

# EFFECT OF THERAPEUTIC EXERCISE AND HEAT MODALITY ON LOWER BACK PAIN ON FEMALE PLAYER'S

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**Abstract-** The aim of this study was to evaluate the efficiency of combining hot pack with specific exercise on the pain level in female players with lower back pain. The study includes 10 players (hot pack + exercise=5, hot pack alone=5) with LBP. Visual analogue scale (VAS) was used in clinical evaluations pre and post therapeutically. A physician evaluated and examined the players before the treatment. The level of statistical significance was set as  $P < 0.05$ . After 2 weeks of experiment again the pain level was accessed. To analyze the data ANCOVA was employed as a measure. Where Descriptive statistics of data obtained by criterion variable after adjusting the covariant. The mean of criterion variable has been obtained in both the group after adjusting covariant. It may be said that the effort of covariate is eliminated in comparing the effectiveness of the criterion variable. The data on criterion variable have been final result of ANCOVA shows where the significant value named as p value found 0.004, which is less than 0.05. This means there is a significance difference found in both the group but hot pack + exercise found more significant for reducing the pain level.

**Keywords:** thermotherapy, lower back pain, therapeutic exercises, VAS scale.

## INTRODUCTION

**Sports injuries** are injuries that occur during sports, athletic activities, or exercising. There are millions of teenagers and children who all are participate in some form of games and sport or different physical activities in their daily life. One study has found that maximum athletes of age 14 years or fewer than 14, experience a sports injury annually during their practice or competition phase. Around 21% of advance athlete misses their practice because of injury which involved lower back, leg, and shoulder, According to Stanford University. Some of injury causes of death like traumatic head or neck injury. This is mostly happened in combat sports. To know about the injury and pain, the coach examines and diagnoses the cause behind that injury and help to rehabilitate faster. In the sports world is seen that, a lot of players hide back pain or, we can say, deny it. They are afraid of losing their place in their team or losing any position and many people also believe that their own pain will work themselves. Along with time they also use many type of medicine. If it's not treated at the right time later trouble can increase and injury can take more serious forms. According to a survey, more than 75% of population experiences back pain at some point in life which may be due to their daily routine or some chronic injury. Lumber spine injury is at risk of injury due to some movement in the game. It can be any sports, whether it is track and field event, football, basketball and badminton. If one estimates it, the injury of the spine that takes 8% to 10% is related to lumber region. Back pain doesn't affect lifestyle very much but still many players do not get their treatment. Many players believe that back ache (limber ache) will heal by itself over time.

Therapeutic exercises are set of specific exercises aims to regain or maintain endurance, strength, flexibility, balance and stability. These exercises are planned specific set of exercises which is executed systematically by which clients and patients remediate their impaired body functions and enhance their fitness and well being and also optimize overall health. Therapeutic exercise may include mechanical training of body, coordinative exercises, muscle stretching, flexibility and range of motion activities, endurance, strength, neuromuscular developmental activities, perception training, stretching of soft tissues, relaxing exercises, and many more. These exercise selected by therapist after evaluation of normal physical capacity through physical examination and previous medical history of patient. Reducing pain and inflammation is the first aim of therapeutic exercises. Once this aim achieved, the specific group of exercises focuses on retaining range of motion and rebuild muscle strength and endurance. Therapeutic program may include various exercises, done progressively and controlled manner, for aims to relieve back pain and strengthen the supportive muscles of the spine and also eliminate pressure from spinal discs and joints. Alleviating stiffness and improving mobility improve circulation and distribute nutrients including endorphins, which is called natural pain killer of body, relives pain naturally. It can also elevate mood and relive depression which is a common effect of chronic pain. Therapeutic exercises not only reduce pain, it also helps with correcting faulty posture, inducing relaxation and also improving overall fitness of the body. Sometime these exercises prescribed by experts instead of surgery, and it also suggested in addition to surgery. Exercises done in a right way with a physical therapist, can offer remarkable benefits. It is necessary to perform exercise and fitness for healing from back problem, recovering from back surgery and specially for maintaining back strength which prevent future episodes of back pain. To improve overall health of patient especially of treatment for pain relief fitness program and specific exercises should be included during various phases of treatment. For severe pain, it is necessary to treat for pain instead of starting a back exercise program.

