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RESEARCH ARTICLE

Quality of Life in Patients with Shoulder Pain and the Effect of Physical Therapy on Quality of Life

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Abstract

Objective: We aimed to investigate to what extent the quality of life of people is affected by shoulder pain originating from the shoulder joint and the contribution of physical therapy to the quality of life in our study.

Methods: In our study, a total of 30 patients who applied to our outpatient clinic with the complaint of shoulder pain were evaluated. A physical therapy program consisting of 10 sessions of hot pack, transcutaneous electrical nerve stimulation (TENS) and ultrasound (US) was applied to the patients for 2 weeks. During the treatment, the patients were included in an exercise program and used nonsteroidal anti-inflammatory drugs (NSAID). Evaluation was performed three times in total, before physical therapy, at the end of the treatment, and 3 months after the treatment. In controls, joint range of motion (ROM) was evaluated with the goniometer, pain was evaluated with the Visual Analog Scale (VAS) at rest, movement, and night, functional status was evaluated with the Shoulder Pain and Disability Index (SPADI) and the Shoulder Disability Questionnaire (SDQ), and quality of life was evaluated with Short Form-36 (SF 36).

Results: A statistically significant improvement was detected in the physical function, physical role limitation and pain parameters of ROM, VAS, SPADI, SDQ and SF-36 at the end of the treatment and at the 3rd month controls compared to the pre-treatment. When the end of the treatment and the 3rd month values were compared, the improvement continued, albeit weaker.

Conclusion: A significant improvement was observed in the VAS score, SF-36, SPADI, SDQ, ROM, and shoulder-specific tests in movement, rest and sleep in patients with shoulder pain at the end of the treatment and at the 3rd month controls. Physical therapy combined with exercise is considered as an efficient, cost-effective and safe method in patients with shoulder pain.

Key Words: Shoulder pain, quality of life, SF-36, physical therapy

Omuz Ağrılı Hastalarda Yaşam Kalitesi ve Fizik Tedavinin Yaşam Kalitesine Etkisi

Özet

Amaç: Çalışmamızda omuz ekleminden kaynaklanan omuz ağrılarında insanların yaşam kalitesinin ne derece etkilendiğini ve fizik tedavinin yaşam kalitesine olan katkısını araştırmayı amaçladık.

Yöntem: Çalışmamızda polikliniğimize omuz ağrısı şikayetiyle başvuran toplam 30 hasta değerlendirmeye alındı. Hastalara 2 hafta boyunca toplam 10 seans hot pack, Transkutanöz elektrik sinir stimulasyonu (TENS) ve ultrasound (US) dan oluşan fizik tedavi programı uygulandı. Hastalar tedavi süresince egzersiz programına alındı ve nonsteroid anti inflamatuvar ilaç (NSAID) kullandı. Değerlendirme fizik tedavi öncesi, tedavinin bitiminde ve tedavi bitiminden 3 ay sonra olmak üzere toplamda üç kez yapıldı. Kontrollerde eklem hareket açıklığı (ROM) gonyometre ile, ağrı; istirahat, hareket, gece ağrısı olmak üzere visual analog skala (VAS), fonksiyonel durum Shoulder Pain and Disability Index (SPADI) ve Shoulder Disability Questionnaire (SDQ) ve yaşam kalitesi Short form-36 (SF 36) ile değerlendirildi.

Bulgu: Tedavi bitiminde ve 3. ay kontrollerinde tedavi öncesine göre EHA, VAS, SPADI, SDQ VE SF-36'nın fiziksel fonksiyon, fiziksel rol kısıtlaması ve ağrı parametrelerinde istatistiksel anlamlı düzelme tespit edildi. Tedavi bitimi ile tedavi sonrası 3. ay değerleri karşılaştırıldığında ise düzelme daha zayıf olmakla birlikte devam etti.

Sonuç: Omuz ağrılı hastalarda hareketle, istirahatte ve uykudaki VAS skoru, SF-36, SPADI, SDQ, EHA ve omuza spesifik testlerde tedavi bitiminde ve 3. aydaki kontrollerde belirgin düzelme kaydedilmiştir. Omuz ağrılı hastalarda egzersizle kombine edilen fizik tedavi etkili, maliyeti düşük ve güvenli bir yöntem olarak görülmektedir.

