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Research

Home exercises and supervised exercises are similarly effective for people with subacromial impingement: a randomised trial

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KEY WORDS

Randomised controlled trial
Shoulder
Subacromial impingement syndrome
Exercise therapy
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ABSTRACT

Question: Are there different effects of home exercises and supervised exercises on pain and disability for people with subacromial impingement? **Design:** Randomised trial with two treatment arms, concealed allocation, blinded assessment of some outcomes, and intention-to-treat analysis. **Participants:** Forty-six patients with subacromial impingement were recruited from an interdisciplinary outpatient clinic of physical medicine and rehabilitation at a university hospital in Norway. **Intervention:** The home exercise group had one supervised exercise treatment followed by exercises at home for 6 weeks. The supervised exercise group had up to 10 supervised exercise treatments in addition to home exercises for 6 weeks. **Outcome measures:** The primary outcome was the Shoulder Pain and Disability Index (SPADI). Secondary outcome variables were: average pain during the past week, the Fear Avoidance Beliefs Questionnaire, participant satisfaction with treatment, active range of motion, work status and clinical shoulder tests. Pain was assessed weekly and all outcomes were assessed at 6 weeks. Participants were free to seek ongoing treatment of their choice until 26 weeks, when the SPADI was assessed again. **Results:** While both groups improved considerably, the groups did not differ significantly on the SPADI after the intervention at 6 weeks (0 points, 95% CI –14 to 14) or when followed up at 26 weeks (–2 points, 95% CI –21 to 17). There were no between-group differences for pain at any time. The remaining outcomes also did not differ significantly, except for the clinical tests of shoulder impingement. In the supervised exercise group, 11 out of 23 participants had two or more positive tests, compared to 18 out of 21 in the home exercise group. **Conclusion:** Supervision of more than the first session of a 6-week exercise regimen did not cause significant differences in pain and disability in people with subacromial impingement. **Trial registration**: NCT01257113. **[Granviken F, Vasseljen O (2015) Home exercises and supervised exercises are similarly effective for people with subacromial impingement: a randomised trial. *Journal of Physiotherapy* 61: 135–141]**

Introduction

The shoulder is one of the most frequent sites of musculoskeletal pain, exceeded only by back and knee pain.[1] The incidence of shoulder pain in primary care patients is estimated to be 11.2 per 1000 per year.[2] The course varies, but a considerable number of people with shoulder pain (41%) show persistent symptoms after 1 year.[3] Many people with shoulder pain have signs of subacromial impingement,[2,4] which is characterised by pain and disability, mainly in activities above shoulder height. Subacromial impingement is reported in 30 to 86% of shoulder pain patients in primary care, [2,4,5] and 36% in secondary care.[6]

The efficacy of physiotherapy is debated, and some passive treatments are not recommended.[7,8] There is strong evidence that extracorporeal shock-wave therapy is ineffective and moderate evidence that ultrasound is ineffective for subacromial impingement.[7] Brox and colleagues reported that surgical treatment and supervised exercises were equally effective in the treatment of subacromial impingement.[9,10] In a published systematic review, Kuhn[11] reported that exercise therapy had statistically and clinically significant effects on pain and disability, but supervised exercises were no better than home exercises. Walther and colleagues[12] compared standardised self-training, conventional physiotherapy and a functional brace, which all showed significant reduction in pain levels and improvement in disability. However, no differences among the three groups were found. Senbursa and colleagues[13] also included three groups: a supervised exercise group, a supervised exercise group combined with mobilisation, and a home-based rehabilitation group. All groups experienced significant decreases in pain and increases in shoulder muscle strength and disability, but no differences between groups were found. None of these studies had any form of blinding.

In the clinic, patients with subacromial impingement receive guidance in different training principles. Guidance is believed to be particularly important in the early rehabilitation phase where the patients need help and support to deal with pain and dysfunction, and to perform the exercises correctly. It remains unclear as to whether supervised exercises provide any additional benefit over

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home-based exercises. Therefore, the main research question in this study was:

Are there different effects of home exercises and supervised exercises on pain and disability for people with subacromial impingement?

Method

Design

In this randomised trial, people with subacromial impingement were randomised to home exercises or supervised exercises. They received oral and written information about the study and informed consent was obtained before baseline measurements were taken. Allocation was concealed. The participants were randomised via online access to the randomisation program at the Unit for Applied Clinical Research at Norwegian University of Science and Technology. Randomisation was stratified by gender to obtain gender-balanced groups because symptoms and pain intensity may differ between women and men.[14,15] Randomisation also used variable block sizes to assign participants to the two treatment groups. Data were obtained before randomisation and at the end of the 6-week intervention period by an examiner blinded to the participants' group assignment. The participants were instructed not to discuss their treatment with the examiner who performed the testing. Twenty-six weeks after randomisation, participants were also assessed without blinding via a mailed questionnaire. Based on their symptoms, participants were free to choose whether they wanted to continue treatment, or not, between 6 and 26 weeks.

