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Impact of Programme for Correcting Lordosis to Changes in Motor Abilities of Elementary School Students

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Abstract

Spine is the axis of locomotor system and it is simultaneously solid and elastic upper body supporter.

Aim: Aim of the research was to determine the impact of corrective exercises to changes in motor abilities in students.

Method: The sample consisted of two groups: experimental group (N=30) and control group (N=36). For the purpose of assessment of motor abilities the following variables were used: Flexibility: sit and reach (MDPK), side split (MŠPA), turn with stick (MISP); Segmentary speed: foot tapping (MTAN), hand tapping (MTAP), foot tapping against a wall (MTAZ); Explosive strength: standing long jump (MSDM), standing triple jump (MTRS), ball throws (MBLP); Repetitive strength: crunches in 30 seconds (MD30),mixed-grip pull ups (MMZG), squats (MČUČ).

Results: Significant differences were noted in following tests: standing triple jump (MTRS .000), ball throws (MBLP .000), crunches in 30 seconds (MD30 .000), mixed-grip pull ups (MMZG .000) and squats (MČUČ .000).

Conclusion: Corrective exercises have positive impact to correction of lordosis. Longer duration of treatment would probably contribute more significant results.

Keywords: Spinal; Lordotic; Exercise; Lumbar vertebrae; School children

Introduction

All three natural physiological curvatures of spine are placed in the sagittal plane: cervical, thoracic and lumbar. They are in the shape of elongated letter S and their task is to accept and distribute body weight to smaller segments and greater surface. Achieving and maintaining good body posture is highly significant in everyday life. Bad posture does not necessarily mean bad general condition of a person. On the other hand, good posture helps the body to function properly on daily basis [1,2]. Issue of posture assessment and related deformities, choice of best indicators and reliability assessment of the procedures performed have been subject of a lot of research [3-9]. All the research stated or not, was conducted with the aim of detecting deformities and anomalies in children and adults. Correct posture is highly significant for child's development and functioning. A relevant indicator used is Frankfurt plane which is an indicator of regularity or irregularity of the observed body segment [10]. Periods critical for the development of deformities in connection to growth and development of active and passive strength in organism are: period of first year of life, period of righting and standing, period at the age of 6-7, period of starting school, period of puberty, period of pronounced neuro-hormonal influence, with adolescent growth spurt [11] Posture of youth nowadays in highly compromised.

It is expected due to many inconveniences which follow them as they grow up. Lifestyle of youth is becoming even more sedentary. Video games, Internet, Facebook, mobile phones and cable TV are favourite form of entertainment of younger generations. One third of children spend more than 4 hours a day in front of television, besides sitting in school, (public) transportation, in front of computer or playing video games [12]. Nowadays, school children have large choice of sport clubs for group and individual sports. Research conducted in this area [13-15] indicate that high number of children at school age do not take up sport activities, not even for recreational purposes as part of extra-curricular activities. Irregularities in body posture occur in two planes: Frontal - scoliosis, and sagittal - kifosis, lordosis, kifo-lordosis, concave and flat back. The most common deformities of the spine are: kifosis (deviation of the spine in thoracic spine in sagittal plane with convexity directed backwards) and lordosis (inward concave curving of the spine).

Method

The sample consists of the part of student population in Elementary Schools with deformities, male, aged 10 in Niš, who took part in the Programme for Correcting Lordosis. The sample of 66 was divided into two groups: Experimental group (N=30) and control group (N=36). The sample of measuring instruments used for assessment of motor abilities was as follows:

a) Flexibility: sit and reach (MDPK), side split (MŠPA), turn with stick (MISP);

b) Segmentary Speed: foot tapping (MTAN), hand tapping (MTAP), foot tapping against a wall (MTAZ);

c) Explosive Strength: standing long jump (MSDM), standing triple jump (MTRS), ball throws (MBLP);

d) Repetitive Strength: crunches in 30 seconds (MD30), mixed-grip pull ups (MMZG), squats (MČUČ).

Measuring instruments for assessment of motor abilities had been selected on the basis of research conducted by Kurelić 1975. Experiment was completed in duration of winter 2017/2018. All the participants from both experimental and control group were regularly attending PE classes. Impact of the Programme for Correcting Lordosis and basic motoric exercises to anthropological characteristics of children with special requirements was realised at Clinical Centre in Niš. Experimental programme was conducted in the course of two months, with 3 hours of exercising per week, which is 24 hours of corrective work in total. Corrective work aimed at realisation of Programme for Correcting Lordosis and basic motoric exercises to anthropologic characteristics of children with body deformities in experimental group had the following structure:

a) Introductory Part: (5 minutes) with the aim of warming up and introducing the participants to activities in the main part of class.

b) Preparatory Part: (10 minutes) had the aim of engaging entire muscular system, warming up the muscles, especially tendons and ligaments, with the purpose of more complete preparation of organism for realisation of activities of corrective exercising in the main part.

c) Main Part: (35 minutes) consisted of motor exercising programme for lordosis correction and basic motor exercises for improving the anthropological characteristics of children with body deformities in experimental group.

d) Final Part: (10 minutes) was aimed at stimulating the recovery process, gradual slowing down of all the functions and emotions of the participants by using less dynamic and low intensity instruments. The choice of corrective exercises for lordotic posture was designed in line with [11] (Table 1).

