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PILOT STUDY

Effect of therapeutic infra-red in patients with non-specific low back pain: A pilot study

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Summary The purpose of this study was to investigate the effect of infra-red (IR) in patients with chronic non-specific low back pain (NSLBP). Ten patients with NSLBP (5 men and 5 women) and disease duration of 21.7 ± 11.50 months participated in this pilot study. Patients had a mean age of 36.40 ± 10.11 years (range = 25–55). Patients were treated with infra-red (IR) for 10 sessions, each for 15 min, 3 days per week, for a period of 4 weeks. Outcome measures were the Numerical Rating Scale (NRS), the Functional Rating Index (FRI), the Modified –Modified Schober Test (MMST), and the Biering-Sorensen test to assess pain severity, disability, lumbar flexion and extension range of motion (ROM), and back extensor endurance, respectively. Data were collected at: baseline - study entry (T0); end of 5th treatment session after 2 weeks (T1); and end of the treatment after 4 weeks (T2). The results of the ANOVA demonstrated a statistically significant main effect of IR on all outcomes of pain, function, lumbar flexion-extension ROM, and back extensor endurance. The treatment effect sizes ranged from large to small. IR was effective in improving pain, function, lumbar ROM, and back extensor endurance in a sample of patients with NSLBP. Treatment effect sizes ranged from large to small indicating clinically relevant improvements primarily in pain and function for patients with NSLBP.
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Introduction

Low back pain (LBP) is a common and major health problem among all age groups globally including Iran (Balague et al., 2012; Mousavi et al., 2011; Davatchi et al., 2009, 2008; Ghaffari et al., 2006) such that up to 80% of adults experience an episode of LBP at least once during their life time (Freburger et al., 2009; Rubin, 2007). The lifetime prevalence of LBP is reported to be 84% (Rubin, 2007; Airaksinen et al., 2006; Walker, 2000). In a cross-sectional study carried out in Iran, the point/present, last month, last six months, last year and lifetime prevalence of LBP among Iranian surgeons was 39.9%, 50.2%, 62.3%, 71.7% and 84.8%, respectively (Mohseni-Bandpei et al., 2011). Period prevalence of LBP during pregnancy in Iranian women was 57.3% (Ansari et al., 2010). The total cost of LBP in the United States due to medical expenses and decreased productivity is enormous, estimated between $100 and $200 billion annually (Katz, 2006). LBP is one of the most common sources of disability in adult patients of working age (van Tulder and Waddell, 2005).

Low back pain is usually classified as non-specific (NSLBP) because for most patients the cause of symptoms is unknown with no specific pathology (Balague et al., 2012; van Tulder et al., 2002). Most of the patients with LBP seen in primary care (about 85%) and referred to physiotherapy clinics present with NSLBP (Wand and O'Connell, 2008; Deyo and Phillips, 1996). LBP can be classified as chronic if symptoms persist for more than 3 months (van Tulder and Waddell, 2005). The prevalence of chronic LBP is about 23% which results in disablement of 11–12% of the chronic low back pain population (Airaksinen et al., 2006).

There are many pharmacological and non pharmacological treatments for LBP (Chou et al., 2009; Chou and Huffman, 2007). LBP is one of the reasons for referring patients for physiotherapy consultation and treatment (Touche et al., 2008). There are several non-exercise physiotherapy interventions for treating LBP including superficial heat (Chou and Huffman, 2007; van Middelkoop et al., 2011). Superficial heat in the form of infra-red (IR) heat lamp may be utilized in physiotherapy clinics for the treatment of musculoskeletal conditions including LBP (French et al., 2006; Kitchen and Partridge, 1991). Infra-red radiation is used to increase blood flow and tissue extensibility thereby potentially reducing pain and maximizing function (Hurley and Bearne, 2008). A double-blind, placebo controlled study found that IR waist wrap was significantly effective in improving chronic LBP (Gale et al., 2006). There are no studies on the clinical effect of IR heat lamp for chronic NSLBP (van Middelkoop et al., 2011; French et al., 2006). Thus, the objective of this pilot study was to investigate the effect of IR in patients with chronic NSLBP.

Methods

Study design

The methodology was designed based on a prospective clinical trial with repeated measurements conducted in patients with NSLBP in accordance with the principles of the Declaration of Helsinki. Approval for the study was gained from the Research Council of the School of Rehabilitation, Tehran University of Medical Sciences (TUMS) and the Ethics Committee of TUMS.

Participants

The study included adult patients (age $\geq$18 years) who all had chronic NSLBP. Patients were excluded if they had any of the following criteria: pregnancy; LBP with known underlying pathology; systemic inflammatory disease; back surgery; nerve root compression; spinal fractures; tumor or malignancy; neurological deficits; and osteoporosis. Informed consent was obtained from all patients prior to the study.

Outcome measures

The outcome measures were Numerical Rating Scale (NRS) to assess pain intensity, Functional Rating Index (FRI) to assess disability, goniometry (Modified–Modified Schober Test) to measure lumbar range of motion, and the Biering-Sorensen Test to assess back muscle endurance.

Numerical Rating Scale

We used the NRS to assess pain intensity. Patients were asked to score their pain on a 0–10 scale with 0 meaning "no pain" and 10 meaning "worst possible pain". Psychometric studies support the reliability and validity of the NRS to be used in pain measurement (Farrar et al., 2001; Jensen et al., 1999; Ferraz et al., 1990).

Functional Rating Index

We used the Persian Functional Rating Index (FRI) to quantify disability. The Persian FRI has been demonstrated to be reliable and valid in Persian-speaking patients with LBP (Ansari et al., 2011). The FRI is a patient self-report questionnaire that measures pain and function (Feise and Menke, 2010, 2001). The FRI consists of 10 items, and patients rate their disability based on a 5-point scale with 0 indicating "no pain/full ability to function" and 4 indicating "worst possible pain/unable to perform this function at all". Item scores are summed to obtain a total score. The functional status is expressed as a percentage from zero (no disability) to 100% (severe disability). The FRI is reliable, valid, and sensitive (Feise and Menke, 2010, 2001).

Lumbar range of motion

We used the Modified–Modified Schober Test (MMST) to measure lumbar flexion and extension range of motion (ROM). The MMST is a reliable and valid test for measurement of spinal flexion and extension and is highly responsive in patients with LBP (Tousignant et al., 2005; Williams et al., 1993). The measurements were taken in a neutral standing position. We drew a line connecting the two posterior superior iliac spines. Then two points in the middle of the line and 15 cm above were marked. With lumbar flexion

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