



# The Relationship between Scoliosis Surgery and Quality of Life

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## **Authors' contributions**

*This work was carried out in collaboration between both authors. Both authors read and approved the final manuscript.*

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## **ABSTRACT**

Scoliosis is known as "curvature of the spine" and early diagnosis is very important. It can provide a great advantage to individuals when appropriate treatment or surgery. Today, the surgical treatment of scoliosis curvatures is very successful and an aesthetic and beautiful appearance is formed after the operation. In addition to the aesthetically beautiful appearance, the pain of individuals decreases, and their quality of life increases. This study was conducted to reveal how the quality of life of patients who had scoliosis surgery changed. The population of the study consisted of 121 patients who underwent scoliosis surgery in a private hospital in Istanbul between September 2009 and October 2010. The ages of these patients were 8 and over and 99 patients participated in the study. Data were collected with two tools, namely the information form and the Scoliosis Research Society-22 (SRS-22) scale. The independent variables of the study were demographic and disease characteristics of the cases; The dependent variable was quality of life scores. Information form and scale were applied at least 3 months after scoliosis surgery. The data were evaluated by percentage distributions, t-tests, and ANOVA analysis in a computer environment. A total of 99 patients participated in the study. Of these, 78 people were 78.8% women, and 21 people were 21.2% men. Their ages were between 8 and 20 years old. 62 people, mostly between the ages of 14-19, were 62.2%. 7 people aged at least 20 years and older were 7.1%. Mean SRS-22 and its sub-dimensions, Pain mean  $21.84 \pm 2.81$ , General Appearance Evaluation mean  $17.66 \pm 4.69$ , Spinal Function means  $20.25 \pm 3.64$ , Mental health mean  $19.46 \pm 2$  The mean treatment satisfaction was found to be  $9.26 \pm 1.01$ , and the mean of the SRS-22 scale was  $88.47 \pm 10.68$ . When male and female patients were compared according to the general total mean score, the mean score of the

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female patients was found to be significantly higher than the mean score of the male patients. There was no difference between the groups in terms of age, education level, number of siblings, consanguineous marriage, place of residence, family type, chronic illness, and sports. The mental health sub-dimension scores of SSK patients were found to be statistically significantly higher than those of bonding and paid patients. Except for the satisfaction with the treatment sub-dimension, it was determined that the mean score of the patients with free movement was significantly higher than the mean score of the patients with partially restricted movement. The mean score of patients with scoliosis in relatives was found to be statistically significantly lower in terms of pain and spinal functions, compared to the mean score of patients whose relatives did not have scoliosis.

*Keywords: Scoliosis; quality of life; patient; surgery; SRS-22 scale.*

## 1. INTRODUCTION

Scoliosis is known as "curvature of the spine". Scoliosis provides a great advantage when diagnosed and treated or operated on early [1]. Generally, scoliosis is diagnosed during growth periods, and if it is not treated, it negatively affects the life of the individual [2]. Scoliosis is a common disorder that affects every aspect of patients' lives [3]. The most common type is Adolescent idiopathic scoliosis, which occurs in adolescence as a three-dimensional deformation of the spine and trunk [4-6]. It occurs in approximately 1-3% of all adolescents and approximately 80% of them are girls [7].

Scoliosis was first described by Hippocrates and was used by Galen in the definition of scoliosis spine curvature. Scoliosis is the name given to vertebral shape deformities of the column. It causes more than 10° lateral curvature and rotation disorder in the transverse plane frontally, while it causes anatomical curvatures, kyphosis and lordosis, and distortion in the direction of straightening sagittally [8]. Scoliosis is a serious structural disorder that is seen with rotation and lateral curvature of the spine and causes anatomical malformation in the thoracic cage over time.

Scoliosis is seen in 4% of society and is 4 times more common in women than men. If left untreated, it can cause pulmonary hypertension, right heart, and respiratory failure in the fourth or fifth decade of life [9]. In addition, patients may experience decreased quality of life, disability, pain, increased cosmetic deformity, functional limitations, neurological deficits, cardio-pulmonary problems, and possible progression in adulthood [10].

