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Original Research Article

Comparative Study of Short Wave Diathermy and Exercise Together and Exercise Alone in the Management of Chronic Back Pain

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ABSTRACT

Study Objective: Comparative Study of Short Wave Diathermy (SWD) and Exercise together and Exercise alone in the Management of Chronic back pain.
Design: Pre & post test control group design.
Method and Measurements: 40 patients from Raj Nursing Home and shifa Hospital [Age group 25-65 yrs] who were diagnosed with Low back pain, with onset >1-3 months (chronic) were randomly assigned to either group A receiving SWD and Exercise combined or group B receiving Exercise alone. Treatment was given for 3 times in a week for the period of 6 week. Before treatment and after 6 weeks of treatment pain was assessed on VAS and MPQ.
Results: Subjects in-group A that received SWD and exercise showed greater Improvement in pain compared with the exercise group on 6th week compared with pre treatment. ($p<0.050$)
Conclusion: The result of study suggests that both SWD and exercise improves the symptoms of chronic back pain. Exercise alone improved the pain symptoms but was too small to reach satisfactory outcome for patients. Based on these results SWD and Exercise should be the treatment of choice for chronic back pain rather than Exercise alone.

Key Words: Short wave diathermy (SWD), Exercise, Chronic back pain.

INTRODUCTION:

Low back pain (LBP) is the most frequent self-reported type of musculoskeletal pain, is often recurrent, and has important socio-economic conse-quences. [1] 80% of population suffers from LBP at some time in their lives, and chronic LBP is the biggest factor limiting activity in young adults under the age of 45. [2]

LBP is the most frequent self-reported type of musculoskeletal pain. LBP is defined as pain and discomfort in the lumbosacral region, below the twelfth rib and above the gluteal crease. There are three types of LBP: 1) non-specific, 2) back pain with nerve root symptoms, 3) back pain resulting from serious pathology. Non-specific LBP, in which there is no recognized pathoanatomic cause, is usually a

benign condition but without appropriate management can develop into chronic LBP. LBP is also categorized according to its duration from onset, as acute (<6 weeks), sub-acute (6 weeks - 12 weeks), and chronic (>12 weeks). [3,4]

The main objective of treatment for chronic LBP is for the patient to return to their desired level of activities and participation, as well as the prevention of chronic complaints and recurrences. [5]

Many treatments are commonly used for LBP such as medication, physiotherapy, and surgery. Many of these interventions have been evaluated in randomized controlled trials and systematic reviews. Evidence shows that the effectiveness of some of the interventions is supported (e.g. exercise), while it shows that other interventions are not effective for LBP (e.g. laser therapy and traction). [6-8]

There is no evidence regarding the benefit of using electrotherapy modalities such as interferential, laser, TENS, even though these modalities are commonly used in physiotherapy practice.

The aim of Study to investigate the effects of Short wave diathermy (SWD) and Exercise combined with pre-defined doses, Exercise program alone on pain intensity and function in patients with chronic LBP.

MATERIAL AND METHOD

Subjects: 40 patients from Raj Nursing Home and Shifa Hospital [Age group 25-65 yrs] who were diagnosed with Low back pain, with onset >1-3 months (chronic) were randomly assigned to either group A receiving SWD and Exercise combined or group B receiving Exercise alone. Treatment was given for 3 times in a week for the period of 6 week. Before treatment and after 6 weeks of treatment pain was assessed on VAS and MPQ. [9]

Design: Study utilized pre & post test control group design.

Equipments & Measuring Tools: Examination table, SWD machine, Towel, VAS, Pillow,

Interventions: Subjects in each group received treatment for 3 times in a week, each around 15 minutes, during a period of 6 weeks. All treatment, SWD delivery, and exercise prescription was provided by qualified and experienced physiotherapist who were instructed by the researcher about study protocol.

