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Clinical Study

Outcomes are not different for patient-matched versus nonmatched treatment in subjects with chronic recurrent low back pain: a randomized clinical trial

Sharon M. Henry, PT, PhD, ATC[a,*], Linda R. Van Dillen, PT, PhD[b], Rebecca H. Ouellette-Morton, MS, MPT[a], Juvena R. Hitt, BS[a], Karen V. Lomond, PhD[a], Michael J. DeSarno, MS[c], Janice Y. Bunn, PhD[c]

[a]*Department of Rehabilitation and Movement Science, College of Nursing and Health Science, University of Vermont, 305 Rowell Bldg, 106 Carrigan Drive, Burlington, VT 05405-0068, USA*

[b]*Program in Physical Therapy and Department of Orthopaedic Surgery, Washington University School of Medicine, Campus Box 8502, 4444 Forest Park Avenue, St. Louis, MO 63108, USA*

[c]*Department of Biostatistics, College of Medicine, University of Vermont, 305 Rowell Bldg, 106 Carrigan Drive, Burlington, VT 05405-0068, USA*

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Abstract

BACKGROUND CONTEXT: Classification schemas for low back pain (LBP), such as the Treatment-Based Classification and the Movement System Impairment, use common clinical features to subgroup patients with LBP and are purported to improve treatment outcomes.

PURPOSE: To assess if providing matched treatments based on patient-specific clinical features led to superior treatment outcomes compared with an unmatched treatment for subjects with chronic recurrent LBP.

STUDY DESIGN: This study is a randomized controlled trial.

PATIENT SAMPLE: Subjects (n=124) with LBP (≥12 months) with or without recurrences underwent a standardized clinical examination to group them into one of two strata: ineligible or eligible for stabilization exercises based on the Treatment-Based Classification schema. Subjects underwent additional clinical tests to assign them to one of the five possible Movement System Impairment categories.

OUTCOME MEASURES: Questionnaires were collected electronically at Week 0 (before treatment), Week 7 (after the 6-week 1-hour treatment sessions), and 12 months. Using the Oswestry disability index (0–100) and the Numeric Pain Rating Scale (0–10), the primary analysis was performed using the intention-to-treat principle. Secondary outcomes included fear-avoidance beliefs and psychosocial work-related and general health status.

METHODS: After subjects were categorized based on their particular clinical features using both the Treatment-Based Classification and Movement System Impairment schemas, they were randomized into one of two treatments using a 3:1 ratio for matched or unmatched treatments. The treatments were trunk stabilization exercise or Movement System Impairment–directed exercises.

FDA device/drug status: Not applicable.

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The disclosure key can be found on the Table of Contents and at www.TheSpineJournalOnline.com.

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Clinical Trials Registration: NCT01362049.

Preliminary results of this study were presented at the American Physical Therapy Association Combined Section Meeting, New Orleans, LA, USA, February 10, 2012.

* Corresponding author. Department of Rehabilitation and Movement Science, College of Nursing and Health Science, University of Vermont, 305 Rowell Bldg, 106 Carrigan Drive, Burlington, VT 05405-0068, USA. Tel.: (802) 656-8146; fax: (802) 656-6586.

E-mail address: sharon.henry@uvm.edu (S.M. Henry)

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RESULTS: Of the patients allocated to treatment for this study, 76 received a matched treatment and 25 received an unmatched treatment. After treatment, both groups showed a statistically significant improvement in the primary outcome measures and almost all the secondary measures; however, the matched treatment group did not demonstrate superior outcomes at Week 7 or 12 months, except on one of the secondary measures (Graded Chronic Pain Scale [Disability Scale]) (p=.01).
CONCLUSIONS: Providing a matched treatment based on either the Treatment-Based Classification or the Movement System Impairment classification schema did not improve treatment outcomes compared with an unmatched treatment for patients with chronic LBP, except on one secondary disability measure.