Scoliosis is diagnosed idiopathic in 70% of structural deformities affecting the spine in children and young individuals. Although

idiopathic scoliosis (of unknown cause) is more common, approximately 20-25% of patients develop scoliosis due to a specific cause [11]; [12]. Factors causing this; genetic factors, connective tissue abnormalities, environmental factors, and central and peripheral nervous system development disorders [13,14]. The main aim of the treatment of scoliosis is to correct the spinal deformity with early diagnosis, to prevent the progression of the curvature, to reduce the pain, and to improve the patient's quality of life. Scoliosis treatment planning; is determined according to the age, gender, maturation of the individual, degree, direction, type of curvature, and the risk of progression of scoliosis. Treatment options to prevent its progression are exercise, brace treatment, and surgery [15]. One of the most important goals of scoliosis surgery is to improve physical appearance and prevent future deformities. Therefore, patients and their families are willing to undergo scoliosis surgery.

When scoliosis diseases are not treated, people's quality of life decreases, pain, deterioration in general appearance, limitations in spinal movements, and deterioration in mental health are observed, and patients become unhappy and restless against life. Although there are different questionnaires evaluating the quality of life in scoliosis patients, the most frequently used questionnaire today is the SRS-22 questionnaire [16] [17] ; [18] ; (Feise et al., 2005); (Merola,2002); (Merola et al., 2002); (Zao et al., 2007); [19]. The validity and reliability of this questionnaire have been proven in several studies [20] ; [21]; [22] ; [19]; [23] ; [24]. This survey is applied in almost all countries of the world. The reliability and validity of the Turkish version were proven by translating the SRS-22 questionnaire into Turkish by Alanay et al. [25].

In this thesis study, the postoperative quality of life of 99 patients was examined through the Scoliosis Research Society-22 scale (SRS-22)

and the information form prepared by the author to determine the quality of life of patients who had scoliosis surgery. The first part of the study includes a detailed literature study, the second part includes methodology, and the third part includes findings, discussion, conclusions, and suggestions.

## 2. LITERATURE REVIEW

### 2.1 The Relationship between Scoliosis Surgery and Quality of Life

Scoliosis is a three-dimensional structural deformity of the spine [26]. Scoliosis treatments aim to eliminate cosmetic problems caused by three-dimensional deformity [27]. Treatment options for scoliosis vary according to the size and location of the patient's curvature, remaining growth potential, and response to conservative treatment [28]. While external traction devices and iron corsets were used in the treatment of scoliosis in the past, the first surgical approach was made by Jules Guerin in the form of myotomies [29]. The most important development in surgical treatment was the use of distraction rods for spinal curvatures due to poliomyelitis sequelae in 1955. Although there have been significant developments in surgical methods following this application, it is still aimed to correct the curvature of the spine by applying instrumentation at multiple levels and using metal rods (Gurkan et al., 2013). Surgery is recommended for patients with a thoracic Cobb angle greater than 40°, who have not reached skeletal maturity, or whose curvature continues to progress [30]. Organic disorders affecting the body structure affect the self-image of patients. Body deformities seen in scoliosis affect the image of the individual negatively, causing depression, stress, a decrease in self-esteem, and a decrease in social confidence [19].

Patients with scoliosis surgery experience hospitalization, side effects, post-operative appearance, the emotional effect of the surgery, difficulty in daily activities, impact on school life, peer relationships, and worries about the future (employment, future discomforts, and problems) [31,32,33]. It has been shown that the decrease in quality of life after fusion surgery in scoliosis surgeries is due to the decrease in participation in physical activities and limitation in social activities after surgery [34]. It has been shown that selective thoracic fusion can positively affect the quality of life of patients by improving their

ability to perform their daily activities, and besides the improvement in curvatures, their quality of life is similar to the normal population after many years [35].

Good nursing care is necessary to prevent post-op complications and increase the quality of life in patients. Nurses should evaluate their patients as a physical and mental whole, and plan and implement the nursing care process. In inpatient education publications, the education of the patient's family is also important [36]. During the hospital stay of the patients; It is important to follow up with nursing diagnoses such as anxiety, fear, deterioration in individual identity, and deterioration in social interaction and to receive psychiatric counseling. It covers many applications such as informing the patient and their families about possible situations, providing a calm and safe environment, responding to the needs of the patient, and preparing the patient/family for surgery. Nursing skills; pharmacological treatment, medical technical equipment, and psychological preparation are necessary [7]. In the study on scoliosis, it was stated that the surgical treatment, intra-operative follow-up, and post-operative care procedures applied by experienced personnel positively affect the quality of life of scoliosis patients [37].

