Physiotherapy 103 (2017) 283–288

Randomised controlled trial to evaluate a physiotherapy-led functional exercise programme after total hip replacement

B. Monaghan [a,*], P. Cunningham [b], P. Harrington [c], W. Hing [d], C. Blake [e], D. O' Dohertya [a], T. Cusack [e]

[a] *Department of Physiotherapy, Our Lady's Hospital, Navan, Co Meath, Ireland*
[b] *Department of Radiology, Our Lady's Hospital, Navan, Co Meath, Ireland*
[c] *Department of Orthopaedics, Our Lady's Hospital, Navan, Co Meath, Ireland*
[d] *Faculty of Health and Sciences and Medicine, Bond University, Robina, QLD, Australia*
[e] *School of Public Health, Physiotherapy and Population Science, University College Dublin, Belfield, Dublin, Ireland*

Abstract

Background At present, there is an insufficient evidence base to evaluate the effectiveness of physiotherapy following total hip replacement (THR). This study evaluated the effectiveness of a physiotherapy-supervised functional exercise programme between 12 and 18 weeks following THR. These time-points coincide with increased functional demand in patients.
Design Adequately powered assessor-blinded randomised controlled trial.
Setting Patients were recruited at a pre-operative assessment clinic and randomised following surgery.
Participants Sixty-three subjects were randomised to either the usual care group (control, $n = 31$) or the functional exercise + usual care group ($n = 32$).
Interventions Patients in the functional exercise group attended a physiotherapy-supervised functional exercise class twice weekly from 12 to 18 weeks following THR. Patients in the control group followed the usual care protocol with no exercise intervention.
Main outcome measurement The main outcome measurement tool was the Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) questionnaire, and the secondary outcomes included walking speed, hip abduction dynamometry, Short Form 12 physical and mental health scores, and visual analogue pain scale score.
Results At 18 weeks post surgery, WOMAC function and walking speed improved significantly more in the functional exercise group [mean difference −4.0, 95% confidence interval (CI) −7.0 to 1.0 ($P < 0.01$); mean difference 21.9 m, 95% CI 0.60 to 43.3 ($P < 0.04$)] than the control group, but there was no significant difference in hip abductor strength.
Conclusion This study demonstrated that patients who undertake a physiotherapy-led functional exercise programme between 12 and 18 weeks after THR may gain significant functional improvement compared with patients receiving usual care.

Clinical trial registration number NCT01683201.

Keywords: Total hip replacement; Late-stage functional exercise; Postoperative rehabilitation; Physiotherapy

Introduction

Total hip replacement (THR) is a successful surgical procedure performed for end-stage arthritis. Rates of THR are increasing internationally, with 86,488 replacements performed in the UK in 2012 [1]. Similar figures have been reported in the Republic of Ireland, where approximately 117/100,000 population underwent THR in 2011 [2].

In most cases, THR provides improved quality of life, pain relief and improved function [3,4]. Pain, physical impairment, gait change and reduced muscle strength have also been reported at 1- and 2-year intervals, even in groups who received physiotherapy as part of their early rehabilitation programme [5–7]. Postoperatively, a number of studies have

* Corresponding author. Address: Department of Physiotherapy, Our Lady's Hospital, Navan, Co Meath, Ireland. Tel.: +353 469242481.
E-mail address: brenda.monaghan@hse.ie (B. Monaghan).

http://dx.doi.org/10.1016/j.physio.2016.01.003
0031-9406/

reported functional problems, in some cases up to 1 year following surgery [4,5]. Dissatisfaction with outcome following THR is reported to be 7–8%, and more recent evidence has correlated patient satisfaction with postoperative levels of function [2,8,9].

Traditionally, physiotherapy has been a routine part of patient rehabilitation following THR [10–13]. More recently, the physiotherapy provision for this clinical group has been reduced across the UK [14], with few centres now offering physiotherapy follow-up after surgery. A number of systematic reviews have failed to establish the effectiveness of physiotherapy [10,15–17]. All reviews reported insufficient evidence to establish the effectiveness of therapeutic intervention, and noted the poor quality of the trials included.

