

ATTENUATING SCOLIOSIS BY ADAPTING JUDO-SPECIFIC MEANS

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Abstract: *The study aims at assessing the extenuative anthropometric and functional improvements of scoliosis in children as a result of a kinetherapeutical program with exercises adapted from judo. The study included 18 aged 10-14 years, diagnosed with levoconvex thoraco-lumbar scoliosis. The kinetherapeutical program adapted from judo was applied for 3 months. The results of the study highlight significant differences in the anthropometric and somatic parameters contributing to improving the spine condition. The efficiency of kinetherapeutical programs depends on the early start of treatment and the effectiveness of specific physical exercise programs.*

Key words: *scoliosis, judo, adapted physical exercise, kinotherapy, kinetoprophylaxis.*

1. Introduction

Judo, by its specific techniques and exercises, may be adapted to contribute in a kinetherapeutic and prophylactic manner to the correction of spinal curvatures, by toning the muscles at the back of the body. The general objectives of the kinetherapeutic treatment are: recovering muscle strength and at the same time developing muscle resistance, recovering, increasing and adapting effort capacity, improving the coordinative function, as well as the body's control and balance, educating the relaxing abilities, correcting corporal alignment and body posture, improving joint mobility, educating breath and sensitivity [13].

Scoliosis is a temporary deformation of the spine, characterized by one or more lateral curvatures (frontal plane) and vertebral rotation with general progressive evolution, leading to morphological and functional disorders, and the convexity names the scoliosis direction, vertebral rotation being towards the spine concavity [5], [9, p. 193], [15, p. 163].

The kinetherapeutic and prophylactic objectives in treating scoliosis refer to: improving posture, posture self-control, increasing spinal flexibility, increasing muscle strength, improving the parameters of the thoracic cage and vital capacity, etc. [4], [8], [12], [14]. The gradual worsening of scoliosis is

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associated to relevant changes of the thoracic cage, which disturbs the dynamic function, and hence the destabilizing the function of the cardio-vascular and respiratory apparatus. [16]. Slight physical deficiencies require the use of corrective physical exercise, while medium and severe deficiencies require the use of kinetotherapeutic programs together with certain orthopedic and surgical methods [7, p. 21-29]. Rehabilitating spinal deficiencies through physical exercise adapted from gymnastics and other sports performed in various environments, by means of present-day materials and technologies, begun as early as possible, may have an impact on the children's bio psychomotor potential [1,2], [6], [11].

Improving and correcting spinal deficiencies contribute to optimizing the patient's life and the subject's motor and functional potential [3], [10].

2. Objectives

The purpose of the study is to improve the anthropometric and functional parameters in view to ameliorate scoliosis in children, by specific means adapted from judo. Another important purpose is to select the judo-specific means in order to use them in a kinetotherapeutic and kinetoprophylactic manner.

3. Material and Method

The study was carried out in the Children's Hospital in Galati, on a number of 18 patients diagnosed with levoconvex thoracolumbar degree I, the curvature

being up to 30° associated with a very small rotation of vertebral bodies, that were treated for 1 year. In the studied lot there were 10 female patients and 8 male patients, aged 11-14 years.

The study was carried out within December 2016 – May 2017, including an initial test at the beginning of December 2016 and a final test at the end of May 2017. Between the two tests we applied a kinetotherapeutic program made up of adapted exercises from judo. It took place 3 times a week all through the study and consisted of 30-40-minute of sessions.

The anthropometric and functional parameters analyzed were as follows: the distance between the ischiatic tuberosity and the ground (cm), the subject's weight (kg), the vital capacity (cm³), the thoracic circumference during rest/inhale/exhale (cm).

The statistic processing was performed in SPSS 24, including the following indicators: eam, standard deviation (SD), Student-t pair test, and the relevant significance threshold for the study was considered $p \leq 0.05$.

4. Results

Tables 1 and 2 include the descriptive analysis of individual results put together at the end of the study.

The results in Table 1 show major individual differences between the initial and final test, as a result of applying the kinetotherapeutic program with means adapted from judo. All the necessary parameters were improved, hence the improvement of scoliosis.

