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Quality of Life in Adolescent's Idiopathic Scoliosis before and after Physical Therapy: A Preliminary Study

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Abstract

Adolescent Idiopathic Scoliosis (AIS) accounts for 80% of all types of diagnosed scoliosis, occurring in 2%-3% of growing age population. This disorder is quite complicated and physical therapy is important factor in the treatment. The aim of this study is to evaluate the efficacy of physical therapy in quality of life in adolescent idiopathic scoliosis. This research was conducted in 56 consecutive adolescent idiopathic scoliosis patients (32 females and 24 males), aged 10-17 years, Cobb angle 10°-45°, at Physical and Rehabilitation Medicine Clinic, University Clinical Center of Kosovo (UCCK), Prishtina, Kosovo, during the period 2016-2017. The physical therapy protocol, including combined Schroth and Pilates exercise were performed during 3 months. The evaluation of Quality of Life (QoL) is done by SRS-22r questionnaire at the beginning and the end of the treatment. Results displayed that supervised combined Schroth and Pilates exercises have provided benefit to the standard of care by improving QoL before and after physical therapy in all components: the mean for function has improved from 3.15 to 3.45, pain from 3.23 to 5.54, self-image from 3.36 to 5.46, mental health from 3.01 to 3.35, and in overall QoL was improved from 3.30 to 3.68. Quality of life was significantly better after physical therapy ($p < 0.05$). The study shows that physical therapy in scoliosis patients achieves good results in daily living life.

Key words: *idiopathic scoliosis, quality of life, physical therapy*

Introduction

Scoliosis is a complex deformity of the spine that develops in three dimensions and results in the appearance of frontal curves, fixed vertebral rotations, and a flattening of the sagittal physiological curves. Scoliosis can progress during growth and usually it occurs most often between 10 years of age to the end of growth, it is called adolescent idiopathic scoliosis (AIS) and is the most common diagnosis which cause a surface deformity, it is usually not symptomatic (Park, & Bae, 2014; Romano et al., 2012). The causes of scoliosis are unknown (Romano et al., 2012; Romano et al., 2013; Janicki, & Alman, 2007; Choi et al., 2013; Konieczny, Senyurt, & Krauspe, 2013; Asher, & Burton, 2006). Problems that causes scoliosis include an increasing cosmetic deformity, disability, pain, functional

limitations, if deformation is expressed can cause sometimes pulmonary problems and possible progression during adulthood (Romano, et al., 2012; Weinstein et al., 2003). Adolescent idiopathic scoliosis does not typically cause any health problems during growth, however the resulting surface deformity frequently has a negative impact on adolescents that can give rise to QoL issues and in the worst cases, psychological disturbances (Romano, et al., 2012; Reichel, & Schanz, 2003). Some patients who suffer from scoliosis apart from physical, physiological problems they also may have psychological problems and encounter obstacles in everyday activities. There is a lack of evidence about health-related QoL in patients with idiopathic scoliosis before and after rehabilitation (Tones, Moss, & Polly, 2006). In their study Freidel with collaborators (2002)



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have concluded that the juvenile patients with idiopathic scoliosis were concerned with their QoL and server depression, whereas the adult patients have reported more psychological problems. According to this research it is reported that the QoL of the patients suffering from idiopathic scoliosis may be poor, and also that the psychological state must be treated in these patients (Freidel et al., 2002).

The aim of this study is to evaluate the efficacy of physical therapy inQoL in adolescent patients with AIS.

Methods

The research was performed on consecutive patients which are diagnosed with idiopathic scoliosis, during their outpatient visit in the Physical and Rehabilitation Medicine Clinic, UCCK, Prishtina, Kosovo, during the period 2016-2017. The study was prospective and 56 adolescent patients with idiopathic scoliosis were included in the study, 10-17 year old, both gander, which had the Cobb - angle between 10° and 45°. Exclusion criteria were patients who had Cobb's angle over 45°, having contraindications to exercise, accompanying mental problems, neuromuscular, neurological problems, congenital malformation or trauma related co morbidity, patient who had non-idiopathic scoliosis and previous spinal surgery. We have informed the parents for implementation of rehabilitation program for idiopathic scoliosis in their children, who came for a treatment. Except parents, each participant was given explanation about the purpose of the research and the exercise methods, and their parents voluntarily have signed inform consent before participated in the research. The study was approved by Ethical Committee of UCCK. Determination of diagnoses and determination of Cobb's level was conducted by orthopedist while the evaluation of QoL was determined by physiatrist and physical therapist.

