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# Effects of conservative therapy applied before arthroscopic subacromial decompression on the clinical outcome in patients with stage 2 shoulder impingement syndrome

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## Effects of conservative therapy applied before arthroscopic subacromial decompression on the clinical outcome in patients with stage 2 shoulder impingement syndrome

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**Background/aim:** To investigate the effects of conservative therapy applied before arthroscopic subacromial decompression on the clinical outcome in patients with stage 2 shoulder impingement syndrome.

**Materials and methods:** Sixty-eight patients having stage 2 shoulder impingement syndrome and treated with arthroscopic subacromial decompression were included in the study. We divided these patients into 2 groups, whereby 32 (47%) patients received conservative therapy before arthroscopic subacromial decompression and 36 (53%) patients did not receive conservative therapy. We compared both groups in terms of the the Constant, UCLA, and VAS scores for shoulder pain before and after arthroscopic subacromial decompression.

**Results:** Constant, UCLA, and VAS scores were statistically significantly improved in both groups after arthroscopic subacromial decompression ( $P < 0.001$ ). Constant, UCLA, and VAS scores before arthroscopic subacromial decompression were statistically better in Group 1 than in Group 2 ( $P < 0.001$ ). No statistically significant difference was found between the groups in terms of Constant, UCLA, and VAS scores after arthroscopic subacromial decompression ( $P > 0.05$ ).

**Conclusion:** Conservative therapy applied in patients with stage 2 shoulder impingement syndrome before arthroscopic subacromial decompression does not have a positive contribution on the clinical outcome after arthroscopic subacromial decompression.

**Key words:** Stage 2 shoulder impingement syndrome, arthroscopic subacromial decompression, conservative therapy

### 1. Introduction

One of the most common causes of shoulder pain is impingement syndrome (1). Neer defined impingement as to occur against the anterior edge and undersurface of the anterior third of the acromion, the coracoacromial ligament, and, occasionally, the acromioclavicular joint, rather than against the lateral acromion (2). Neer divided signs and symptoms of impingement lesions into 3 stages. Stage I consists of edema and hemorrhage, usually encountered in patients aged <25 years, and its treatment is conservative. Stage II consists of fibrosis and tendonitis from repeated mechanical irritation, encountered in persons aged 25 to 40 years; its treatment modality is primarily conservative, although surgical management is recommended if sufficient improvement cannot be achieved despite conservative therapy of over 6 months. Stage III consists of complete rotator cuff tear and its treatment is surgery (3,4).

Although different combined applications may be seen in conservative therapy, in general this treatment may

include methods such as immobilization (5), ice, nonsteroid antiinflammatory drugs, corticosteroid injections, rotator cuff and scapular muscle strengthening exercises (6), manipulative therapies, range of motion exercises, various mobilization techniques (7), home exercise program, transcutaneous electrical nerve stimulation, ultrasound, intermittent ultrasound (8), and laser. The most important method in conservative treatment is exercise therapy.

Arthroscopic subacromial decompression (ASD) is widely used for the treatment of shoulder impingement syndrome. Neer popularized acromioplasty as the surgical treatment for chronic impingement syndrome. Arthroscopic anterior acromioplasty was described first by Ellman (9). Several authors have reported favorable results with ASD in the treatment of stage II impingement syndrome (10–17).

As mentioned above, the 2 main treatment options for shoulder impingement syndrome are conservative therapy and arthroscopic decompression surgery of the shoulder. Studies comparing arthroscopic surgery and conservative

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therapy, which have different results, have been published previously. In this retrospective study we compared the clinical outcomes of patients with shoulder impingement syndrome who received conservative therapy before ASD and those did not receive conservative therapy before ASD using the Constant (18), University of California at Los Angeles shoulder scale (UCLA) (19), and visual analog scale (VAS) (20) scores. This study was done in order to investigate whether preoperative conservative therapy resulted in better clinical outcome after ASD.