Anahtar Kelimeler: Omuz ağrısı, yaşam kalitesi, SF-36, fizik tedavi

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INTRODUCTION

Shoulder pain is a common musculoskeletal problem in the general population. It ranks third in the society after low back and neck pain (1). The prevalence of shoulder pain ranges from 6.9% to 34% (2). Primary shoulder pathologies consist of rotator cuff pathologies, bicipital tendinitis, glenohumeral joint pathologies, glenoid labrum tears, acromioclavicular joint pathologies and glenohumeral instability (3). The most common cause is subacromial impingement syndrome (SIS), which is seen as a result of the compression between the rotator cuff structures, subacromial bursa and humeral head of bicipital tendon, and the coracoacromial arch (4). Studies have shown that the quality of life in patients with shoulder pathologies is significantly reduced (5).

A diagnosis should be made and treatment should be started quickly, with anamnesis, physical examination, shoulder-specific tests and, if necessary, radiographic evaluations in a patient with shoulder pain. Conservative treatment is recommended primarily in the treatment. Conservative treatment methods are rest, ice application, non-steroidal anti-inflammatory (NSAID) and analgesic drugs, exercise, physical therapy modalities, mobilization, and injection therapy (6,7). Heat agents used in physical therapy provide muscle relaxation, increase soft tissue elasticity, and reduce joint stiffness in various musculoskeletal pathologies (8). The effect of therapeutic ultrasound (US) is mainly due to thermal and non-thermal effects, while the mechanical ultrasound energy is absorbed by the tissues and increases tissue healing and repair. It is widely used in the treatment of many diseases such as myofascial pain syndrome, low back pain, pelvic pain, and knee osteoarthritis (9). Transcutaneous electrical nerve stimulation (TENS) is a low-frequency electrical current applied with superficial electrodes placed on the skin. It is used to relieve pain in acute and chronic painful conditions (10). These physical therapy modalities are frequently used in musculoskeletal disorders. In our study, we aimed to investigate how shoulder pain affects the quality of life of people and to what extent physical therapy with a combination of US, TENS, hot pack, and exercise changes the quality of life, pain and functional status.

METHODS

A total of 30 patients aged between 30-73 years who applied to the Physical Therapy and Rehabilitation and Orthopedics outpatient clinic with the complaint of shoulder pain and limitation between December 2009 and February 2010 were evaluated in
our study.

Of all patients participating in the study, detailed anamnesis was taken, necessary radiological examinations (shoulder AP/lateral, cervical AP/lateral, PA chest graphy) were performed together with orthopedic and neurological examinations, and complete blood

count, sedimentation, and C-reactive protein levels were recorded. Moreover, Neer, Hawkins, Jobe, Painful arc, Speed and Yergason tests were performed before the treatment, at the end of the treatment and three months after the treatment. Magnetic resonance imaging (MRI) was requested from patients with full-thickness tears and suspected malignancy. Those with systemic inflammatory rheumatic disease, malignant disease, decompensated heart failure, cardiac pacemaker, those with a history of neurological and psychiatric diseases, those who have undergone shoulder and neck surgery, those who received shoulder physical therapy and steroid injection in the last 3 months, those with impaired shoulder integrity after major trauma, and those with full-thickness tears were excluded from the study.

A total of 10 sessions of physical therapy consisting of US, TENS and hot pack were applied to 30 patients included in the study five days a week. Active US was applied as a continuous and pulsed on 1.5 watts/cm² dose at a frequency of 1 MHz for 5 minutes. Active TENS was performed with the conventional method, transarticularly with 4 electrodes.

The exercise program was started with passive range of motion (ROM), stretching and pendulum exercises (Codman exercises). Shoulder strengthening exercises were started in patients with full or nearly full range of motion. After good strengthening was achieved, movements of the shoulder above 90 degrees and activities of daily living were allowed.

VAS (visual analog scale) was used for pain assessment. Rest, movement, and night pain were evaluated separately. For this, a line 10 cm long was drawn, and this line was numbered at 1 cm intervals. It was explained that 0: painless and 10: the most severe pain, and the patient was asked to mark the value corresponding to his pain on the scale.

Joint range of motion (ROM) was measured actively and passively with a goniometer. The patient's shoulder abduction, flexion, internal and external rotation range of motion values were measured and recorded. Values were measured with the patient in the supine position.

