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The Physical Rehabilitation Effects on the Dynamics Indices of a Trunk Muscle Strength Tolerance in Iranian Children with Scoliosis

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ABSTRACT

Among the most common orthopedic diseases is Scoliosis. Depending on different situations its frequency differs dramatically from 0.5 to 20%. As the number of children with scoliosis has recently been increasing, rehabilitation programs for the correction and prevention of scoliosis, generally in the educational institutions, was developed. In this research, we studied the real problem of correction scoliosis, deformation, and infringements of a bearing in a frontal plane in conditions. The aim of this research was to study the effect of physical rehabilitation programs for primary school age children with incorrect posture in the frontal plane, and scoliosis in first and second degree in educational institution of Iran, on the strength endurance of trunk muscles. A sample of 165 was selected among the primary school age children who got the incorrect posture in the frontal plane, and scoliosis first and second degree, living in Iran from 6 to 8 years. Trunk muscle strength endurance was measured once at the beginning and once again at the end of the pedagogical experiment. Results indicated that the method applied in the classroom of physical education and physiotherapy, have caused the functionality of the back muscles on either side of the spine, which affected the increase in the level of development in main group children to be leveled.The time that the pedagogical experiment increases strength endurance of the back muscles in the control group number one was 7.2 sec (13.8%), in the main was 17.8 sec (35%), the differences were significant (p).

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INTRODUCTION

A major problem in any society has been creation, preservation and strengthening of school health, healthy lifestyle, creating sufficient conditions for their physical, intellectual, and moral development, rehabilitation of existing difference in health status of any society.

A material adverse, which has a great impact on child's body, can lead to a lot of school dangerous factors and brings about a decrease in health of children and adolescence. In many children with similar condition, a weakened nervous system slowed down thought process, increased fatigue, and a delay in the motor skills development has been witnessed.

Children with posture disorders and scoliosis are legion in the world and a large number of specialists working as pediatricians, orthopedists, rehabilitation specialists, educators and physicians are enthusiastic about working on them.

Research studies conducted by Iranian experts reveal that only in Tehran, capital of Iran, 86% of school children have abnormalities of posture along with changes in a variety of organs and systems such as cardiovascular , respiratory and digestive system. In a survey, 90% of boys in high school were revealed to have spinal diseases. Pupils of primary school age have shown the largest number of posture violations.

Scoliosis is among the most common orthopedic diseases. Depending on different situations, its frequency differs dramatically from 0.5 to 20%. %. During the intensive growth 7 to 8 and 11to13 year-old girls showed the most rapid progression in the curvature in scoliosis, while it was reported in 8 to 10 and 13 to 15 year-old boys.

It has been reported that non-fixed posture disorders in the frontal plane and scolioticabnormalities have influenced the quality of the functioning important organs and systems of the body negatively. headache,

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impaired learning and getting exhausted quickly is usually seen in children suffering from scoliosis due tolow ventilation, inadequate supply of oxygen and disorganized the cardiovascular function which is because of poor posture and the presence of spinal malformation.

As the number of children with scoliosis has recently been increasing, rehabilitation programs for the correction and prevention of scoliosis, generally in the educational institutions, was developed. This method can decrease the effect from school risk factors and relief process in the early stages of development.

In this research we are to study the effect of physical rehabilitation programs for elementary school age children with wrong posture in the frontal plane, and scoliosis in first and second degree in educational institution of Iran, on the strength endurance of trunk muscles so as to achieve a great effectiveness of the rehabilitation, especially in the early stages of adverse deviations in the motor system.

*Objective***:**

The primary objective of this research study is to design and confirm a program for physical rehabilitation in a comprehensive school including Iranian children suffering from scoliosis. Then we are to give a clear definition of effectiveness and the effect of the recommended physical rehabilitation tools and methods on the functional circumstances of the Iranian pupils' spine and body. Conducting this research, we used methodological literature, educational experiment, mathematical methods, as well as, Ergo therapy programs.

