

Review: Both aerobic and home-based quadriceps strengthening exercises reduce pain and disability in knee osteoarthritis

Roddy E, Zhang W, Doherty M. Aerobic walking or strengthening exercise for osteoarthritis of the knee? A systematic review. *Ann Rheum Dis*. 2005;64:544-8.

Clinical impact ratings: GIM/FP/GP ★★★★★☆ Phys Med & Rehab ★★★★★☆ Rheumatology ★★★★★☆

QUESTION

In patients with knee osteoarthritis, is aerobic exercise or home-based quadriceps strengthening exercises effective for reducing pain and disability?

METHODS

Data sources: MEDLINE, EMBASE/Excerpta Medica, CINAHL, PEDro, and the Cochrane Library (all searched to September 2003); and bibliographies of relevant studies. **Study selection and assessment:** Randomized controlled trials (RCTs) published in English of patients with knee osteoarthritis that compared aerobic walking or home-based quadriceps strengthening exercise with a nonexercise control group. Quality assessment of individual studies included random-

ization, blinding, withdrawals, and dropouts using a 5-point scale.

Outcomes: Pain and self-reported disability. The differences between the mean change scores for exercise and control groups were converted to effect sizes.

MAIN RESULTS

13 RCTs met the selection criteria. 3 RCTs evaluated aerobic walking (8- to 24-wk duration), 9 RCTs evaluated home-based quadriceps strengthening exercise (8-wk to 2-y duration), and 1 RCT compared aerobic exercise with home-based quadriceps strengthening exercise (18-mo duration). Weighted pooled effect sizes for pain were 0.52 (95% CI 0.34 to 0.70, $n = 449$) for aerobic walking and 0.32 (CI 0.23 to 0.42,

$n = 2004$) for quadriceps strengthening. Weighted pooled effect sizes for self-reported disability were 0.46 (CI 0.25 to 0.67, $n = 385$) for aerobic walking and 0.32 (CI 0.23 to 0.41, $n = 2004$) for quadriceps strengthening.

CONCLUSION

In patients with knee osteoarthritis, both aerobic walking and home-based quadriceps strengthening exercises reduce pain and self-reported disability.

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COMMENTARY

Osteoarthritis of the knee is very common: A third of elderly persons show radiographic evidence of knee osteoarthritis (1), and the prevalence is steadily rising with the increasing age of the population and the epidemic of obesity, 2 major risk factors. Knee osteoarthritis causes considerable joint pain, stiffness, and loss of function, compromising quality of life and leading to disability in an estimated 10% of persons > 55 years of age (1). The annual attributable costs are therefore immense, underscoring the need to identify effective, safe, and inexpensive interventions that can be applied to groups of patients or provided as "home-based" programs.

Although nonpharmacologic measures have long been a part of guidelines for treatment of knee osteoarthritis, the systematic review of RCTs by Roddy and colleagues is an important addition. It shows that both aerobic exercises (a general intervention) and quadriceps strengthening (a local, joint-specific intervention) are effective, with no advantage of one over the other. Reliance on "pooled," and therefore quite variable, data without direct comparison and little information on dropout rate (which may be 20% to 30%) (1) are limitations, because

patient adherence is critical for success (2). Nevertheless, concurrent with their other obvious advantages, these interventions seem to take effect within a few weeks (1) and lead to such improvements as longer 6-minute walking distance (2). Exercise has many additional benefits, not the least of which is a decreased incidence of disability in activities of daily living in older patients (3).

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