

A Comparative Analysis between Short Wave Diathermy and Infrared Radiation's Effects on the Patients with Chronic Low Back Pain Due to Lumbar Spondylosis

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ABSTRACT

Introduction: Low back pain is a symptom and not a disease. The low back pain is considered to incorporate dorsal pain found any place between the 12 thoracic vertebra and lower buttock up to gluteal folds or anus. Lumbar spondylosis is a typical reason for chronic low back pain and chronic disability.

Objective: The main purpose of this research is to give a comparative analysis between short wave diathermy and infrared radiation for treating lower back pain caused by spondylosis.

Method: This was an observational study. A randomized clinical trial study was conducted on Department of Physical Medicine and Rehabilitation, BSMMU, Shahbagh, Dhaka on 153 patients who came to hospital with lower back pain and suffered from spondylosis. The study duration was from 1st March 2010 to 15 September, 2010.

Results: Out of 153 patients, irrespective of sex, it was found that most of the patients (50.98%) belong to 40-49 years age group followed by: 50-59 years (27.45%), 30-39 years (11.11%) and 60-70 years (10.46%) age group. In 72.2% patients prolonged sitting exacerbate the lower back pain. Prolonged standing was also found as another aggravating factor of pain among the study patients (17.6%). Prolonged walking (5.9%) and leaning forward (3.3%) came next in the

order of aggravating factors for lower back pain. The study also showed the performance difference between SWD and IRR on the patients.

Conclusion: Considering the information gathered from this study, it can be concluded that all the tested therapies seemed to improve the patients with chronic low back pain. But IRR and SWD showed no significant difference in improvement for the patients with chronic LBP due to lumbar spondylosis.

Keywords: Short Wave Diathermy, Infrared Radiation, Chronic Low Back Pain.

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INTRODUCTION

Low back pain is a symptom and not a disease. The low back pain is considered to incorporate dorsal pain found any place between the 12 thoracic vertebra and lower buttock up to gluteal folds or anus.¹ Back pain has been termed as "an illness in search of disease".²

It is amazingly normal. About 40% of individuals state that they have included low back pain inside the most recent a half year. Studies have indicated life time prevalence as high as 84%. Most

episodes resolve with or without treatment. Somewhere in the range of 80 and 90% of the health care and social cost of back pain are for the 10% who create chronic low back pain and incapacity. Simply over 1% of grown-ups in the USA are for all time disabled by back agony, and another 1% are briefly handicapped. The percentage of patients disabled by back pain, just as the expense of low back pain, has consistently expanded in the course of the last 25 years.³

Lumbar spondylosis is a typical reason for chronic low back pain and chronic disability. Spondylosis might be connected nonspecifically to any degenerative conditions influencing the circles, vertebral bodies, and/or associated joints of the lumbar spine.⁴ In Bangladesh, gigantic cash is likewise spent for the treatment of chronic low back pain because of lumbar spondylosis however there is no statistics about it close by. These individuals become incapacitated and a weight for the general public and they can't contribute anything for the nation. There are numerous alternative of treatment for low back pain. In an investigation in Bangladesh, it was found that SWD is a successful modality of treatment for chronic low back pain.⁴ IRR is superficial heating equipment. It is cost effective, easily applicable, and widely available. A scarcity of data exists in this nation in regards to the precise job of IRR in the management of chronic low back pain. Because of absence of appropriate rehabilitation numerous patients become permanently disabled. In this nation, whatever information is accessible yet it isn't adequate about restoration treatment on chronic low back pain because of lumbar spondylosis. Along these lines, the point of this study is to find out the impacts of infrared radiation (IRR) and short wave diathermy (SWD) on the patients with chronic LBP due to lumbar spondylosis.

OBJECTIVES

Main Objective

The main purpose of this research is to give a comparative analysis between short wave diathermy and infrared radiation for treating lower back pain caused by spondylosis.

Specific Objectives

- Identifying continuous SWD's effects on the study sample,
- Identifying IRR's effects on the study sample, and
- Making comparison from the result after using the SWD and IRR.

METHOD

Study Type

This was an observational study. This study has been conducted by using randomized clinical trial.

Inclusion Criteria of the Study

- Has come to the clinic to get treatment for lower back pain
- Has symptoms of spondylosis (> 03 months)
- ≥ 30 - 70 years of age

Exclusion Criteria of the Study

The patients that have psychological ailments suffering from the similar symptoms of spondylosis have been set as criteria for exclusion in this study.

Study Area

- Department of Physical Medicine and Rehabilitation, BSMMU, Shahbagh, Dhaka.
- A randomized clinical trial was conducted.
- 153 patients that came to the hospital to treat lower back pain.
- The study duration was 1st March 2010 to 15 September, 2010.

Study Population

According to the selection criteria 200 patients were selected randomly for the study. Random sampling involves random selection procedures to ensure that each unit of the sample is

chosen on the basis of chance. Therefore, all units of study population have an equal chance of being included in the sample. These selected patients were divided into three groups (Group-A, Group-B and Group-C) by lottery.

