

## Evaluation of the effects of shortwave diathermy in patients with chronic low back pain

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### Abstract

A prospective experimental study on 97 patients of chronic low back pain was conducted to find out the effects of shortwave diathermy. They were divided randomly into two groups and treated with non-steroidal anti-inflammatory drugs, exercises, activities of daily living instructions and with or without shortwave diathermy. After six weeks of treatment, improvements were observed in both the groups. But significant difference in improvement was found in shortwave diathermy group than in placebo group. The present study suggests that shortwave diathermy is effective for the treatment of patients with chronic low back pain.

### Introduction

Low back pain is defined as an uncomfortable sensation in the lumbar and buttock region originating from neurons near or around the spinal canal that are injured or irritated by one or more pathologic processes<sup>1</sup>. Low back pain is a symptom complex<sup>2</sup> which persists for more than three months is called chronic low back pain<sup>3</sup> and affects the area between the lower rib cage and gluteal folds<sup>4</sup>. Chronic low back pain remains poorly understood and inadequately treated due to the heterogeneity of the patients' population, and the lack of a simple and useful system<sup>5</sup>. Chronic low back pain is one of the most common causes of chronic disability<sup>6</sup> and most prevalent medical disorders in industrialized societies<sup>7</sup>. Frymoyer stated that, lifetime prevalence of low back pain ranges from 60%-90% and the annual incidence is 5%. Men and women are equally affected, but women suffer after the age of sixty<sup>8</sup>. It is estimated that 80%-90% of all people experience at least one episode of back pain in their lifetime<sup>9</sup>. Additionally it causes work losses, which in recent years have increased more rapidly than any other common form of incapacity<sup>10</sup>.

There were a very few studies underwent about the statistics of the patients of chronic low back pain in our country. The treatment and management of chronic low back pain is not simple but current multidisciplinary rehabilitation is appropriate<sup>11</sup>. Shortwave diathermy produces deep heating<sup>12</sup> and it is using as a modality of treatment in patients with chronic low back pain. So, the aim of this study was to find out the effects of shortwave diathermy in the management of patients with chronic low back pain.

### Materials and Methods

The study was conducted on 111 patients (65 males and 46 females) during the period July 2002 to January 2003. 97 patients completed the scheduled period. The patients were selected randomly according to the following criteria:

*Inclusion criteria:* The patients of either sex, above 20 years and below 80 years, with complaints of chronic low back pain who gave consent, were taken into the study.

*Exclusion criteria:* The patients of below 20 years and above 80 years having low back pain for less than three months, with traumatic low back pain, acute and inflammatory low back pain, with any complication and unwilling to give consent were excluded.

In the first attendance of the patients, a brief discussion was made about the nature of the study and consent was taken from all the participants. Clinical evaluation was done giving importance to the musculoskeletal and the nervous system and necessary investigations were done. The patients were divided into groups A and B and scheduled with shortwave diathermy in group A and placebo in group B. Same non-steroidal anti-inflammatory drugs, exercises and activities of daily living instructions were given to both the groups.

*Treatment procedures:* The patients were treated in the department with shortwave diathermy in the low back region for 15 min three times in a week for six weeks in group A and detuned placebo shortwave with only machine on but not producing heat was given to group B patients. Non-steroidal

anti-inflammatory drugs in the form of meloxicam 15 mg daily orally and therapeutic exercises with activities of daily living instructions were prescribed and demonstrated to the patients of both the groups. The therapeutic procedures were executed by the same physiotherapist in the department and advised to continue at home.

**Data collection procedures:** After the treatment of the patients as per schedule, the patients were followed up weekly for six weeks and the outcomes were recorded in the assessment data sheet. Lattinen's test score<sup>13</sup> for pain is measured by pain intensity 0-4, pain frequency 0-4, analgesic intake 0-4, disability 0-4, and sleep disturbance 0-4, total 20. Tenderness score was 0-4 and visual analog scale<sup>14-16</sup> from 0-10. Adding the three scores the grand total was 0-34.

**Statistical analysis:** All the outcome assessment data were analysed by using the computer and the SPSS-package program (version-12.0) for windows. Student's 't' tests were done as required, to see the level of significance. The results were expressed as mean  $\pm$  standard deviation and  $p=0.05$  was considered as the level of significance.

## Results

Out of total 97 patients completed the study, baseline clinical and investigation characteristics of both the groups found almost identical (Table I). The mean age of the patients was  $39.72 \pm 11.94$  years and majority of the patients (64%) were in the age group of 30-49 years.

