

The Infrared Radiation's Effects on the Patients with Chronic Low Back Pain Due to Lumbar Spondylosis

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Abstract

Original Research Article

Introduction: Lumbar spondylosis is a typical reason for chronic low back pain and unending handicap. Receptive changes create in adjacent vertebrae; the bone ends up sclerotic and osteophytes structure around the rim of the vertebra. The most well-known destinations of lumbar spondylosis are L5/S1 and L4/L5. Infra-red radiation is a superficial heating modality which is the segment of the electromagnetic range adjoining the long-wavelength, low-frequency (red) end of the visible spectrum. **Objective:** The main purpose of this research is to find out the infrared radiations effectiveness for treating lower back pain caused by spondylosis. The specific objectives of the study are:

- Identifying continuous symptoms of Lumbar Spondylosis in the study samples,
- Finding out the level of pain suffered by the patients, and
- Identifying IRR's effects on the study sample.

Method: This was a cross sectional study. A clinical trial was conducted on Department of Physical Medicine and Rehabilitation, BSMMU, Shahbagh, Dhaka on 103 patients scheduled for appraisal of their problems regarding LBP. The study duration was from 1st March 2010 to 15 September, 2010. **Results:** 103 patients regularly took the treatment plan assigned to them in the course of the study. In accordance to time point improvement, one week i.e. pre-treatment summation score with compared to at the end of one week summation score (W1) was 65.27 ± 3.18 vs 59.38 ± 3.28 ($P=0$, 95% CI=5.51 to 6.28). The improvement gradually increased day by day and after the end of treatment significant improvement was found in our study i.e. pretreatment vs post treatment summation score was 65.27 ± 3.18 vs 20.15 ± 3.66 ($P=0$, 95% CI=44.09 to 46.16). This indicates that a combined treatment with NSAIDs, exercise, ADL and IRR is effective for the improvement of the patients with chronic LBP due to lumbar spondylosis. **Conclusion:** it can be seen from the study that Infrared Radiation or IRR therapy on patients had alleviated the pain and symptoms of lumbar spondylosis but its effectiveness was not significant from control group. Further studies on a larger sample size will give improved and conclusive result.

Keywords: Infrared Radiation, LBP, Lumbar Spondylosis.

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INTRODUCTION

Lumbar spondylosis is a typical reason for chronic low back pain and unending handicap. Spondylosis might be connected nonspecifically to all degenerative conditions influencing the disks, vertebral bodies, and/or associated joints of the lumbar spine [1]. Receptive changes create in adjacent vertebrae; the

bone ends up sclerotic and osteophytes structure around the rim of the vertebra. The most well-known destinations of lumbar spondylosis are L5/S1 and L4/L5. Circle prolapse through an adjacent vertebral endplate to deliver a schmorl's node on x-beam is easy yet may quicken disk degeneration [2].

Infra-red radiation is a superficial heating modality which is the segment of the electromagnetic range adjoining the long-wavelength, low-frequency (red) end of the visible spectrum glowing ir heat lamps transmit radiation in the near-infrared spectrum (wavelength, 770-1500 nm). IRR produces heating by instigating molecular vibration. A 1.3°C temperature rise has been noted at a profundity of 2 cm following heat lamp application. In this examination populace IRR was given on low back region of the patients for 10 min each substitute day for about a month and a half.

A lack of data exists in this nation with respect to the careful job of IRR in the management of chronic low back pain. Because of absence of appropriate recovery numerous patients become for all time crippled. 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) on the patients with chronic LBP due to lumbar spondylosis.

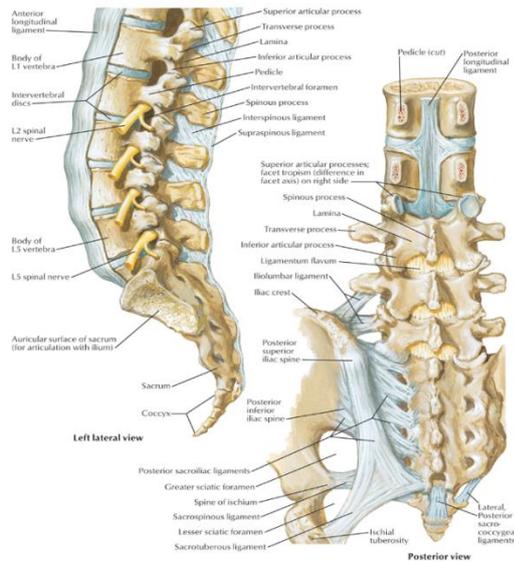


Fig-1: Anatomy of lumbosacral region of spine



Fig-2: X-ray of lumbosacral spine showing lumbar spondylosis (lateral view)

Objectives

Main Objective

The main purpose of this research is to find out the infrared radiations effectiveness for treating lower back pain caused by spondylosis.

Specific Objectives

The specific objectives of the study are

- Identifying continuous symptoms of Lumbar Spondylosis in the study samples,
- Finding out the level of pain suffered by the patients, and
- Identifying IRR’s effects on the study sample.

METHOD

Study Type

This was a case control study. This study has been conducted by using randomized clinical trial.