Methodology:

A sample of 165 was selected among the primary school age children who got the incorrect posture in the frontal plane, and scoliosis first and second degree, living in Iran from 6 to 8 years. Below is how groups divided:

First main group included6 year- old children containing 13 girls and 20 boys (all in all 33 children), second main group included 7 year-old children containing 19 girls and 14 boys (all in all 33 children). Third main group included 8 year-old children containing 18 girls and 11 boys (all in all 33 children). First control group included 6 year-old children containing 12 girls and 12 boys (all in all 33 children). Second control group included 7 year-old children containing 12 girls and 11 boys (all in all 33 children). Third control group included 8 year-old children containing 14 girls and 9 boys (all in all 33 children). Random sampling was used for placing children in a main and a control group.

The current thesis work is carried out based on the plan of scientific research of the Physical Rehabilitation Department in NUPESU consolidated plan of research in the field of physical culture and sports in 2006-2010 years. Tags: 4.1.5. "Modern basis of elimination and rehabilitation of disorders in the motor system", NO0106U010793 and on topic: 4.3.1. "Development of recreation and rehabilitation programs for the prevention and correction of dysfunctions brought about by interruption in the different body systems", NO 0106U010794. The section undertook by author, allocated to the physical rehabilitation of school children of age 6-8 suffering from impaired posture and scoliosis.

Once at the beginning and next at the end of the pedagogical experiment trunk muscle strength endurance was appraised. The dynamics of the strength endurance of trunk muscles was appraised in relation to growth performance, computed on the groundwork of pedagogical testing described I. Loveiko, V.A. Kashuba, T.Yu. Krutsevich.

Classes were conducted according to the Iran laws. Engagement of both girls and boys was done separately. Special preventive measures were taking for forming and posture correction from scoliotic deformities, were held to the same extent in both main and control groups. Organized physical activity of children comprised physical education, Iran school planned program, morning hygienic gymnastics lessons, physiotherapist visiting two times week, moving change we can see on the program «Ergo Therapy». Traditional fixing skill correct posture was used in all groups (standing in front of the mirror with the support of the wall).Children in the main and control group were given exercises for building the correct posture skills for 10-15 minutes every day, with compulsory supervision by parents for their implementation.

In addition to activities mentioned above, fitness breaks carried out in control and main groups during the school year. The program was adapted to the physical education lesson plans, planned school program. Therapeutic exercises included in school hours two times per week. Each Physiotherapy session lasted for 45 minutes.

Classroom training. Rehabilitators helped to shed light on the pathology core in an accessible form for preschoolers and make the objectives and activities clear.

The objective of Health corrective gymnastics classes as mentioned I. Loveiko and M.I. Fonareva [6], was to prevent posture violations. Symmetrical nature, breathing exercises (BE) and outdoor games were taught to the main groups

Objective of program and methodical complex from N.A. Potapova, L.M. Mole, R.R. Gatiatulina [9], was to correct scoliosis and harmonious development of the child.

There included exercises in a balancing platforms, pillows and tracks for proprioception in the S.P. as a standing and sitting for the formation, as an appropriate muscular and dominant optimal movement patterns in the middle of the major part of the activity of TE, for 5-10 min.

Lessening muscle tension and restoring their function, we hold Automyorelaxation sessions at the end of each Physical Education session. Parents also became aware of the benefits of doing such exercises on the weekends.

Orthopedic balls were used in the control group so as to strengthen and relax the muscles.

Results:

Results indicated that the applied methodological approaches have brought leveling of the functionality of the back muscles on either side of the spine, which itself raised the level of development in main group children. Length of the pedagogical experiment increase strength endurance of the back muscles in the control group number one was 7.2 sec (13.8%), and in the main group was 17.8 sec (35%), the differences were significant ($p < 0.05$).

Strength endurance of the abdominal muscles increased in the control group in 30.3 seconds (39.4%) in the study group number one this time was 18.5 seconds (14.1%). The differences between the control and the main group were not significant ($p > 0.05$).

Statistical analysis of the testing results has revealed that level of muscle strength endurance side of the trunk grew annually. In the control group, increasing the strength endurance of these muscles by increased functionality was 6.13 seconds, on the opposite side - 8.08 sec., it compared to the results achieved at the beginning of the pedagogical experiment. In the main group, the difference of indicators of strength endurance of the high functionality of the body was considerably rose in comparison with the original data: as a 14.85 seconds - 56.09 seconds at the beginning of the pedagogical experiment and 70.94 seconds at the end of the experiment ($p < 0.05$).

