, three classes per week.

The variables used to track and trace the changes in morphological properties are:

• Circular skeleton dimensionality: average chest circumference (AOGRK), upper arm circumference (AONDL), lower leg circumference (AOPTK)

• Longitudinal skeleton dimensionality: body height (AVIS)

• Adipose tissue: abdomen skin fold (ANTRB)

For the assessment of the growth and development of the test subjects the following standard measuring instruments were used:

• For determination of body circumference – measuring tape 150cm long, precise within 0,1cm;

• For determination of the body height – Martin anthropometer precise within 0,1cm;

• For determination of skinfold thickness - calliper. Set so that the pressure on the tips of the branches that touch the skin folds surface is 10g/mm;

To assess the motor abilities, 6 tests were used the description of which was given by Kurelić et all. (1975), such as:

• Leg tapping MTANArm tapping MTAR

• Leg wall tapping MTAZ

• Standing long jump MSDM

• Body lifting in 30 s MD30

• Squats MČUČ

The measurement of the given variables and tests was performed twice: the initial measurement at the beginning and the final measurement at the end of the experiment.

RESULTS

Table 1. The basic statistic parameters for the morphological properties assessment during the initial measurement:

A. Measurements	N	Mean	Min.	Max.	St. Dev.	Skewn.	Kurtos.
AVIS	24	177,62	165	195.00	10.80	0.768	-1.188
AOGRK	24	87.12	80	96.00	6.07	0.181	-1.761
AONDL	24	25.78	22	30.00	5.61	0.118	-1.501
AOPTK	24	26.54	22.15	32.00	2.759	0.288	-0.382
ANTRB	24	8.50	4.6	16.1	4.067	0.782	-0.857

Table 2*.* The basic statistic parameters for the morphological properties assessment during the final measurement:

A. Measurements	N	Mean	Min.	Max.	St.dev	Skewn.	Kurtos.
AVIS	24	180	165.5	195.00	10.61	0.468	-1.523
AOGRK	24	88.56	81.00	97.00	6.098	-0.030	-1.046
AONDL	24	25.90	22.52	30.00	2.712	0.170	-1.554
AOPTK	24	25.84	21.15	30.00	2.775	-0.270	-0.905
ANTRB	24	7.98	4.0	14.00	3.779	0.576	-1.274

Table 3. The significance of the differences between initial and final measurements in the morphological properties of the test subjects

A. Measurements	N	Mean inic.	Mean final.	T test
AVIS	24	177,62	180	0,002
AOGRK	24	87.12	88.56	0,087
AONDL	24	25.78	25.90	0,008
AOPTK	24	26.54	25.84	0,005
ANTRB	24	8,5	7,98	0,001

Table 4. The basic statistic parameters for the assessment of motor abilities at the initial measurement

Variables	N	Mean	Min.	Max.	St.dev	Skewn.	Kurtos.
MTAN	24	21.83	17.00	28.00	3.607	0.486	-0.956
MTAP	24	30.00	24.00	37.00	4.333	0.311	-0.956
MTAZ	24	15.62	12.00	19.00	2.222	-0.155	-1.235
MSDM	24	183.00	155.00	210.00	16.023	-0.178	-0.915
MD30	24	12.20	9.00	18.00	2.570	0.736	-0.297
MČUČ	24	9.45	5.00	14.00	2.765	-0.038	-0.038

Table 5. The basic statistic parameters for the assessment of motor abilities at the final measurement

Variables	N	Mean	Min.	Max.	St.dev	Skewn.	Kurtos.
MTAN	24	22.083	18.00	29.00	3.693	0.746	-0.618
MTAP	24	30.37	25.00	39.00	4.716	0.614	-0.775
MTAZ	24	15.83	13.00	20.00	2.200	0.257	-0.891
MSDM	24	184.25	159.00	220.00	16.288	0.165	-0.543
MD30	24	12.583	10.00	19.00	2.602	1.001	0.173
MČUČ	24	10.083	7.00	16.00	2.569	0.922	0.153

Table 6. The significance of the differences between initial and final measurements in the motor abilities of the test subjects

A. Measurements	N	Mean inic.	Mean final.	T test
MTAN	24	20.10	22.083	0,010
MTAP	24	30.00	30.37	0,016
MTAZ	24	15.62	15.83	0,022
MSDM	24	183.00	184.25	0,028
MD30	24	12.20	12.583	0,001
MČUČ	24	9.45	10.083	0,001

DISCUSSION

By analysing the mean results of the students' motor abilities at the final measurements, it may be said that there have occurred positive changes in the students and that by applying the motor tests one can influence the improvement of the morphological properties. During the research, data processing and comparison of the initial and final measurements of the test subjects (Tables 1, 2, and 3) we have

reached the conclusion that a significant improvement of morphological properties occurred and that the body height (AVIS) difference was observed, as well as the reduction of the abdominal skin flap (ANTRB), increase of the average chest circumference (AOGRK), upper arm circumference (AONDL) and lower leg circumference (AOPTK). Overall, we can say that there has been a significant improvement in the final measurement in relation to the initial one.

By observing the processed data regarding the motor abilities on the initial and final measurements (Tables 4, 5, and 6) regarding arm tapping (MTAR), leg wall tapping (MTAZ), standing long jump (MSDM), body lifting in 30 s (MD30) and the number of squats (MČUČ), we can conclude that an improvement has occurred. As regards the motor function, a weaker improvement was observed with arm tapping, leg wall tapping and body lifting in 30 s tests, while a major improvement was observed in the standing long jump test.

The changes in showing motor functions that happened are the result of the training process that lasted for 6 months and the specially programmed physical education; hence we can say that provided that the corrective treatment continues over a prolonged period of time, there would be even major changes within students' motor abilities.

CONCLUSION

After the conducted research, obtained data and interpretation of the results as well a practising corrective exercise, a major improvement in the motor abilities of upper elementary students was observed. The programme applied fit in well with the activities conducted around schools, which is why it is safe to say that such a programme may be introduced into the regular PE curriculum.

This research should initiate further and more extensive research, with a larger number of test subjects in a wider area, that will lead to more efficient transformations of the morphological properties and motor abilities and the results obtained should be directed towards innovating the curriculums and their adaptation to the needs of children of the upper elementary school age.

The experience so far and the results of research should demonstrate that more efficient planning and programming of these activities may be achieved only if one has sufficient information at their disposal based on which one may establish the current state of facts and the steps for further activities.

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