

# Research Paper Review

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# Exercise therapy may postpone total hip replacement surgery in patients with hip osteoarthritis: a long-term follow-up of a randomised trial

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## ABSTRACT

**Background** Exercise treatment is recommended for all patients with hip osteoarthritis (OA), but its effect on the long-term need for total hip replacement (THR) is unknown.

**Methods** We conducted a long-term follow-up of a randomised trial investigating the efficacy of exercise therapy and patient education versus patient education only on the 6-year cumulative survival of the native hip to THR in 109 patients with symptomatic and radiographic hip OA. Results regarding the primary outcome measure of the trial, self-reported pain at 16 months follow-up, have been reported previously.

**Results** There were no group differences at baseline. The response rate at follow-up was 94%. 22 patients in the group receiving both exercise therapy and patient education and 31 patients in the group receiving patient education only underwent THR during the follow-up period, giving a 6-year cumulative survival of the native hip of 41% and 25%, respectively (p=0.034). The HR for survival of the native hip was 0.56 (CI 0.32 to 0.96) for the exercise therapy group compared with the control group. Median time to THR was 5.4 and 3.5 years, respectively. The exercise therapy group had better self-reported hip function prior to THR or end of study, but no significant differences were found for pain and stiffness.

**Conclusions** Our findings in this explanatory study suggest that exercise therapy in addition to patient education can reduce the need for THR by 44% in patients with hip OA. ClinicalTrials.gov number <u>NCT00319423</u> (original project protocol) and <u>NCT01338532</u> (additional protocol for long-term follow-up).

## **ANALYSIS**

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#### **Background Information**

Physical activity and patient education are recommended as first-line treatments for all patients with osteoarthritis (OA). While total joint replacement is often considered in cases of advanced degeneration – or where conservative treatment methods have failed (1,2) – exercise therapy has been found to have beneficial effects in reducing pain and improving function in lower limb OA (3-6). This evidence; however, is based primarily on studies of knee OA. The objective of the current study was to evaluate the long-term effect of exercise therapy in addition to patient education on the patient's need for total hip replacement (THR).

#### PERTINENT RESULTS

#### Participants

220 patients were screened for eligibility; 109 were included in the trial and randomized to the exercise therapy or control group. Data on THR was collected for 102 patients; 71 total patients (41 in the exercise group, 30 in the control group) completed the final follow-up (29 months). 27 patients underwent THR prior to the 29 month follow-up; 11 of whom were lost to follow-up at 29 months.

#### THRs and cumulative survival of native hip

A total of 53 patients (22 exercise group, 31 control group) underwent THR within the 3.6-6.1 years of follow-up. Median time to THR was 5.4 years (4.5-6.2) in the exercise group and 3.5 years (2.3-4.6) in the control group. The 6-year survival rate of the native hip to THR was 0.41 for the exercise group vs. 0.25 for the control group. Exercise therapy plus education was associated with a protective effect against THR when compared with education alone (Cox hazard analysis – HR = 0.56, 0.32-0.96).

#### Self-reported pain, stiffness and function

WOMAC scores for physical function were significantly better in the exercise group vs. control group (p = 0.004) at 29 months; no significant difference was noted for pain or stiffness. Mean joint space was less in patients who underwent THR than those who did not ( $1.5 \pm 0.9$  mm vs.  $2.5 \pm 1.0$ , p < 0.01). The 53 patients who underwent THR prior to the end of the study had worse pre-operative WOMAC scores than those who did not undergo THR (p < 0.01).

### Self-reported physical activity and exercise

The number of self-reported exercise sessions per week was similar in the two groups. There was no significant difference in PASE (Physical Activity Scale for the Elderly) scores between the exercise therapy group and the control group over the 29-month follow-up period (p = 0.397).

#### **CLINICAL APPLICATION & CONCLUSIONS**

Participation in a 12-week exercise therapy program, in addition to patient education, resulted in

significantly higher 6-year cumulative survival of the native hip to THR compared with patient education only. Participation in this type of exercise program, therefore, has the potential to reduce the need for or postpone surgery in patients with hip OA. This finding supports recommendations that exercise therapy should be considered a first-line therapy and be offered to patients with hip OA.

## **STUDY METHODS**

This study is a long-term follow-up of a randomized, controlled trial evaluating the effect of exercise and patient education in hip OA patients (7).

