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Original article

# Effect of a muscle stretching program using the global postural reeducation method for patients with chronic low back pain: A randomized controlled trial



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## ABSTRACT

**Objectives:** To assess the effect of a muscle stretching program using the global postural reeducation (GPR) method for patients with chronic low back pain.

**Methods:** A randomized, controlled, clinical trial with a single blinded examiner and intention-to-treat analysis was conducted. Sixty-one patients with chronic low back pain were randomly allocated to either the GPR group or a control group. Patients in the GPR group underwent one weekly 60-minute session of GPR for a period of 12 weeks. The control group remained on the waiting list under drug treatment, with no physical intervention. The following parameters were evaluated: pain (VAS), function capacity (Roland-Morris Questionnaire [RMQ]), quality of life (SF-36) and depressive symptoms (Beck Inventory). The evaluations were performed by a single blinded examiner at baseline, three and six months after the initial evaluation.

**Results:** The GPR group demonstrated statistical improvements ( $P < 0.05$ ) in the VAS and RMQ as well as the pain, emotional aspects, limitation in physical functioning, vitality and mental health subscales of the SF-36 immediately after the intervention (three months), which were maintained through to the six-month evaluation.

**Discussions:** Based on the findings, a stretching program using the GPR method showed effective at improving pain, function, some quality of life aspects (emotional, limitations in physical functioning, vitality and mental health) and had no effect on depressive symptoms in patients with chronic low back pain.

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## 1. Introduction

Low back pain is defined as pain between the 12th rib and the inferior gluteal folds [1]. Acute low back pain lasts up to three weeks, whereas subacute low back pain lasts three to 12 weeks and chronic low back pain lasts more than 12 weeks [2]. Low back pain has a multifactor etiology [3] and is denominated *specific* when the cause is known and *nonspecific* when the cause is unknown [1]. The causal factors of low back pain are identified in 5 to 15% of cases, whereas more than 85% of patients exhibit nonspecific low back pain [3].

Low back pain is a leading cause of physical limitations and absenteeism at work throughout the world [4]. This condition can lead to a significant reduction in quality of life, with negative economic consequences for affected individuals, their families, the general community and public healthcare systems. Low back pain has epidemic proportions and constitutes a public health and welfare problem [5].

The diagnosis of low back pain is regarded as clinical. As low back pain is generally diagnosed as nonspecific, a number of treatments, techniques and multidisciplinary interventions have emerged aimed at improving the symptoms until the resolution of the pain [6]. Systematic reviews of the literature offer some evidence of the effectiveness of rehabilitation techniques on reducing pain symptoms and improving function in patients with chronic low back pain [6–11]. However, no one of this reviews include postural exercises.

'Global postural reeducation' (GPR) is a physical therapy method developed by Philippe-Emmanuel Souchart in France. This

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technique is based on the idea of the muscular system as formed by muscle chains, which can face shortening resulting from many factors as constitutional, behavioral and psychological. The aim of the technique is to stretch the shortened muscles using the viscoelastic tissue properties and to enhance contraction of the antagonist muscles avoiding postural asymmetry. The technique involves six postures divided into two groups:

- hip flexion postures that emphasize the posterior chain (lying on back with the legs flexed, sitting with legs extended, standing with the body leaning forward);
- neutral hip postures that emphasize the anterior chain (lying on back with the legs extended, standing with the back against the wall and standing in the center) [12].

The aim of these postures is to correct retractions in the different chains of muscles and re-establish the balance between these muscles, minimizing the loads placed on the joints and thereby reducing pain symptoms.

GPR has been applied in cases of ankylosing spondylitis [13–15], temporomandibular disorder [16], female stress urinary incontinence [17,18], chronic neck pain [19] and chronic low back pain [20]. All these trials have methodological problems not being capable of offering scientific evidence of the effectiveness of this technique on different conditions.

One systematic review assessed the use of GPR for different conditions of the musculoskeletal system [21] and found only one randomized, controlled study that demonstrated a statistical improvement in functional capacity in patients with ankylosing spondylitis [14,15]. The authors concluded that further randomized, controlled trials with adequate methodological quality are needed to assess the effects of GPR on patients with chronic low back pain.

The aim of the present study was to assess the effect of a muscle stretching program using the GPR method on pain, function, quality of life and depressive symptoms in patients with chronic low back pain.

