

Immediate Effects of Mobilization With Movement vs Sham Technique on Range of Motion, Strength, and Function in Patients With Shoulder Impingement Syndrome: Randomized Clinical Trial

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ABSTRACT

Objective: The purpose of this study was to compare the immediate effects of mobilization with movement (MWM) with sham technique on range of motion (ROM), muscle strength, and function in patients with shoulder impingement syndrome.

Methods: A randomized clinical study was performed. Participants (mean age \pm standard deviation, 31 ± 8 years; 56% women) were divided into 2 groups: group 1 ($n = 14$), which received the MWM technique in the first 4 sessions and the sham technique in the last 4 sessions; and group 2 ($n = 13$), which was treated with the opposite order of treatment conditions described for group 1. Shoulder ROM, isometric peak force assessed with a handheld dynamometer, and function as determined through the Disabilities of the Arm, Shoulder and Hand and Shoulder Pain and Disability Index (SPADI) questionnaires were collected at preintervention, interchange, and postintervention moments.

Results: Two-way analysis of variance revealed no significant group-by-time interaction for any outcome but did reveal a main time effect for shoulder external rotation ($P = .04$) and abduction ($P = .01$) ROM, Disabilities of the Arm, Shoulder and Hand ($P < .01$), SPADI Pain ($P < .01$), SPADI Function ($P < .01$), and SPADI Total ($P < .01$). Only abduction movement and SPADI Pain overcame the clinical relevance threshold. The isometric peak force tests revealed no effects.

Conclusion: The MWM technique was no more effective than a sham intervention in improving shoulder ROM during external rotation and abduction, pain, and function in patients with shoulder impingement syndrome. (*J Manipulative Physiol Ther* 2016;xx:0-11)

Key Indexing Terms: *Shoulder Pain; Physical Therapy Modalities; Musculoskeletal Manipulations; Pain; Placebo Effect*

INTRODUCTION

Shoulder pain affects an individual's functional ability to perform daily activities and generates high socioeconomic

costs.¹ Shoulder pain is more prevalent in women and older people and is the third most common complaint, after back pain and knee pain, among those with musculoskeletal disorders.² The most common diagnosis for shoulder pain is shoulder impingement syndrome (SIS),³ which comprises a spectrum of alterations of the subacromial space⁴ and may affect the supraspinatus tendon, subacromial bursa, tendon of the long head of the biceps, and shoulder capsule isolated or combined.⁵

Anti-inflammatory medications and physical therapy are the first options for the treatment of SIS.⁶ Although manual therapy is a common approach to treat SIS,⁷⁻¹¹ its effectiveness has not been well established. Movement with mobilization (MWM) technique, a specific type of manual technique, is based on a combination of accessory joint mobilizations induced by the therapist and is associated with physiological active joint and pain-free movements. The goal is to treat restrictions caused by small

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mechanical failures that generate joint dysfunction.^{12,13} During active movements, patients with SIS present abnormal translational movements of the humeral head in the anterosuperior direction.^{14,15} The MWM technique allows for increased pain-free range of motion (ROM), inducing biomechanical or neurologic effects.¹⁶ Studies have reported better results of MWM on ROM and pain for SIS compared with control and sham groups.^{16,17} However, more studies are needed to determine the effectiveness of the MWM intervention with respect to sham or placebo manual interventions, which have produced active hypoalgesic effects,¹⁸ on other outcomes such as muscle strength and function.

The main purpose of this study was to evaluate the immediate effects of MWM compared with a sham technique on ROM, isometric peak force, and function of patients with SIS through the alternative application of both interventions to 2 groups of individuals. The study hypothesis was that MWM is more effective in improving the investigated outcomes of patients with SIS than the sham technique, *independent* of the sequence of application.

METHODS

Study Design

The research (registered number NCT 02463526 on ClinicalTrials.gov) was characterized as a single-blinded (blinded assessor), randomized clinical trial with repeated measures, controlled by sham technique, with the alternative application of the intervention and sham techniques to both groups. This study was conducted under the guidelines of the CONSORT Statement.

Participants

Patients with pain compatible with SIS were recruited from the waiting list of the physical therapy school clinic and through fliers around the university. The recruitment period was from March to December 2015. The following inclusion criteria were used: age between 18 and 65 years,¹⁹ history of pain in the shoulder lasting longer than 1 week,²⁰ pain located in the anterolateral area of the shoulder consistent with SIS, positive signs for at least 1 of the clinical tests to evaluate the SIS (Neer test,⁴ Hawkins-Kennedy test,²¹ or Jobe test²²) associated with painful movement during arm elevation, or pain during external rotation of the shoulder with the arm abducted at 90°.²⁰ Because none of the clinical tests alone have high specificity, a pool of 2 or more tests was used.^{20,23}

The exclusion criteria were as follows: pregnancy; epilepsy; any type of cancer; fibromyalgia; depressive symptoms (score ≥ 9 as evaluated by the Beck Depression Inventory)²⁴; body mass index greater than 28 kg/m²²⁰; systemic diseases; being under the influence of anti-inflammatories, painkillers, or muscle relaxants during the evaluation or during treatment; history of use of



Fig. 1. Therapist and patient positioning for completion of the techniques.

corticosteroid on the shoulder less than 1 year prior¹⁶; history of trauma, fracture, or surgery in the neck or upper limbs¹⁷; positive sign for the Sulcus test; receiving physical therapy for the shoulder or cervical spine within 3 months before the survey; history of dislocation or shoulder subluxation; or present clinical evidence of any other type of involvement of the shoulders.^{19,20} The randomization of the individuals to groups, as well as the order of ROM assessments and the dynamometry tests, were conducted before the beginning of the research using the website randomization.com.

The research project was approved by the Research Ethics Committee (28898014.3.0000.5504) of the Universidade Federal de São Carlos, and all volunteers who agreed to participate signed the consent form.

Interventions

During MWM and sham techniques, the patient remained in the same position: sitting in a chair with the trunk supported, both feet flat on the floor, and hips and knees at 90°. Researcher B (JFG), with 8 years of experience in manual therapy and expertise in the Mulligan Concept, stabilized the shoulder opposite to that being treated, leaving the hands free to work with the affected shoulder. Using the MWM technique, the therapist positioned one hand flat on the scapula and placed the thenar eminence of the other hand over the anterior surface of the humeral head (Fig 1). The therapist applied a dorsolateral glide force to the humeral head. The patient was asked to raise his or her arm in the scapular plane at a velocity of approximate 30° per second until the onset of pain, while the therapist supported the glide of the humeral

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