As far as reduced functionality of the muscle side of the trunk was concerned, there was a significant difference between the control group and the main group number 1 was significant, ($p < 0.05$). In the main group (Fig 1.1) rate was estimated 48.67 seconds at the beginning of the pedagogical experiment and 71.18 seconds at the end of the rehabilitation course. The increase equals 22.5 seconds. In the control group, the figures were 49.4 sec and 57.5 sec, respectively.

In the main group number 2 increase strength endurance after increasing functionality of the trunk muscles was 14.1 seconds and with low functionality - 22.4%.

As a matter of fact, the static muscle endurance side of the body with the low power capabilities of 7 year-old children in the main group almost was identical to the performance of a stronger hand. A difference on 0.61 seconds. The significance of differences ($p \geq 0.05$).

In the control group number 2, static muscle endurance side indicators from the low power abilities was calculated 62.26 seconds at the beginning of the pedagogical experiment and 69.52 seconds at the end of the rehabilitation course. Indicators of static muscle endurance side of the body raised the power abilities; it was on a 69.65 seconds and 77.57 seconds respectively.

We made comparison between the difference of indicators of strength endurance on the right and the left half of the body and the original data: as a 7.29 seconds was at the beginning of the pedagogical experiment, and 7.92 seconds was at the end of the experiment, the differences were not statistically significant ($p > 0.05$). However, on the other hand, the main goal - the alignment of muscle tone, has not been achieved.

According to the findings, it is suggested that there are positive dynamics of power endurance of muscles in all groups.

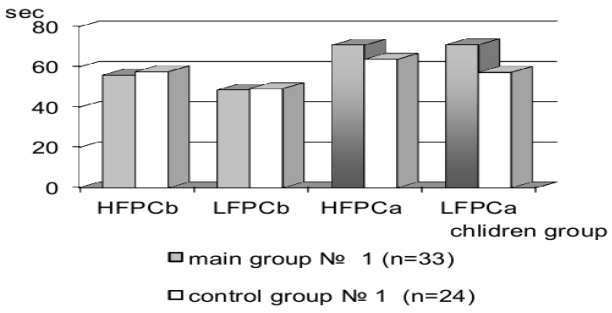

Fig. 1:

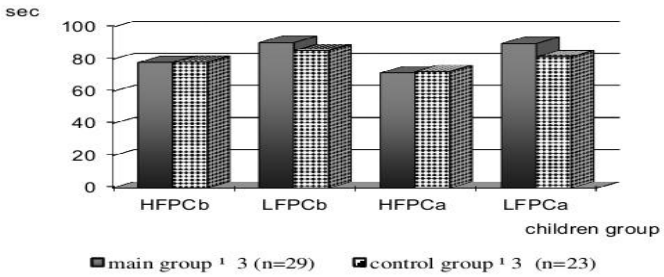

Fig. 2:

Discussion:

Analysis carried out before and after the pedagogical experiment indicated the power endurance of back muscles was dynamic during the period of the school year for children of age 7 and 8. In comparison with the results shown at the beginning of the pedagogical experiment (20.5 seconds - the second main group and 25.8 seconds - the third main group),a great increase was seen in strength endurance of the back muscles in the second and third test group showed. The differences were significant ((p> 0.05).

Original data was compared with 7.3 seconds in the second group and 8 seconds in the third, there showed to be significant differences (p> 0.05). Analyzing test results mathematically highlighted significant differences between the control and the main groups at the end of the pedagogical experiment (p> 0.05).

Testing endurance strength of the abdominal muscles, we came to patterns observed in second and third main group.in comparison with the impacts perceived in the second and third main group at the beginning of the pedagogical experiment, rates have gone up by 22 seconds - the second main group and 29.8 seconds - the third main group. Analyzing test results mathematically highlighted significant differences between the control and the main groups at the end of the pedagogical experiment (p> 0.05).

Conclusion:

According to above-mentioned statements, we can come to this conclusion that the physical rehabilitation program employed in elementary school age children with scoliosis 1st and 2nd degree caused scoliosis correction. Also there showed to be an increase in the static trunk muscle endurance important to use an effective exercise in view of the functional status during the course.

Future work:

In further work we are to develop physical rehabilitation programs for children with combined disabilities in motor system.

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