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The effects of progressive relaxation method on the patients applied total knee arthroplasty

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Abstract

Objective: The aim of this quasi-experimental study is to depict the effects of progressive relaxation method on the patients who were applied total knee prosthesis.

Material and Methods: The findings of the study were obtained from the patients who applied to Adnan Menderes University Research and Practice Hospital, Clinic of Orthopedics and Traumatology with the diagnosis of gonarthros in October 2014–February 2015.Sample of the study was consisted of 80 patients; 40 in experimental group and 40 in control group. The study findings were collected via patient information forms which showed the patients' introductive information, and via Visual Analogue Scale in which independent variables of stable-ongoing anxiety inventory were investigated.

Results: According to the results, experimental group patients' age mean was analyzed as X=62.27±7.98, and control group patients' X=62.35±9.80. 70% of the experimental group patients were female, and 75% of the control group patients were female, 50% of the patients in the experimental group were found to have any chronicle ilness; 62.5% of them had operation experience in the past; 60% used adjuvant tools; 62.5% used their own techniques to overcome the pain when emerged; and body-mass index mean was X=27.62±3.75. 67.5% of the patients in the control group were found to have any chronicle illness; 60% of them had operation experience in the past;76.2% used adjuvant tools;72.5% used their own techniques to overcome the pain when emerged; and body-mass index mean was X=29.57±5.10.

Conclusion: It is considered that progressive relaxation method which was applied to patients has a positive effect on decreasing the post-operative pain and anxiety.

Keywords: Knee Arthroplasty, Progressive Relaxation, Pain, Anxiety

Introduction

Knees are the biggest joints of the body that carry the weight of the body, that support various movements such as standing, crouching, walking, running and jumping, that are exposed to the highest force in the body, and that provide stabilization with bones, ligaments, peripheral muscles and meniscus (1). Total knee arthroplasty (TKA) is the replacement of articular surface (tibial, femoral and patellar joint surfaces), which is degenerated due to rheumatoid arthritis, osteoarthritis, posttraumatic arthritis, and other nonspecific arthritis and thus causes complaints such as severe pain and dysfunction, with prosthesis made with metal and plastic (1). TKA surgery is among the major surgical operations. Patients may experience anxiety before and after this operation. Anxiety is a universal experience and can take place in every person's life. It is an unpleasant state of emotive concern or worry and is defined as the tension and affection that the one feels under threat (2,3,4).

Most of the patients experience different levels of anxiety and fear before surgery. Preoperative anxiety has been reported in 60-80% of the patients to undergo surgical intervention. They experience severe pain in the postoperative period (5). With the beginning of human thinking, pain has become primary among the main problems that human beings have on the mind and this problem has been one of the most important interests of humankind up to the present (6). Pain is the primary postoperative complaint. Postoperative pain is an acute pain that starts with surgical trauma, decreases gradually and terminates with tissue healing (7). Postoperative pain causes anxiety in particular and affects the mental state of elderly patients (8). Unrelievable severe pain makes rehabilitation and healing process difficult and causes a prolonged hospitalization and thus leads to increased health care costs (8).

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It has been reported that the incidence of pain in patients who have undergone surgery demonstrates a broad distribution in Turkey changing from 30% to 97% (9). It is known that important surgeries, especially in fields such as Orthopedics and Traumatology, General Surgery and Cardiovascular Surgery, cause fear of death in patients and that this fear changes to general anxiety and postoperative pain afterward (10,11). Due to the frequently seen postoperative pain in patients, non-pharmacological treatment methods are used as well as pharmacological treatments. Progressive relaxation techniques which are developed by Edmund Jacobson are used as a non-pharmacological treatment method, especially in orthopedics and traumatology clinics and physical therapy and rehabilitation clinics. With this technique, 16 different muscle groups of the body can make stretching and relaxation movements. Studies have shown that the progressive relaxation technique relieves pain and anxiety in patients.

The aim of this research the effects of progressive relaxation method on the patients applıed total knee arthroplasty

Materials and Methods

The research is a quasi-experimental study conducted to investigate the effect of progressive relaxation method on pain and anxiety in patients who have undergone Total Knee Arthroplasty (TKA) between October 2014 and February 2015 at Orthopedics and Traumatology Clinic of Adnan Menderes University Practice and Research Hospital.

The universe of the research consisted of female and male patients who applied to the Orthopedics and Traumatology Clinic, who volunteered to participate in the research, who were at the age of 18 years and over, who were mentally healthy, who did not have any problem related to seeing, hearing and speaking, who knew Turkish, who have been diagnosed with gonarthrosis and who were going to undergo total knee arthroplasty, and who were at least literate in terms of educational status. G-power analysis was used for the calculation of the sample size. In the calculation made with G-Power program, the sample size was determined as 64 by accepting the effect size as 0.3, the margin of error (α) as 0.05, power (1-β) as 0.80 and it was determined as 76 at a minimum with 1.2 was calculated with 1.2 design effect. According to the results of the G-Power analysis, the sample size was planned to consist a total of 80 patients, 40 in the control group and 40 in the experimental group.