Requests and load intensity were in accordance with the individual abilities and characteristics of the participants in the experimental group.

Table 1: Schematic overview of the activities' plan.

Program Units	Hours
Initial diagnosis of anthropological signatures: Motor abilities	
1.Lordosis Corrective Exercises	14
2. Basic Motor Exercises	10
2.1 Speed exercises	3
2.2 General motor abilities exercises	2
2.3 Coordination exercises	2
2.4 Dynamic flexibility exercises	3
Total:	24

Table 2: Initial measuring - experimental group

Variable	N	Mean	Min.	Max.	Std.dev.	Skew.	Kurtos
MDPK	30	41.53	28.00	48.00	6.90	0.725	1.006
MŠPA	30	133.28	120.00	153.00	10.21	0.744	-0.271
MISP	30	68.45	46.00	87.00	10.36	-0.707	-2.212
MTAN	30	21.83	15.00	26.00	25.73	-0.387	-0.047
MTAP	30	29.34	22.00	35.00	25.23	-0.382	0.144
MTAZ	30	13.62	10.00	17.00	1.34	-0.902	1.605
MSDM	30	152.85	144.00	178.00	17.05	0.226	2.312
MTRS	30	438.24	395.00	510.00	6.96	-0.105	2.621
MBLP	30	18.56	15.00	25.00	5.23	-0.345	2.144
MD30	30	11.73	7.00	16.00	1.34	-0.952	0.675
MMZG	30	3.67	0.00	6.00	17.05	0.206	0.302
MČUČ	30	7.26	3.00	13.00	16.96	-0.158	0.601

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Results and Discussion

Table 2 results analysis suggests that there are no statistically significant differences between the results obtained and normal distribution in tests of motor abilities. Test results after assessment of motor abilities of the participants suggest that the distribution is positive. That is confirmed by the asymmetry of distribution (Skewness) which is not over 1.00, which means that the tests are neither difficult (to +1.00) nor easy (to -1.00), but adequate for the population subject to research and they are below value of one. Homogeneity of the results (Kurtosis) points out to the fact that the tests are adequately sensitive (test discrimination) because values obtained are below 2.75. Results of motor abilities obtained are in line with the results of similar research conducted locally at this population, hence providing for possibility to apply multivariate method of result analysis for the purpose of this research. Generalisation of the results on population that the sample consists of is therefore rendered possible.

Table 3: Final measuring - experimental group

Variable	N	Mean	Min.	Max.	Std.dev.	Skew.	Kurtos
MDPK	30	43.24	29.00	49.00	32.27	-0.414	1.410
MŠPA	30	138.53	122.00	155.00	33.23	0.600	2.258
MISP	30	62.38	43.00	82.00	15.14	-0.358	-0.552
MTAN	30	23.76	18.00	31.00	12.24	-0.345	-2.344
MTAP	30	31.50	25.00	37.00	21.51	0.253	-1.241
MTAZ	30	14.83	12.00	18.00	25.52	0.352	1.459
MSDM	30	168.64	149.00	181.00	10.27	0.027	2.304
MTRS	30	542.72	410.00	592.00	15.10	0.745	-2.240
MBLP	30	28.34	17.00	32.00	15.15	-0.358	-0.502
MD30	30	16.15	8.00	19.00	12.27	-0.311	-0.340
MMZG	30	5.45	2.00	8.00	20.52	0.223	-0.201
MČUČ	30	10.88	5.00	16.00	9.54	0.332	0.450

The results of the participants for the tests of motor abilities at final measuring are presented in Table 3 and they suggest that there are no statistically significant differences between the results obtained and normal distribution (Skewness) which is not over 1.00, which means that the tests are neither difficult (to +1.00) nor easy (to -1.00), but adequate for the population subject to research and they are below value of one. Homogeneity of the results (Kurtosis) points out to the fact that the tests are adequately sensitive (test discrimination) because values obtained are below 2.75. Results of motor abilities obtained are in line with the results of similar research conducted locally at this population, hence providing for possibility to apply multivariate method of result analysis for the purpose of this research. Generalisation of the results on population that the sample consists of is therefore rendered possible.