Group A: In this group patients were treated with NSAID, ADLs, Exercises & SWD

Group B: In this group patients were treated with NSAID, ADLs, Exercises & IRR

Group C: In this group patients were treated with NSAID, ADLs & Exercises only.

Exercise: Back muscle strengthening exercises in the form of Back muscle extension exercise, pelvic tilting exercise and Back muscle flexion exercise (in case of hyperlordotic lumbar spine) was given in all the groups.

NSAIDs (Non-Steroidal Anti-Inflammatory Drugs): Naproxen (250mg) twice daily orally was prescribed in all the groups. The drug was used from only one company to avoid any difference in efficacy.

Sampling Technique

Purposive sampling- subjects were selected purposively according to the availability of the patients who fulfilled the inclusion criteria.

Sample Size

Here the probability of two events under consideration were: P_1 (control) = 0.45 and P_2 (treatment group) = 0.25. The arcsine transformation of P_1 is 1.471 and of P_2 is 1.0478. Using equation $h = \phi_1 - \phi_2$, "h" is 0.424. Here, h= effect size, ϕ_1 = arcsine transformation of P_1 and ϕ_2 = arcsine transformation of P_2 . When this value is substituted into equation $n = 15.7 / h^2$ together with an α_2 of 0.05 and a β_1 of 0.2, a minimum of 88 subjects are required per group. 15.7 is the common value where an $\alpha_2 = 0.05$ and $\beta_1 = 0.2$ in the equation sample size (n) = 15.7/ h^2 .

Between March 01, 2010 and September 15, 2010 a total of 200 patients were assessed for the trial, of which 47 were dropped out from the study because they could not attend regularly for follow up and/or could not follow the treatment allocated to them properly. So, 153 patients were entered into the trial.

Table 1: Age distribution of the study patients (n=153)

Age in years	Frequency	Percentage (%)
30-39	17	11.11
40-49	78	50.98
50-59	42	27.45
60-70	16	10.46
Total	153	100

RESULTS

In our study the age range of the patients was ≥ 30 to ≤ 70 years irrespective of sex. The mean age of the patients of both sexes was 47.82 ± 7.96 years. Out of 153 patients irrespective of sex it was observed that most of the patients (50.98%) belong to age group of 40-49 years followed by 50-59 years (27.45%), 30-39 years (11.11%) and 60-70 years (10.46%) age group (Table 1).

Out of 153 patients irrespective of sex it was observed that in most patients (73.2%) prolonged sitting exacerbate the pain. Prolonged standing was found as another important aggravating factor of pain among the study patients (17.6%). Prolonged walking (5.9%) and leaning forward (3.3%) came next in order of aggravating factors (Figure 1).

Comparative Improvements of Symptoms between Group A and Group B in Different Time Points

Though highly significant improvement ($p < 0.005$) were observed throughout the whole treatment period in individual group, the differences of improvement between the groups were not found to be significant finally ($P > 0.05$ in W_5 and W_6) (Table 2).

Comparative Improvements of Symptoms between Group B and Group C in Different Time Points

Though highly significant improvement ($p < 0.005$) were observed

throughout the whole treatment period in individual group, the differences of improvement between the groups were not be significant (Table 3).

Comparative Improvements of Symptoms between Group A and Group C in Different Time Points

Though highly significant improvement ($p < 0.005$) were observed throughout the whole treatment period in individual group, significant improvement between the groups were not found (Table 4).

Table 2: Comparative improvements of symptoms between Group A and Group B in different time points

Group	W ₀	W ₁	W ₂	W ₃	W ₄	W ₅	W ₆
Group A (n=50)	63.60 ±4.175	57.02 ±4.405	44.08 ±5.102	37.38 ±6.722	30.32 ±8.198	24.22 ±9.429	17.68 ±10.979
Group B (n=48)	65.27 ±3.181	59.38 ±3.279	47.23 ±3.372	40.00 ±3.209	33.38 ±3.480	26.73 ±3.565	20.15 ±3.661
P-value	0.028	0.003	0.001	0.016	0.018	0.084	0.138
95% CI	-3.156 to - 0.185	-3.909 to - 0.801	-4.880 to - 1.149	-4.728 to - 0.512	-5.577 to - 0.533	-5.365 to 0.347	-5.747 to 0.815

Results are expressed as mean ± SD, n= number of patients, W= week

Table 3: Comparative improvements of symptoms between Group B and Group C in different time points

Group	W ₀	W ₁	W ₂	W ₃	W ₄	W ₅	W ₆
Group B (n=48)	65.27 ±3.181	59.38 ±3.279	47.23 ±3.372	40.00 ±3.209	33.38 ±3.480	26.73 ±3.565	20.15 ±3.661
Group C (n=55)	62.53 ±2.987	56.29 ±3.023	47.31 ±3.615	40.51 ±4.203	33.69 ±4.686	27.47 ±5.221	20.76 ±5.157
P-value	0.000	0.000	0.908	0.488	0.696	0.396	0.481
95% CI	1.532 to 3.956	1.844 to 4.324	-1.447 to 1.287	-1.961 to 0.943	-1.918 to 1.286	-2.475 to 0.987	-2.351 to 1.116