Rehabilitation Program

The physical therapy regime included 1-hour combined Schroth and Pilates exercises which was performed during 3 months. Exercises were performed by one session in duration of 60 minutes daily for five days per week. Also, we have recommended to them a home exercise program, which consist of 30 minute sessions seven days per week.

Assessment

We have evaluated the QoL of all patients included in the study using a questioner test for QoL (SRS-22r questioner). The SRS-22r questioner is a QoL scoliosis questionnaires' that assesses five domains: function, pain, self-image and mental health (5 questions for each), satisfaction with treatment (2 questions). The number of possible answers for each question was standardized in 5. Points vary from 1 to 5, where 5 is best and 1 is worst. Maximal points for 5 questions are 25 while minimal 5. While in relation to two questions that has to do with satisfaction about treatment, total points were 10 (Kotwicki et al., 2013; Asher, Lai, Burton, & Manna, 2004; Schreiber et al., 2015). The patients have fulfilled the questionnaire with our help, pre-treatment and after 3 months of treatment.

Statistical analysis

The statistical analysis was performed using Statistical Package for the Social Science (SPSS). The presentation of results was carried out through the tables and figure. The following statistical parameters were included: index of the structure, arithmetic average, standard deviation, minimal and maximal value. T-test was used for the parametric data. A p<0.05 was considered significant.

Results

Table 1 shows the demographic data of the patients which were included in the study. From 56 patients, 32% or 57.1% of them were female and 24% or 42.9% were male. The patients included in this study were adolescents from 10 to 17 years old, the mean age was 13.4 years old. The mean Cobb angle in thorac/lumb was 17.7°, in thoracic was 17.9°, while in lumbar was 16.2°. Forty cases or 71.4% of them had scoliosis in the thoracic/lumbar region, 12 cases or 21.4% had scoliosis in the thoracic region, where 4 cases or 7.1% had scoliosis in the lumbar region. In 23 cases or 41.1% of them, the orientation of the scoliosis curve was left, in 15 cases or 26.8% was right, while in 18 cases or 32.1% the orientation of the curve was S in both sides. 37 patients or 66.1% of them were treated with only physical therapy while 19 cases or 33.9%, except physical therapy treatment they also were treated with brace.

Table 1. General characteristics of patients (N=56)

Patients	Frequency	%
Female	32	57.1
Male	24	42.9
Mean Age	13.14±2.03	
Mean Cobb angel -Th/L	17.7±6.6	
Mean Cobb angel -Cobb/Th	17.97±7.5	
Mean Cobb angel- Cobb/L	16.22±7.42	
Thoracic	12	21.4
Lumbar	4	7.1
Thoraco/Lum	40	71.4
Right	15	26.8
Left	23	41.1
S (double)	18	32.1
Without Breace	37	66.1
WithBreace	19	33.9

Table 2 and Figure 1 shows the results of SRS 22r variables as well as a total score, before and after physical therapy showing significant improvement in all components.

Table 2. Quality of life according SRS-22r patients questionnaire pre-treatment and after 3 month of treatment

	Initial		Final		%	R	T	Sig
	Mean	Std.Dev.	Mean	Std.Dev.				
Function	3.15	0.55	3.45	0.41	9.52	0.37	-4.05	.000
Pain	3.23	0.81	5.54	13.00	71.52	0.58	-3.58	.002
Self image	3.36	0.62	5.46	13.01	62.50	0.29	-2.30	.035
Mental health++	3.01	0.38	3.35	0.43	11.30	0.55	-6.48	.000
Sub Total	3.19	0.45	3.56	0.30	11.60	0.53	-7.17	.000
Satisfaction/Dissatisfaction	4.36	0.86	4.71	0.43	8.03	0.53	-3.59	.001
QoL total	3.30	0.47	3.68	0.27	11.52	0.57	-7.44	.000

The Mean for function has improved from 3.15 to 3.45 (t=4.05, sig=.000), pain from 3.23 to 5.54 (t=3.58, sig=.002), self image from 3.36 to 5.46 (t=2.30, sig=.035) mental health++ from 3.01 to 3.35 (t=6.48, sig=.000), subtotal SRS-22r from 3.19 to 3.56 (t=7.17, sig=.000), satisfaction/dissatisfaction from 4.36 to 4.71 (t=3.59, sig=.001) and in overall QoL from 3.30 to 3.68, (t=7.44, sig=.000).