Criteria (inclusion and exclusion) of the study

Inclusion Criteria	Has chronic low back pain (≥ 03 months)
	Has come to the clinic to seek treatment for lower back pain
	Between 30 to 70 years of age
Exclusion Criteria	Have psychological ailments suffering from the similar symptoms of spondylosis

Study Area

- Department of Physical Medicine and Rehabilitation, BSMMU, Shahbagh, Dhaka.
- A clinical trial was conducted in the hospital
- 103 patients were chosen based on the inclusion criteria for the study

- The study duration was 1st March 2010 to 15 September, 2010.

Study population

103 patients were selected randomly for the study according to the selection criteria. Activities of daily living (ADL) instructions were advised, and Non-Steroidal Anti-Inflammatory Drugs (NSAIDs) twice

daily orally was prescribed for the patients to protect them from back pain and for treatment reasons.

Sample Size

These selected patients were divided into two groups (Group-B and Group-C) by lottery.

Case Group

Group-B: In this group patients were treated with NSAID, ADLs, exercises & IRR
Total sample: 48

Control Group

Group-C: In this group patients were treated with NSAID, ADLs & exercises only.
Total sample: 55

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.

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 103 patients irrespective of sex it was observed that most of the patients (50.48%) belong to age group of 40-49 years followed by 50-59 years (26.22%), 30-39 years (12.62%) and 60-70 years (10.68%) age group (Table No.1).

Table-1: Age distribution of the study patients (n=103)

Age in years	Frequency	Percentage (%)
30-39	13	12.62
40-49	52	50.48
50-59	27	26.22
60-70	11	10.68
Total	103	100

n= Number of total study subjects

In the present study chronic LBP due to lumbar spondylosis was most frequently found in housewives (54.9%) followed by businessman (11.8%), private service holders (9.2%), and government service

holders (7.2%). On the other hand people engaged as guard or security worker was least affected (0.7%) (Figure 3).

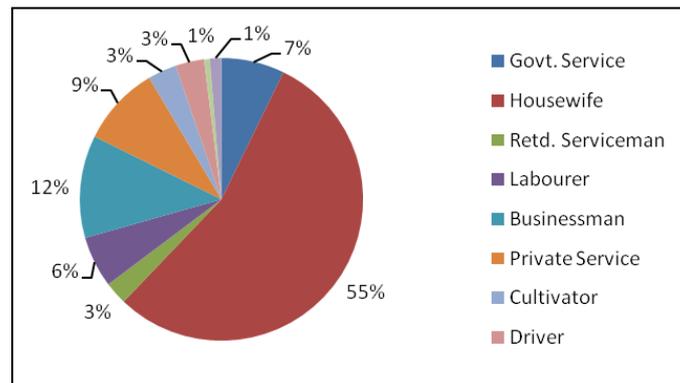


Fig-3: Occupation of the Patients (n=103)

Treatment response in group B (n=48) at different time points

Fourty eight patients were included in Group B and all of them regularly took the treatments allocated to them. Based on Oswestry Disability Index, Visual Analogue Scale and Modified Zung Index score for chronic low back pain due to lumbar spondylosis pre-treatment and post treatment data were compared statistically. There was also significant improvement after treatment in Group B. In respect to time point improvement, marked improvement started to occur

after one week i.e. pretreatment summation score vs at the end of one week summation score (W1) was 65.27 ± 3.18 vs 59.38 ± 3.28 (P=0, 95% CI=5.51 to 6.28). The improvement gradually increased day by day and after the end of treatment significant improvement was found in our study i.e. pretreatment vs post treatment summation score was 65.27 ± 3.18 vs 20.15 ± 3.66 (P=0, 95% CI=44.09 to 46.16) (Table 2). This indicates that a combined treatment with NSAIDs, exercise, ADL and IRR is effective for the improvement of the patients with chronic LBP due to lumbar spondylosis.

Table-2: Treatment response in group B (n=48) at different time points

Time points	Mean ± SD	95% CI	P-value
W ₀ vs W ₁	65.27 ± 3.18 vs 59.38 ± 3.28	5.51 to 6.28	0.000
W ₀ vs W ₂	65.27 ± 3.18 vs 47.23 ± 3.37	17.30 to 18.79	0.000
W ₀ vs W ₃	65.27 ± 3.18 vs 40 ± 3.21	24.47 to 26.07	0.000
W ₀ vs W ₄	65.27 ± 3.18 vs 33.38 ± 3.48	31.04 to 32.76	0.000
W ₀ vs W ₅	65.27 ± 3.18 vs 26.73 ± 3.57	37.61 to 39.48	0.000
W ₀ vs W ₆	65.27 ± 3.18 vs 20.15 ± 3.66	44.09 to 46.16	0.000

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

Fifty five patients were included in Group C and all of them regularly took the treatments allocated to them. Based on Oswestry Disability Index, Visual analogue Scale and Modified Zung Index score for chronic low back pain due to lumbar spondylosis pre-treatment and post treatment data were compared statistically. There was also significant improvement after treatment in Group C. In respect to time point improvement, marked improvement started to occur after one week i.e. pretreatment summation score vs at the end of one week summation score (W₁) was 62.53 ±

2.99 vs 56.29 ± 3.02 (P=0, 95% CI=5.94 to 6.53). The improvement gradually increased day by day and after the end of treatment significant improvement was found in our study i.e. pretreatment vs post treatment summation score was 62.53 ± 2.99 vs 20.76 ± 5.16 (P=0, 95% CI=40.09 to 43.44) (Table 10). This indicates that a combined treatment with NSAIDs, exercise and ADL is effective for the improvement of the patients with chronic LBP due to lumbar spondylosis.