## 3. MATERIALS AND METHODS

This cross-sectional study was conducted to determine the impact on the quality of life of patients who had scoliosis surgery. The study was planned to be performed on a total of 121 patients who underwent scoliosis surgery in a private/foundation hospital in Istanbul, Turkey, between September 2009 and October 2010. Sample selection was not made in the study and all cases were taken as a population sample. However, since 22 of them lacked information and did not follow up for at least 3 months, the research continued with 99 people. The collected data were collected with two tools: the information form containing the demographic information of the patients and the Scoliosis Research Society-22 scale (SRS-22). After the information form was prepared, written permission was obtained from the institution. The information form and scale were applied by interviewing each patient face-to-face. Independent variables were evaluated with their frequency distributions. The dependent variable was evaluated with arithmetic mean and standard deviation, minimum and maximum values. In addition, a t-test was used to compare two groups on the SRS-22 scale, and ANOVA

analysis was used to compare more than two groups. The Pearson correlation coefficient was calculated to determine the direction and level of the relationship between the variables.  $P < 0.05$  was accepted as the level of significance in the evaluations.

### 3.1 Information Form

An information form consisting of questions showing the demographic characteristics of the patients was prepared by the researcher. These questions are; age, gender, height, family type, number of siblings, family type, first-level consanguineous marriage, place of residence, education level, health insurance type, activity level, whether there was scoliosis in first-degree relatives, whether they had been hospitalized for scoliosis before whether he has been treated with scoliosis before, whether he has a chronic disease, whether he does sports or not.

### 3.2 Scoliosis Research Society-22 / Scoliosis Research Society-22 Scale (SRS-22)

It is a widely accepted scale developed by the association to evaluate the health-related quality of life of scoliosis patients in the USA (Leelapattana et al., 2011). The reliability and validity of the Turkish version of the scale were

performed by Alanay et al. in 2005 [25]. Scores are calculated by assigning an answer value to all 22 questions within a 5-point indicator chart. Each statement has responses ranging from negative to positive. negative answer; It receives 1 point and 5 points if it is positive. Scores from each sub-dimension; 0-25 for pain, evaluation of general appearance, spine functions, and mental health; It ranges from 0-10 total scores for satisfaction with the treatment. High scores on the scale indicate an increase in quality of life, and low scores indicate a decrease. Sub-dimension questions are; Pain (questions numbered 1.2.8.11.17), Evaluating its general appearance (questions no. 4.6.10.14.19), Spine functions (questions no. 5.9.12.15.18), Mental health (questions no. 3.7.13.16.20), Satisfaction with the treatment (questions no. 21,22) [25].

## 4. RESULTS

As seen in Table 1, Cronbach's  $\alpha$  value was used to examine SRS-22 and its sub-dimensions and reliability. The Cronbach  $\alpha$  value was developed by Cronbach Alpha [38]. A value of 0.60-0.80 indicates medium reliability, and a value of 0.80-1.00 indicates high reliability [39]. In this study, SRS-22 and its sub-dimensions values are quite good and agree with each other when compared to Alanay [25].

**Table 1. SRS-22 Sub-Dimensions Scale Reliability and Comparison with Alanay et al., [25]**

SRS-22 Sub Dimension	Alanay et al., [25]		Thesis	
	Cronbach $\alpha$	n	Cronbach $\alpha$	n
Pain	0,72	5	0,59	5
Overview Evaluation	0,81	5	0,81	5
Spine Functions	0,48	5	0,63	5
Mental Health	0,72	5	0,81	5
Satisfaction With The Treatment	0,83	2	0,71	2
Total	0,86	22	0,84	22

**Table 2. Demographic Characteristics of the Patients (n=99)**

Demographic Characteristics		Frequency (n)	Percent %	Valid Percent	Cumulative Percent %
Gender	Male	78	78,8	78,8	78,8
	Female	21	21,8	21,8	100,0
	Total	99	100	100	
Age range	8-13 age	30	30,3	30,3	30,3
	14-19 age	62	62,6	62,6	92,9
	20 and over	7	7,1	7,1	100,0
	Total	99	100	100	
Educational Status	Primary School	32	32,3	32,3	32,3
	High School	55	55,6	55,6	77,9
	License	12	12,1	12,1	100,0
	Total	99	100	100	

