

## Home-Based Exercise Program Reduces Chronic Knee Pain

Thomas KS, Muir KR, Doherty M, et al. Home based exercise programme for knee pain and knee osteoarthritis: randomised controlled trial. *BMJ* 2002;325:752–6.

### Study Overview

**Objective.** To determine whether home-based knee exercise is effective at reducing knee pain and improving knee function.

**Design.** Pragmatic, factorial randomized controlled trial.

**Setting and participants.** Patients aged 45 years or older from 2 general medicine practices in Nottingham, England, were recruited if they reported knee pain on most days in a month and pain in the week prior to presentation. Patients with total knee replacement, lower limb amputation, and cardiac pacemakers were excluded. 786/1932 men and women with identified knee pain were randomized to 1 of 6 arms.

**Intervention.** Patients were assigned to a 2-year course of one of the following: a home exercise program, regular telephone contact, a placebo medication, exercise plus telephone, exercise plus telephone and placebo medication, or no intervention. The home exercise program included four 30-minute in-home training sessions and a self-paced, progressively challenging exercise plan.

**Main outcome measures.** The primary outcome was self-reported score for knee pain on the Western Ontario and McMaster Universities (WOMAC) osteoarthritis index at 2 years. Secondary outcomes were knee-specific physical function and stiffness (both scored on WOMAC), general physical function (SF-36 scale), psychological outlook (hospital anxiety and depression scale), and isometric muscle strength.

**Main results.** 600 (76.3%) participants completed the study. A significant reduction in the WOMAC knee pain score was observed in the pooled exercise groups (mean difference,  $-0.82$  [95% confidence interval,  $-1.3$  to  $-0.3$ ]). Reduction was sustained at 6, 12, 18, and 24 months, and pain scores were reduced furthest in patients with the highest reported adherence. No significant difference was found between groups that did and did not receive placebo medication or regular telephone contact.

**Conclusion.** A home-based exercise program reduces knee

pain. The improvement is not due to regular telephone contact with a researcher or therapist.

### Commentary

Knee pain is a common problem in the adult primary care population. Twenty-five percent of men and women over 55 years have a persistent episode of knee pain in a 1-year period, and 15% of these see their primary care physician about it [1]. Knee function is impaired by chronic pain and, as the population ages, the proportion of people disabled by knee pain is increasing. The high prevalence of knee disorders in older adults and the increasing burden on social supports and the health system make knee pain a major public health problem.

At least one prior study has documented that exercise via supervised physical therapy prevents disability from knee osteoarthritis. However, patient adherence to the exercise regimen declined over time and the cost was substantial [2]. Furthermore, similar studies show that these improvements are not sustained at 9 months [3]. Thomas and colleagues' study is innovative because a simple home-based exercise intervention is applied over 2 years. Unlike prior studies, the intervention required limited involvement of health professionals, followed patients for an extended period of time, and focused on pain and disability rather than radiographic appearance of the joint. From previous studies, the authors adopted a technique to distinguish the effect of social support and from the effect of the intervention. They periodically called participants in 2 of the study groups to show that calling was ineffective at reducing symptoms. Furthermore, they demonstrated that placebo medication did not replicate the effect of the home exercise.

Further analysis and study in this area will help define when home exercise is likely to be helpful and when it is

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unlikely to make a difference. A subgroup of patients in this study showed an excellent response to the intervention; the number needed to treat to achieve a reduction in pain score of more than 50% was 13. However, the authors were not able to characterize these high responders, which would help target the intervention. Applied universally, the returns from a home exercise program are limited, with an average reduction in pain score of 12% and an adherence rate at 2 years of 48%. When physicians are able to predict the moderate to high responders, home exercise will be a simple, effective, low-cost alternative to outpatient physical therapy for patients with knee pain.

### **Applications for Clinical Practice**

Home-based exercise is a simple, modestly effective treatment for chronic knee pain that should be targeted to moti-

vated patients who are likely to adhere to the treatment program.

*—Review by Josh F. Peterson, MD, MPH*

### **References**

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