## 2. Materials and methods

Sixty-eight patients with stage 2 shoulder impingement syndrome were included in this retrospective randomized study. All of the patients had a detailed physical examination, and required tests for diagnosis and differential diagnosis were performed. Standard radiographs of the shoulder were ordered. The diagnostic tests for shoulder impingement syndrome were performed, and magnetic resonance imaging of the affected shoulder was carried out in all patients. Patients included in the study did not have cervical radiculitis, calcific tendinitis, adhesive capsulitis, degenerative joint disease, glenohumeral instability, acromioclavicular osteoarthritis, or rotator cuff tear.

We divided patients into 2 groups as patients who received and did not receive conservative therapy, which consisted of multiple periods of physiotherapy including range of motion (ROM) exercises like pendulum exercises and symptom-limited active-assistive ROM exercises, isometric strengthening exercises, and antiinflammatory medication. All the patients in Group 1 had attended physiotherapy, which was done by the same physiotherapist at the outpatient clinic, for at least for 6 months (range: 6–12 months) and did not have satisfactory improvement. Group 2 consisted of patients who preferred to be operated on as soon as possible without receiving any conservative therapy and who had had complaints for at least for 3 months (range: 3–15 months). Informed consent was received from all of the patients in both groups. This study was approved by the Ethics Committee of Atatürk University. Constant, UCLA, and VAS scores before ASD (just before the operation) and at the end of the follow-up period were evaluated in both groups.

All patients were operated on under interscalene block anesthesia in the beach-chair position. An arthroscope was placed in the subacromial bursa and subacromial decompression was performed in all of the patients. Patients had been introduced Codman pendulum exercises in a strap on the first day of the operation. The strap was removed when the patient felt comfortable and active exercises were suggested within the first week. At the fourth week after ASD, Constant, UCLA, and VAS scores were evaluated again in both groups.

## 2.1. Statistical analysis

SPSS 13.00 was used for statistical analysis. Intragroup values before and after ASD were compared with the paired-samples t-test. Intergroup values before and after ASD were compared with the variance test. Equal variances were assumed.  $P < 0.05$  was considered as significant. Values were expressed as mean  $\pm$  standard deviation.

## 3. Results

Of 32 (47%) patients in Group 1, 17 (53.1%) were male and 15 (46.9%) were female. Of 36 (53%) patients in Group 2, 20 (55.5%) were male and 16 (44.5%) were female. Mean age was 48.2 (range: 25–66) years in Group 1 and 50.3 (range: 26–64) years in Group 2. Mean hospitalization duration was 1.67 (range: 1–3) days. Mean back-to-work duration was 10.4 (range: 5–26) days. Mean follow-up duration was 31.1 (range: 24–48) months in Group 1 and 27.1 (range: 24–52) months in Group 2.

In Group 1, mean Constant score before ASD was 45.0, while it was calculated as 72.5 after ASD ( $P < 0.001$ ). In Group 1, mean UCLA score before ASD was 19.88, while it was calculated as 31.38 after ASD ( $P < 0.001$ ). In Group 1, mean pre-ASD VAS score was 6.13, while it was 1.38 after ASD ( $P < 0.001$ ). There was a significant difference between Constant, UCLA, and VAS scores before and after ASD in Group 1 ( $P < 0.001$ ) (Table).

In Group 2, mean Constant score before ASD was 14.33, while it was calculated as 71.97 after ASD ( $P < 0.001$ ). In Group 2, mean pre-ASD UCLA score was 7.86, while it was 30.61 after ASD ( $P < 0.001$ ). In Group 2, mean pre-ASD VAS score was 8.56, while it was calculated as 1.53 after ASD ( $P < 0.001$ ). There was a significant difference between Constant, UCLA, and VAS scores before and after ASD in Group 2 ( $P < 0.001$ ) (Table).

When Constant, UCLA, and VAS scores before and after ASD were compared between the groups, there was a statistically significant difference ( $P < 0.001$ ). No statistically significant difference was found between Group 1 and Group 2 in terms of Constant ( $P = 0.89$ ), UCLA ( $P = 0.49$ ), and VAS ( $P = 0.68$ ) scores after ASD (Table).