Demographic Characteristics		Frequency (n)	Percent %	Valid Percent	Cumulative Percent %
Number Of Siblings	1	18	18,2	18,2	18,2
	2	57	57,6	57,6	75,8
	3-4	24	24,2	24,2	100,0
	Total	99	100	100	
Family Type	Nuclear Family	80	80,8	80,8	80,8
	Extended Family	7	7,1	7,1	87,9
	Broken Family	12	12,1	12,1	100,0
	Total	99	100	100	
Consanguineous Marriage	Yes	2	2,0	2,0	2,0
	No	97	98,0	98,0	100,0
	Total	99	100	100	
Place of Residence	Town/ City	39	39,4	39,4	39,4
	Big City	60	60,6	60,6	100,0
	Total	99	100	100	
Health Insurance	SSK	55	55,6	55,6	55,6
	Emekli Sandığı	23	23,2	23,2	78,8
	Baş-Kur	18	18,2	18,2	97,0
	Paid	3	3,0	3,0	100,0
	Total	99	100	100	
Motion Status	Freedom	96	97,0	97,0	97,0
	Restricted	3	3,0	3,0	100,0
	Total	99	100	100	
Scoliosis In Relatives	Yes	9	9,1	9,1	9,1
	No	90	90,9	90,9	100,0
	Total	99	100	100	
Have You Received Treatment Before?	Yes	27	27,3	27,3	27,3
	No	72	72,7	72,7	100,0
	Total	99	100	100	
Has She / He Been Hospitalized Before?	Yes	0	0	0	0
	No	99	100	100	100,0
	Total	99	100	100	
Chronic Disease	Yes	7	7,1	7,1	7,1
	No	92	92,9	92,9	100,0
	Total	99	100	100	
Whether She / He Does Sports Or Not	Yes	14	14,1	14,1	14,1
	No	85	85,9	85,9	100,0
	Total	99	100	100	

Table 2 shows the demographic characteristics of the patients. The majority of the participants are women, 78,8%, and men make up 21,2%. Their ages are 8 and over 20. Maximum 62,2% is between the ages of 14-19. Educational status is secondary education with 55,6%. The number of siblings is 2 with a maximum of 57,6%. 80,8% of the patients were from nuclear families and 98% of the patients did not have consanguineous marriages. Most of them, 60,6% of them live in metropolitan cities. The majority of the participants have health insurance, and only 3,0% are paid patients. 3,0% of the patients have a limitation of movement due to scoliosis. Among the first-degree relatives, it is 9,1% have

scoliosis. 27,3% of those who were treated for scoliosis before scoliosis surgery and there were no hospitalizations due to scoliosis. Those with another chronic disease are 7,1%. Those who do sports to reduce the effects of scoliosis are 14,1%.

Table 3. As can be seen, the averages of SRS-22 and its sub-dimensions are shown. Pain means  $21.84 \pm 2.81$ , General Appearance Evaluation mean  $17.66 \pm 4.69$ , Spine Functions mean  $20.25 \pm 3.64$ , Mental health means  $19.46 \pm 2.91$ , Treatment satisfaction mean 9, The mean of  $26 \pm 1.01$  and SRS-22 scale was  $88.47 \pm 10.68$ .

**Table 3. SRS-22 and Its Sub-Dimensions Scale Scores**

SRS-22 Sub-Dimensions	Minimum	Maximum	Mean	Std. dev
Pain	13	25	21,84	± 2,81
Overview Evaluation	8	25	17,66	± 4,69
Spine Functions	9	25	20,25	± 3,64
Mental Health	13	25	19,46	± 2,91
Satisfaction with The Treatment	6	10	9,26	± 1,01
Total	57	106	88,47	± 10,68

**Table 4. The Relationship between the Ages of the Patients and the Scale Scores of SRS-22 and its Sub-Dimensions**

SRS-22 Sub-Dimensions	R	P
Pain	0,030	0,771
Overview Evaluation	0,060	0,557
Spine Functions	0,043	0,676
Mental Health	0,011	0,914
Satisfaction with The Treatment	0,059	0,562
Total	0,031	0,763

Table 4. As can be seen, the relationship between age and scale scores of SRS-22 and its sub-dimensions was made using Pearson correlation analysis. There was no statistically significant correlation between the age of the patients and the sub-dimensions of the SRS-22 scale ( $p > 0.05$ ).

As seen in Table 5, the relationship between the scale scores of the SRS-22 and its sub-dimensions according to the gender of the patients was made with the t-test. When male and female patients were compared according to the general total mean score, the mean score of the female patients was found to be significantly higher than the mean score of the male patients. When the sub-dimensions were examined, it was found that the mean spinal function score of female patients was statistically significantly

higher than the mean score of male patients ( $p=0.009$ ).

As seen in Table 6, the relationship between the scale scores of srs-22 and its sub-dimensions according to the education level of the patients was made with the ANOVA test. When the sub-dimensions of the SRS-22 scale were evaluated according to their educational status, no statistically significant difference was found between the primary, secondary, and higher education groups ( $p > 0.05$ ).