Data Collection Tools

The data of the research were collected between October 01, 2014 and February 15, 2015, at ADU Practice and Research Hospital. The research data were collected using patient introduction form prepared by the researcher. Patient introduction form included 19 open-ended questions about the sociodemographic characteristics of the patients included in the experimental and control groups (age, sex, marital status, educational status, job/occupational status, income status, place of residence, health insurance, body mass index, chronic disease, continuously used medication, past surgery experience, the use of assistive device during the disease and the methods used for coping with pain). In addition, there were sections that included the State-Trait Anxiety Inventory (STAI) and Visual Analogue Scale (VAS) measurements made and recorded preoperatively and on postoperative 1st and 2nd-days. In order to prevent the interaction between the patients in the experimental and control group, the data were collected first from the control group and then from the experimental group. Primarily, the patient introduction form was applied to the patients in the control group in the preoperative period. Then, the state-trait anxiety levels of the patients were determined and the preoperative pain scores of the patients were calculated according to the VAS pain scale. State levels and VAS pain scores of the patients were calculated on the postoperative 1st-day. On the postoperative 2nd-day, routine applications continued in the clinic. The state anxiety levels and VAS pain scores of the patients were calculated. For the selection of the experimental group patients, the patients who met the sample selection criteria were selected. The patients who were suitable for the research were informed about the study and a written informed consent form was taken from each patient volunteered to participate in the study. The patient introduction form was applied to the patients who were hospitalized for TKA surgery in the preoperative period and they were informed about the research. The preoperative state-trait anxiety levels of the patients were determined and their pain scores were calculated according to VAS. Progressive relaxation technique was first explained practically by the researcher to the patients. A brochure on progressive relaxation techniques prepared by the researcher was given to the patients and they were asked to do the exercises. The points which the patients had difficulty or did not understand were re-explained practically. On the postoperative 1st-day, progressive relaxation techniques were re-explained to remind them and state anxiety levels and VAS pain scores after approximately 1 hour from the exercises were calculated. State anxiety levels and VAS pain scores were calculated on the postoperative 2nd-day.

Ethical Consideration

A written clinical research permission was obtained from Adnan Menderes University Practice and Research Hospital and the written approval was obtained from Adnan Menderes University Medical Faculty Non-Invasive Clinical Trials Ethics Committee. The purpose of the study, the fact that there was no risk and the fact that there would be no any harmful procedure were explained to each patient in the experimental group and the control group, and a written informed consent form was obtained from each patient.

Statistical Analyses

In the evaluation of the data, the descriptive statistical methods (percentage calculations, mean, standard deviation) were used. In addition, in the Kolmogrov-Simirnov test conducted to determine normal distribution in the analyses, preoperative TAI was determined as 0.043, preoperative SAI as 0.002, postoperative 1st-day SAI as

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0.000, postoperative 2nd-day SAI as 0.006, preoperative VAS as 0.000, postoperative 1st-day VAS as 0.000, and postoperative 2nd-day VAS as 0.001. Nonparametric analyses were preferred since they were not suitable to a normal distribution (Mann Whitney U test, Wilcoxon test, and Spearman Correlation). The data obtained from the study were analyzed using SPSS (Statistical Package for Social Sciences) for Windows 18 (SPSS Inc., Chicago, IL, USA). The license number of SPSS is 10241440. A p value of <0.05 and 95% confidence interval was accepted as significant.

Strengths and Limitations

The fact that only volunteer patients were involved in the study and that the research was conducted at only one hospital, within a specific period of time, were the primary limitations of this study. Secondly, as another limitation, data were restricted to being collected within the period of time set for the master's thesis.

Results

The mean age of the patients in the control group was 62.35±9.80 and the age range was between 33 and 85 years. It was determined that of the patients, 75% (30) were female, 55% (22) were primary school graduates, 50% (20) were not employed, and 55% (22) were living in a district. The mean age of the patients in the experimental group was 62.27±7.98 and the age range was between 31 and 81 years. It was determined that of the patients, 70% (28) were female, 47.5% (19) were primary school graduates, 50% (20) were not employed and 40% (16) were living in a district. In this respect, it was seen that both groups were similar to each other in terms of sociodemographic characteristics and that there was no sociodemographic difference between the groups that could affect the research results (p>0.05).

It was found that 67.5% (27) of the patients in the control group had a chronic disease and that 74.1% (20) of the patients who had a chronic disease were diagnosed with hypertension. 60% (24) of the patients were found to have a past surgical experience. It was determined that 52.5% (21) of the patients were using an assistive device and that 76.2% (16) of the users were using a cane. It was found that 75% (30) of the patients were continuously using a medication and that 66.7% (20) did not use painkillers. It was determined that 72.5% (29) of the patients had a coping method in the presence of pain and that 33.3% (10) of the patients used painkillers as a coping method. When the BMI distributions of the patients were examined, 25% (10) were between 18.5 and 24.9 kg/m2 (normal weight), 20% (8) were between 25 and 29.9 kg/m2 (overweight), and 55% (22) were between 30 and 39.9 kg/m2 (obese). The mean BMI was found as 29.57±5.10 and BMI ranged from 19.59 to 39.96.

