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Immediate effects of hip mobilization with movement in patients with hip osteoarthritis: A randomised controlled trial☆

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ABSTRACT

Background: Mobilization with movement (MWM) has been shown to reduce pain, increase range of motion (ROM) and physical function in a range of different musculoskeletal disorders. Despite this evidence, there is a lack of studies evaluating the effects of MWM for hip osteoarthritis (OA).
Objectives: To determine the immediate effects of MWM on pain, ROM and functional performance in patients with hip OA.
Design: Randomized controlled trial with immediate follow-up.
Method: Forty consenting patients (mean age 78 ± 6 years; 54% female) satisfied the eligibility criteria. All participants completed the study. Two forms of MWM techniques (n = 20) or a simulated MWM (sham) (n = 20) were applied. Primary outcomes: pain recorded by numerical rating scale (NRS). Secondary outcomes: hip flexion and internal rotation ROM, and physical performance (timed up and go, sit to stand, and 40 m self placed walk test) were assessed before and after the intervention.
Results: For the MWM group, pain decreased by 2 points on the NRS, hip flexion increased by 12.2°, internal rotation by 4.4°, and functional tests were also improved with clinically relevant effects following the MWM. There were no significant changes in the sham group for any outcome variable.
Conclusions: Pain, hip flexion ROM and physical performance immediately improved after the application of MWM in elderly patients suffering hip OA. The observed immediate changes were of clinical relevance. Future studies are required to determine the long-term effects of this intervention.

1. Introduction

Osteoarthritis (OA) is a common degenerative joint disease that causes substantial musculoskeletal pain and disability (Bennell, 2013). The global age-standardised prevalence of symptomatic radiographically confirmed hip OA is 0.85%, being more common in females, and increasing with age. Hence the burden of hip OA is likely to rise, as globally the number of people aged over 60 years is expected to increase to 33% by 2030 (Croft, 2005; Wright et al., 2011).

The characteristic features of hip OA are loss of articular cartilage, joint space narrowing, and capsule contracture and fibrosis (Sokolove and Lepus, 2013). These changes will often result in pain, impaired mobility, and limitation in activities of daily living (Steultjens et al., 2000), although change in pain is potentially more important for prognosis (van Dijk et al., 2010). Physical examination reveals joint pain during activity such as stair climbing, sit to stand, and walking, as well as reduced hip flexion and internal rotation

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range of motion (ROM) (Altman et al., 1991; Birrell et al., 2001; Wylde et al., 2014).

Clinical practice guidelines recommend manual therapy combined with exercise as part of the management of hip OA (Hochberg et al., 2012; National Institute for Clinical Excellence, 2014). This is despite contradictory evidence, with one study showing that manual therapy is an effective treatment in the long-term management of hip OA (Abbott et al., 2013) but not when combined with exercise in another (Bennell et al., 2014). One explanation may be that hip OA responds differently to different forms of manual therapy. One form of manual therapy for the hip is mobilization with movement (MWM) (Mulligan, 1989; Hing et al., 2015). MWM combines an accessory glide force with an active or passive movement. The purpose is to eliminate pain during movement enabling a greater range and improved function. Despite positive results in some painful joint conditions (shoulder, elbow, and ankle) and preliminary results from a case series of patients with knee OA (Abbott, 2001; Collins et al., 2004; Dimitrova, 2008; Anap, 2012; Djordjevic et al., 2012; Takasaki et al., 2013), the effects of MWM on the hip have not been investigated in isolation. Thus, there is a need for further research to confirm the effectiveness of manual therapy intervention in hip OA (French et al., 2011). Due to the conflicting evidence regarding the efficacy of manual therapy for hip OA (Abbott et al., 2013; Bennell et al., 2014), new studies are required to determine whether alternate forms of manual therapy (such as MWM), that have not been investigated in isolation may be effective in hip OA. In this regard a preliminary step may be to investigate the immediate effects of specific manual therapy techniques such as MWM. Techniques shown to produce immediate effects can then be compared in randomized controlled trials with long-term follow up.

Therefore, the primary purpose of this study was to determine the immediate effects of a single session of MWM on hip pain in people with hip OA. The secondary objective was to evaluate the immediate effects of MWM on hip ROM and physical performance in these subjects. We hypothesized that a single session of hip MWM would reduce pain, increase ROM, and improve function in people with hip OA.