As seen in Table 7, the relationship between the scale scores of srs-22 and its sub-dimensions according to the number of siblings of the patients was made with the ANOVA test. There was no statistically significant difference between the groups ( $p > 0.05$ ).

**Table 5. The Correlation of SRS-22 and its Sub-Dimensions with Scale Scores by Gender ( t-Test, n=99)**

SRS-22 Sub-Dimensions	Female (n=78) Mean ± Std. dev	Male (n=21) Mean ± Std. dev	t	p
Pain	22,06 ± 2,66	21,0 ± 3,24	1,548	0,125
Overview Evaluation	17,91 ± 4,58	16,71 ± 5,12	1,036	0,303
Spine Functions	20,74 ± 3,34	18,43 ± 4,22	2,660	0,009
Mental Health	19,71 ± 2,81	18,57 ± 3,18	1,593	0,115
Satisfaction with The Treatment	9,17 ± 1,06	9,62 ± 0,74	1,833	0,070
Total	89,59 ± 10,14	84,33 ± 11,40	2,053	0,0

**Table 6. The Correlation of SRS-22 and its Sub-Dimensions with Scale Scores According to Educational Levels of the Patients (Anova Test, n=99)**

SRS-22 Sub-Dimensions	Primary School (n=32) Mean ± Std.dev	High school (n=55) Mean ± Std. dev	License (n=12) Mean ± Std. dev	F	p
Pain	21,38±3,12	22,02±2,7	22,25±2,34	0,669	0,515
Overview Evaluation	17,97±4,93	17,20±4,8	18,92±2,87	0,758	0,451
Spine Functions	20,34±3,89	20,20±3,7	20,25±2,89	0,015	0,985
Mental Health	19,44±3,14	19,24±2,87	20,58±2,42	1,052	0,353
Satisfaction with The Treatment	9,28±0,95	9,24±1,07	9,33±0,98	0,052	0,950
Total	88,41±11,70	87,89±10,75	91,33±5,82	0,517	0,598

**Table 7. The Correlation of SRS-22 and its Sub-Dimensions with Scale Scores According to the Number of Siblings of the Patients (Anova Test, n=99)**

SRS-22 Sub-Dimensions	1 (n= 18) Mean ± Std. dev	2 ( 57) Mean ± Std. dev	3-4 (n=24) Mean ± Std. dev	F	p
Pain	22,33±2,56	21,74±2,937	21,71±2,77	0,336	0,715
Overview Evaluation	18,22±4,15	17,12±4,74	18,50±4,99	0,882	0,417
Spine Functions	21,28±2,67	20,40±3,32	19,13±4,73	1,942	0,149
Mental Health	20,44±2,54	19,19±2,93	19,38±3,10	1,280	0,283
Satisfaction with The Treatment	9,06±1,30	9,33±0,85	9,25±1,15	0,509	0,603
Total	91,33±8,38	87,79±10,99	87,96±11,09	0,801	0,45

**Table 8. Correlation of SRS-22 and its Sub-Dimensions with Scale Scores According to Consanguineous Marriage of Patients' Parents ( t-Test, n=99)**

SRS-22 Sub-Dimensions	Yes (n=2) Mean ± Std. dev	No (n=97 ) Mean ± Std. dev	t	P
Pain	22,50 ±3,53	21,82 ±2,82	0,334	0,739
Overview Evaluation	17,50 ±2,12	17,66 ±4,743	0,047	0,962
Spine Functions	20,00 ±1,41	20,26±3,68	0,098	0,922
Mental Health	20,50±0,70	19,44±2,94	0,505	0,615
Satisfaction with The Treatment	9,50±0,70	9,26±1,02	0,332	0,740
Total	90,00±1,41	88,44±10,69	0,205	0,838

As can be seen in Table 8, the relationship between the scale scores of SRS-22 and its sub-dimensions according to the consanguineous marriages of the parents of the patients was made with the t-test. There was no statistically significant difference between the groups (p>0.05).

As seen in Table 9, the relationship between the scale scores of the SRS-22 and its sub-dimensions according to the place of residence

of the patients was made with the t-test. There was no statistically significant difference between the groups (p>0.05).

As can be seen in Table 10, the relationship between the scale scores of SRS-22 and its sub-dimensions according to the family types of the patients was made with the ANOVA test. There was no statistically significant difference between the groups (p>0.05).