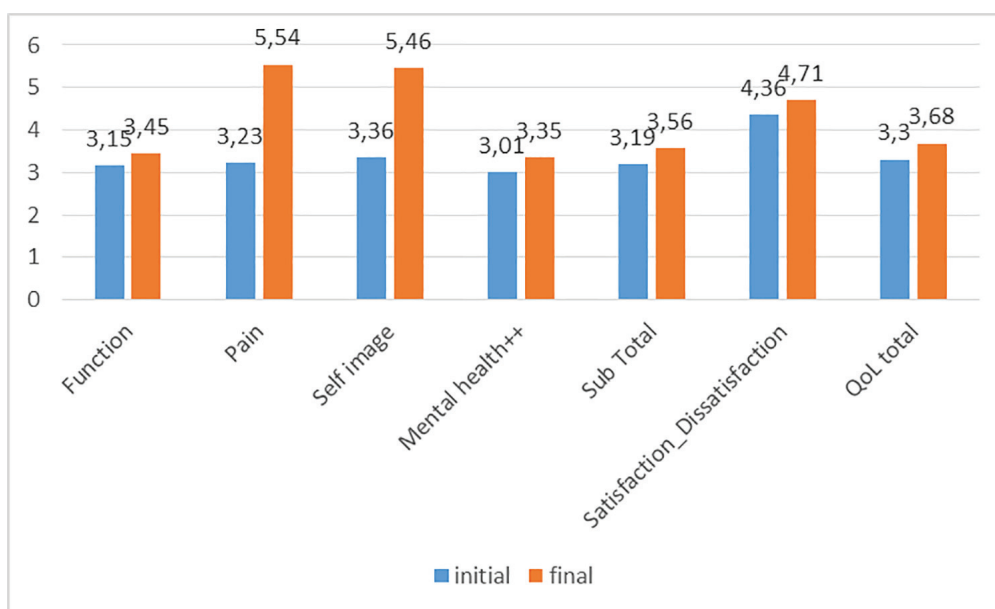


Figure 1. Changes in Quality of Life according SRS-22r patients questionnaire pre-treatment and after 3 month of treatment

Discussion

The real idiopathic scoliosis causes deformity of the spine column and as a consequence of this deformity physical and psychological problems can be caused in patients, then these problems can have negative impact in QoL (Freidel et al., 2002; Çolak et al., 2017). Some studies report that conservative treatment – application of different protocols of exercises has no impact on improvement of QoL, while some of them report that have positive effect in improvement of QoL in patients with idiopathic scoliosis. Vasiliadis and Grivas (2008) have reported that health-related quality of life (HRQoL) was negatively affected after conservative treatment of the patients with AIS. Kuru et al. (2015), in their study have evaluated QoL in patients with scoliosis before and after the treatment, using SRS-23 instrument, and they have reported that there was no significant difference between the groups of patients with scoliosis. In our study we evaluated the QoL by using the SRS-22r questionnaire pre-treatment and after 3 month of treatment, we have improvement in the mean function, pain, self image,

mental health++, subtotal, satisfaction/dissatisfaction and in overall QoL from 3.30 to 3.68 (t=7.44, sig=.000). The results of our study have similarity with the results of some studies which have reported that application of different methods of conservative treatment, especially application of Schroth method has positive impact in QoL in patients with scoliosis, for example: Schreiber et al. (2015), in their study had an intention to determine the effect of combined exercises Schroth with standard care in QoL and back muscle endurance (BME), comparing to only standard care in patients with AIS. They have confirmed that the group of patients that was treated with Schroth exercises had improvement in self-image for 0.13, and in QoL in general, while the control group didn't have an improvement, on contrary there was worsening of the self-image for 0.17. Also they reported about the difference in SRS-22r pain score between the groups, in Schroth group the pain was improved with increase of 65.3%, while in control group there was decrease for 20.0%. Schroth group had improvement also in other variables of SRS-22r: pain=18.4%, function=28.6%,

with decrease of SRS-22r total in 0.08 ($p=0.047$), also there was improvement in the results of SAQ instrument (Schreiber et al., 2015). Kwan, Cheng, Koh, Chiu and Cheung (2017) also reported that application of Schroth method showed significant improvement in function and in total score, while in other domains they reported that there was significant difference in experimental group, while in control group they didn't find significant improvement in none of SRS-22 domains. For evaluation of the QoL, these authors used SRS-22 instrument.

Physiotherapy, different regimens, has been shown to have favourable outcomes in scoliosis patients, in many studies in international literature, and generally we can consider that Schroth and Pilates exercises, are well received by patients with scoliosis and instead of showing good results in improving Cobb angle, they also prevent the development of deformity, increase the flexibility of trunk, muscular strength and fixing the posture, by reducing the spinal deformities, and it also may improve the QoL.

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Conflict of Interest

The authors declare that there are no conflict of interest.

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