The 16-item Shoulder Disability Questionnaire (SDQ) was used to assess pain-related disability. The patient was asked to tick one of the options ‘yes’, ‘no’ or ‘not applicable’ for each item, depending on whether or not s/he had done it in the last 24 hours. Is/f he has done the activity and has pain, the option ‘yes’ was marked, if s/he has done the application but has no pain, the option ‘no’ was marked, and if he has not done this in the last 24 hours, the option ‘not applicable’ was marked. In this scale, zero points indicate maximum well-being, and 100 points indicate maximum illness state.

The Shoulder Pain and Disability Index (SPADI) was used to measure pain and disability associated with shoulder pain. This questionnaire

consists of two parts, namely pain and disability, and includes a total of 13 questions. The patients were asked to rate the severity of pain during different activities they performed in the past week, by scoring between zero (no pain) and 10 (most severe pain). According to these answers, pain and disability were evaluated separately. In this questionnaire, zero points indicate maximum well-being, and 130 points indicate maximum illness state.

In our study, the SF-36 form, whose reliability and validity has been demonstrated by studies and which could also be filled in by the patient as a general quality of life scale, was used in patients with musculoskeletal disorders. This 36-item questionnaire includes 8 different health-related parts: 10 items about physical function, 2 items about social function, 3 items about role limitations due to physical problems, 5 items about mental health, 4 items about energy-vitality, 2 items about pain, and 5 items about general perception of health. The patients were asked to evaluate the questions considering the last four weeks. The answers given were converted into a scored scale from 0 (worst health condition) to 100 (best health condition) for each part. The subjects were evaluated before treatment, after treatment and at the 3rd month.

Statistical analysis

SPSS 15.0 (Statician Package of Social Science) program was used to evaluate the study results. Paired Samples T Test was used in dependent groups to compare the pre- and post-treatment values of the patients, and Bivariate Correlation Analysis was used to investigate the correlations between the parameters. The normality of the groups was determined by the Kolmogorov Smirnov test. A p value of <0.05 was considered significant.

RESULTS

Of our patients, 9 were male, 21 were female, one of them was single and the rest were all married. The mean age was 53.03 ± 9.45 (30 – 73 years) and the education level was 16 primary school, 3 secondary school, 4 high school and 1 university graduate. According to distribution by occupation, 18 people were housewives and 12 people were retired. Of them, 17 had right shoulder pain and 13 had left shoulder pain. The duration of pain ranged from 1 month to 48 months, with a mean of 8.9 ± 11.4 months. While 29 of the patients were right-handed, 1 of them was left-handed. No correlation was found between the hand used and the shoulder with pain. Details are presented in Table 1.

Table 1. VAS Score and correlation results of variables

		P Value	Correlation Coefficient
Hand used and the shoulder with pain		0,26	0.212
The Rate of Improvement of Pain and	Age	0,31	0,208
	Duration of pain	0,44	0,162
	Gender	0,38	0,416
	Painful shoulder	0,56	0,121
	Education level	0,68	-0,86
	Weight	0,69	-0,84

It was determined that the VAS scores of the patients during movement, rest and sleep decreased

statistically significantly before the treatment, at the end of the treatment and 3 months after the treatment. Details are presented in Table 2. According to the VAS scores, there was no correlation between the rate of improvement of pain and age, duration of pain, gender, painful shoulder, education level and weight. Details are presented in Table 1.

Active and passive external rotation, flexion, and abduction angles of the patients showed a statistically significant increase at the end of the treatment and at the controls after 3 months compared to the pre-treatment. In the active and passive internal rotation angles, there was a statistically significant increase at the end of the treatment compared to the pre-treatment, but there was no more increase in the third month control. The details are presented in Table 3.

Shoulder movements of the patients were evaluated with Hawkins, Yergason, Supraspinatus, Speed, and Neer tests for specific diagnosis. While Hawkins test was positive in 86.7% of the patients before the treatment, it was found positive in 36.7% at the end of the treatment ($p<0.001$). The difference between them was statistically significant. Likewise, Yergason test was 56.7%, Supraspinatus test was 86.7%, Speed test was 96.7% and Neer test was 83.3% positive before the treatment while these positivity rates were 3.3% ($p<0.001$) in Yergason test, 33.3% ($p<0.001$) in Supraspinatus test, 33.3% ($p<0.001$) in Speed test and % 20.0 ($p<0.001$) in Neer test at the end of the treatment ($p<0.001$). In the 3rd month after the treatment, positivity was detected in Hawkins at a rate of 26.7%, Yergason at a rate of 3.3%, Supraspinatus at a rate of 23.3%, Speed at a rate of 33.3% and Neer at a rate of 16.7%. The difference between all these values was found to be statistically significant. Details are presented in Table 4.