It was found that 50% (20) of the patients in the experimental group had a chronic disease and that 65% (13) of the patients who had a chronic disease were diagnosed with hypertension. 62.5% (25) of the patients were found to have a past surgical experience. It was determined that 60% (24) of the patients were using an assistive device and that 54.2% (13) of the users were using a cane.

It was found that 77.5% (31) of the patients were continuously using a medication and that 54.8% (17) were using painkillers. It was determined that 62.5% (25) of the patients had a coping method in the presence of pain and that 54.8% (17) of the patients used painkillers as a coping method. When the BMI distributions of the patients were examined, 22.5% (9) were between 18.5 and 24.9 kg/m2 (normal weight), 50% (20) were between 25 and 29.9 kg/m2 (overweight), and 27.5% (11) were between 30 and 39.9 kg/m2 (obese). The mean BMI of the patients in the experimental group was found as 27.62±3.75, and BMI ranged from 20.81 to 35.11. In this respect, it was seen that both groups were similar to each other in terms of health status characteristics except the presence of osteoporosis, cancer and heart disease (p<0.05), and that there was no difference between the groups in terms of health status except osteoporosis, cancer and heart disease, which could affect the results of the study (p>0.05).

When preoperative SAI and TAI mean scores of the patients in the control and experimental groups were compared, there was no statistically significant difference found between the SAI and TAI mean scores of the control and experimental groups (p<0.05). When postoperative 1st-day SAI mean scores were compared, the SAI mean scores of the patients in the control group were found to be significantly lower than those of the patients in the experimental group (12.090; 0.001). When postoperative 2nd-day SAI mean scores were compared, the SAI mean scores of the patients in the control group were found to be significantly lower than those of the patients in the experimental group (9.110; 0.003).

Preoperative VAS mean scores of the patients in the control group were found to be statistically significantly lower than those of the patients in the experimental group (12.064; 0.001); however, it was determined that postoperative 1st and 2nd-day VAS mean scores of the patients in the experimental group were statistically significantly lower than those of the patients in the control group (22.302; 0.000: 32.716; 0.000).

When the preoperative SAI mean score and the postoperative 1st-day SAI mean score of the patients in the experimental group were compared, the postoperative 1st-day SAI mean score was found to be statistically significantly higher than the preoperative SAI mean score (-3.039; 0.002). When the preoperative SAI mean score and postoperative 2nd-day SAI mean score were compared, there was no statistically significant correlation found between the postoperative 2nd-day SAI mean score and the preoperative SAI mean score (-0.082;0.412). When the postoperative 1st-day SAI mean score and postoperative 2nd-day SAI mean score were compared, the postoperative 2nd-day SAI mean score was found to be statistically significantly lower than the postoperative 1st-day SAI mean score (-2.171;0.030).

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When the preoperative and postoperative 1st and 2nd-days VAS mean scores of the patients in the experimental group were compared, it was determined that the postoperative 2nd-day VAS mean score of the patients was statistically significantly lower than postoperative 1st-day VAS mean score (-4.967;0.000) and preoperative VAS mean score (-5.539;0.000). When the preoperative and postoperative 1st-day VAS mean scores were compared, the postoperative 1st-day VAS mean score of the patients was found to be statistically significantly lower than the preoperative VAS mean score (4.292;0.000).

There was a positive, moderate correlation between the preoperative SAI mean score and the postoperative 1st-day SAI mean score of the control group (0.454;0.003). There was no statistically significant correlation found between the preoperative SAI mean score and the postoperative 2nd-day SAI mean score of the control group (0.292;0.068). There was no statistically significant correlation found between the preoperative SAI mean score and the preoperative TAI mean score of the control group (0.171;0.292).

There was no statistically significant correlation found between the preoperative SAI mean score and preoperative, postoperative 1st and 2nd-days VAS mean scores of the control group (-0.040;0.809: -0.067;0.681: 0.282;0.078). There was no statistically significant correlation determined between the postoperative 1st-day SAI and the postoperative 2nd-day SAI mean score (0.278;0.082). There was no statistically significant correlation found between the postoperative 1st-day SAI mean score and preoperative TAI mean score of the control group (0.094;0.564).

There was no statistically significant correlation found between the postoperative 1st-day SAI mean score and preoperative, postoperative 1st and 2nd-days VAS mean score of the control group (0.243;0.131: -0.125;0.441: 0.029;0.861). There was no statistically significant correlation determined between the postoperative 2nd-day SAI mean score and the preoperative TAI mean score (0.016;0.920).

There was no statistically significant correlation found between the postoperative 2nd-day SAI mean score and the preoperative, postoperative 1st and 2nd-days VAS mean scores of the control group (-0.001;0.997: -0.183;0.259: -0.112;0.490). There was no statistically significant correlation determined between the preoperative TAI mean score and the preoperative VAS mean score (0.247;0.124). There was a positive, moderate correlation found between the preoperative TAI mean score and postoperative 1st-day VAS mean score of the control group (0.336;0.034).