Physical modalities are kind of therapeutic medium which is basically used to relief pain or pain management. It includes heat, cold, pressure, and water, different form of electricity, light sound frequency and many more, can be used as a medium for treatment or to decrease pain. The basic purpose of all these modalities is to enhance overall outcome. Among all heat therapy is most commonly used for rehabilitation purpose. The therapeutic effect of heat include reduction of pain and inflammation, relieving muscle spasm, edema, increasing joint mobility, decreasing stiffness of joints, increasing flexibility of collagen tissues and

increasing blood flow. The increased blood flow to the injured area provides enough oxygen, nutrients to the tissues for better healing.

From past centuries heating has been used for pain relief and reduction of muscle spasm from the injured area, which has been used by people in various conditions for treatment. In current scenario the clinician must be well known with the various conditions for which these physical agents are used and should be aware of contraindications to the use of thermotherapy. The local application of heat modality used for more relaxation, stiffness and tightness of joints and tight muscle for exercise. It is found by various studies that the heat therapy uses as an intervention in physical therapy treatment. These studies from different country indicate that the around 36.5% to 95% of daily use of heat modalities, such as hot pack in common context and paraffin wax. Most commonly used superficial heat modalities include: hot packs, heating pads, and paraffin bath, infrared and fluid therapy. The heat penetration for all these superficial modalities is usually 1cm. the physiological effects of heat is to relief pain, increase metabolism and blood flow of local area and also improve elasticity of connective tissues. Heat can effect negatively if used in acute inflammation because it increases the local blood flow of effected area. There are various ways by which heat transferred in different temperature between two objects. Direct contact method include hot packs, paraffin bath, convection used for fluid circulation over the surface of body, conversion is changing of one energy form into another like ultrasound, radiant heat. Ultrasound, shortwave diathermy (SWD) and microwave diathermy are deep heat modalities having more 3-5cm penetration without overheating underlying skin or subcutaneous tissue. The most commonly used deep heating agent is ultrasound which convert electric energy into acoustic energy via the piezoelectric effect. It has thermal and non-thermal effect which has been widely used in the treatment of various soft tissue disorder including degenerative arthritis, musculoskeletal pain, contracture. Tendinitis, bursitis, and promote healing. There are various contraindications of ultrasound, it include: over eyes, pregnant uterus, malignant area, near the heart, brain and spine, epiphysis plates of children and patients with pacemakers. SWD and MWD convert electromagnetic energy into thermal energy. SWD basically used to penetrate bone and heat the large area of deep tissues and within the joints, such as knee ankle hip. MWD is used for superficial muscle. It has less penetration then SWD.

**Physical therapy** and exercise is considered an important part of most **back pain** patients' treatments, including those undergoing non-surgical and surgical care. Exercise therapy appears to be slightly effective at decreasing pain and improving function in adults with chronic low-back pain, particularly in populations visiting a healthcare provider. In adults with sub acute low-back pain there is some evidence that a graded activity program improves absenteeism outcomes, though evidence for other types of exercise is unclear. For patients with acute low-back pain, exercise therapy is as effective as either no treatment or other conservative treatments.

## METHODS

### Subjects

Ten [N=10] female students of Lakshmbai National Institute of Physical Education, ageing 18 to 24 were selected as a subject. Their level of participation was of collegiate level. The subjects were divided into two sub-groups, 5 in each group (therapeutic modality group and exercise plus modality group).

### Selected variable

Back pain level

**Administration:** Certain tests were conducted before selecting subjects. Ten [N=10] subjects were divided into two group i.e. the heat modality (hot pack) group and heat modality (hot pack) plus exercise group. Both groups were allotted session in morning for the therapy. The duration of the therapy was 20 minutes. The second group slotted rehabilitation exercises in the evening session for 15 days. The subjects were tested two times during whole training program i.e. prior to the training(pre-test) and after the training program (post-test).

**Training program:** A 15 days rehabilitation program of back pain was designed. In which the therapeutic modality group was given hot packs on the site of injury, and the heat plus exercise group was given therapy (hot pack) and specific exercises. Duration of the heat modality (hot pack) for both groups was set 20 minutes and there were three to six exercises programmed for the back rehabilitation for heat plus exercise group.