SWD treatment procedure and technique

Before starting treatment a consent form was given to patients and benefits and risks of procedure including sensations expected during procedure were explained to them. They were positioned (sitting or lying) with additional pillow support comfortably and assessed thoroughly. Time and intensity was kept at '0' before switching on power. Patients were also instructed to report any excess heat or pain. [10]

The patients were treated with shortwave diathermy (SWD) in the LBP region. SWD is therapeutic application of high frequency current. The frequencies are allowed for the treatments are 13.66 MHz, 27.33 MHz, and 40.98MHz.500 watt electro care diathermy machines with frequency of 27.33 MHz use. SWD is applied in Condenser technique. Pads were applied to the back with spacing between skin and electrodes provided by 1-2 inch layer of towel. [11]

The patients were treated in the department with SWD in the low back region for 15 min 3 times in a week for 6 weeks. [12]

Placebo Short Wave Diathermy

Patients in placebo group received same duration of SWD with the Machine switched on (so that patients see lights on in the machine) but without any heat were

given. In this way, patients were blinded for SWD treatment. [12]

Exercise therapy:

Exercise therapy appears to be slightly effective for decreasing pain and improving function in adults with chronic LBP. [7] The intervention included 12 stretching exercises (i.e., gastrocnemius, soleus, quadriceps, posterior and inferior shoulder, upper trapezius, hip flexor, back extension, back rotation, hamstrings, hip external rotators, back flexion), plus 3 additional stretches (hip internal rotators, hip adductors and hip flexors). Each stretching exercise was held for approximately 60 seconds and repeated once. In addition to a complete set (15) of full-body stretches, the class began with five minute warm-up period consisting of basic aerobics steps (i.e., one minute each of walking in place, marching, lateral shuffling, turning and reaching, and box step) and also included four exercises to strengthen back, abdomen and hips (i.e., squats, crunches, oblique crunches, back extensions). [13]

In this study both groups received pamphlets in which all the exercises that are going to be taught during the treatment period were available in combination with pictures.

The patients were treated for 3 times in a week for period of 6 week. Pain was assessed by VAS and MPQ before starting treatment and on 6th week of post treatment session.

In VAS Patients were asked to describe their pain status on a 10cms line where left end represents no pain and right end represents maximum pain.

MPQ consists of a set of pain descriptor list, and are read to a patient with the explicit instruction that he chooses only those words which described his feelings and sensations at that moment.

PRI is based on the rank values of words. In this scoring system, the word in each subclass implying the least pain is given a value of 1, the next word is given a value of 2, etc. The rank values of words chosen by a patient are summed to obtain a score separately for the sensory (subclass 1-10), affective (subclasses 11-15), evaluative (subclass 18) and miscellaneous (subclasses 17-20) words, in addition to provide a total score (subclasses 1-20).The PPI is recorded as a number and is associated with the following words 1-mild, 2-discomforting, 3-distrcession, 4- horrible, and 5-excruciating.

Data Analysis:

All Data was analyzed using statistical test-pair t test. Mean and SD for pre R_x and after 6th week Rx pain values were calculated for each group. Significance was accepted at 0.05 level of probability.

RESULT

In this study 40 patients participated with a mean age of 48.55±15.32 in group A (M, n=10; F, n=10) and 46.85±16.23 in Group B (M, n=10; F, n=10) ranging from 25 to 65 years (Table 1). Sex was matched in both the groups.

Table1: Mean and SD of age between group A and B.

	Group A (N=20) Mean±SD	Group B (N=20) Mean±SD
Age (Yrs)	48.55±15.32	46.85±16.23

Mean reduction in PRI, PPI &VAS of group A & B with p & t values:
Mean reduction in PRI (Table 2)

Both groups had significant difference in pre R_x to 6th week values as t and p values for group A and B were t=14.85, p=0.000 and t=10.75,p=0.000 respectively (table 2).

Table 2: Mean reduction in PRI values between group A and B. Mean and standard deviation at pre treatment, 6th week and pre treatment to 6th week with t and p values.

Groups	Pre R_X	6th week	Pre R_x to 6th week		
			Mean±SD	Paired t value	P value
Group A(N=20) Mean±SD	23.41±4.17	2.15±1.36	17.81±4.21	14.85	0.000
Group B(N=20) Mean±SD	18.25±4.59	7.85±3.51	7.81±2.45	10.75	0.000

Mean reduction in PPI (Table 3)

Both groups had significant difference in pre R_x to 6th week values as t and p values for group A and B were t=11.48, p=0.000 and t=10.49,p=0.000 respectively (table 3).

Table3: Mean reduction in PPI values between group A and B. Mean and standard deviation at pre treatment, 6th week and pre treatment to 6th week with t and p values.