There was a positive, moderate correlation determined between the preoperative TAI mean score and the postoperative 2nd-day VAS mean score of the control group (0.390;0.013).

There was no statistically significant correlation determined between the preoperative VAS mean score and the postoperative 1st and 2nd-days VAS mean scores (-0.194;0.229: -0.177;0.274). There was a positive, moderate correlation found between the postoperative 1st-day VAS mean score and the postoperative 2nd-day VAS mean score (0.789;0.000).

There was a positive, significant correlation found between the preoperative SAI mean score and the postoperative 1st-day SAI mean score of the experimental group (0.517;0.001).

There was no statistically significant correlation determined between the preoperative SAI mean score and the postoperative 2nd-day SAI mean score of the experimental group (-0.242;0.132). There was no statistically significant correlation found between the preoperative SAI mean score and the preoperative TAI mean score of the experimental group (-0.304;0.057).

There was no statistically significant correlation found between the preoperative SAI mean score and the preoperative, postoperative 1st-day VAS mean scores of the experimental group (-0.037;0.820: 0.293;0.067). There was a positive, moderate correlation determined between the preoperative SAI mean score and the postoperative 2nd-day VAS mean score of the experimental group (0.318;0.045). There was no statistically significant correlation found between the postoperative 1st-day SAI mean score and the postoperative 2nd-day SAI mean score (-0.128;0.431).

There was a negative, moderate correlation determined between the postoperative 1st-day SAI mean score and the preoperative TAI mean score of the experimental group (-0.459;0.003). There was no statistically significant correlation found between the postoperative 1st-day SAI mean score and the preoperative, postoperative 1st and 2nd-days VAS mean scores of the experimental group (0.003;0.986: 0.123;0.450: 0.292;0.068).

There was a positive, moderate correlation determined between the postoperative 2nd-day SAI mean score and the preoperative TAI mean score (0.491;0.001). There was no statistically significant correlation found between the postoperative 2nd-day SAI mean score and the preoperative, postoperative 1st and 2nd-day VAS mean scores of the experimental group (0.095;0.559: 0.209;0.195: -0.121;0.458).

There was no statistically significant correlation determined between the preoperative TAI mean score and the preoperative, postoperative 1st and 2nd-day VAS mean scores (-0.002;0.992: -0.007;0.956: -0.277;0.084).

There was no statistically significant correlation found between the preoperative VAS mean score and the postoperative 1st and 2nd-day VAS mean scores (0.129;0.427: 0.205;0.205). There was no statistically significant correlation determined between the postoperative 1st-day VAS mean score and the postoperative 2nd-day VAS mean score (0.290;0.070).

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Table 1. Distribution of the Patients in Control and Experimental Groups According to Their Health Status Characteristics

Health Status Characteristics	Control Group (n=40)		Experimental Group (n=40)		x^2
	N	%	n	%	
Presence of a Chronic Disease					
Yes	27	67.5	20	50	2.527
No	13	32.5	20	50	0.112
Chronic Diseases					
Diabetes (n=47)	7	25.9	6	30	0.95 0.758
Hipertension (n=47)	20	74.1	13	65	0.452 0.501
Asthma (n=47)	6	22.2	8	40	1.736 0.188
Other (osteoporosis, cancer, heart diseases)	7	25.9	13	65	7.176 0.007
History of past surgery					
Yes	24	60	25	62.5	0.503
No	16	40	15	37.5	0.818
Use of assistive device during disease					
Yes	21	52.5	24	60	0.457
No	19	47.5	16	40	0.499
Type of assistive device used during disease					
Cane (n=45)	16	76.2	13	54.2	2.371
Other (Crutch, leading string)	5	23.8	11	45.8	0.124
Presence of continuously used medication					
Yes	30	75	31	77.5	0.069
No	10	25	9	22.5	0.793
Use of analgesics					
Yes	10	33.3	17	54.8	2.858
No	20	66.7	14	45.2	0.091
Use of coping methods in the presence of pain					
Yes	29	72.5	25	62.5	0.912
No	11	27.5	15	37.5	0.340
The coping method used in the presence of pain					
Use of painkiller (n=54)	10	33.3	17	54.8	2.858 0.091
Resting (n=54)	9	31	13	52	2.444 0.118
Other (Physical therapy application, exercising (n=54))	7	24.1	7	28	0.104 0.747
Body Mass Index (BMI)					
18.5-24.9 kg/m^2 (normal weight)	10	25	9	22.5	
25-29.9 kg/m^2 (overweight)	8	20	20	50	
30-39.9 kg/m^2 (obese)	22	55	11	27.5	
	X±SD	Range	X±SD	Range	
	29.57±5.10	19.59 39.96	27.62±3.75	20.81 35.11	

*Chi-square (X2)

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Table 2. Comparison of Preoperative Trait Anxiety Inventory (TAI), Preoperative and Postoperative 1st and 2nd-day State Anxiety Inventory (SAI) and VAS Mean Scores of the Patients in Control and Experimental Groups