Results are expressed as mean ± SD, n= number of patients, W= week

Table 4: Comparative improvements of symptoms in between Group A and Group C in different time points

Group	W ₀	W ₁	W ₂	W ₃	W ₄	W ₅	W ₆
Group A (n=50)	63.60 ±4.175	57.02 ±4.405	44.08 ±5.102	37.38 ±6.722	30.32 ±8.198	24.22 ±9.429	17.68 ±10.979
Group C (n=55)	62.53 ±2.987	56.29 ±3.023	47.31 ±3.615	40.51 ±4.203	33.69 ±4.686	27.47 ±5.221	20.76 ±5.157
P-value	0.137	0.330	0.000	0.006	0.013	0.034	0.074
95% CI	-0.348 to 2.493	-0.751 to 2.209	-4.960 to - 1.498	-5.331 to 0.927	-6.000 to - 0.741	-6.257 to - 0.249	-6.478 to 0.311

Results are expressed as mean ± SD, n= number of patients, W= week

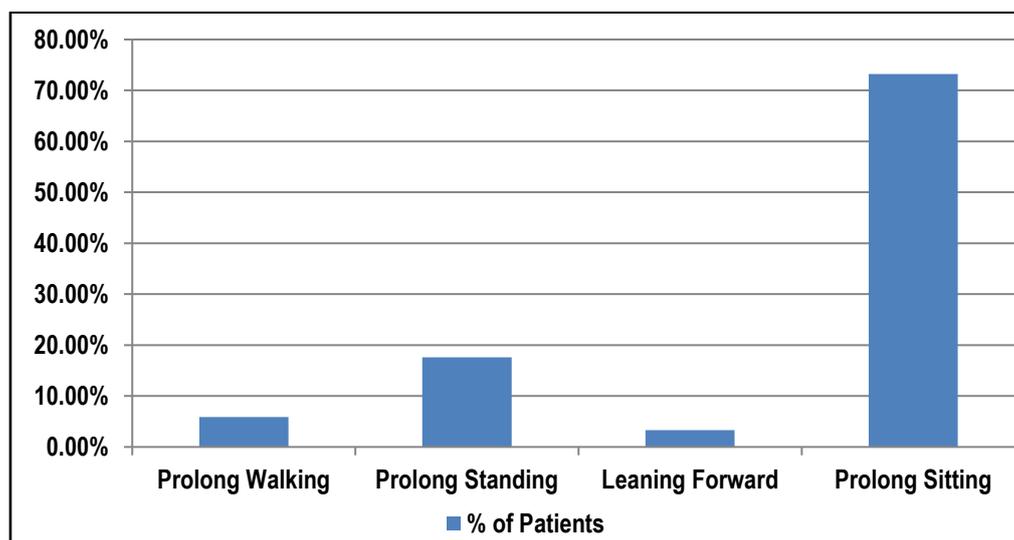


Figure 1: Aggravating Factors of pain (n=153)

DISCUSSION

Assessment of improvement was done using the Oswestry Disability Index (ODI) and measurement of pain on a Visual Analogue Scale (VAS) and Modified Zung Index. The significant improvement of symptoms within the three groups began to appear after one week of treatment. The trend of improvement continued throughout the whole period of six weeks. At the end of 6th week significant improvements of symptoms were found within all groups. All these tested therapies were helpful for the patients with chronic low back pain. But there were no difference in improvement between the groups. It may be concluded that both of SWD and IRR are effective in chronic low back pain, but there is no significant difference between them in comparison of their effectiveness. Debsarma⁵ in a study showed that deep heat modality is more effective than superficial heat in pain management in chronic low back pain patients. Shakoor MA et al⁶ in an experimental study showed that both IRR and Cervical Traction have beneficial effect on Cervical Spondylosis. It was also found that IRR is also helpful for the patients with LBP. Ullah⁷ showed that improvement was better in the patients who received SWD than that of the patients who are not treated with SWD. In a study Keren and Yigiter⁸ studied 60 patients and showed significant improvements in measured parameters in SWD group after the treatment. An Evidence-based Guidelines at Philadelphia⁹ panel recommendation agrees with the AHCP and BMJ guide lines that evidence for the effectiveness of the therapeutic ultrasound (deep heating modality like SWD) for low back pain is lacking. Gibson et al¹⁰ compared the effect of SWD and exercise on patients with low back pain and found no difference between their effects. Hossain MS¹¹ in a study with chronic low back pain showed that the comparative effectiveness of ultrasonic therapy (a deep heating modality) and SWD was not superior to one another and their effectiveness was not significant from control group.

CONCLUSION

The number of the patients for the study was small and as such the result may not be entirely conclusive. Considering the information gathered from this study, it can be concluded that all the tested therapies seemed to improve the patients with chronic low back pain. But IRR and SWD showed no significant difference in improvement for the patients with chronic LBP due to lumbar spondylosis & their effectiveness was not significant from control group. However, further studies on a larger sample size are needed for an improved result and analysis.

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