Introduction

A lot of research has been done to investigate if physical therapy after total hip replacement (THR) is effective. So far, the results are inconclusive. One explanation could be that the studies are very diverse in type of therapeutic intervention, duration and when the therapy starts after surgery. This case series was originally a randomized controlled trial (RCT) investigating whether post-clinical physical therapy, compared to no physical therapy, after THR leads to a better functional recovery. The study was terminated prematurely after 3 years because the inclusion rate was too low: because patients from the whole country visit our specialized hospital, only a small portion came from the hospital’s postal code area. Furthermore, some patients refused to participate due to transportation problems. Other patients did not participate because they preferred physical therapy after discharge. Although the study is not finished and we have not yet published the results, this research question is still actual and relevant as this topic is one of the prioritized research questions of the NOV Zorgevaluatie Agenda. This study was approved by the IRB: Commissie Mensgebonden Onderzoek and is registered under file number: 2007/276. The authors have nothing to disclose.

Patients

The patients were on the waiting list for a THR as a treatment for their hip osteoarthritis. After being asked by their surgeons, the patients were contacted by the research nurse who provided further information and arranged the informed consent procedure. Patients were asked to participate when full weight bearing was to be expected, when they lived in the Nijmegen region (postal code within reach for the physical therapist) and were younger than 75 years old (due to a lower chance of co-morbidity and possible after care). Patients were excluded if they had rheumatoid arthritis, if they could not communicate in Dutch and if they were to be discharged to a nursing home or rehabilitation facility. Furthermore, they were excluded when there was a clinical reason for physical therapy after discharge, when they had symptoms on the contra-lateral hip, or when patients could not follow treatment due to physical, emotional or neurological conditions.

Intervention

All patients (whether in the treatment group or control group) were operated and received treatment according to the standard protocol. All THRs were placed by a postero-lateral approach. Before discharge, a baseline measurement was performed. Randomization occurred for patients who had had no complications during the hospital stay and who had no indication for physical therapy at home. Randomization took place on the day of discharge.

Patients in the treatment group received treatment by a physical therapist from the orthopedic department hip group. The physical therapist first determined the patient’s medical history and performed a physical examination. The physical therapist, in collaboration with the patient, formulated the treatment goals according to the Patient Specific Complaints Scale (PSK). Thus, each patient received a personalized treatment protocol, not a standardized regime. After these individual treatment goals had been formulated, the treating physical therapist determined the program that would be necessary to accomplish these goals.1 For example, the program could include the optimization of motion, muscle strength and balance to create optimal function related to the patient’s specific goals.

In general, the patient was treated at the orthopedic department once or twice a week for a period
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of eight weeks. In agreement with the patient (e.g. in case of transportation problems) it was possible that the patient was treated at home.

Comparison

After discharge, patients in the control group received no physical therapy, only instructions with regard to the quality and quantity of walking, and for hip extension exercises. The Dutch Orthopaedic Association (NOV) states in the guideline for Total Hip Arthroplasty that a home based exercise regime or physical therapy might help in recovering from a THR operation. They also state that the evidence so far is weak.

Outcome

From all patients, the following baseline data were collected: secondary pathology as well as the standard patient characteristics. The Harris Hip Score (HHS) and the Oxford Hip Score (OHS) were completed pre-operatively; before discharge, the PSK was completed. The subjects who participated in this study, where followed according to standard follow-up which was planned at the regular post-operative controls (CPO). These were at eight weeks and six months. During these follow-up visits the HHS, the OHS and the PSK were again administered. The PSK has been validated in Dutch.

All outcome measures were compared between the experimental group and the control group with the non-parametric Mann-Whitney U test. Ten per cent improvement in the PSK at 8 weeks postoperatively (primary outcome) was considered to be clinically relevant. However, to the best of our knowledge, there is no literature available concerning this value. Differences in the number of patients who were classified as showing ten per cent improvement between the groups were tested with the Chi-square test. A score between 34 and 41 on the OHS is considered good and above 41 is considered very good. The median and range for the descriptive statistics were presented. A p-value of <0.05 was considered to be statistically significant.

Thirty-two patients were eligible for inclusion. However, only fourteen participated in the study: four patients declined to participate; the other eleven did not meet the inclusion criteria: lack of baseline assessment (three), physical therapy at home prescribed at discharge (five), or patients had had a complication requiring other therapy (three). Three patients who agreed to participate were still on the waiting list for their THR when the study was terminated. The patients’ characteristics are summarized in Table 1.

At baseline, there were no significant differences between the treatment group and the control group regarding the PSK, the HHS, and OHS. After eight weeks, the group receiving physical therapy scored statistically significant better on the PSK and HHS; after six months, this difference was no longer statistically significant (Figures 1 and 2). Concerning the OHS, here the treatment group scored statistically significant higher not only at the 8-week follow-up but also at the 6-month follow-up (Figure 3).