**Collection of data:** Both pre & post data were collected at health center of LNPE Gwalior under the supervision of physiotherapist of the institute, through Visual Analysis Scale that measured a characteristic or attitude ranging across a continuum of values.

**Statistical technique:** In order to analyze the effect of therapeutic exercise and heat modality (hot pack) on lower back pain, descriptive statistics and comparative statistics Analysis of covariance (ANCOVA) was employed at 0.05 level of significance.

## RESULTS

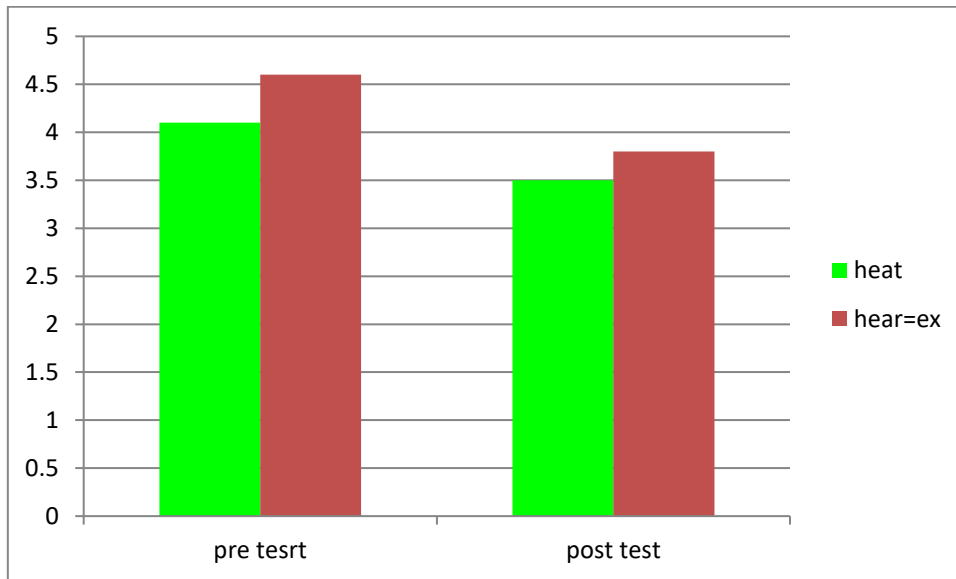
### Analysis of data

The results of the descriptive statistics which was obtained in order to ascertain the group means and standard deviation of selected groups i.e. heat and heat plus exercise, have presented below in table 1:

**Table 1: DESCRIPTIVE STATISTICS**

GROUPS	PRE TEST(M±SD)	POST TEST (M±SD)
HEAT	4.1±1.24	3.5±0.86
HEAT +EXERCISE	4.6±1.14	3.8±1.03

Table 1: Descriptive statistics showed the mean of pre and post data of both the groups. Pre test mean and standard deviation of both the groups (heat alone and heat exercise) are (M±SD=4.1±1.24) and (M±SD= 4.6±1.14) respectively. While post test mean and standard deviation of both the groups (heat alone and heat +exercise) are (M±SD=3.5±0.86) and (M±SD= 3.8±1.03) respectively.



**Figure 1: shows the graphical representation of pre and post test mean of both the groups**

Above graph indicate the mean difference of pre and post data of both the groups (heat alone and heat + exercise). As both the groups have different pre and post mean and SD, further researcher applied dependent t test statistics for computing the significant values of both the groups.

**Table 2: DEPENDENT t- TEST STATISTICS**

GROUPS	df	t- value	Sig
HEAT	4	3.20	.033
HEAT +EXE	4	3.13	.035

Table 2: showed the significant values of both the groups, which clearly indicated that both the treatments (heat and heat+ex) were effective for reducing back pain. As the p value of both the groups are 0.33 and 0.35, which is less than the estimated p value 0.05.( $p < 0.05$ ).

Now further , as both the groups has significant values and both the groups has initial mean differences to nullify the initial mean differences of both the groups and to find more effective treatment ANCOVA ( analysis of covariance) used as a test statistic.

**ANCOVA STATISTICS**

**Estimates**

**Table 3 : Dependent Variable: post( Adjusted means)**

group	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
Ex+heat	5.482 <sup>a</sup>	.377	4.590	6.373
heat	3.218 <sup>a</sup>	.377	2.327	4.110

<sup>a</sup>\*-Covariates appearing in the model are evaluated at the following values: pre = 4.3500.