A recent systematic review which informed the current study focused on patients in the post-acute stage of recovery [16], and found low-grade evidence that a rehabilitation programme at this stage after THR may serve to improve gait speed and hip abductor strength.

As such, this single-blinded randomised controlled trial was designed with the primary aim of evaluating the effectiveness of an outpatient physiotherapy-supervised functional exercise programme in the post-acute stage of recovery, and was set in the period from 12 to 18 weeks after THR. The specific primary outcomes evaluated were pain, stiffness and physical function.

Study design

This randomised controlled trial allocated patients to either a 6-week physiotherapy-supervised functional exercise + usual care group or a usual care group (control group) after THR.

Functional exercise intervention

Three experienced physiotherapists supervised the functional exercise classes at each of the three community hospital-based clinical sites. Training was provided prior to the commencement of classes in the form of a practical workshop, and written illustrated manuals were provided that included an exercise log book which was completed by the treating therapist at each attendance. This recorded patient compliance with the programme. During the functional exercise classes, the participants were taught 12 exercises by the supervising physiotherapist. The physiotherapist monitored form and exercise intensity, progressing the exercises as necessary. Each session was 35 minutes in length. Patients attended classes twice weekly for 6 weeks, and were not given any additional exercises as a home exercise programme. The specific exercise programme in this study was based on an exercise programme that had previously been shown to improve pain and function in patients at this stage of recovery after THR [18] (see Table A, online supplementary material).

Usual care

Both the control group and the functional exercise group followed the usual care pathway. This involved the provision of an educational and immediate postoperative exercise booklet on admission, and assessment by the orthopaedic surgeon at 6 weeks. The exercises outlined in the educational booklet for both groups consisted of early postoperative exercises for the duration of the hospital stay. These included foot and ankle pumps, static quadriceps, static gluteal contractions, active hip flexion and hip abduction. Following surgery, all patients are advised to walk daily with crutches until review by the orthopaedic surgeon at 6 weeks, increasing the distance gradually to approximately 1 mile after 1 month. No instructions for any additional exercises were given to either group on discharge.

The inclusion criteria have been published previously [19], and consisted of: patients who had undergone primary THR for osteoarthritis, aged $\geq$50 years, able to read and understand instructions in English, willing to attend classes twice weekly for 6 weeks, and willing to participate in an exercise programme without physical assistance. Exclusion criteria were: medical instability, underlying terminal disease and suspicion of infection following joint replacement. Patients with previous THR or total knee replacement were not excluded.

Having gained ethical approval from the Health Service Executive Committee of the North East Hospital Group, patients were recruited at the pre-assessment clinic of the elective orthopaedic regional unit by the principal investigator, and then enrolled fully into the study 12 weeks after surgery. Following a standard interview, a written description of the study was given to patients, together with a stamped addressed envelope to return their written consent. This allowed for a cooling-off period. All patients were scheduled for primary THR for osteoarthritis under the care of one of the seven surgeons in the unit.

Randomisation was achieved using a computer-generated random number table. Concealed allocation was achieved using sequentially numbered envelopes that were administered by an independent third party (physiotherapy manager). All patients were contacted directly for baseline assessment at 12 weeks after THR, and those randomised to the exercise group were contacted directly by the physiotherapists responsible for conducting the exercise classes. Patients were asked not to discuss their group allocation, and were asked not to disclose their group allocation until the final outcome assessments had been completed.

All outcome measurements were recorded 12 weeks after surgery (baseline) and 18 weeks after surgery by the principal investigator, who was blinded to group allocation. The primary outcome measurement tool was the Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) questionnaire, which consisted of 24 questions on pain (scored 0 to 20), stiffness (scored 0 to 8) and function (scored 0 to 68). Secondary outcome measures were visual analogue pain scale score, walking speed [6-minute walk test