The treatment responses at the end of each week were compared within the groups and in between the groups with the pre-treatment scores. Pretreatment combined scores of the groups were, in Group A=  $20.44 \pm 3.02$  and in Group B=  $20.10 \pm 3.51$ . It was observed that after the treatment, improvement of symptoms of both the groups was started at the end of first week. But, significant difference of improvement in between the groups began at the end of third week. At the end of 2<sup>nd</sup> week, Group A score was  $15.34 \pm 4.82$  in comparison to pre-treatment score  $20.44 \pm 3.02$  and Group B score was  $17.58 \pm 3.39$  in comparison to pre-treatment score  $20.10 \pm 3.51$  ( $p=0.01$ ). At the end of 3<sup>rd</sup> week, Group A score was  $13.06 \pm 5.01$  and Group B score was  $15.70 \pm 3.77$  ( $p=0.005$ ). At the end of 4<sup>th</sup> week, Group A score was  $11.06 \pm 4.15$  and Group B score was  $15.04 \pm 3.77$  ( $p=0$ ). At the end of 5<sup>th</sup> week, Group A score was  $8.34 \pm 3.62$  and Group B score was  $14.02 \pm 3.31$  ( $p=0$ ). At the end of 6<sup>th</sup> week, Group A score was  $6.44 \pm 3.06$

and Group B score was  $13.38 \pm 3.10$  ( $p=0$ ). It proved that, at the end of 6 weeks of treatment, there was more significant improvement of symptoms of the patients in Group A, than that of Group B ( $p=0$ , Table II).

**Table I:** Baseline clinical criteria during the first attendance of the patients

Parameters	Group A (n=47)	Group B (n=50)
Height (inch)	$63.36 \pm 3.04$	$63.46 \pm 2.96$
Weight (kg)	$59.04 \pm 10.09$	$59.58 \pm 10.55$
Pulse/min	$75.23 \pm 5.43$	$73.72 \pm 5.35$
Systolic blood pressure (mmHg)	$120.74 \pm 11.52$	$119.22 \pm 8.20$
Diastolic blood pressure (mmHg)	$78.91 \pm 7.04$	$77.86 \pm 5.37$
Hemoglobin (g/dL)	$12.18 \pm 1.39$	$12.20 \pm 1.37$
ESR mm1 <sup>st</sup> hr	$18.02 \pm 8.25$	$18.74 \pm 10.82$
Schober's test	$4.32 \pm 0.70$	$4.39 \pm 0.87$

**Table II:** Group wise time-point comparisons of treatment response

Score	Group A (n=47)	Group B (n=50)	95% CI	P value
Pre-treat score	$20.44 \pm 3.02$	$20.10 \pm 3.51$	-0.97 to 1.66	0.63
Score at W1	$17.82 \pm 3.79$	$18.78 \pm 3.21$	-2.37 to 0.47	0.14
Score at W2	$15.34 \pm 4.82$	$17.58 \pm 3.39$	-3.93 to -0.54	0.01
Score at W3	$13.06 \pm 5.01$	$15.70 \pm 3.77$	-4.43 to -0.83	0.005
Score at W4	$11.06 \pm 4.15$	$15.04 \pm 3.77$	-5.58 to -2.37	0.0
Score at W5	$8.34 \pm 3.62$	$14.02 \pm 3.31$	-7.08 to -4.27	0.0
Score at W6	$6.44 \pm 3.06$	$13.38 \pm 3.10$	-8.17 to -5.68	0.0

## Discussion

This study shows that the patients of both the groups responded well to the treatment. The significant improvement of symptoms within both the groups began to appear at the end of first week with no significant difference ( $p=0.14$ ). At the end of second week more improvements were observed in both the groups and in between the groups. The trends of improvements were continued throughout the whole period of six weeks of study. But, in comparison, the significance of improvement in the group of patients who received shortwave diathermy was better than that of placebo group ( $p=0$ ). The outcomes of treatment was unrelated to the initial severity or duration of pain of both the groups. Zaman<sup>8</sup> reported in a study at IPGMR that partial or complete relief of pain was more in the patients who received shortwave diathermy than the exercise group or placebo group.

Gibson et al. studied 109 patients and significant improvements after treatment were observed in 59% patients who received shortwave diathermy<sup>17</sup>. Shakoor et al. found that there was significant

improvement after giving shortwave diathermy on the patients with neck pain<sup>18</sup>. In a meticulous review, Chard and Dieppe indicated that the use of non-pharmacological interventions shortwave diathermy in osteoarthritis is essential for good management<sup>19</sup>. Ullah showed that improvement was better in the patients who received shortwave diathermy than that of the patients who were not treated with shortwave diathermy<sup>20</sup>. In a study, Kerem and Yigiter studied 60 patients and showed significant improvements in measured parameters in shortwave diathermy group after the treatment<sup>21</sup>. Debsarma in a study showed that deep heat modality is more effective than superficial heat in pain management in chronic low back pain patients<sup>22</sup>.

Short wave diathermy is a deep heating modality of physical treatment. It has significant effect on relief of pain and increased temperature in the tissues due to heat causes increased arteriolar and capillary dilatation followed by increased blood flow to the area. There is marked alteration of the physical properties of fibrous tissue as found in the tendons, joint capsules, scars and tissues yield more readily to stretch when heated<sup>23, 24</sup>.

In conclusion, present study showed that shortwave diathermy is an effective modality in the treatment of the patients with chronic low back pain.

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