Inventories	Control Group (n=40) Mean±SD	Experimental Group (n=40) Mean±SD	U p
PreoperativeTAI	50.07±5.07	50.10±3.28	0.108 0.743
Preoperative SAI	45.87±4.08	46.52±3.59	0.390 0.532
Postoperative1st-day SAI	45.55±4.90	48.25±1.59	12.090 **0.001**
Postoperative2nd-day SAI	44.92±4.37	47,02±2.66	9.110 **0.003**
PreoperativeVAS	4.90±2.45	6.57±1.35	12.064 **0.001**
Postoperative 1st-day VAS	6.70±1.72	4.65±1.76	22.302 **0.000**
Postoperative 2nd-day VAS	5.00±1.82	2.50±1.15	32.716 **0.000**

*Mann Whitney U (U)

Table 3. Comparison of the Preoperative and Postoperative 1st and 2nd-day State Anxiety Inventory (SAI) and VAS Mean Scores of the Patients in the Experimental Group

Groups	Mean ± SD	Z p
Preoperative SAI Postoperative 1st-day SAI	46.52±3.59 48.25±1.59	-3.039 **0.002**
Preoperative SAI Postoperative 2nd-day SAI	46.52±3.59 47.02±2.66	-0.082 0.412
Postoperative 1st-day SAI Postoperative2nd-day SAI	48.25±1.59 47.02±2.66	-2.171 **0.030**
Preoperative VAS score Postoperative 1st-dayVAS score	6.57±1.35 4.65±1.76	-4.292 **0.000**
Postoperative 1st-dayVAS score Postoperative 2nd-dayVAS score	4.65±1.76 2.50±1.15	-4.967 **0.000**
Preoperative VAS score Postoperative 2nd-dayVAS score	6.57±1.35 2.50±1.15	-5.539 **0.000**

*Wilcoxon Test (Z)

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Table 4. The Correlation Between Preoperative Trait Anxiety Inventory (TAI), Preoperative, Postoperative 1st and 2nd-days State-Trait Anxiety Inventory (STAI) and VAS Mean Scores of The Patients in Control Group

	Preoperative SAI **r** **p**	Postoperative 1st-day SAI **r** **p**	Postoperative 2nd-day SAI **r** **p**	Preoperative TAI **r** **p**	Preoperative VAS **r** **p**	Postoperative 1st-dayVAS **r** **p**
Postoperative 1st-day SAI	0.454 **0.003**					
Postoperative 2nd-day SAI	0.292 0.068	0.278 0.082				
Preoperative TAI	0.171 0.292	0.094 0.564	0.016 0.920			
Preoperative VAS	-0.040 0.809	0.243 0.131	-0.001 0.997	0.247 0.124		
Postoperative 1st-day VAS	-0.067 0.681	-0.125 0.441	-0.183 0.259	0.336 **0.034**	-0.194 0.229	
Postoperative 2nd-dayVAS	0.282 0.078	0.029 0.861	-0.112 0.490	0.390 **0.013**	-0.177 0.274	0.789 **0.000**

*Spearman Correlation (r)

Table 5. The Correlation Between Preoperative Trait Anxiety Inventory (TAI), Preoperative, Postoperative 1st and 2nd-days State-Trait Anxiety Inventory (STAI) and VAS Mean Scores of The Patients in Experimental Group

	Preoperative SAI **r** **p**	Postoperative 1st-day SAI **r** **p**	Postoperative 2nd-day SAI **r** **p**	Preoperative TAI **r** **p**	Preoperative VAS **r** **p**	Postoperative 1st-day VAS **r** **p**
Postoperative 1st-day SAI	0.517 **0.001**					
Postoperative 2nd-day SAI	-0.242 0.132	-0.128 0.431				
Preoperative TAI	-0.304 0.057	-0.459 **0.003**	0.491 **0.001**			
Preoperative VAS	-0.037 0.820	0.003 0.986	0.095 0.559	-0.002 0.992		
Postoperative 1st-day VAS	0.293 0.067	0.123 0.450	0.209 0.195	-0007 0.965	0.129 0.427	
Postoperative 2nd-day VAS	0.318 **0.045**	0.292 0.068	-0.121 0.458	-0.277 0.084	0.205 0.205	0.290 0.070

*Spearman Correlation (r)

Discussion

In this study, control and experimental groups were compared in terms of some variables reported in the literature (12,13,14,15) indicating the effect of progressive relaxation method on pain and anxiety. Nurses use various methods such as changing the patient's position, hot-cold application, massage, relaxation techniques as well as medications in order to relieve the pain after diagnosing it (1). In the study conducted by Yıldırım, it was seen that "standing up, walking and exercising" increased the pain by 98.6% while "the use of analgesic medication" (65.3%) and "hot-cold application with analgesic medication" (24.7%) reduced the pain. In the study conducted by Akyol, it was found that 38.4% of the patients who have undergone total knee arthroplasty had a reduced pain through analgesic medication, 29.2% through resting and 13.3% through lying.

