

## Supervised Exercise Superior to Radial Extracorporeal Shockwave Treatment for Subacromial Pain Syndrome

Engebretsen K, Grotle M, Bautz-Holter E, et al. Radial extracorporeal shockwave treatment compared with supervised exercises in patients with subacromial pain syndrome: single blind randomised study. *BMJ* 2009;339:b3360.

### Study Overview

**Objective.** To compare the effectiveness of supervised exercises and radial extracorporeal shockwave treatments for the treatment of subacromial pain syndrome.

**Design.** Randomized nonblinded controlled trial.

**Setting and participants.** The setting was a single outpatient physical medicine and rehabilitation clinic in Oslo, Norway. Subjects were women and men aged 18 to 70 years who had subacromial shoulder pain lasting at least 3 months during 2006–2007. Subjects were excluded if they had physical signs of rotator cuff rupture or subacromial impingement syndrome, bilateral shoulder pain, previous surgery on the affected shoulder, joint instability, rheumatoid arthritis, glenohumeral or acromioclavicular arthritis, inability to understand Norwegian, serious psychiatric disorders, pregnancy, or previous experience with either of the study interventions. Of 110 subjects meeting inclusion criteria, 104 consented to participate in the study. Subject baseline characteristics, including age, educational attainment, duration of symptoms, and previous treatments, were similar between the treatment groups.

**Interventions.** Subjects were randomized to receive either a supervised exercise regimen or a series of radial extracorporeal shockwave treatments. The exercise regimen consisted of up to 12 weeks of biweekly 45-minute sessions with 1 of 2 physiotherapists, with each session focusing on “re-learning normal movement patterns” through observation, instruction, and feedback (median 14 treatments received). Radial extracorporeal shockwave treatments, which rely on shockwaves generated when a contained projectile hits an instrument applied to the subject, were provided weekly for 4 to 6 weeks by a physiotherapist (median 5 treatments received). Patients were instructed not to take any additional treatments during the study period. Analyses of differences between the treatments were stratified by patient gender.

**Main outcome measures.** The primary outcome was the patients’ self-reported scores on the shoulder pain and disabil-

ity index (SPADI) questionnaire. Secondary outcomes were self-reported pain intensity, functional capacity, work status, and active range of motion (assessed by a physiotherapist blinded to treatment group). Outcomes were assessed at 6, 12, and 18 weeks.

**Main results.** As compared with radial extracorporeal shockwave treatments, the adjusted effect of supervised exercise was 8.4 points on the SPADI questionnaire (95% confidence interval [CI], 0.6–16.5) at 18 weeks. Subjects receiving supervised exercise were more likely than those receiving radial extracorporeal shockwave treatments to return to work by week 18 (76% vs. 52%;  $P = 0.016$ ). There were no significant differences in pain intensity, functional capacity, or active range of motion between treatment groups. Between weeks 12 and 18, subjects randomized to radial extracorporeal shockwave treatments were more likely than those randomized to exercise to receive additional treatments such as cortisone injections, chiropractic treatment, and physical therapy/supervised exercises (25% vs. 6%;  $P = 0.014$ ).

**Conclusion.** Supervised exercise may be superior to radial extracorporeal shockwave treatments for the treatment of subacromial pain syndrome. The scope and setting of this trial suggest a need for corroborating evidence. However, given that the mechanisms of action for both treatment modalities are unclear, payers may wish to preferentially reimburse supervised exercise over newer—but less effective—treatment technology.

### Commentary

Though shoulder pain is a common condition treated by physicians and physical therapists, the exact pathophysiology of subacromial pain syndrome (also known as rotator cuff disease, impingement syndrome, and rotator cuff tendinosis) is unknown [1]. Common treatments for subacromial pain syndrome include oral and injected medications as well as exercise, and extracorporeal shockwave treatment has become an increasingly common treatment modality despite evidence that its effectiveness may be limited [2]. In the context of recent evidence that procedure-based treatments may

not improve upon exercise for this complex syndrome [3], a comparison between extracorporeal shockwave treatment and exercise is timely.

The current investigation by Engebretsen and colleagues present results from a single-center randomized controlled trial comparing the effectiveness of supervised exercise and extracorporeal shockwave treatment for subacromial pain syndrome. Compared with extracorporeal shockwave treatment, patients receiving supervised exercise had greater self-reported subjective improvement in symptoms and higher rates of return to work at 18 weeks. In addition, patients in the extracorporeal shockwave treatment group were more likely to receive additional treatments including cortisone injections, chiropractic treatments, or physical therapy over the study period. The higher rate of return to work in the exercise group, despite an absence of differences in functional capacity or active range of motion, suggests that the relationship between “objective” measures of physical function and more complex—but arguably more meaningful—social outcomes of treatment is incompletely understood.

This study has limitations. The “dose” of treatment may not have been directly comparable between treatment arms; duration of supervised exercise was 12 weeks, compared with 6 weeks for radial extracorporeal shockwave treatment. However, the superiority of exercise was actually greater at 6 and 12 weeks than at 18 weeks, suggesting that longer duration of radial extracorporeal shockwave treatment (or shorter duration of exercise) may not have changed the study’s findings. There were only 2 physiotherapists pro-

viding treatment in the exercise arm and 1 physiotherapist providing treatment in the radial extracorporeal shockwave treatment arm. Therefore, the study may have limited applicability to these treatment modalities in the hands of other providers. In addition, the study was limited to a single center in Norway, and it is possible that treatment effectiveness may compare differently in the United States.

### Applications for Clinical Practice

This study provides important evidence that exercised-based treatment is more effective than radial extracorporeal shockwave treatment for the treatment of subacromial pain syndrome. Given these results and others comparing exercise to newer, technology-intensive treatments for shoulder pain, payers and health system managers may wish to consider reinvesting in exercise-based treatment for this common problem until a substantially improved treatment technology is convincingly demonstrated.

—Review by Mark W. Friedberg, MD, MPP

### References

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