2. Materials and methods

2.1. Study design

A double blind randomized placebo controlled trial was conducted (registered with ClinicalTrials.gov, NCT02390336). The study was carried out according to CONSORT guidelines.

2.2. Participants

The study sample consisted of a sample of convenience of volunteers residing in one of two retirement homes in South Douro region (Portugal). The inclusion criteria were: aged over 65 years, and clinical criteria of OA of the hip, established by the American College of Rheumatology (Altman et al., 1991). Subjects were excluded from the study if they had received lower extremity surgery in the previous 6 months, rheumatoid arthritis, uncontrolled hypertension, mobility aid during walking, a primary neurogenic disorder, advanced osteoporosis, previous physiotherapy treatment to the hip, or inability to understand the instructions and complete the study assessments.

Subjects were randomly allocated into one of two groups by the Research Randomizer (Version 4.0) computer software: experimental (MWM group) and placebo (sham intervention). Only the first author was aware of subject group allocation. A blinded examiner carried out measurements with subjects' blind to their intervention.

2.3. Interventions

MWM and the sham intervention were carried out by the first author, blind to the measurements, who received training in the Mulligan Concept and had 3 years clinical experience.

In the experimental group two forms of MWM were applied. The first, a hip flexion MWM was carried out with the subject supine and the physical therapist standing next to the subject. A manual therapy belt was looped around the therapist's pelvis and the subject's thigh contacting the medial side of the participant's upper thigh closest to the joint line. The belt was positioned such that it was always perpendicular to the participant's thigh (Hing et al., 2015). The therapist supported the subject's leg, while also stabilizing their pelvis via the ilium. The subject's hip was moved passive into hip flexion to the maximum pain-free range. Three sets of 10 repetitions were applied, with a 1 min rest interval between each set (Fig. 1). Following this, a hip internal rotation MWM was performed (Fig. 2). The procedure was the same as for hip flexion except that passive internal rotation was the movement applied with the hip as close as possible to 90° flexion. The physical therapist could adapt the angle and strength of the accessory mobilization to maximize ROM response and decrease pain. A towel was placed at the site of belt contact to reduce discomfort (Figs. 1 and 2) (Mulligan, 2010). The order of technique application was the same for all subjects.

In the placebo group, the investigator performed a simulated MWM technique. The positioning of the patient and the physical therapist were the same as for the MWM procedure, however, no force was applied with the belt and no repeated movement of passive hip flexion or internal rotation carried out (Abbott et al., 2013). The positions of hip flexion and internal rotation were maintained for 10 s and repeated 3 series.

2.4. Outcome measures

Outcome measures were evaluated by a blinded examiner in all subjects prior-to and 5-min after the intervention. Measures included pain intensity, hip flexion and internal rotation ROM, and functional tests. Subjects had no previous experience of manual

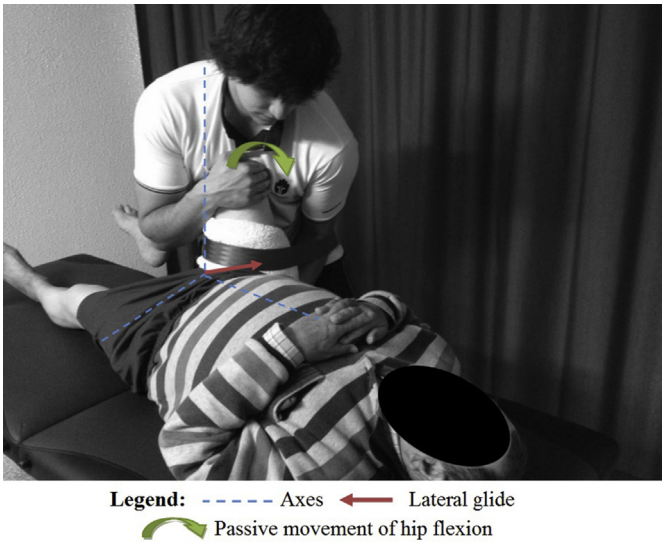

Fig. 1. Hip flexion mobilization-with-movement technique.