



REHABILITATION PROGRAM IN THORACOLUMBAL SCOLIOSIS - PRESENTATION OF A CLINICAL CASE

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ABSTRACT

Modern lifestyle and reduced motor activity are factors that trigger the onset of vertebrate deformities - poor posture and various deformities of the spine and chest.

Objectives. The main objective of this study is tracking the impact of the implementation of a rehabilitation program in a child with thoracolumbar scoliosis to overcome muscle imbalances, correcting posture, general strengthening and creating healthy muscle corset.

Methods. Object of the study was a 17 years old patient with right-sided thoracolumbar scoliosis. Rehabilitation was appointed after the diagnosis. Until that moment she has passed several courses of treatments, among them she has been recommended to attend swimming classes.

Results. In the treatment and the rehabilitation, a rehabilitation algorithm was applied in combination with swimming. After the control measurements and studies on MMT are found positive changes in muscle tone, and correcting the posture and gait.

Conclusions. Comprehensive rehabilitation is crucial in prevention and treatment of spinal deformities. The long experience in our country confirms undoubtedly that targeted physical exercises in the form of correctional gymnastics are the most important tool in the treatment.

Key words: spinal deformities, rehabilitation, correctional gymnastics, general strengthening, correcting posture, strong muscle corset.

INTRODUCTION

Physical development of children and adolescents is correlated with their physical regime and diet, their constitution, annealing, early detection, prevention, and treatment of acute and chronic diseases that accompany growth (1). Spinal deformities are among the most common diseases in childhood and adolescence. Deformities are to some extent caused by the urbanization, acceleration, and forced hypodynamia accompanying modern lifestyles. Rickets and bad posture remain only as a possible cause, which would faster manifest to a potential deformity (2, 3).

Lateral deformities of the spine are much more common than the front-rear. They are serious

medical and social problem, because they affect the young generation, have prolonged course and can lead to severe malformations affecting the overall development of the locomotory system of the child (4).

Early diagnosis, systematic observation and treatment contribute to the favorable outcome of the initial distortions in children. Essential are good organization of therapeutic and rehabilitation activities, accurate and timely guiding to conservative or surgical treatment, and systematic monitoring of treatment outcomes for preventing deformations of the spine and the following complications, leading to severe disability (4, 5).

Objectives: To track the effects of implementation of a comprehensive rehabilitation program in children with lateral spine deformities for a general strengthening, overcoming muscle

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imbalances, correcting posture and establishing a strong muscle corset.

MATERIALS AND METHODS

Object of the study was a patient of 17 years with right-sided thoracolumbar scoliosis. Rehabilitation was appointed after the diagnosis. Until that moment she has passed several courses of treatments, among them she has been recommended to attend swimming classes to strengthen muscles and prevent progression of deformity, and to perform the necessary exercises at home. In the last few months, she has not conducted the rehabilitation for some time, so subjective complaints appeared, and the deformation progressed. *For one month a course of treatment was conducted, including a comprehensive rehabilitation program in Kinesitherapy and Physical therapy, involving a total of 10 treatments, lasting 30 -40min. once a day during pre-graduate experience of students in their third year of specialty "Rehabilitation therapist".*

Methods of study. At the beginning and the end of the period a diagnosis of the spine was made - the patient was examined, the mobility of thoracic and lumbar region was measured, applied were tests of OTT, Tom Meyer, Shober, quadrangle of Mushkov, side inclinations of the body, measurements of the chest, and manual muscle testing of abdominal, back and seat muscles (2-4).

After the measurements and studies we have found:

- Asymmetry in shoulder contour with a higher right shoulder;
- The right scapula is convex;
- Increased is the lumbar lordosis;
- There is an asymmetry in the location of the sternum and bigger right protrude.
- There is a deformity of the chest with an increased front-rear diameter.
- There is a clear imbalance in muscle groups, however, abdominal and gluteal muscles are weaker.
- When standing still the patient compensates to some extent the distorting.
- When walking the weight is not evenly distributed at two feet.
- There is no signs of platypodia, and this was confirmed by a plantography .

There is a muscle imbalance, the muscles are shortened from the left concave side and stretched and weak on the right convex side.

There is a left side protrusion on the chest. When leaning forward with lowered hands, a slight rib asymmetry is expressed on the right. There are limitations of flexion in the thoracic department /Test of OTT/ and in side inclinations of the corpse, as well as the body overall flexion /test of Tom Meyer/. There is not an asymmetry of lower limbs and presence of platypodia. There is disturbed coordination. The posture and gait are relatively normal, because the patient has developed a habit of proper body posture.

A comprehensive rehabilitation program was composed and implemented, which includes special means of Kinesitherapy to improve strength of the abdominal, back and gluteal muscle in order to mobilize the spine and to stimulate the balance stability (6-8).