Table 2. Changes in patients' VAS scores before, after, 3 months after treatment and statistical significance values

	Before Treatment	End of Treatment	3. Month After Treatment	Before – End of Treatment	Before – 3. Month After Treatment	End of Treatment – 3. Month After Teatment
With movement VAS	7,73±2,49	4,05±2,71	3,00±2,47	< 0,001*	< 0,001*	0,05
At rest VAS	4.00±3.44	2.17±2.48	1.27±2.24	< 0,001*	< 0,001*	0,01
İn the sleep VAS	6.28±3.36	2.57±2.71	1.47±2.58	< 0,001*	< 0,001*	0,02

Table 3. Joint range of motion measurements and statistical evaluation results before, after and 3 months after treatment

	Before Treatment	End of Treatment	3. Month After Treatment	Before – End of Treatment	Before – 3. Month After Treatment	End of Treatment – 3. Month After Teatment
Active İnternal Rotation	56.6±13.8	68.0±5.5	68.0±5.2	<0,001	<0,001	0,87
Passive İnternal Rotation	60.7±12.4	69.2±5.7	68.9±5.9	<0,001	<0,001	0,24
Active External Rotation	52.0±20.7	68.6±23.0	72.9±20.9	<0,001	<0,001	0,053
Passive External Rotation	56.8±20.5	72.3±20.9	76.1±18.6	<0,001	<0,001	0,019
Active Flexion	144.9±31.5	167.0±21.8	168.8±20.0	<0,001	<0,001	0,024
Passive Flexion	152.3±27.5	169.7±18.9	171.7±14.9	<0,001	<0,001	0,024
Active Abduction	121.2±36.8	141.3±31.8	152.6±32.4	0,002	<0,001	0,005
Passive Abduction	129.0±35.0	150.5±34.6	158,9±28,3	<0,001	<0,001	0,047

Table 4. Impingement test positivity rates and statistical evaluation results before, after and 3 months after treatment

	Before Treatment	End of Treatment	3. Month After Treatment	Before – End of Treatment	Before – 3. Month After Treatment	End of Treatment – 3. Month After Teatment
Hawkins	86.7	36.7	26.7	0,001	< 0,001	0,264
Yergason	56.7	3.3	3.3	<0,001	< 0,001	1,00
Supraspinatus	86.7	33.3	23.3	< 0,001	< 0,001	0,184
Speed	96.7	33.3	33.3	< 0,001	< 0,001	1,000
Neer	83.3	20.0	16.7	< 0,001	< 0,001	0,712

Table 5. Mean SF-36 scores and statistical evaluation results before, after and 3 months after treatment

SF-36	Before Treatment	End of Treatment	3. Month After Treatment	Before – End of Treatment	Before – 3. Month After Treatment	End of Treatment – 3. Month After Teatment
General health	58,1	61,7	65,2	0,02	< 0,001	0,02
Physical function	75,1	85,4	89,6	<0,001	< 0,001	0,02
Social function	73,3	83,3	92,0	0,02	0,04	<0,001
Physical role restriction	60,4	79,1	87,0	<0,001	< 0,001	0,02
Emotional role restriction	78,3	78,8	83,8	0,78	0,01	0,005
Mental health	53,5	50,1	49,0	0,01	0,01	0,48
Energy	59,7	56,8	55,2	0,1	0,03	0,28
Pain	46,0	68,0	76,0	<0,001	< 0,001	0,01

The discomfort experienced by the patients due to aching shoulders and its effect on their daily lives were evaluated with SPADI. The mean SPADI-Pain score was observed as 75.3±2.6 before the treatment, 42.7 ±3.7 at the end of the treatment, and 28.2 ± 4.0 at the 3rd month after the treatment. The mean SPADI-Physical function score was detected as 69.4 ± 3.2 before the treatment, 37.9 ± 3.9 at the end of the treatment, and 23.1 ± 4.3 at the 3rd month after the treatment. A statistically significant decrease was found in all scores when before the treatment-end of the treatment, before the treatment-3rd month after the treatment, and end of the treatment-3rd month after the treatment were compared ($p<0.001$ in all evaluations) (Figure 1).