## Participants

Inclusion criteria

- Age between 40 and 80 years,
- Hip pain for at least 3 months,
- Radiographically verified minimum joint space according to Danielsson's criterion (8) (< 4 mm for patients < 70 years, < 3 mm for patients > 70 years), and
- Harris Hip Score between 60 and 95 points.

### Exclusion criteria

- THR in the index joint,
- Knee pain or knee OA,
- Low back pain,
- Rheumatoid arthritis,
- Osteoporosis,
- Cancer,
- Cardiovascular disease unable to tolerate exercise,
- Dysfunction in lower extremities due to accident or disease,
- Pregnancy, or
- Not understanding Norwegian.

## Randomization and treatment groups

All patients were given three group sessions of a patient education program developed for patients suffering from hip OA (9). They were then randomized, using a computer-generated randomization list, to receive either exercise therapy or no exercise therapy. The exercise therapy program consisted of 12 weeks of exercises specifically designed for hip OA patients, performed 2-3 times per week, with physical therapist supervision at least once per week.

## Outcome measures and follow-up

The main outcome measure for this long-term follow-up was survival of the native hip to THR in the index joint. Follow-up appointments occurred at 4, 10, 16 and 29 months after inclusion via telephone contact. The Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) (10) and the Physical Activity Scale for the Elderly (PASE) (11) were filled in at baseline and at the 4-, 10-, 16- and 29-month follow-up.

## **STUDY STRENGTHS / WEAKNESSES**

## Limitations

- The criteria for when THR surgery was indicated were not specified prior to the start of the study.
- Preoperative assessment was not conducted, but pain and physical function were assessed with an average time of  $0.7 \pm 0.8$  years prior to THR.
- Calculation of statistical power for this study was not based on survival of the native hip to THR, but rather the WOMAC pain subscale, which was the primary outcome measure of this trial.

## Strengths

The study methodology regarding blinding, randomization and control were sound, and the exercise program frequency was reasonable and was not so ambitious as to nullify its likelihood of being adopted in non-study patients.

## Additional References

- 1. Dieppe PA, Lohmander LS. Pathogenesis and management of pain in osteoarthritis. Lancet 2005; 365: 65–73.
- 2. Lohmander LS, Roos EM. Clinical update: treating osteoarthritis. Lancet 2007; 370: 2082–4.
- 3. Zhang W, Nuki G, Moskowitz RW, et al. OARSI recommendations for the management of hip and knee osteoarthritis: part III: Changes in evidence following systematic cumulative update of research published through January 2009. Osteoarthritis Cartilage 2010; 18: 476–99.
- 4. Fransen M, McConnell S, Hernandez-Molina G et al. Exercise for osteoarthritis of the hip. Cochrane Database Syst Rev 2009; 3: CD007912.
- 5. Fransen M, McConnell S. Exercise for osteoarthritis of the knee. Cochrane Database Syst Rev 2008; 4: CD004376.
- 6. Hernandez-Molina G, Reichenbach S, Zhang B, et al. Effect of therapeutic exercise for hip osteoarthritis pain: results of a meta-analysis. Arthritis Rheum 2008; 59: 1221–8.
- 7. Fernandes L, Storheim K, Sandvik L, et al. Efficacy of patient education and supervised exercise vs patient education alone in patients with hip osteoarthritis: a single blind randomized clinical trial. Osteoarthritis Cartilage 2010; 18: 1237–43.
- Danielsson LG. Incidence and prognosis of coxarthrosis. Acta Orthop Scandi 1964; 66(Suppl): 61–114.
- 9. Klassbo M, Larsson G, Harms-Ringdahl K. Promising outcome of a hip school for patients with hip dysfunction. Arthritis Rheum 2003; 49: 321–7.
- 10. Bellamy N, Buchanan WW, Goldsmith CH, et al. Validation study of WOMAC: a health status instrument for measuring clinically important patient relevant outcomes to antirheumatic drug therapy in patients with osteoarthritis of the hip or knee. J Rheumatol 1988; 15: 1833–40.
- 11. Washburn RA, Smith KW, Jette AM, et al. The Physical Activity Scale for the Elderly (PASE): development and evaluation. J Clin Epidemiol 1993; 46: 153–62.

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