In addition, it was noticed that those patients decreased their physical activities to reduce pain and to protect the joint and muscle. In the study conducted by Büyükyılmaz, it was seen that changing position increased the pain in 78.7% of orthopedic patients, and that analgesic medication reduced the pain in 95.3% of the patients. In the study conducted by Yıldırım, it was found that exercise increased the pain. In our study, on the other hand, exercising reduced the pain in 28% (7) of the patients and it was noticed that the patients used this method as a coping method when they had pain. In addition, it was seen in other studies that patients mostly use painkillers when they have pain (16,17,18).

Concerns related to anesthesia and surgical intervention are known to cause anxiety in the preoperative period (19).

It is reported that 60-80% of patients to undergo surgical intervention have preoperative anxiety (20). Cimili stated that the prevalence of preoperative anxiety symptoms was between 10% and 30% and that the most important cause of anxiety in orthopedic patients was the unrelievable/unreducable pain (21). In the study conducted by Büyükyılmaz, it was determined that mean preoperative state anxiety score was 59.27±5.55 in the control group and 57.20±5.57 in the experimental group. On the other hand, the trait anxiety score was found as 44.43±3.75 in the control group and 42.33±6.02 in the experimental group. In addition, it was reported that there was no significant difference between the control and experimental groups in terms of anxiety characteristics ($p>0.05$). It was noticed that the anxiety levels of the patients in the experimental group decreased after the relaxation exercises and that this change was highly significant between all the measurements performed before and after exercising. In the study conducted by Turhan in order to investigate the correlation between preoperative and postoperative anxiety in patients who were going to undergo an elective surgical operation and patient satisfaction, the preoperative anxiety score of the patients who participated in the study was found to be 44.32±11.12 and the postoperative anxiety score was found to be 38.28±9.14. When the preoperative and postoperative state-trait anxiety scores of the patients who participated in the study were examined according to the unit, the preoperative state-trait anxiety score of the patients who have undergone orthopedic surgery was determined to be 39.31±8.96, and the postoperative state-trait anxiety score was found to be 39.38±10.12. In the study conducted by Taşdemir et al. in order to compare the preoperative and postoperative anxiety levels of patients who were preoperatively informed using State-Trait Anxiety Inventory Test, the preoperative anxiety score of the patients was found as 40.6±11.23 and postoperative anxiety score was found as 37.5±10.28. In this study, there was a statistically significant decrease in the anxiety levels between the preoperative period and postoperative period (12,15,22). The results of our study were different than the results of other studies. In some studies, it was seen that the level of anxiety increased (12,22), whereas the level of anxiety decreased in some studies (15,23,24). The fact that the level of anxiety was found to be higher on the postoperative 1st-day than on the preoperative period in our study may be due to the fear and trauma experienced by the patients during the operation.

Pain is a commonly seen and long-lasting problem in orthopedic diseases (1). In the study conducted by Yavuz titled "non-pharmacologic interventions in postoperative pain management and comparison of analgesic practice method and routine analgesic method according to patients' own pain assessment", it was seen that there was a statistically significant decrease in the pain level of patients as a result of 2-day follow-up. In the study conducted by Rejeh et al. to investigate the effect of systematic relaxation techniques on anxiety and pain in older patients undergoing abdominal surgery, VAS pain scores of the patients were controlled 4 times: in the preoperative period and postoperative 15th minute, 6th hour and 12th hour. It was found that the preoperative VAS pain score was 6.96±1.62 in the control group and 7.08±1.59 in the experimental group. In the control group, VAS pain score was found to be 5.35±094 at the postoperative 15th minute, 4.77±0.73 at the postoperative 6th hour, and 3.64±0.45 at the postoperative 12th hour. In the experimental group, VAS pain score was found to be 4.12±1.83 at the postoperative 15th minute, 2.74±1.50 at the postoperative 6th hour, and 1.88±0.85 at the postoperative 12th hour. It was seen that the pain levels of the patients were low in the studies conducted (26,27). Likewise, in our study, non-pharmacological methods applied to patients reduced the pain. Therefore, it is seen that the progressive relaxation technique is effective on pain. In the study conducted by Rejeh et al., it was determined that the preoperative anxiety score of the patients was 6.16±1.17 in the experimental group. In addition, the anxiety score of the experimental group was determined to be 5.77±1.41 at the postoperative 15th minute, 3.48±0.80 at the postoperative 6th hour and 2.45±0.61 at the postoperative 12th hour. In the study conducted by Yazar, there was no statistically significant difference between the preoperative trait anxiety scores and the trait anxiety scores in the morning of the surgery according to the groups ($p>0.05$). There were statistically significant decreases in the preoperative morning trait anxiety scores compared to the preoperative scores in the control group ($p<0.01$). There were statistically significant decreases in the preoperative morning trait anxiety scores compared to the preoperative scores in the experimental group ($p<0.05$) (24,25,26). Our study findings are compatible with the finding of studies conducted. Progressive relaxation technique applied is thought to be effective on the fact the postoperative 1st-day state anxiety score was lower than that in the preoperative period. There was no statistically significant correlation between the postoperative 2nd-day SAI mean score and the preoperative SAI mean score. This may be due to the fact that the patients stood up on the 2nd-day. In the study conducted by Yıldızeli Topçu to investigate the effect of relaxation exercise on pain in patients who underwent upper abdominal surgery, it was found that patients who applied relaxation exercise had a lower pain level. In the study conducted by Sjöling et al. to assess the effect of training about pain experience given to patients to undergo total hip arthroplasty surgery on postoperative pain, it was found that patients in the experimental group experienced less pain during the 3-day follow-up. Good et al. (2002) reported that systematic relaxation applied to 102 female patients who underwent abdominal surgery was effective in relieving postoperative pain (28,29,30). It is seen that our findings are compatible with the findings of the studies conducted. It can be said that progressive relaxation technique is effective on pain.