Table 3 showed the descriptive statistics of both the groups (exercise plus heat and heat).The mean of criterion variable has been obtained in both the group after adjusting covariant. It may be said that the effort of covariate is eliminated in comparing the effectiveness of the criterion variable which clearly indicated that the adjusted mean and standard error ( $M \pm SE = 5.482 \pm .377$ ) of group heat and exercise was more than the adjusted mean and standard error ( $M \pm SE = 3.218 \pm .377$ ) of group heat only. The graphical representation of the mean value of both the groups was also presented in figure 2:



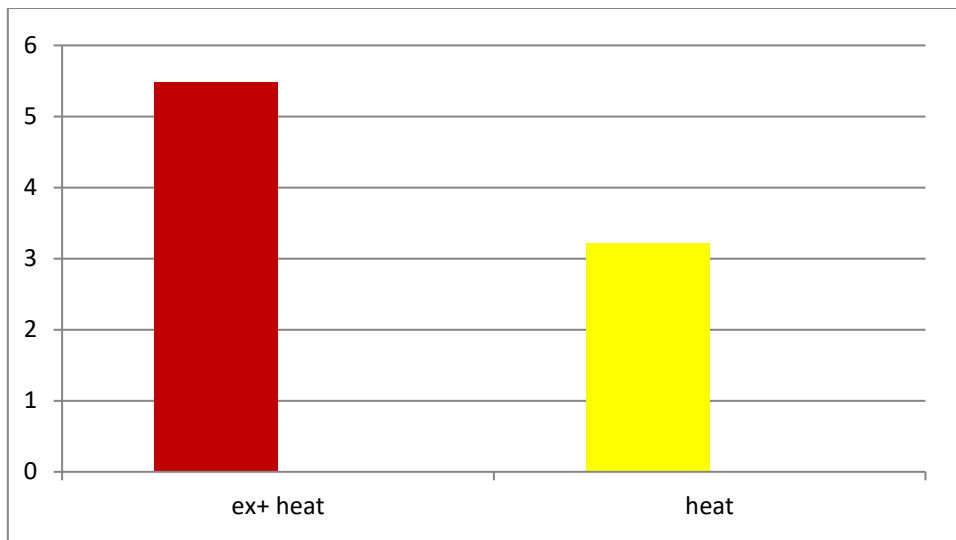


Figure: 2 adjusted means of both the groups

**Univariate Tests Statistics**

**Table 4 : Dependent Variable: post**

+	Sum of Squares	df	Mean Square	F	Sig.
Contrast	12.139	1	12.139	17.549	.004
Error	4.842	7	.692		

F value -17.549

Table 2 clearly showed that the data on criterion variable have been final result of ANCOVA the significant value p value found 0.004, which is less than 0.05(p<0.05).

The effective significant value revealed that pain level reduced more by heat plus exercise treatment where the time duration is same for heat therapy but for exercise we take extra time.

**DISCUSSION**

The findings of the present study showed that there was significant difference found in both the groups i.e. (heat plus exercise and heat) among both the groups heat plus exercise has more significant effect on lower back pain level as compared to heat group only. Similar results were obtained by the mahammad salauddin alyat in 2013 by comparing the effect of high intensity lesar therapy alone, cimbine with exercise and placebo laser with exercise, where laser with exercise was found more effective for the treatment. Similar outcome were acquired by mayer in 2009 through investigating the effect of heat wrap alone, exercise alone and heat wrap with exercise, where heat wrap plus exercise found more significant in comparison to other treatment.

Descriptive statistics of data obtained by criterion variable after adjusting the covariant. The mean of criterion variable has been obtained in both the group after adjusting covariant. It may be said that the effort of covariate is eliminated in comparing the effectiveness of the criterion variable. The data on criterion variable have been final result of ANCOVA shows where the significant value named as p value found 0.004, which is less than 0.05(p< 0.05) which is also termed as significant value. It means there was a significance difference found in both the group.

**CONCLUSION**

Bases on the analysis and within the limitations of present study following conclusion were drawn.

- After the treatment significance difference was found in pre and post test values in both the group (heat alone and heat + exercise).
- After the treatment it was found that heat + exercise group has more effect on reducing the pain level of the players in comparison to the only heat group.

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