Table 4: Initial measuring - control group

Variable	N	Mean	Min.	Max.	Std.dev.	Skew.	Kurtos
MDPK	36	42.28	36.00	48.00	2.50	0.742	-0.698
MŠPA	36	134.15	112.00	146.00	1.50	0.602	1.020
MISP	36	67.82	53.00	78.00	10.02	0.122	-1.209
MTAN	36	22.56	19.00	26.00	5.24	0.455	1.045
MTAP	36	28.74	22.00	34.00	32.15	0.155	-2.648
MTAZ	36	14.15	11.00	18.00	2.12	0.274	-1.547
MSDM	36	151.26	138.00	178.00	5.51	0.299	-1.524
MTRS	36	441.43	390.00	496.00	2.47	0.274	-1.105
MBLP	36	19.72	15.00	26.00	25.22	0.455	1.045
MD30	36	12.10	6.00	17.00	21.11	0.155	-1.642
MMZG	36	3.14	0.00	5.00	20.12	0.274	-0.517
MČUČ	36	7.82	3.00	12.00	15.51	0.204	-0.004

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Analysis of the results of the participants in control group for the tests of motor abilities at initial measuring is presented in Table 4 and it suggests that there are no statistically significant differences between the results obtained and normal distribution and that the distribution is positive. That is confirmed by the results of distribution asymmetry (Skewness) which is not over 1.00, which means that the tests are neither difficult (to +1.00) nor easy (to -1.00), but adequate for the population subject to research and they are below value of one. Homogeneity of the results (Kurtosis) points out to the fact that the tests are adequately sensitive (test discrimination) because values obtained are below 2.75. Results of motor abilities obtained are in line with the results of similar research conducted locally at this population, hence providing for possibility to apply multivariate method of result analysis for the purpose of this research. Generalisation of the results on population that the sample consists of is therefore rendered possible.

Table 5: Final measuring – control group.

Variable	N	Mean	Min.	Max.	Std.dev.	Skew.	Kurtos
MDPK	36	43.82	37.00	49.00	25.74	0.587	0.633
MŠPA	36	136.43	116.00	153.00	3.30	0.341	1.226
MISP	36	65.72	50.00	74.00	22.52	0.051	2.025
MTAN	36	24.18	20.00	30.00	1.22	0.599	-1.963
MTAP	36	30.76	23.00	37.00	25.45	0.025	-1.115
MTAZ	36	16.13	12.00	19.00	5.31	0.165	0.304
MSDM	36	154.10	140.00	178.00	12.15	0.024	2.925
MTRS	36	472.56	395.00	525.00	13.12	0.542	0.226
MBLP	36	21.43	16.00	29.00	1.22	0.500	-1.795
MD30	36	12.90	7.00	18.00	25.45	0.022	-1.112
MMZG	36	3.74	1.00	6.00	5.31	0.160	0.302
MČUČ	36	8.34	4.00	14.00	12.15	0.024	2.025

The results of the participants of the control group for the tests of motor abilities at final measuring are presented in Table 5 and they suggest that there are no statistically significant differences between the results obtained and normal distribution. Results of tests used for assessment of motor abilities suggest that the distribution is positive. That is confirmed by the results of the distribution asymmetry (Skewness) which is not over 1.00, which means that the tests are neither difficult (to +1.00) nor easy (to -1.00), but adequate for the population subject to research and they are below value of one. Homogeneity of the results (Kurtosis) points out to the fact that the tests are adequately sensitive (test discrimination) because values obtained are below 2.75. Results of motor abilities obtained are in line with the results of similar research conducted locally at this population, hence providing for possibility to apply multivariate method of result analysis for the purpose of this research. Generalisation of the results on population that the sample consists of is therefore rendered possible.

Table 6: Final measuring – control group.

Test	Mean (E)	Mean (K)	F-ratio	p
MDPK	41.53	42.28	1.56	.135
MŠPA	133.28	134.15	1.96	.242
MISP	68.45	67.82	1.28	.257
MTAN	21.83	22.56	1.38	.104
MTAP	29.34	28.74	1.59	.158
MTAZ	13.62	14.15	1.55	.122
MSDM	152.85	151.26	1.54	.109
MTRS	438.24	441.43	1.75	.130
MBLP	18.56	19.72	1.54	.128
MD30	11.73	12.10	1.56	.225
MMZG	3.67	3.14	1.82	.109
MČUČ	7.26	7.82	1.69	.150

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In Table 6 is presented univariate analysis of tests of motor abilities obtained by comparing the results of arithmetic means of experimental and control group at initial measuring. On the basis of coefficient of F-ratio and their significance (P-level) we may conclude that there was no statistically significant difference in level of motor abilities between experimental and control group.