At the 8-week follow-up, an improvement of at least ten per cent on the PSK was found in both groups: six patients from the treatment group and five patients from the control group, a non-significant difference (p = .91). After six months, all patients showed this improvement. After eight weeks, six out of seven patients in the treatment group had the highest classification on the HHS versus only one patient in the control group having this score (p = 0.013, one missing). After six months, five patients in each group had this classification (four missing). The OHS showed the same pattern: after eight weeks four out of seven patients in the treatment group had the highest classification whereas in the control group no patient had that score (p = 0.026, one missing). After six months, although this effect was still visible, it was no longer statistically significant (p = 0.058, two missing in each group).

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Table 1. Patient characteristics.

<table>
<thead>
<tr>
<th>Age: median(min - max)</th>
<th>Treatment group (N=7)</th>
<th>Control group (N=7)</th>
</tr>
</thead>
<tbody>
<tr>
<td>57.8 (46.4 - 67.7)</td>
<td>56.0 (46.1 - 64.0)</td>
<td></td>
</tr>
<tr>
<td>Gender: M / V</td>
<td>5 / 2</td>
<td>3 / 4</td>
</tr>
<tr>
<td>Operated side: L / R</td>
<td>4 / 3</td>
<td>5 / 2</td>
</tr>
<tr>
<td>Other pathologies</td>
<td>1 ipsilateral knee arthroscopy</td>
<td>1 contralateral knee arthroscopy</td>
</tr>
<tr>
<td></td>
<td>1 ipsilateral foot surgery</td>
<td></td>
</tr>
</tbody>
</table>
Relevant literature

In the literature, there is still no consensus on the effectiveness of post-clinical physical therapy. The majority of papers indicate that physical therapy, compared to home-based exercises, does indeed have a positive contribution to the recovery 3 months after surgery and that this positive effect is no longer present at 12 months postoperatively.7-14 One study found improvement in muscle strength and walking speed but not in improvement in quality of life in favour of the physical therapy group.15 On the other hand, some other studies suggest that there is no difference in improvement between the groups.16-20 One explanation for finding no difference could be that the specific goals of the patients were not taken into account and each patient regardless of individual wants or needs received a standard treatment protocol. By looking at the patients' goals from the PSK and consequently adapting the treatment to achieve these individual goals, we were able to evaluate functional improvement in the aspects of daily living that were important to each individual patient.

There is also evidence in the recent literature that there is loss of muscle strength that begins early after surgery and remains without training.21,22 To prevent this, the patients should start with exercises as soon as possible after their THA. The study by Skoff et al. shows that resistance training is feasible shortly after surgery.23

Recommendations

In this study on the effect of post-clinical physical therapy after total hip replacement on functional recovery, the group that received physical therapy showed an earlier functional recovery than the control group. Eight weeks after the operation, there was a statistically significant improvement on all three outcome measures (PSK, HHS and OHS) in comparison to the group that received no therapy. After six months, the two groups showed no difference on the PSK and HHS, but the therapy group continued to show statistically significant improvement on the OHS. Note that because of the small sample size and resulting low power these results have to be interpreted with some care. Nevertheless, taking this into account, our study indicates that favorable effects of post-clinical physical therapy may be present.

In 2014, 28.026 THAs were performed, 53% in patients who were 69 years or younger.24 There will be an increase of these numbers because of the aging
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society and increasing obesity. Early improvement in the physical therapy group may not seem important, but for this group it means that these patients are able to take care of themselves earlier after surgery and are less dependent on after care. They may therefore be able to participate in social activities sooner, with a possible increase in quality of life. Early improvement also means earlier return to work. Tibbule et al. investigated that after THA 25% to 95% of the patients return to work between 1-12 months and the people who worked preoperatively returned to work between 1.1 to 10.5 weeks after surgery. Earlier return to work has also economic advantages. One physical therapy session costs between 28-40 euro and one sick day is approximately 225 euro. In The Netherlands, physical therapy after THR is compensated for by the primary health care package after the first 20 treatments. For the first 20 treatments the patients need to pay or they need supplementary insurance.

To summarize, when reviewing the existing literature and also the results of our study: physical therapy after discharge, providing that the treatment is personalized, home-based, early enough after surgery and with the right intensity, has a positive effect on functional recovery. Future studies are needed to investigate this and the outcome should be taken into account when the Dutch Orthopaedic Association (NOV) guideline “Totale Heupprothese” will be updated.

Disclosure statement
Nothing to disclose.

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References
Does post-clinical physical therapy after total hip replacement lead to better functional recovery?