Descriptive statistics of results of the study subjects

Table 1

No	Distance between ischiatic tuberosity and ground(cm)				G (kg)		CV (cm ³)		PT rest (cm)		PT inhale (cm)		PT Rest (cm)	
	IT (r)	FT (r)	IT (l)	FT (l)	IT	FT	IT	FT	IT	FT	IT	FT	IT	FT
1	87.2	87.5	86.8	86	42	42	2400	2300	81.5	80.5	86	87	79	78
2	81	82	80.5	80.7	40	41	2350	2400	81	81.5	84.5	85.5	79	80
3	88	88.5	87.3	87.8	51	52	2350	2450	85	86.5	91	92	80.5	80
4	80.5	81.5	80.2	80.4	53	52	2550	2570	74	75	81.5	82.5	69	68
5	87	87.5	87.5	88	43	44	2500	2550	76	75	82.5	82	69	70
6	82	83	82.5	83	50	50	2450	2500	78.5	78	83	83	74.5	74
7	80	81	80.5	81	41	42	2350	2400	63	63.5	68	89	60	61
8	86.5	87	87	87.5	51	52	2300	2350	75.5	76	79	78	72.5	71
9	87.2	87.2	86.8	86	42	42	2400	2300	81.5	80.5	86	87	79	78
10	81	81	80.5	80.7	40	41	2350	2400	81	81.5	84.5	85.5	79	80
11	88	88	87.3	87.8	51	52	2350	2450	85	86.5	91	92	80.5	80
12	80.5	81.5	80.2	80.4	53	52	2550	2570	74	75	81.5	82.5	69	68
13	81.5	82	80.2	80.4	53	52	2550	2570	74	75	81.5	82.5	69	68
14	87	87.5	87.5	-	43	44	2600	2650	76	75	82.5	82	69	70
15	82	83.5	82.5	83	50	50	2450	2500	78.5	78	83	83	74.5	74
16	80	81	80.5	-	41	42	2350	2400	63	63.5	68	89	60	61
17	86.5	87	87	87.5	51	52	2300	2350	75.5	76	79	78	72.5	71
18	87.2	87.2	86.8	86	42	42	2400	2300	81.5	80.5	86	87	79	78

G – weight; CV – vital capacity; CT – thoracic circumference

Statistical analysis of results

Table 2

	Tests	Mean	SD	Mean	SD	t	p
Distance between ischiatic tuberosity and ground (cm) – right	IT	84.06	3.27	-60	.44	-5.72	.000
	TF	84.66	2.99				
Distance between ischiatic tuberosity and ground (cm) – left	IT	83.97	3.29	-.33	.49	-2.92	.009
	TF	84.31	3.30				
Weight (kg)	IT	46.50	5.21	-.38	.77	-2.12	.049
	TF	46.88	4.89				
Vital capacity (cm ³)	IT	2419.44	94.15	39.44	59.71	-2.80	.012
	TF	2458.88	100.52				
Thoracic perimeter rest (cm)	IT	76.91	6.18	-.50	.74	-2.83	.011
	TF	77.41	6.28				
Thoracic perimeter inhale (cm)	IT	84.25	3.45	-.97	.83	-4.96	.000
	TF	85.22	3.72				
Thoracic perimeter exhale (cm)	IT	72.94	6.39	-1.27	2.42	-2.23	.039
	TF	74.22	6.28				

SD – standard deviation, t - value of Student t test, p – probability level.

In Table 2, the values of the distance between the ischiatic tuberosity and ground grew on the right by 0.6 cm, and on the left by 0.49 cm, the differences between tests being statistically significant, for $p \leq .05$. they increased, meaning scoliosis improved. The value of the vital capacity measured when the experiment first started was normal in all patients, and during the experiment it was optimized in all subjects. Upon the examination of the patients one may notice an increase of the vital capacity due to diminishing the curvature degree in the thoracic area, and increasing the thoracic cage elasticity, which lead to the conclusion that the kinetherapeutic program was effective and accurately applied. The values of thoracic capacity improved significantly from the initial to the final test, $p \leq .05$, by 0.50 cm during rest, by 0.972 cm in the inhale stage, and the most relevant increase was in the exhale stage, by 1.22, favoring the improvement of scoliosis (Table 2).

5. Conclusions

A physical deficiency in the frontal plane, undetected and thus left untreated or neglected, may turn into a serious acute health issue with negative influences on the trunk and upper and lower limbs, as well as on the smooth running of internal organs.

The results of the recovery program largely depend on the patient age, and the earlier it starts, the bigger the recovery chances and the better the results obtained. The present research

found that frontal physical deficiencies are more common in teenagers than in children due to the following causes: lack of exercise, the parents neglecting the posture of their children, deficient posture when sitting at school, in front of the TV or the computer, lack of timely observation of deviations from the normal posture.

Adapting exercises and techniques specific to various sports may constitute efficient means within the kinetherapeutic programs aimed at correcting physical deficiencies. These adapted programs provide variety and attractiveness due to the diverse possibilities of combining exercises. Judo is an efficient alternative in putting together kinetherapy-adapted programs in view of spinal recovery.

Scoliosis prophylaxis should aim at developing and toning the abdominal muscles, the back muscles and the lower limb muscles. Practising systematically a physical exercise program accurately executed and at an early age, leads to improving physical deficiencies in particular, and the health and quality of life in general.

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