**Table 9. The Correlation of SRS-22 and its Sub-Dimensions with Scale Scores According to the Residence of the Patients ( t-Test, n=99)**

SRS-22 Sub-Dimensions	Town/ city (n=39) Mean ± Std. dev	Big city (n=60 ) Mean ± Std. dev	t	P
Pain	22,33 ±2,93	21,52 ±2,71	1,417	0,160
Overview Evaluation	17,41±4,86	17,82 ±4,62	0,419	0,419
Spine Functions	20,49±3,53	20,10±3,74	0,514	0,608
Mental Health	19,82±3,01	19,23±2,85	0,978	0,331
Satisfaction with The Treatment	9,13±0,95	9,35±1,05	1,062	0,291
Total	89,18±11,60	88,02±9,93	0,532	0,596

**Table 10. The Correlation of SRS-22 and its Sub-Dimensions with Scale Scores by Family Types (Anova Test, n=99)**

SRS-22Sub-Dimensions	Nuclear Family (n= 80) Mean ± Std. dev	Extended Family ( 7) Mean ± Std. dev	Broken Family (n=12) Mean ± Std. dev	F	p
Pain	21,88±2,84	22,86±1,21	21,00±3,19	0,996	0,373
Overview Evaluation	17,91±4,62	18,14±5,58	15,67±4,63	1,238	0,295
Spine Functions	20,36±3,62	20,71±3,77	19,25±3,88	0,540	0,584
Mental Health	19,50±2,83	20,57±3,45	18,58±3,14	1,058	0,351
Satisfaction with The Treatment	9,28±1,01	9,00±1,15	9,33±0,98	0,265	0,768
Total	88,93±10,47	91,29±11,11	11,83±10,63	1,488	0,23

**Table 11. The Correlation of SRS-22 and its Sub-Dimensions with Scale Scores According to Patients' Social Security (Anova Test, n=99)**

SRS-22 Sub- Dimensions	SSK (n= 55) Mean ± Std. dev	Emekli sandığı ( 23) Mean ± Std. dev	Bağkur(n=18) Mean ± Std. dev	Paid ( 3) Mean ± Std. dev	F	p
Pain	21,98±2,93	21,43±2,80	21,83±2,74	22,33±1,52	0,230	0,875
Overview Evaluation	18,44±4,44	17,70±4,73	15,83±4,76	14,00±6,55	2,080	0,108
Spine Functions	20,98±3,040	20,98±3,040	18,61±4,14	18,67±2,51	2,256	0,087
Mental Health	20,18±2,54	18,91±3,11	18,44±3,32	16,67±1,52	3,242	0,025
Satisfaction with The Treatment	9,24±1,03	9,04±1,10	9,67±0,59	9,00±1,73	1,402	0,247
Total	90,82±9,73	87,09±12,09	84,39±9,84	80,67±9,074	2,589	0,05

As seen in Table 11, the relationship between the scale scores of SRS-22 and its sub-dimensions according to the social security of the patients was made with the ANOVA test. In the further analysis performed with the SRS-22 scale scores according to the health insurance status of the patients, the mental health sub-dimension scores of the patients with SSK were found to be statistically significantly higher than those of affiliation and paid patients ( $p=0.025$ ).

As can be seen in Table 12, the relationship between the scale scores of the SRS-22 and its sub-dimensions according to the patients' movement status was made with the t-test. When the sub-dimensions of the SRS-22 scale were examined according to the movement status of the patients; In all sub-dimensions, except for the satisfaction with treatment sub-dimension ( $p = 0.698$ ), it was determined that the mean score of patients with free movement was significantly



higher than the mean score of patients with partially restricted movement.

As seen in Table 13, the relationship between the scale scores of SRS-22 and its sub-dimensions according to the scoliosis status of

the patient's first-degree relatives was made with the t-test. The mean score of the patients with scoliosis in relatives was found to be statistically significantly lower in terms of pain and spinal functions than the mean score of the patients whose relatives did not have scoliosis.

**Table 12. The Correlation of SRS-22 and its Sub-Dimensions with Scale Scores According to the Movement Degrees of the Patients (t-Test, n=99)**

SRS-22 Sub-Dimensions	Freedom (n=96) Mean ± Std. dev	Restricted (n=3) Mean ± Std. dev	t	P
Pain	22,05±2,56	15,00 ±1,73	4,709	0,000
Overview Evaluation	17,82±4,63	12,33 ±4,16	-2,024	0,046
Spine Functions	20,57±3,20	10,00±1,00	5,675	0,000
Mental Health	19,61±2,83	14,67±0,57	3,008	0,003
Satisfaction with The Treatment	9,25±1,02	9,67±0,57	0,698	0,698
Total	89,31±9,57	61,67±5,03	4,964	0,698

