

Exercise Programs Prevent Disability in Elderly Patients with Knee Osteoarthritis

Penninx BWJH, Messier SP, Rejeski WJ, et al. Physical exercise and the prevention of disability in activities of daily living in older persons with osteoarthritis. Arch Intern Med 2001;161:2309–16.

Study Overview

Objective. To examine whether supervised exercise programs can prevent the development of disability in activities of daily living (ADL) for elderly patients with knee osteoarthritis.

Design. 2-center, single-blind, randomized controlled trial. This study was based on a subgroup analysis of the previously published Fitness Arthritis and Seniors Trial (FAST) [1].

Setting and participants. 1402 community-dwelling persons aged 60 years or older with knee pain from osteoarthritis were initially recruited by 2 sites using advertisements and mailings. All participants had radiographically evident osteoarthritis and some impairment from the pain. Participants were included if they could walk on a treadmill or walk 128 m unassisted in 6 minutes. Participants were excluded from the study if they had any ADL disability as ascertained by a widely used questionnaire. Participants who had medical contraindications for an exercise program, had inflammatory arthritis, or already were participating in regular exercise also were excluded.

Intervention. Participants were randomized to 1 of 3 groups: (1) an 18-month education and support program, (2) an aerobic exercise program consisting of a 3-month facility-based supervised walking program followed by a 15-month home-based program, or (3) a resistance exercise program consisting of a 3-month facility-based supervised weight training program followed by a 15-month home-based program. Compliance to the exercise programs was measured by attendance during the facility-based part of the programs and by exercise logs during the home-based part of the programs.

Main outcome measures. During 18 months of follow-up, the development of ADL disability was assessed every 3 months using questionnaires administered during telephone interviews and data collection visits. ADL disability was defined as experiencing at least some difficulty in performing 1 of the following tasks without help: bathing, eating, dressing, transferring from bed to chair, or using a toilet.

Main results. Of the 1402 persons initially recruited, 250 were included in the study. Baseline demographic and clinical

characteristics were not statistically different among the 3 randomization groups. The dropout rate was 9.8% in the resistance exercise group and 13.6% in the aerobic exercise group. The cumulative incidence of ADL disability was lower in the exercise groups (37.1%) than in the education and support control group (52.5%) ($P = 0.02$). After adjusting for baseline demographic and physical function in a Cox proportional hazards model, the relative risk for developing an ADL disability was 0.60 (95% confidence interval [CI], 0.38 to 0.97; $P = 0.04$) in the resistance exercise group and 0.53 (95% CI, 0.33 to 0.85; $P = 0.009$) in the aerobic exercise program. Similar results were obtained in a Markov regression model. The lowest ADL disability risk was found for participants with the highest compliance to exercise.

Conclusion. Aerobic and resistance exercise programs may reduce the incidence of ADL disability in select elderly persons with symptomatic knee osteoarthritis.

Commentary

ADL disability represents a serious decline in function and previously has been shown to increase the risk of hospitalization, nursing home admission, and death. In this well-conducted study, Penninx et al demonstrated the potential for exercise programs to prevent ADL disability onset in elderly patients with symptomatic knee osteoarthritis. The effect of the exercise programs was impressive: the authors demonstrated a statistically significant risk reduction in ADL disability on the order of 40% to 45%, with only 18 months of follow-up.

Several factors may limit the generalizability of this study. First, 2% of the study population suffered an injury related to the exercise programs. Given that the study excluded persons with major medical problems and patients unable to walk on a treadmill or to walk 128 m in 6 minutes, the injury rate might have been higher if these programs had been offered to the community at large. Second, the relatively low dropout rates observed in the exercise groups suggest that the study recruited highly motivated participants. Thus, it might be difficult to reproduce the effects seen in this study in the community. Third, disability was assessed with questionnaires administered to unblinded subjects rather than with objective functional assessment tools. With the wide-

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spread belief that exercise is good for general health, it is possible that subjects in the exercise groups underreported their disabilities, thus exaggerating the exercise programs' effect. Fourth, the follow-up period in this study was relatively short; follow-up data beyond 18 months would be useful to assess the long-term benefits of the exercise programs.

Applications for Clinical Practice

Despite the limitations of this study, its methodologies are sound and its conclusions are reasonable. Furthermore, it builds on the growing literature showing the favorable effects of exercise programs on physiologic and performance out-

comes in the elderly. Thus, a supervised exercise program should be considered for the appropriately selected and motivated elderly patient with symptomatic knee osteoarthritis.

—Review by Eric Poon, MD

References

1. Ettinger WH Jr, Burns R, Messier SP, et al. A randomized trial comparing aerobic exercise and resistance exercise with a health education program in older people with knee osteoarthritis. The Fitness Arthritis and Seniors Trial (FAST). *JAMA* 1997;277:25-31.

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