

# A Study to Compare the Effectiveness of Thermotherapy versus Cryotherapy in Treatment of Low Back Pain among College Students

Prakashkumar J. Patel <sup>1\*</sup>, Namrata Patel <sup>2</sup>

<sup>1</sup>Assistant Professor, SPB Physiotherapy College, South Gujarat Medical Education and Research Centre, Surat, Gujarat, India

<sup>2</sup>Physiotherapist, Surat, Gujarat, India

**Abstract:** ***Introduction:** Low back pain is one of the most common health problems where 75 per cent of the population develop it at least once during their life. This study examined the effectiveness of thermotherapy and cryotherapy in treatment, on pain relief in patients with low back pain. **Materials and Methods:** Study was conducted on 30 patients. subjects divided into 3 categories, acute (N=10), sub - acute (N=10), chronic (N=10). Subjects falling in each of these categories were randomly divided into 2 groups. Group I received Thermotherapy and Group II received cryotherapy. Both the group were assessed for low back pain prior to the treatment and after 7 days of treatment. **Results:** Cryotherapy patients reported significantly less pain compare to thermotherapy ( $p < 0.05$ ) during acute phase and thermotherapy patients reported less pain compare to cryotherapy ( $p < 0.05$ ) in sub - acute and chronic phase. **Conclusion:** The study was aimed to find out which therapy is effective on low back pain and statistical analysis proves that cryotherapy is effective during acute stage and thermotherapy during sb - acute and chronic stages.*

**Keywords:** Low back pain, Thermotherapy, Cryotherapy.

## 1. Introduction

Low back pain is one of the most common musculoskeletal diseases globally, with high financial burden especially in industrialized countries where approximately 80 per cent of the population suffers from it at least once during their life.<sup>1-3</sup>

Low back pain (LBP) produces a huge individual and socioeconomic burden through direct and indirect costs, such as patients' management (imaging, drugs, etc.) and productivity loss, respectively.<sup>4-5</sup> It is the first cause of years lived with disability in many countries.<sup>6</sup> A study reported that 12 months after LBP onset, pain was still present in 62% of patients.<sup>7</sup>

Physical therapy students have a high frequency of low back pain compare to other medical students and this reduce students work and leisure activity strikingly. Physical therapy practice with poor body postures and other risk factors associated with poor back pain in students not only affect the students work but also affect the socioeconomic and physiological activities. Physical therapy students were found to have a 48.3% lifetime prevalence and 81.60% 12 months prevalence. Prolong sitting hours could cause the stiffness of the lumbar spine and performing full range flexion movements after a long time sitting increase the risk of soft tissues injuries of lumbar region. There is a relationship among back pain as well as environmental risk factors including time spent in a static sitting position during class, carrying heavy bags and books and time spent in leisure or sports activities.<sup>8</sup>

Low back pains are divided into three categories based on the pain duration. The acute low back pain lasts for less than four weeks, subacute type for four to eight weeks, and the chronic type for more than eight weeks.<sup>9-10</sup> Treatment of

low back pain could be pharmacologic or nonpharmacologic. Pharmacologic treatment includes analgesics, anti - inflammatory drugs, muscle relaxants, etc. and nonpharmacologic treatment could be surgical and nonsurgical<sup>11</sup> of nonpharmacologic, nonsurgical treatments thermotherapy is an adjuvant one used to relieve pains nowadays either in a superficial (for skin) or deep (for joints and muscles) way.<sup>12</sup> Another method is cryotherapy conducted in order to treat some diseases or some of their symptoms by means of freezing materials.<sup>13</sup>

Cryotherapy or cold therapy is indicated for all acute and certain chronic conditions. The cold application has been found to have a direct inhibitory effect inflammation by slowing cellular metabolism. Application of cold decrease inhibition and pain which can be limiting to movements. It is believed that every short - term interruption of pain stimulus, includes by cryotherapy, may break pain — spasm — pain cycle and provides pain relief for a prolonged period.<sup>14</sup>

For thermotherapy, most of the physiological responses attribute are local increase in temperature, increase in local metabolic rate, arteriolar dilation and increase capillary permeability. These effects relive pain, relax muscle tension and have a positive effect on the resolution of inflammation.<sup>15</sup>

Purpose of this study is to examine the relative effect of thermotherapy and cryotherapy during various stage of low back pain.

## 2. Methodology

Study was conducted in physiotherapy outpatient department of Shree Swaminarayan physiotherapy college, kadodara, surat. Subject with age of 18 to 25 years with having mechanical/ postural low back pain were included in this

study. Subjects were excluded if they have neurological / vascular symptoms.

On the basis of duration of low back pain, subjects divided into 3 categories, acute (N=10), sub - acute (N=10), chronic (N=10).

Subjects falling in each of these categories were randomly divided into 2 groups. Group I received Thermo-therapy and Group II received cryotherapy. Both the group were assessed for low back pain prior to the treatment and after 7 days of treatment. The groups were assessed by using numerical rating scale.