**Table 13. The Correlation of SRS-22 and its Sub-Dimensions with Scale Scores According to Scoliosis in First Degree Relatives of the Patients (t-Test, n=99)**

SRS-22 Sub-Dimensions	Yes (n=9) Mean ± Std. dev	No (n=90) Mean ± Std. dev	t	P
Pain	19,44±3,87	22,08±2,59	-2,763	0,007
Overview Evaluation	16,67±5,93	17,16±4,58	-0,661	0,510
Spine Functions	17,00±5,85	20,58±3,22	-2,910	0,004
Mental Health	17,78±3,56	19,63±2,814	-1,841	0,069
Satisfaction with The Treatment	9,22±1,093	9,27±1,01	-,0124	0,901
Total	80,11±16,28	89,31±9,57	-2,556	0,012

**Table 14. The Correlation of SRS-22 and its Sub-Dimensions with Scale Scores According to Previous Scoliosis Treatment Status (t-Test, n=99)**

SRS-22 Sub-Dimensions	Yes (n=27) Mean ± Std. dev	No (n= 72) Mean ± Std. dev	t	P
Pain	20,19±3,44	22,46±2,27	-3,816	0,000
Overview Evaluation	15,48±4,82	18,47±4,41	-2,927	0,004
Spine Functions	18,44±4,11	20,93±3,23	-3,154	0,002
Mental Health	17,85±3,08	20,07±2,62	-3,562	0,001
Satisfaction with The Treatment	9,41±0,84	9,21±1,074	0,867	0,388
Total	81,37±11,94	91,14±8,71	-4,468	0,000

**Table 15. The Correlation of SRS-22 and its Sub-Dimensions with Scale Scores According to the Chronic Disease Status of the Patients (t-Test, n=99)**

SRS-22 Sub-Dimensions	Yes (n=7) Mean ± Std. dev	No (n= 92 ) Mean ± Std. dev	T	P
Pain	22,86 ±1,34	21,76 ±2,88	0,993	0,323
Overview Evaluation	16,57±4,99	17,74 ±4,69	-0,632	0,529
Spine Functions	18,71±4,03	20,37±3,61	-1,159	0,249
Mental Health	18,14±2,54	19,57±2,93	0,062	0,216
Satisfaction with The Treatment	9,29±0,95	9,26±1,02	-1,247	0,951
Total	85,57±5,74	88,70±10,85	-0,751	0,454

As seen in Table 14, the relationship between the scale scores of the SRS-22 and its sub-dimensions according to the patient's previous scoliosis treatment and their motion status was determined with the t-test. When the sub-dimensions of the SRS-22 scale were examined according to the patient's previous scoliosis treatment; There was a statistically significant difference in all sub-dimensions, except for the satisfaction with the treatment sub-dimension ( $p=0.38$ ).

As seen in Table 15, the relationship between the scale scores of SRS-22 and its sub-dimensions according to the chronic disease of the patients was made with the t-test. There was no statistically significant difference between the groups ( $p>0.05$ ).

As seen in Table 16, the relationship between the scale scores of SRS-22 and its sub-dimensions, according to whether the patients do sports or not, was made with the t-test. There was no statistically significant difference between the groups ( $p>0.05$ ).

In Table 17, when the SRS-22 scale and its sub-dimensions were evaluated within themselves, no relationship was observed between mental health and satisfaction with treatment ( $r=0.017$ ;  $p=0.864$ ), while a significant relationship was observed between all other dimensions.

## 5. DISCUSSION

Scoliosis, often seen in adolescence and advanced deformities also require surgery [40]. Each patient should be evaluated with its characteristics. The issue that patients are most interested in is how they will look after the surgery. The main purpose of scoliosis surgery is to bring the curvature to physiological limits without causing neurological complications in patients [41]. This process is a very difficult one. Normal activities of patients in the recovery period after surgery are difficult, especially in the post-operative three months. Patients should be provided with multidisciplinary care needs in the pre-/ Intra/postop periods [42].