Table 7: Univariate analysis, experimental and control group, final measuring.

Test	Means (E)	Means (K)	F-ratio	p
MDPK	43.24	43.82	1.67	.196
MŠPA	138.53	136.43	1.54	.155
MISP	62.38	65.72	1.54	.136
MTAN	23.76	24.18	1.52	.128
MTAP	31.50	30.76	1.55	.196
MTAZ	14.83	16.13	1.42	.180
MSDM	168.64	154.10	1.35	.149
MTRS	542.72	472.56	7.00	.000
MBLP	28.34	21.43	5.78	.000
MD30	16.15	12.90	10.54	.000
MMZG	5.45	3.74	8.54	.000
MČUČ	10.88	8.34	11.52	.000

In Table 7 is presented univariate analysis of tests of motor abilities obtained by comparing the results of arithmetic means of experimental and control group at initial measuring. On the basis of coefficient of F-ratio and their significance (P-level) we may conclude that there was statistically significant difference in level of motor abilities between experimental and control group in following motor tests: standing triple jump (MTRS .000), ball throws (MBLP .000), crunches in 30 seconds (MD30 .000), mixed-grip pull ups (MMZG .000) and squats (MČUČ .000).

Conclusion

Corrective exercises are aggregate physical exercises dosed by intensity, type and duration, used either for prevention purposes in children with predisposition for some of the postural deformities, or for therapeutic purposes in case deformities are already present. Aim of the exercises is increasing the muscle strength, movement amplitude and coordination. Aim of this research was determining the impact of corrective exercises to changes in motor abilities of students. The programme was applied on the sample of 30 students, and upon obtaining results significant differences were observed in the following tests: standing triple jump, ball throws, and crunches in 30 seconds, mixed-grip pull ups (MMZG .000) and squats. Corrective exercises have positive impact to correction of lordosis. Prolonged duration of treatment would probably contribute more significant results. It would be interesting to study the impact of corrective exercises to changes in morphological characteristics and functional abilities of the students.

References

1. Opavsky P (1999) Uvod u biomehaniku sporta. Udžbenik. Belgrad, Europe.
2. Bjeković G, Tanović I, Pelemiš M (2011) Korektivna gimnastika sa kineziterapijom. Fakultet za fizičko vaspitanje i sport, Istočno Sarajevo, udžbenik, Europe.
3. Wickens JS, Kiputh OH (1937) Body mechanic analysis of Yale University freshmen. Research Quarterly 8(4): 38-48.
4. Stefanović D, Finogenov N, Tasić M, Rašić D, Nikolić S, et al. (1972) Učestalost telesnih deformacija i lošeg telesnog držanja školske dece na području SR Srbije. Zbornik radova I kongresa liječnika školske medicine Hrvatske, Split Trogir, pp. 351-357.
5. Palmer LM, Epler EM (1998) Fudamentals of Musculoskeletal Assessment Techniques. Lippincott Williams & Wilkins, p. 46.
6. Watson AWS, Donncha CM (2000) A reliable method for the assessment of posture. Journal of Sports Medicine and Physical Fitness 40(3): 260-270.
7. Straker L, Mekhora K (2000) An evaluation of visual dislay unitplacement by electromyography, posture, discomfort and preference. International Journal of Industrial Ergonomics 26(3): 389-398.
8. Paušić J (2006) Konstrukcija i vrednovanje mjernih postupaka za procjenu tjelesnog držanja u dječaka dobi od 10 do 13 godina. Kineziološki fakultet sveučilišta u Zagrebu, doktorska disertacija, pp. 167.
9. McEvoy MP, Grimmer K (2005) Reliability of upright posture measurements in primary school children. BioMed Central Musculoskeletal Disorders 6: 35.
10. Keros P, Pećina M (1977) Temelji anatomije čovjeka. Medicinska naklada, Zagreb, Europe.
11. Živković VD (2000) Teorija i metodika korektivne gimnastike, II izdanje, Niš, Europe.
12. Marshall SJ, Gorely T, Biddle S J (2006) A descriptive epidemiology of screen-based media use in youth: A review and critique. J Adolesc 29(3): 333-349
13. Bogdanović Ćurić J, Ivanišević D (2012) Motivacija i zadovoljstvo učenika u rekreativnom bavljenju sportom. Sportski logos 10(19): 44-50.

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14. Tubić T, Đorčić V (2009) Televizija i kompjuterske igrice - razbribriga ili stil života? Norma časopis za teoriju i praksu vaspitanja i obrazovanja 14(1): 29-38.

15. Đokić Z (2014) Procena fizičke aktivnosti učenika uzrasta 11 godina. Fakultet za sport i turizam, Novi Sad, TIMS Acta 8: 61-69.

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