Patients who experience anxiety at high levels are more sensitive to pain (31,32). In the study conducted by Demir and Arslantaş, it was seen that there was no statistically significant difference between the state anxiety mean scores of the individuals before the application and that there was a statistically significant correlation between the state anxiety mean scores after the application. In the study conducted by Büyükyılmaz, it was seen that pain and state anxiety levels of the experimental group were significantly

lower than those of the control group in the evaluation made after relaxation exercises and back massage applied to the experimental group on postoperative days. In the study conducted by Pellino et al., there was no statistically significant difference between experimental and control groups in terms of mean pain severity and anxiety scores during the 3-day follow-up period; however, the use of opioid drugs on 2nd-day was less in the experimental group (11,21). When the studies conducted were examined, there were no differences in the pain and anxiety levels of the patients between the control and experimental groups in the preoperative period; however, there were differences in the postoperative days. In some studies, it was observed that pain and anxiety levels of the patients in the experimental group decreased during the postoperative days (12,28,33,34,35), whereas there was no difference found in the mean pain and anxiety scores between the experimental and control groups in the study conducted by Pellino et al. In our study, the mean anxiety scores were found to vary according to days.

Conclusion

It is thought that progressive relaxation method has a positive effect on decreasing postoperative pain and anxiety in patients who underwent total knee arthroplasty.

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References

1. Elbaş NÖ, Erdil F. Surgical Nursing, Aydogdu Offset Printing, Ankara: 2016;587.
2. Cüceloğlu D. Human and Behavior - Basic Concepts of Psychology, Remzi Bookstore İstanbul 2005.
3. Sertbaş G, Bahar A. Nursing Initiatives in Coping with Anxiety and Anxiety. 2004; 39-44.
4. Smeltzer SC, Bare BG, Hinkle JL & Cheever KH. Pain Managament. Textbook Of Medical-Surgical Nursing. Philadelphia: Lippincott Williams & Wilkins, 2008;258-299
5. Kindler CH, Harms C, Amsler F. The Visual Analog Scale Allows Effective Measurement Of Preoperative Anxiety And Detection Of Patients' Anesthetic Concerns. Anesthesia & Analgesia 2000; 90(3): 706-712. Doi:10.1097/00000539-200003000-00036
6. Raj PP. Pain taxonomy. Erdine S (Ed). Pain. Istanbul, Alemdar Ofset, 2000; 12-20.
7. Arslan S, Çelebioğlu A. Postoperative Pain Management And Alternative Applications. International Journal of Human Sciences 2004;1(1): 1-7.
8. Society, Korean Knee. Guidelines for the management of postoperative pain after total knee arthroplasty. Knee surgery & related research. 2012;2(4): 201.
9. Eti Aslan F. Pain: Nature and Control. European Medical Bookshop Mart Printing Arts, Istanbul, 2006.
10. Hill N. Davis P. Nursing Care of Total Joint Replacement. Journal of Orthopaedic Nursing. 2000;4: 41-45. Doi:10.1054/joon.2000.0060
11. Özer N, Karaman Özlü Z, Arslan S. Effect of Music on Postoperative Pain and Physiologic Parameters of Patients after Open Heart Surgery.Pain Management Nursing. 2013 ;14(1): 20-28. Doi:10.1016/j.pmn.2010.05.002
12. Büyükyılmaz, F. The Effect Of Relaxing Tecnique And Back Massage On Postoperative Pain And Anxiety İn Total Hip Or Knee Arthroplasty Patients, İstanbul University Institute of Health Science, PhD. Thesis, İstanbul, 2009.
13. Karaçay P, Eti Aslan F, Şelimen D. Determination of Pain Relation Approaches in Emergency Trauma Units. Pain 2006;18(1):45
14. Pinto PR, Mclntyre T, Ferrero R, Almeida A, Araujo-Soares V. Predictors Of Acute Postsurgical Pain And Anxiety Following Primary Total Hip And Knee Arthroplasty. The Journal of Pain 2013;14(5): 502-515. Doi: 10.1016/j.jpain.2012.12.020
15. Taşdemir N. Relaxation Technique, Aromatherapy And The Combination Of Both Methods Of Postoperative Pain Effect, Ege University Department of Surgical Nursing, PhD Thesis, İzmir, 2012.
16. Akyol O. Prevalence, Characteristics, Affecting Factors of Pain in Patients Undergoing Knee Replacement and Examination of Satisfaction in Pain Management, Dokuz Eylul University Institute of Health Sciences, Department of Surgical Nursing, M.Sc. Thesis, Izmir, 2008.
17. Büyükyılmaz F. Diagnosis Of Postoperative Pain İn Orthopedics And Traumatology Patients, Istanbul University Institute of Health Sciences, Department of Nursing Principles, Master Thesis, Istanbul, 2005.
18. Yıldırım A. Diagnosis Of Postoperative Pain And Pain Management İn Patients With Total Knee Replacement Surgery, Istanbul University Institute of Health Sciences, Fundamentals of Nursing Program, Master Thesis, Istanbul, 2013.
19. Grieve RJ. Day Surgery Preoperative Anxiety Reduction And Coping Strategies. British Journal of Nursing. 2002;11(10):670-678. Doi:10.12968/bjon.2002.11.10.670
20. Jlala HA, French JL, Foxall GL, Hardman JG, Bedforth NM.Effect Of Preoperative Multimedia İnformation On Perioperative Anxiety İn Patients Undergoing Procedures Under Regional Anaesthesia. British journal of anaesthesia. 2010;104(3): 369-374. Doi:10.1093/bja/aeq002
21. Cimilli C. Anxiety in surgery. Journal of Clinical Psychiatry. 2001;4: 182-186. Doi:10.4236/ss.2011. 26065