**Table 16. The Correlation of SRS-22 and its Sub-Dimensions with Scale Scores According to Patients' Sports Status (t-Test, n=99)**

SRS-22 Sub-Dimensions	Yes (n=14) Mean ± Std. dev	No (n= 85 ) Mean ± Std. dev	t	P
Pain	22,57±2,68	21,72±2,83	1,052	0,296
Overview Evaluation	18,43±2,87	17,53±4,93	0,661	0,510
Spine Functions	21,50±1,45	20,05±3	1,387	0,169
Mental Health	20,00±1,79	19,38±3,06	0,739	0,462
Satisfaction with The Treatment	9,00±1,35	9,31±0,95	-1,044	0,299
Total	91,50±6,30	87,98±11,07	1,156	0,250

**Table 17. The Relationship between SRS-22 Scale Scores and Sub-Dimension Scores**

SRS-22 Sub-Dimensions	Pain	Overview Evaluation	Spine Functions	Mental Health	Satisfaction with The Treatment	Total
Pain	<b>1</b>					
Overview Evaluation	$r=0,343$ $p=0,001$	<b>1</b>				
Spine Functions	$r=0,500$ $p=0,000$	$r=0,359$ $p=0,000$	<b>1</b>			
Mental Health	$r=0,389$ $p=0,000$	$r=0,589$ $p=0,000$	$r=0,470$ $p=0,000$	<b>1</b>		
Satisfaction with The Treatment	$r=0,078$ $p=0,444$	$r=0,306$ $p=0,002$	$r=0,238$ $p=0,018$	$r=0,017$ $p=0,864$	<b>1</b>	
Total	$r=0,693$ $p=0,000$	$r=0,792$ $p=0,000$	$r=0,744$ $p=0,000$	$r=0,804$ $p=0,000$	$r=0,147$ $p=0,145$	<b>1</b>

The quality of life of patients with scoliosis was measured with the Scoliosis Research Society-22 (SRS-22) scale. This scale is widely used to measure the quality of life of patients with scoliosis. Some of the studies conducted in Turkey on this subject [43, 44, 45] (Huge 2021; Ozturk et al., 2019) [46, 47, 48, 49, 50]. Some of the studies conducted abroad are; [51-55]. In this study, the quality of life of patients who had scoliosis surgery was evaluated by Alanay et al., [25] Scoliosis Research Society-22 (SRS-22) questionnaire. and its sub-dimensions, Pain average  $21.84 \pm 2.81$ , General Appearance Evaluation average  $17.66 \pm 4.69$ , Spine Function average  $20.25 \pm 3.64$ , Mental health average  $19.46 \pm 2.91$ . The mean of satisfaction with the treatment was  $9.26 \pm 1.01$ , and the mean of the SRS-22 scale was  $88.47 \pm 10.68$ . When male and female patients were compared according to the overall total score, the mean score of female patients was significantly higher than the mean score of male patients. Age, education level, number of siblings, consanguineous marriage, place of residence, family type, chronic illness, and DOIng sports were among the groups. no difference was observed. The mental health sub-dimension scores of SSK patients were found to be statistically significantly higher than those of bonding and paid patients. In all sub-dimensions except satisfaction with the treatment, the mean score of patients with free movement was found to be significantly higher than the mean score of patients with partially restricted mobility. were found to be statistically significantly low in terms of SRS-22 scale sub-dimensions; There was a statistically significant difference in all sub-dimensions except satisfaction with the treatment sub-dimension.

## 6. CONCLUSION

Scoliosis often sees adeleson experience. One of the most important features of young people at this age is their appearance. While the service program is determined in scoliosis objects, it should be aimed to rescue both external appearance and image perceptions. Rehabilitation may be important in this period [44]. Adult scoliosis is a lateral curvature of the spine that causes bilateral low back pain and paresthesia in the lower extremities. Conservative treatment of scoliosis is primarily for young people, but scoliosis may worsen as the patient ages [56]. In this dimension, diagnosis, and treatment are important. Post-operative care is very important for the patient and their relatives in surgical treatments. The

psychological health of patients is as important as their physical health and the demographic, clinical, and psychosocial effects of animals [57]. Therefore, instead of the standard maintenance facility, a suitable maintenance facility should be prepared for each. From the remains obtained from our study, it is expected that surgical treatment of the intensive care process, good intraoperative follow-up, and good post-operative care will positively affect the quality of life of scoliosis patients. Compliance with these study criteria. There is a similar examination on this subject [58, 59].

## 7. LIMITATIONS OF THE STUDY

Research findings are limited to the patients who had scoliosis surgery and were followed up in the hospital where the study was conducted between September 1, 2009, and October 30, 2010.

## ETHICAL APPROVAL AND CONSENT

Before starting the research, written permission was obtained from the institutions where the research was conducted. Worked with those who volunteered to participate. Due to the confidentiality principle, the names of the cases were not used. Necessary explanations were given to the families of the participants and their consent was obtained.

## COMPETING INTERESTS

Authors have declared that no competing interests exist.

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