### 3. Results

**Table 1:** Comparison of Pain scores within Group A and within Group B.

Phase	Group	Intervention Period	Mean	Standard Deviation	t - value	Level of significance
Acute	A	Pre	5.60	1.14	1.66	p > 0.05
		Post	4.40	1.14		
	B	Pre	5.60	1.14	4.42	p < 0.05
		Post	2.80	0.84		
Sub - acute	A	Pre	6.20	1.48	3.30	p < 0.05
		Post	3.00	1.58		
	B	Pre	6.00	1.58	1.30	p > 0.05
		Post	4.80	1.30		
Chronic	A	Pre	7.00	1.00	6.78	p < 0.05
		Post	2.40	1.14		
	B	Pre	7.20	0.84	2.44	p < 0.05
		Post	6.00	0.71		

**Table 2:** Comparison of Change in Pain scores across the Intervention Period between Group A and Group B

Phase	Group	Mean Difference	Standard Deviation	t - value	Level of significance
Acute	A	1.20	0.45	3.77	p < 0.05
	B	2.80	0.84		
Sub - acute	A	3.00	0.71	4.81	p < 0.05
	B	1.20	1.20		
Chronic	A	4.60	0.55	10.75	p < 0.05
	B	1.20	0.45		

### 4. Discussion

This study was done to find out the comparative effect of thermo-therapy and cryotherapy on different stages of low back pain 30 subjects were selected on the basis of inclusion criteria. The difficulty faced was that subjects had different duration of low back pain, so there were divided into 3 groups that are acute, sub - acute, and chronic. Then subjects were randomly divided into 2 groups. Group A received thermo-therapy and other group B received cryotherapy. The subject was assessed before and after treatment. The results show that during acute stage cryotherapy has greater reduction in pain than thermo-therapy. This could be attributed to the tissue cooling that has a direct inhibitory effect on inflammation, by slowing cellular metabolism, it reduces secondary hypoxic injury. Greater pain reduction with thermo-therapy during sub - acute and chronic stages could be because of increase blood flow that enhances metabolism, assists resolution of inflammation and relieves ischemia. Thermo-therapy also relieved greater pain during this stage because of easing out muscle tension due to heating effects. Findings of this study are in agreement with the finding of Mc Krause (2003) and Knight (1980).

### 5. Conclusion

The study was aimed to find out which therapy is effective on low back pain and statistical analysis proves that

cryotherapy is effective during acute stage and thermo-therapy during sub - acute and chronic stages.

### References

- [1] Henchoz Y, Kai - Lik So A. Exercise and nonspecific low back pain: A literature review. *Joint Bone Spine*.2008; 75 (5): 533–39.
- [2] Richardson SM, Hoyland JA. Stem cell regeneration of degenerated intervertebral discs: current status. *Curr Pain Headache Rep*.2008; 12 (2): 83–88.
- [3] Furlan AD, Imamura M, Dryden T, Irvin E. Massage for low back pain: an updated systematic review within the framework of the Cochrane Back Review Group. *Spine (Phila Pa 1976)* 2009; 34 (16): 1669–84.
- [4] Dagenais S, Caro J, Haldeman S. A systematic review of low back pain cost of illness studies in the United States and internationally. *Spine J*.2008; 8 (1): 8–20.
- [5] Merkesdal S, Mau W. Prediction of costs - of - illness in patients with low back pain undergoing orthopedic outpatient rehabilitation. *Int J Rehabil Res*.2005; 28 (2): 119–26.
- [6] Disease GBD, Injury I, Prevalence C. Global, regional, and national incidence, prevalence, and years lived with disability for 328 diseases and injuries for 195 countries, 1990 - 2016: a systematic analysis for the global burden of Disease study 2016. *Lancet*.2017; 390 (10100): 1211–59.
- [7] Kent PM, Keating JL. Can we predict poor recovery from recent - onset nonspecific low back pain? A systematic review. *Man Ther*.2008; 13 (1): 12–28.
- [8] Muhammad Kashif, Tasbeeh Kokab, Zobia Rafique. Prevalence of Low Back Pain among Physiotherapy Students of Riphah College of Rehabilitation Sciences. *J Liaquat Uni Med Health Sci*.2020; 19 (04): 280 - 4.
- [9] Blount BW, Hart G, Ehreth JL. A description of the content of army family practice. *J Am Board Fam Pract*.1993; 6 (2): 143–52.

- [10] van Tulder M, Koes B, Bombardier C. Low back pain. *Best Pract Res Clin Rheumatol.*2002; 16 (5): 761–75.
- [11] Bach SM, Holten KB. Guideline update: what's the best approach to acute low back pain? *J Fam Pract.*2009; 58 (12): E1.
- [12] Melzack R. Pain: past, present and future. *Can J Exp Psychol.*1993; 47 (4): 615–29.
- [13] Costello JT, Algar LA, Donnelly AE. Effects of whole - body cryotherapy ( - 110 degrees C) on proprioception and indices of muscle damage. *Scand J Med Sci Sports.*2012; 22 (2): 190–98.
- [14] Robers DJ, wall CN, carble JA. Relief of chroic low back pain: heat v/s cold: evaluation and treatment of chronic pain Baltimore Urban and schwarzenbeag.1985: 263 - 266.
- [15] Knight KL, Londeree BR. Cpmparison of blood flow in the ankle of injured subject during therapeutics application of heat, cold and exercise. *Med Sci. Sport Exercise.*1980; 12: 26 - 80.