Participants, therapists and centres

Participants were recruited from patients who had been referred for shoulder problems to the Interdisciplinary Outpatient Clinic of Physical Medicine and Rehabilitation Department at St. Olav's Hospital, Norway, between January 2011 and August 2012. As part of the standard procedures, both a doctor in physical medicine and an orthopaedic surgeon examined all referrals in order to determine further examination and treatment in the physical medicine or orthopaedic department. Patients ineligible for consideration for the study were surgery candidates with fractures, full thickness ruptures/total ruptures, or prosthesis candidates. A doctor in physical medicine examined all of the other patients who were considered to be suitable for non-operative treatment at the outpatient clinic. From this pool, patients were screened for inclusion in the current study.

To be eligible for the study, patients had to be between 18 and 65 years old and have unilateral shoulder pain lasting more than 12 weeks. Furthermore, they underwent three diagnostic clinical tests based on criteria in previous recommendations.[16] The painful arc test[17] was positive if pain was present in any parts of the motion path between 60 and 120 deg either on the way up or down during active abduction. A positive infraspinatus test[18] was indicated by pain and/or weakness in isometric external rotation against force performed with 90 deg of elbow flexion and the upper arm in neutral position along the side of the body. The Kennedy-Hawkins test[19] was positive if pain was experienced when the arm was passively positioned at 90 deg of flexion and internally rotated by the therapist. For a patient to be included in the study, all three tests had to be positive. In addition, they had to have normal passive glenohumeral physiological range of motion.

Exclusion criteria were: glenohumeral instability, acromioclavicular joint pathology, labrum pathology on imaging, proven full thickness ruptures/total ruptures of the rotator cuff, or signs of glenohumeral osteoarthritis. Patients were also excluded if they had: undergone shoulder surgery, insufficient language capability, cervical spine problems (if the patient reported more pain in the neck than the shoulder), rheumatoid arthritis, or other physical or serious mental illness. Earlier treatment, but no other treatment during the study period, was allowed.

Interventions

Before any intervention, all participants took part in a theory lesson with other people with shoulder problems. The course was physiotherapist-led and focused on shoulder anatomy and the rehabilitation process.

The home exercise group had one supervised treatment session with a physiotherapist in order to set up a tailored home-exercise program. The supervised exercise group was offered 10 treatments of supervised exercise therapy, in addition to home exercises. Exercises and overall training dose were the same for both groups. The intervention period was 6 weeks.

For both groups, established training principles were used.[11,20] The main goal for all exercises was to re-establish normal shoulder movement patterns through awareness, which the participants could transfer to daily activities. To normalise shoulder motion, a mirror was used at the start of the rehabilitation for visual stimulation. All participants started with training of correct scapular placement. An example of this was to depress the shoulder during shoulder flexion and abduction movements to avoid pulling the shoulder towards the ear and upward rotation of the scapulae. Focus was on scapular stabilising exercises, rotator cuff exercises, and pain-free range of motion exercises. Exercises were individually adapted.

During the training, a thin rubber band was used as a training tool for many of the exercises, either to reduce the arm load, control movement or provide resistance. The exercises were performed with as little pain as possible, and the choice of exercises, starting position and range of motion were decided with this in mind. Participants used three sets of 30 repetitions for most exercises. For both groups the same exercises were performed at home with four to six exercises twice a day every day. The home training group was also instructed in the progression opportunities for the appropriate exercises.

Based on individual needs, participants were later given stretching exercises for tight structures in addition to the other exercises. Stretches were held for 30 seconds and repeated twice for each exercise. All participants were given written home exercises and they registered their training in a training diary.

Outcome measures

Baseline data included age, gender, dominant arm, painful arm, education, duration of symptoms, treatment during the last 3 years and work status.

Primary outcome

The primary outcome was the Shoulder Pain and Disability Index (SPADI).[21] This is a self-reported questionnaire for people with shoulder pain. The SPADI contains 13 items that assess two domains: a five-item subscale that measures pain and an eight-item subscale that measures disability. Items are scored on a visual analogue scale. The total score ranges from 0 to 100 points, where 0 is no pain/disability and 100 is the worst pain/disability. The questionnaire was scored as originally described[21] and a version adapted to the Norwegian language and culture was used.[22]

Secondary outcomes

Secondary outcome variables were: average pain in the past week, scored on a numerical rating scale; clinical tests (painful arc, infraspinatus and Kennedy-Hawkins tests); the Fear Avoidance Beliefs Questionnaire (FABQ); active range of motion; work status; and participant satisfaction.

The painful arc, infraspinatus and Kennedy-Hawkins tests are designed for diagnostic purposes, but the tests were repeated at 6 weeks to see if they had changed over the intervention period.

Active range of motion was measured using a digital inclinometer.[a] Maximum ranges for active flexion, abduction, external and