The SDQ was used to evaluate the limitations experienced by the patients in their daily activities due to pain. While the mean score was 83.7 before the treatment, it was 46.6 at the end of the treatment and 34.1 at the 3rd month after the treatment. The difference between all values was found to be statistically significant. (Before the treatment-End of the treatment $p<0.001$, Before the treatment-3rd month after the treatment $p<0.001$, End of the treatment-3rd month after the treatment $p=0.012$). It was evaluated that the improvement continued in the 3rd month follow-up of the patients, and they were better at the 3rd month compared to the end of the treatment (Figure 2).

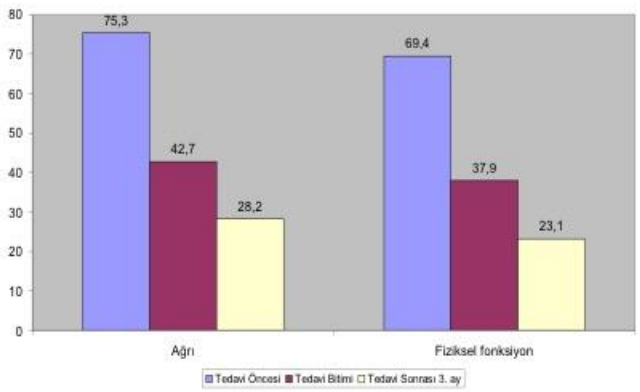

Figure 1. Change in mean SPADI scores before treatment, at the end of treatment, and at 3 months after treatment.

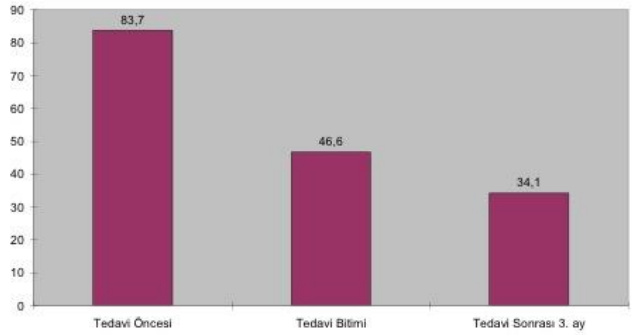

Figure 2. Mean SDQ scores before treatment, at the end of treatment and at 3 months after treatment.

From quality of life subgroups assessed with SF-36, physical function score ($p<0.001$), physical role limitation ($p<0.001$), pain ($p<0.001$), general health ($p=0.02$), social function ($p=0.02$), and mental health ($p= 0.01$) scores were statistically significant at the end of 10 sessions of physical therapy applied to the patients and at the 3rd month after the treatment while there was no significant difference in the energy ($p=0.1$) and emotional role restriction ($p=0.78$) subgroups at the end of the treatment. In the evaluations of these two groups at the 3rd month after the treatment, it was observed that there was a significant increase ($p=0.03$ and $p=0.01$) compared to before the treatment. It was detected that the increase in the quality of life in general was more pronounced in the 3rd month after the treatment. The details are presented in Table 5.

DISCUSSION

Shoulder pain is a crucial cause of disability that affects shoulder movements and functions, thus restricting the person in daily life functionally and spiritually. Acute or chronic shoulder pain with intra-articular or extra-articular origin caused by trauma or degenerative process causes limitations in patients and negatively affects daily living activities (3). Therefore, rapid diagnosis and treatment of individuals with shoulder pain will both increase their quality of life and accelerate their return to social life. Conservative approach is primarily recommended in primary shoulder lesions. Rest, ice application, NSAID and analgesic drugs, exercise, physical therapy modalities are used as conservative treatment methods (6,7). In our study, a combination of US, TENS, hot pack, and exercise was applied to the patients with shoulder pain as physical therapy, and a statistically significant improvement was observed in shoulder ROM, functionality, pain and quality of life at the end of the treatment and at the 3rd month follow-up compared to before the treatment. In a study, 413 patients diagnosed with SIS were treated with conservative methods, and successful results were obtained in 67% of them, in parallel with our study. They reported that those who started treatment within one month of symptom onset had a higher chance of success (11). In another study, 62 patients with shoulder pain were treated conservatively with rest, ice application, NSAID treatment, exercise program, physical therapy modalities, mobilization techniques, subacromial injections, and statistically significant improvement was observed in the pain, shoulder ROM and functional status of the patients in comparison of the values of the