## 4. Discussion

The objective of conservative therapy in shoulder impingement syndrome is to reduce pain, decrease subacromial inflammation, enable healing of the injured rotator cuff, and provide an increase of joint motions. Several rehabilitation programs have been described for conservative treatment of shoulder impingement syndrome, but the superiority of these programs to each other is yet to be proven. Some of the exercise programs

**Table.** Intra; and intergroup comparison of Constant, UCLA, and VAS scores before and after ASD.

	Group 1, n = 32 (mean ± SD)	Group, 2 n = 36 (mean ± SD)	P*
Constant, before ASD	45.00 ± 10.47	14.33 ± 14.55	<0.001
Constant, after ASD	72.50 ± 12.76	71.97 ± 19.57	0.89
P**	<0.001	<0.001	
UCLA, before ASD	19.88 ± 4.10	7.86 ± 5.70	<0.001
UCLA, after ASD	31.38 ± 2.91	30.61 ± 5.63	0.49
P**	<0.001	<0.001	
VAS, before ASD	6.13 ± 0.94	8.56 ± 1.44	<0.001
VAS, after ASD	1.38 ± 1.33	1.53 ± 1.68	0.68
P**	<0.001	<0.001	

\*Intergroup comparison; \*\*intragroup comparison of the pre-ASD and post-ASD scores.

\*Repeated measures analysis of variance test; \*\*paired-samples t-test.

are based on muscle strengthening (5–7). ROM exercise programs aim to increase the restricted range of motion (7). Morrison et al. (6) obtained satisfactory results by 67% with conservative therapies and reported that the success rate was higher in patients with type 1 acromion who had the symptoms for shorter than 1 month. Hanratty et al. (21), Heredia-Rizo et al. (22), and Holmgren et al. (23) reported good short-term results with physiotherapy programs in patients with shoulder impingement.

Arthroscopic subacromial decompression is widely used in treatment of patients with shoulder impingement syndrome in the event of failure of conservative therapies. Arthroscopic anterior acromioplasty was described first by Ellman (9). Today, ASD has taken its place as a successful method in parallel with advancements in the devices used in arthroscopy (1,24). ASD includes acromioplasty, coracoacromial ligament resection, and bursectomy with a motorized shaver, burr and electrocautery (1,25). The ASD method has many advantages (16,17,26–28). Patients who had ASD returned more quickly to daily life and work, regained flexion and strength more rapidly, had a shorter length of stay in the hospital, and used fewer analgesics (17,28,29). The clinical success rate for acromioplasty is reported in the literature as being from 65% to over 90% (30–36).

Of their 42 patients with stage 2 shoulder impingement syndrome who underwent ASD, Lim et al. (1) achieved perfect results in 14 (33%), good in 21 (50%), equivalent in 4 (8%), and poor in 3 (7%). Dom et al. (37) obtained good

results with ASD in 45 of their 52 patients with stage 2 shoulder impingement syndrome and recommended ASD for the treatment of these patients.

There is not an exact consensus on the duration of conservative therapy to be applied in patients with shoulder impingement syndrome. Several studies recommended a duration of 3 to 6 months, over 6 months, or a maximum of 1 year for conservative therapy (27,38). However, it has been demonstrated in different studies that prolonged conservative therapy negatively affects the results of the treatment (12,27,31,35,38). The rotator cuff may be damaged, and symptoms may progress with prolonged conservative therapy (1). Gartsman (12) reported that the results are better in patients with symptoms lasting for less than 1 year.

In this study, Constant, UCLA, and VAS scores were statistically better in the patients who received conservative therapy before ASD than in those did not receive conservative therapy before ASD ( $P < 0.05$ ). We could not find a statistically significant difference between the groups in terms of Constant, UCLA, and VAS scores after ASD ( $P > 0.05$ ).

In our study, we found that conservative therapy applied in patients with stage 2 shoulder impingement syndrome before ASD does not have a positive contribution to the clinical outcome after ASD. Therefore, orthopedic surgeons dealing with shoulder impingement syndrome must keep in mind that conservative therapy will not improve postoperative clinical outcomes.

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