Rehabilitation program including rehabilitation algorithm

Rehabilitation algorithm:

- *Measurements of mobility of the cervical, thoracic and lumbar lobe of the spine and the chest mobility (6 -8).*
- *Kinesitherapy for improving posture and creating a healthy muscle corset:* applied are corrective exercises for posture and gait, breathing exercises - static and dynamic, diaphragmatic breathing, and breath holding in isometric exercises, exercises of extension and mobilization of the spine from occipital posture, isometric exercises to strengthen the gluteal, abdominal and back muscles, exercises for balance and coordination with big therapeutic ball /Fit-ball/ (9), stretching for shortened muscles; PIR for shortened muscles, m. semitendinosus, m.semimembranosus, m. biceps femoris, m.qadratus lumborum, m.trapezius , m.erector spinae, m.levator scapulae (10), exercises for muscular strength, exercises with equipment - dumbbells, elastic, wall bars, exercises for correct body posture and balance (6-8).
- *Physical therapy for stimulating trophic and improving muscle tone:* electro stimulation was applied on the right weak and flabby muscles to stimulate them. For the application of electro stimulation were used: DDT - RS - 1s 50Hz - 1s pause - 8 min. for a healthy neuromuscular system - 10 treatments (6).
- *Sports elements* - swimming (alternating with Kinesitherapy on different days) (2, 3).

Methodical instructions: Specific exercises are given for the spine with eliminated gravity—lying on the back, lying on the stomach and knee posture. In order not to deepen lordosis during KT procedure the position is lying on the back with bent legs. The exercises are performed slowly and correctly as a very important condition is that breathing exercises accompany others, as breathing improves not only respiratory function, but also has a favorable affect on the spine (2-4).

RESULTS AND DISCUSSIONS

In the treatment and the rehabilitation, a rehabilitation algorithm was applied in

combination with swimming. After the control measurements and studies by manual muscle testing (MMT) there were positive changes in muscle tone of weak abdominal muscles, which were improved as compared to the examination before the procedures (**Table 1**). This was achieved through isometric exercises for abdominal muscles alternating with diaphragmatic breathing against resistance. The survey results are evidence of the good effect of Kinesitherapy to improve muscle strength of weak muscles and create a strong muscle corset.

Table 1. MMT – Flexion and extension of the body

Test movements	Beginning 23/03/2012	End 12/04/2012
Flexion of the body	Assessment 4	Assessment 5
Extension of the body	Assessment 3	Assessment 4
Rotation of the body	Assessment 3	Assessment 4

Improved was the mobility of the chest (**Table 2**), and lung function through dynamic breathing exercises from different starting

positions against resistance, through exercises to mobilize the spine, and through exercises against resistance for the upper limbs.

Table 2. Chest measurement

Chest measurement	Beginning 23/03/2012	End 12/04/2012
Hirz - 1	74 – 78 – 72cm	74 – 79 -72cm
Hirz - 2	78 – 81-77cm	78 – 83 – 76cm
Hirz - 3	58 – 62 – 56cm	58 – 64 – 55cm

There was a good impact on the patient due to well-conducted Kinesitherapeutic program. Along with exercises to improve the strength of back, gluteal and abdominal muscles, the spine was stretched and mobilized, and PIR and stretching were applied for shortened muscles. The effect of the impact was shown in the final survey results (**Table 3**), where flexion was increased in the thoracic lobe (test of OTT), complete flexion of the body (test of Tom Meyer), side inclinations and mobility in the cervical lobe. Coordination of the movements also has been improved.

As a result of the complex rehabilitation we achieved a correction of posture and gait, significantly improvement of the functional condition of the entire musculoskeletal system, chest and spine. It is recommended wearing a soft correctional corset and implementation of complex physical therapy at home by including gymnastic exercises from different starting

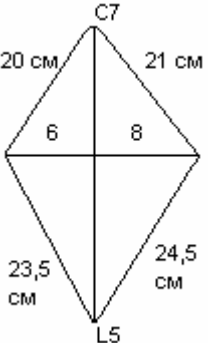
positions using weights, springs and elastics. Prohibited are the hard physical work, lifting and carrying heavy weights, jumping and long walks. It is necessary to conduct courses in Kinesitherapy and Physical therapy at least twice a year.

CONCLUSIONS

Prolonged and early rehabilitation in children with spinal deformities is a major factor in the overall strengthening and promoting proper development of the entire organism. This leads to overcoming the problems of the spine, improving lung function, chest, and creating strong muscle corset.

The combination of comprehensive rehabilitation with swimming further increased the chances of success on overcoming the muscle imbalance, on total body strengthening, and promotion of psycho-emotional tone.

Table 3. Diagnostic tests for the spine

	Beginning 23/03/2012	End 12/04/2012
Test of OTT	1,5cm	2,5m
Test of Shober	5cm	5cm
Test of Tom Meyer	15cm- fingers-floor	11cm- fingers-floor
Test of Forestie	4cm- back-wall	4cm- back-wall
Side inclinations on the right	44cm	34cm
Side inclinations on the left	45cm	35cm
Quadrangle of Mushkov 		

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