patients before and after the treatment (12). In a study investigating the effectiveness of different analgesic currents, two groups of patients with shoulder pain were formed, deep and superficial heat was applied to both groups, in addition, TENS was given to one group and interferential current to the other group, and a decrease in pain intensity and an increase in ROM were noted in both groups after the treatment (13). In another study comparing the effects of conventional US and high-powered US at the pain limit on shoulder pain, ROM and upper extremity functions in patients with frozen shoulder, it was shown that patients benefited from both treatment programs (14). Likewise, in another study comparing extracorporeal shock wave therapy (ESWT) + exercise combination with ultrasound + exercise combination in frozen shoulder patients, it was stated that both treatment methods were beneficial in reducing pain and increasing range of motion and adding a physical therapy program to frozen shoulder treatment would be beneficial (15). In our study, US, TENS, hot pack therapy and exercise therapy were applied to the patients without any interventional procedure, and a significant reduction was achieved in both ROM and pain intensity. At the same time, statistically significant improvement was achieved in all parameters evaluated at the end of the treatment and this improvement was found to continue in the 3rd month controls.

In a study comparing Tenoxicam injection and physical therapy, significant improvement was observed in shoulder ROM and SDQ scores in both groups at the 1st, 2nd and 6th weeks after the treatment compared to before the treatment (16). In our study, a statistically significant decrease was achieved in the ROM and SDQ scores at the end of the treatment, and it was observed that the decrease in the scores continued at the 3rd month controls. It was seen that satisfactory improvement could be achieved with interventional procedures such as PRP (platelet rich plasma), steroid, NSAID injection, etc. in shoulder pain as well as with non-invasive methods. However, randomized comparative studies are needed to determine which method is superior.

Pain often has a negative impact on activities of daily living and quality of life (17,18). Among musculoskeletal pain, shoulder pain has the greatest impact on quality of life and is an independent risk factor for poor quality of life. There is a prevailing opinion that interventions to improve shoulder pain and shoulder complaints are necessary in order to improve the quality of life in healthy middle-aged and elderly people (19). In a study in which 120 patients with shoulder pain were examined, kinesiophobia caused by pain in the shoulder causes the patients to experience limitations in their daily living activities, while the low quality of life brought about by this situation causes patients to fight both physical and psychological factors (20). In our study, it was

determined that there was a significant improvement in the general quality of life, and SPADI and SDQ scores of the patients together with the treatment we applied. In patients with shoulder pain, it may be possible to achieve a serious improvement in the quality of life with conservative treatments without any interventional procedure.

Patients diagnosed with SIS were randomly divided into three groups in a recent study. Group 1 received PRP injection into the subacromial space of the affected shoulder, corticosteroid injection was applied into the subacromial joint space in Group 2, and 10 sessions of physical therapy consisting of TENS, US, and hot pack were applied five times a week in Group 3. An exercise program was applied to all groups. In the treatment of SIS, all three treatment methods were effective in terms of pain, quality of life, and functionality. However, they reported that physical therapy and exercise methods might be the first choice in SIS because they were inexpensive and noninvasive, and the risk of side effects is low compared to others (21). In our study, a significant improvement was observed in the quality of life, joint range of motion, shoulder-specific tests, functionality, and pain in the patients at the end of physical therapy and at the 3-month follow-up.

The lack of a control group and the small number of patients can be considered as the limitations of our study. However, despite the small number of patients, it was shown that statistically significant improvement was achieved in all parameters evaluated with the treatments applied. Moreover, although a significant decrease in pain and an increase in the quality of life of the patients were observed after the treatment, an imaging method that could objectively show the improvement could not be used. Conducting more detailed studies, in which the improvement was also shown by imaging, will help to reveal the results more objectively.

CONCLUSION

All in all, significant improvement was noted in the VAS, SF-36, SPADI, SDQ, ROM and shoulder-specific tests in the patients with shoulder pain during movement, rest, and sleep at the end of the treatment and at the 3rd month controls. Physical therapy combined with exercise is considered as an effective, cost-effective and safe method in patients with shoulder pain. However, there is a need for longer-term, large and comprehensive studies with a larger number of patients.

Ethics Committee Approval: This study was carried out in accordance with the Declaration of Helsinki Principles and was presented as a medical specialization thesis in 2011. Consent form was obtained from all participants

Peer-review: Externally peer-reviewed.

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Data Collection and Processing: D. C, T.U. Analysis or Interpretation: D. C, T.U. Written by: D. C, T.U.

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