Table-3: Treatment response in group C (n=55) at different time points

Time points	Mean ± SD	95% CI	P-value
W ₀ vs W ₁	62.53 ± 2.99 vs 56.29 ± 3.02	5.94 to 6.53	0.000
W ₀ vs W ₂	62.53 ± 2.99 vs 47.31 ± 3.62	14.29 to 16.15	0.000
W ₀ vs W ₃	62.53 ± 2.99 vs 40.51 ± 4.20	20.84 to 23.20	0.000
W ₀ vs W ₄	62.53 ± 2.99 vs 33.69 ± 4.69	27.44 to 30.24	0.000
W ₀ vs W ₅	62.53 ± 2.99 vs 27.47 ± 5.22	33.48 to 36.63	0.000
W ₀ vs W ₆	62.53 ± 2.99 vs 20.76 ± 5.16	40.09 to 43.44	0.000

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

DISCUSSION

The patient with a CHRONIC PAIN problem typically has a complicated medical and psychological history. An adequate comprehensive treatment of the problem requires a careful and multidisciplinary assessment. The goal of the assessment is to identify NOCICEPTIVE factors that may be correctable, psychological factors that can be addressed (PHARMACOLOGICALLY or BEHAVIORALLY), the contribution of disuse to the pain problem, and the socio-environmental context in which the pain problem is maintained. The distinction between ACUTE and CHRONIC PAIN MANAGEMENT strategies cannot be overemphasized when attempting to help the individual to achieve a more functional life [3].

In the study, the age range of the patients was from 30 years to 70 years of age. The mean age of the patients was 47.82 ± 7.96. The chronic Low Back Pain due to lumbar spondylosis was most frequently found in housewives at 54.9%, followed by businessmen (11.9%), the private service holders (9.2%), and government service holders (7.2%). On the other hand people engaged at physically intensive work, such as guard or security worker was the least affected (0.7%). 103 patients belonged in the study group and all of them

took the treatment plan allocated to them. There was significant improvement after treatment in the patients after making comparison with the base line time point (Pre-treatment) with post treatment time points. In respect to time point improvement, marked improvement started to occur after one week i.e. pretreatment summation score versus the end of one week summation score (W₁) was 65.27 ± 3.18 vs 59.38 ± 3.28 (P=0, 95% CI=5.51 to 6.28). The improvement gradually increased day by day and after the end of treatment significant improvement was found in our study i.e. pretreatment vs post treatment summation score was 65.27 ± 3.18 vs 20.15 ± 3.66 (P=0, 95% CI=44.09 to 46.16). This indicates that a combined treatment with NSAIDs, ADL exercise, and *Infrared Radiation (IRR)* is effective for the improvement of the patients with chronic LBP due to lumbar spondylosis, where treatment application of IRR is primary but its effectiveness was not significant from control group. Shakoor MA *et al.* [4] in an experimental study showed that both IRR and CERVICAL TRACTION have beneficial effect on CERVICAL SPONDYLOSIS. Zaman [5] MM in a study with 46 patients of lumbar spondylosis showed improvement in 73% of patients using SWD. We also found that IRR is helpful for the patients with LBP. In another controlled examination think about Rahman S *et al.* [6] announced microwave

diathermy (a deep heating modality) as a valuable strategy for the treatment of patients with lumbar spondylosis. Debsarma[7] in an investigation demonstrated that deep heat modality is more compelling than superficial heat in torment the board in ceaseless low back pain patients. Manniche *et al.* [8] studied the role of exercise in 105 patients for 3 months. They found very satisfactory result in 44 % and only satisfactory result in 30 % (overall 74%) improvement. Kraus and Nagler[9] studied 12,000 patients to see the effect of exercises of low back pain. 80% of their patients who received generalized mobilizing, strengthening and stretching exercise reported improvement after 6 weeks treatment. We also used back muscle strengthening exercise for the patients. Ullah[10] 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 Yigiter[11] studied 60 patients and showed significant improvements in measured parameters in SWD group after the treatment. An Evidence-based Guideline at Philadelphia [12] panel recommendation agrees with the AHCPR 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 al.* [13] compared the effect of SWD and exercise on patients with low back pain and found no difference between their effects. Hossain MS [14] 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 trial for this study involved a small number of patients which limited the study. However, it can be seen from the study that Infrared Radiation or IRR therapy on patients had alleviated the pain and symptoms of lumbar spondylosis but its effectiveness was not significant from control group. It may be due to important role of back muscle strengthening exercise on chronic low back pain patient. Further studies on a larger sample size will give improved and conclusive result.

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