## 2. Methods

A randomized, controlled, clinical trial was carried out with a single blinded examiner and intention-to-treat analysis. This study received approval from the Research Ethics Committee of the Federal University of São Paulo and is registered in ClinicalTrials.gov under the number NCT01557049.

All patients were previously evaluated and diagnosed by a rheumatologist and were instructed to use up to 3.0 g of acetaminophen per day as the first choice for back pain or up to 150 mg of diclofenac as the secondary choice, if needed, and to keep of record of the intake. All patients originated from rheumatology ambulatory of Federal University of São Paulo.

The following were the inclusion criteria: either gender; age between 18 and 65 years; diagnosis of chronic low back pain, characterized by mechanical pain (pain that worsens with movement and improves with rest), for a period of more than three months between the last rib and gluteal sulcus [1]; and a score of 3.0 to 8.0 cm on a 0–10 cm visual analog scale for pain. This range of score was chosen to permit analyses the changes that could occur in this parameter.

The following were the exclusion criteria: nerve root pain; motor impairment; inflammatory spondyloarthropathy; spondylolisthesis, fibromyalgia, previous back surgery, vertebral fracture, current pregnancy, current physiotherapy (or in previous three months); body mass index (BMI) greater than 30 kg/m<sup>2</sup>; change in pain drugs in previous 30 days, because the benefit caused by

the drugs could influence the results or current involvement in litigation.

Opaque, sealed envelopes numbered in increasing order were used for the randomized allocation of the patients based on an electronic randomization table. Sixty-one individuals were randomly allocated to one of two groups: GPR group or control group.

The individuals in the GPR group individually underwent one weekly 60-minute session of GPR by the same physiotherapist, with 12 years of experience in technical, for a period of 12 weeks, and after these weeks, they remained without intervention over 12 weeks, completing 24 weeks in total. All six GPR postures described by Souchard et al. [12] were used in a standardized fashion. Each stretching posture lasted about 20 minutes. In the first three sessions, “lying on back with the legs extended” and “lying on back with the legs flexed” were performed with arms folded. In sessions 4, 5 and 6, “lying on back with the legs extended” and “lying on back with the legs flexed” were performed with arms open, ending with “standing with the body leaning forward”. In sessions 7, 8 and 9, “lying on back with the legs extended” with arms open, “lying on back with the legs flexed” with arms open and “sitting with legs extended” were performed. In the last three sessions, “lying on back with the legs extended” with arms folded, “lying on back with the legs flexed” with arms open, “standing with the back against the wall and standing in the center” were performed (Fig. 1). All these 6 different stretch positions were performed by patient under the therapist supervision.

The individuals in the control group remained only under drug treatment, if necessary, with no physical intervention, during 24 weeks of study, but were offered GPR after the end of the study (after 24 weeks from started study).

Evaluations were performed at baseline (T0) as well as three (T1) and six months after the baseline (T2). An examiner blinded to the allocation of the patients performed all evaluations. All patients were followed up in person. Pain in the day of the evaluation, function capacity, quality of life and depressive symptoms were assessed using a visual analog scale of pain (VAS) that ranged 0 cm (painless) to 10 cm (severe pain), the Roland-Morris Questionnaire [22], the Medical Outcomes Study Short-Form 36-Item Health Survey (SF-36) [23] and the Beck Inventory [24], respectively.

### 2.1. Statistical analysis

A minimal sample of 60 individuals was required to detect a difference of up to 20% on the VAS, with a standard deviation of 2 cm,  $\alpha$  of 5 and 90% test power. The Chi-squared test was used of the categorical variables. The Mann-Whitney test was used for continuous variables with non-normal distribution. Either ANOVA with a post hoc correction or the Student's *t*-test was used for continuous variables with normal distribution. The statistical analysis was performed using the SPSS 17.0 program, with the level of significance set to 5% ( $P < 0.05$ ).

## 3. Results

From January 2008 to September 2011, among the 108 patients contacted, 61 fulfilled the eligibility criteria and were randomly allocated to the two groups (31 in the GPR group and 30 in the control group). One participant in the GPR group interrupted treatment due to a humerus fracture occurred outside the study, but attended the evaluations (Fig. 2). Another participant did not show up for the final evaluation due to personal reasons and the data from the previous evaluation were repeated for this patient (intention-to-treat analysis).

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