Keywords: Randomized controlled trial; Chronic low back pain; Classification; Physical therapy; Subgroups; Exercise

Introduction

Low back pain (LBP) remains a public health issue because it is a heterogeneous musculoskeletal condition that affects up to 80% of all people at some point in their life [1]. In 85% of persons with LBP, no pathoanatomic cause can be identified [2,3], which makes prescribing treatments for patients difficult. Classification of patients with LBP into homogenous subgroups with relevant clinical features has been identified as a research priority by several groups [4–6] and may be used to direct treatment and improve treatment outcomes.

Two promising classification systems for LBP are the Treatment-Based Classification [7] and the Movement System Impairment [8] approaches. The Treatment-Based Classification system uses clusters of clinical features from a patient's medical history and physical examination, to categorize and direct the patient into one of 4 types of treatments [9]: trunk stabilization exercises, specific exercises, spinal manipulation, or traction. Hicks et al. [10] and Fritz et al. [9] have identified four clinical features associated with patient improvement after stabilization treatment: age less than 40 years, a positive score on the prone instability test [10,11], more than 91° of hip flexion during a passive straight-leg test [10,11], and aberrant trunk movements with lumbar-spine flexion [10]. At least any three of the four clinical features, taken together, now comprise a clinical prediction rule used to identify patients likely to improve with stabilization exercises [12]. Additionally, Fritz et al. [13] have identified another clinical feature of patients with LBP who improve with stabilization treatment: lumbar-spine hypermobility. Rater agreement when classifying patients based on shared clinical features using the Treatment-Based Classification system ranges from a kappa statistic of 0.52 to 0.62 with a percent agreement ranging from 67% to 81% [12,14].

The Movement System Impairment system classifies types of LBP based on impaired trunk movements and postures associated with the patient's LBP observed during a standardized examination [8]. The Movement System Impairment system draws on the Kinesiopathologic model, which assumes that altered precision in spinal movement may result in specific changes in the neuromusculoskeletal system, such as changes in the activation patterns of trunk muscles. The Kinesiopathologic model also assumes that, unless persons with LBP modify these repeated direction-specific trunk movements and postures, they are at risk for persistent or recurrent LBP [8].

In the Movement System Impairment examination, the physical therapist conducts standardized tests [8,15] and assesses for changes in the patient's LBP symptoms. If any test increases the patient's symptoms, the physical therapist modifies the test and has the patient perform this modified test to determine if the patient's movement patterns, trunk posture, and/or symptoms are altered. If the patient reports that the modified test decreases or eliminates the LBP, this response confirms that the direction-specific movement or posture contributes to the patient's LBP [16]. Results from the initial and modified tests are used to classify the patient into one of five movement system impairment (MSI) subgroups (named for the observed lumbar movement or alignment impairments): rotation, extension, flexion, rotation with extension, and rotation with flexion. The five MSI subgroups serve to help the physical therapist design a matched treatment to the patient's specific signs and symptoms. The reliability of physical therapists classifying patients based on the Movement System Impairment approach has been examined [17–19], and the kappa statistic ranged from 0.61 to 0.81 with a percent agreement ranging from 75% to 87% that reflects moderate-to-excellent agreement in classification of patients.

The Treatment-Based Classification–directed trunk stabilization approach focuses on three components of spinal stability: motor control of the deep trunk muscles (transversus abdominis, internal oblique, and multifidus) [10,20,21]; strengthening of the flexor, extensor, and oblique trunk muscles [10]; and incorporating trunk muscle control into activities of daily living. The Movement System Impairment–directed approach focuses on direction-specific functional activity modifications to change lumbopelvic movement patterns to patterns that are pain free, exercises to modify lumbopelvic movements and postures in specific directions that are pain free, and patient education on how specific lumbopelvic movement patterns and postures repeated daily might accelerate lumbar-tissue stress and education about the importance of modifying the movement patterns throughout the day. The treatments directed by the Treatment-Based Classification and Movement System Impairment classification approaches share similar goals of