Groups	Pre R_X	6th week	Pre R_x to 6th week		
			Mean±SD	Paired t value	P value
Group A (N=20) Mean±SD	4.75±0.63	0.48±0.54	2.64±0.83	11.48	0.000
Group B (N=20) Mean±SD	4.34±0.65	1.45±0.66	1.89±0.67	10.49	0.000

Mean reduction in VAS (Table 4)

Both groups had significant difference in pre R_x to 6th week values as t and p values for group A and B were t=18.96, p=0.000 and t=11.97,p=0.000 respectively (table 4).

Table 4: Mean reduction in VAS values between group A and B. Mean and standard deviation at pre treatment, 6th week and pre treatment to 6th week with t and p values.

Groups	Pre R_X	6th week	Pre R_x to 6th week		
			Mean±SD	Paired t value	p value
Group A (N=20) Mean±SD	7.65±1.23	0.45±0.47	6.51±1.28	18.96	0.000
Group B (N=20) Mean±SD	6.71±1.48	2.83±1.17	2.97±0.89	11.97	0.000

Thus, it can be concluded from above results that both interventions (SWD and Exercise) were effective in Pain reduction as reflected by VAS and MPQ .But, Patients (group A) that received SWD and Exercise showed greater improvement in pain compared with Exercise (group B) on 6th week compared with pre treatment .

DISCUSSION

The fact that there are more than 20 types of treatment for chronic LBP, each of which has multiple subcategories, is a testament that no single approach has yet been able to demonstrate its definitive superiority. [14] For example, exercise therapy is one promising treatment option, but there is still no consensus upon which kind is the most effective. [15] This situation makes it very challenging for Clinicians, policy makers, insurers, and patients to make decisions regarding which treatment is the most appropriate for chronic LBP.

Continuous SWD is the technique of choice when uniform marked elevation of temperature is required in the deep tissues. This heating can be targeted accurately by using an appropriate applicator positioned correctly. SWD also allows superficial structures to be heated selectively, although for this the various methods of surface heating are usually preferable. Sub-acute or

chronic conditions respond best to continuous shortwave diathermy which, when used properly, can be as effective as ultrasound. Acute lesions are better treated with pulsed shortwave diathermy. Continuous shortwave diathermy can help to relieve pain and muscle spasm, resolve inflammatory states and reduce swelling, promote vasodilation, increase the compliance of connective tissue, increase joint range and decrease joint stiffness. [16]

SWD 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. [17,18]

The advantages of this study would be comparing the SWD with placebo SWD, which would clarify the value of adding to a semi-supervised exercise program. Limited possibilities for double blinding can be a potential limitation to this study.

There is not a 'standard therapy' for any type (acute, sub-acute, chronic) of LBP that is agreed upon to use as a comparison in clinical trials. Exercise therapy is recommended by various guidelines, but it is not clear which type of exercises are best. [19,20]

According to Rahman MM 77.42% patient improves after treatment with SWD. [21]According to Bansil et al SWD was effective in the treatment of OA Knee joints and showed that SWD provides a wide coverage of all structures of the knee than the Ultrasonic procedure and gives a more effective soothing effect. [22]Gibson et al. studied 109 patients and significant improvements after treatment were observed in 59% patients who received shortwave diathermy. [23]

According to Shakoor et al. that there was significant 20 improvements after giving shortwave diathermy on the patients with neck pain. [24] According to Kerem and Yigiter 60 patients showed significant improvements in measured parameters in SWD group after the treatment. [25] According to Debsarma study deep heat modality is more effective than superficial heat in pain management in chronic low back pain patients. [26] These all study findings support the results of the present study.

CONCLUSION

This study has shown that for the group of patients involved SWD and Exercise is effective in the treatment of Chronic LBP than Exercise alone.

Interest of conflict reference:

Some limitations of this study when no follow up was done by patient and variable patient mass. To reach significant conclusion further prospective study with comparable patient variables like ROM, Muscle force, disability & muscle strength. Further research is clearly indicated to establish if there is effectiveness of exercise alone in the treatment of LBP. There was an improvement of pain in the LBP, but it was too small to reach a satisfactory outcome for patient, most of whom required further physiotherapy to reduce their symptoms. This is a dire necessity in the field since a number of physiotherapy approaches are in vogue. So, further research can be done with a large sample using the same protocol to study which modality is more effective in treatment of LBP.

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