22. Turhan Y. Preoperative And Postoperative Anxiety İn Patients Scheduled For Elective Surgery Relationship With Patient Satisfaction, Cukurova University Faculty of Medicine Department of Anesthesia and Reanimation, Master Thesis, Adana, 2007.

23. Akinsulore A, Owojuyigbe AM, Faponle AF, Fatoye FO. Assessment of preoperative and postoperative anxiety among elective major surgery patients in a tertiary hospital in Nigeria. Middle East Journal of Anesthesiology. 2015;23(2): 235-240.

24. Yazar M. Effect Of Pre-Operative Training On Anxiety Level İn Patients With Open Heart Surgery, Halic University Institute of Health Sciences, Master Thesis, Istanbul, 2011.

25. Büyükyılmaz F, Aşti T. Nursing Care of Postoperative Pain. Journal of Anatolia Nursing and Health Sciences. 2009;12(2): 84-93.

26. Rejeh N, Heravi-Karimooi M, Vaismoradi M, Jasper M. Effect of systematic relaxation techniques on anxiety and pain in older patients undergoing abdominal surgery. International journal of nursing practice. 2013;19(5): 462-470. Doi: 10.1111/ijn.12088.

27. Yavuz A. Nonpharmacological İnterventions İn Postoperative Pain Management And Analgesic Application According To Patient's Own Pain Assessment And Comparison Of Routine Analgesia Method, Ege University Institute of Health Sciences Nursing Program, Master Thesis, Izmir, 2000.

28. Good M, Anderson GC, Stanton-Hicks M, Grass JA, Makii M. Relaxation and music reduce pain after gynecologic surgery. Pain Management Nursing. 2002;3(2): 61-70. Doi:10.1002/nur.20076

29. Sjöling M, Nordahl G, Olofsson N, Asplund K. The impact of preoperative information on state anxiety, postoperative pain and satisfaction with pain management. Patient education and counseling. 2003;51(2): 69-176. Doi:10.1016/S0738-3991(02)00191-X

30. Yıldızeli Topçu S. The Effect Of Relaxation Techniques Taught By Nurses On Pain Control İn Patients Undergoing Upper Abdominal Surgery, Trakya University Institute of Health Sciences, Master thesis Edirne, 2008.

31. Kaçmaz N. Psychological problems and nursing approaches of intensive care patients. Journal of Intensive Care Nurses. 2002;6(2): 75-81.

32. Payen JF, Bosson JL, Chanques G, Mantz J, Labarere J. Pain Assessment Is Associated with Decreased Duration of Mechanical Ventilation in the Intensive Care UnitA Post HocAnalysis of the DOLOREA Study. The Journal of the American Society of Anesthesiologists. 2009;111(6): 1308-1316. Doi: 10.1097/ALN.0b013e3181c0d4f0.

33. Demir Ö, Arslantaş H. The effect of progressive muscle relaxation exercise on the level of anxiety in patients with corneal angiography and percutaneous transluminal coronary angioplasty. Journal of Psychiatric Nursing. 2014;5(3): 113-121. Doi: 10.5505/phd.2014.78942

34. Eti Aslan F. Quality Cost Effectiveness in Maintenance: Relaxation Techniques, Cold Application and Massage and Postoperative Pain Management. 5th National Nursing Congress (International Participation) Book. 1997; 9-11.

35. Roykulcharoen V, Good M. Systematic relaxation to relieve postoperative pain. Journal of Advanced Nursing. 2004;48(2): 140-148. Doi:10.1111/j.1365-2648.2004.03181.x