



Original Articles

The Effect of Harmonic Technique vs End Range Loading Exercises on Pain and Disability in Patients With Non-Specific Chronic Low Back Pain: A Preliminary Study



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Abstract

Objective: The purpose of this study was to compare the effects of end range loading (ERL) vs harmonic technique (HT) on patients with chronic low back pain (LBP).

Method: Fourteen volunteer patients with LBP were randomly assigned to 2 groups based on a blocked randomization method with 7 patients in the HT group and 7 patients in the ERL group. The patients received 10 sessions of treatment for 5 sessions per week. Pain intensity and disability score were recorded using the numeric pain scale and Roland-Morris Disability questionnaire (RMQ), respectively, before and after the treatment period.

Results Although pain intensity ($P = .02$) and the RMQ score ($P = .03$) decreased in the HT technique group, no statistically significant change was found in the ERL group for the RMQ score ($P > .05$). The effect size for HT was .6 and .3 for numeric pain scale and RMQ, respectively.

Conclusion: This preliminary study showed that pain intensity and disability improved in subjects with chronic LBP in the HT group. More investigations with larger sample size are needed to clarify these findings.

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Introduction

Low back pain (LBP) is a common musculoskeletal disorder, and in 1998, it cost the United States \$90.7 billion in direct health care expenditures,¹ and total direct and indirect costs have been estimated to be \$624.8 billion per year.² The prevalence of LBP has been reported to reach from 14% to 84% in the Iranian population.³ Heavy physical work, static postures, repetitive bending and turning, lifting, pushing, pulling, repetitive work, vibration, and psychological-social factors are suggested as causes or aggravation factors⁴ which cause more prevalence of LBP among people aged 35-65 years.⁵

Noninvasive treatments have been considered an asset for practitioners to reduce pain and disability in patients with LBP and to reduce the burden of cost. Thus, an increasing demand for exercise therapy, manual therapy,⁶ and advice to remain active⁷ has been noticed in treatment approaches for chronic LBP. A commonly used exercise approach, end range loading exercise (ERL), was introduced in 1980 by Robin McKenzie. This protocol places an emphasis on extension exercises followed by flexion exercises. The exercises focus on decreasing and centralizing pain from the extremities to the lower back.⁸ Despite being commonly prescribed by practitioners,⁸ some investigators showed no significant differences between the effects of ERL and the other exercises.⁹⁻¹¹

Harmonic technique (HT) is an active soft tissue technique used to treat patients with musculoskeletal disorders.^{12,13} Harmonic technique focuses on rhythmic and oscillatory movements to improve physiological function of damaged tissues.¹² Rhythmic movements trigger healing by improving fluid flow, tissue nutrition, and repair. Recent studies have shown that active rhythmic motion has a substantial beneficial

effect on proprioceptive stimulation and pain relief compared with passive rhythmic motion.^{12,13}

According to Lederman,¹³ active and passive movements and manual therapy techniques that have periodic and rhythmic quality may activate transsynovial pump leading to an increase in fluid flow, a decrease in fluid retention, improvement of nutrition, and acceleration of tissue repair. Evidence supports early therapeutic exercise under the supervision of a trained professional for LBP patients with an emphasis on active movements.^{9,14}

To our knowledge, no study has directly investigated the effect of HT technique on patients with LBP. The purpose of this study is to investigate the effects of ERL vs HT for CLBP.

Methods

This study was a double-blinded clinical trial (ClinicalTrials.gov, identifier: NCT02178202). Subjects were recruited from volunteer patients referred to Khatamolania Polyclinic, Yazd, Iran, for chronic nonspecific LBP and between 20 and 65 years old. Fourteen subjects were divided into 2 groups based on the blocked randomization method (based on sample size in each group): (1) 7 patients received HT (4 male, 3 female), and (2) 7 patients received ERL (4 male, 3 female). Participants were not informed about the intervention in another group. Subject's demographic information was recorded at the time of testing by the same person (Table 1). The Human Research Ethics Committee at the University of Social Welfare and Rehabilitation Sciences approved the study. Written informed consent was obtained from all participants before testing. All interventions in both groups were

Table 1 Physical Characteristics of Subjects in HT and ERL Groups and Pain and Disability Scores and Their Standard Deviations (SDs)

	HT Group (4 Male, 3 Female)				ERL Group (4 Male, 3 Female)			
	Max	Min	Mean	SD	Max	Min	Mean	SD
Age (y)	51	30	39.71	7.94	50	19	34.57	10.05
Weight (kg)	95	52	75.57	15.60	94	68	74.29	9.52
Height (cm)	174	155	163.86	6.77	179	150	162	10.89
NPS pretest	5	2	3.71	1.11	7	2	4.71	1.88
NPS posttest	5	0	1.42	1.81	6	0	3.71	2.27
RMQ pretest	20	9	13.43	4.24	17	10	13.43	2.64
RMQ posttest	14	5	9	3.16	18	2	12	5.16

ERL, end range loading; HT, harmonic technique; NPS, numeric pain scale; RMQ, Roland-Morris Disability questionnaire.

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