



## Research Article

# Therapeutic Efficacy of Progressive Muscular Relaxation Versus Hydro Collator Pack for Stress on Chronic Lumbago

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## Abstract

**Introduction:** Lumbago also called as Chronic back pain is defined as pain over lumbo sacral junction the term referred to Lumbago. The duration of pain continues for more than 12 weeks called as Chronic Lumbago. Lumbago is the major cause of activity limitation in any age group.

**Objective of the study:** To find out therapeutic effects of progressive muscular relaxation on stress and disability associated with chronic Chronic Lumbago.

**Methodology:** 30 Chronic Lumbago subjects were included in the study with age group 25-35 years. All the subjects were random selected according to inclusion and exclusion criteria. All the patients randomly divided into two groups (CG & EG), experimental group were received progressive muscular relaxation & hydro collator pack. Control group treatment given only hydro collator pack. Outcome measures were noted as stress using DASS and pain intensity measured by VAS. All the measurements were recorded from baseline to before discharge.

**Result:** EG Baseline score level (VAS 23, Stress7.5) and CG Baseline score value is (VAS 21, Stress7.6). EG post intervention score level (VAS2.5, Stress12.0 ( $p<0.0.1$ )) and CG post intervention value is (VAS 6.0, Stress8.0 ( $p<0.0.1$ )).

**Conclusion:** The investigator declared that the application of tailored made Progressive muscular relaxation treatment approach which helps to reduction in perception of pain, stress and improvement in spinal, mental overall health, wellbeing livelihood and wisdom for the management of Chronic Lumbago.

## Keywords

CL; DASS; VAS &amp; PMR.

## Introduction

Low Back Pain (CL) is the main cause of disability [6] and a common reason for lost work days [38, 30]. An estimated 149 million days of work per year are lost because of CL [15]. Approximately 10%–20% of patients with Low Back Pain develop chronic lumbago, defined as pain and disability persisting for more than 3 months [6].

Back pain in general affects 70–85% of all people at some time in their lives, but 90% of affected individuals recover, typically within 12 weeks [35]. Recovery after 12 weeks is slow and uncertain, and this subset of patients with CL accounts for major expenses in the health care and disability systems [2, 3, 6]. Unfortunately chronic CL is prevalent in many countries around the world [6].

38.7% of patients with undefined CL had to reduce their leisure-time activities [18] and in another study, 47% of CL patients spent less time on household chores during the week prior to the study, So 35% of the patients, the household chores were taken over by others [23]. Nearly one-third of the patients refrained from participating in sporting activities because of their CL [10]. Low back pain (CL) is the main cause of absenteeism and disability in industrialized societies [6].

Chronic pain patients also deal with a broad range of secondary pain-related challenges, such as job loss, marital strain, and social isolation, which further compromise adjustment and negatively affect subjective

well-being [19]. Chronic back pain is a more difficult problem, which often has strong psychological effect and more disabling because of its physical limitation and psychological effect [12], that's why the CL is a stress factor in itself but when pain, stress and depression become overwhelming and stress seems to become prominent [17].

Chronic lumbago is a multifactorial phenomenon [39] and many therapeutic approaches exist [25]. Exercise produces large reductions in pain and disability. There are multiple disciplinary rehabilitation techniques which are effective treatment options for chronic CL [6].

As Chronic lumbago is a multifactorial phenomenon [40] and stress factor in itself [17]. Progressive Muscle Relaxation (PMR) is a popular technique known for its muscle tension relieving effects and consists of a series of exercises involving tensing and relaxing muscle groups [3]. It was developed by American physician Edmund Jacobson in the early 1920s. So it has physical and mental component [29].

Relaxation reduce pain or pain perception and tension, create a pleasant mental state, reduce anticipatory anxiety, reduce anxiety as a response to stress, increase parasympathetic activities, increase knowledge concerning muscle tension and autonomous stimuli, improve concentration, increase the feeling of control, improve the ability to block inner talk, energize and improve sleep, decrease the cardiac index, lower blood pressure, warm or cool body parts, enhance performance of physical activities and help in the relationship with other so the

Progressive Muscular Relaxation has long-term benefits which improve of quality of life of patients [1,41,9,14,37].

## Methodology

### Sample

30 subjects were included in the study with age group 18-30 years. All the subjects were random selected according to inclusion and exclusion criteria and were included in the study who have low back pain more than 12 weeks. Subjects were excluded if they had back pain attributed to any specific pathology Eg. Disc herniation, trauma etc. and nerve root irritation, major past surgery. All the subjects were randomly assigned into two groups; one experimental and other was control group. Subjects of experimental group were received progressive muscular relaxation, hydro collator pack and only hydro collator pack in control group. Outcome measures were noted as stress using DASS, Disability using Quebec pain disability scale and pain using VAS. All the measurements were done before the treatment session and after 1st week, after 2nd week and after 4th week.

### Methods

**Measurement of pain:** Pain was measured by using VAS. To measure the VAS (Figure 1) for pain subjects were instructed to mark on a 10 cm scale which is divided into 10 equal segments where 0 represent no pain and 10 represent intolerable pain. The entire subject has to mark the point according to their severity of pain [28].

### Measurement of Stress

Stress was measured by using DASS. The DASS (Figure 2) is a 42-item questionnaire which includes three self-report scales designed to measure the negative emotional states of depression, anxiety and stress. Each of the three scales contains 14 items. DASS questionnaire was given to subjects in a printed form, and were asked to use 4 point severity scale, to rate the extent of their depression, anxiety and stress [27].

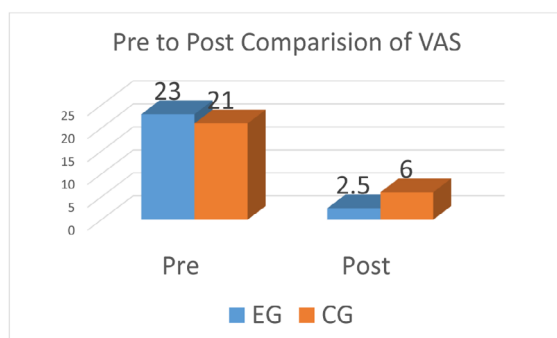


Figure 1

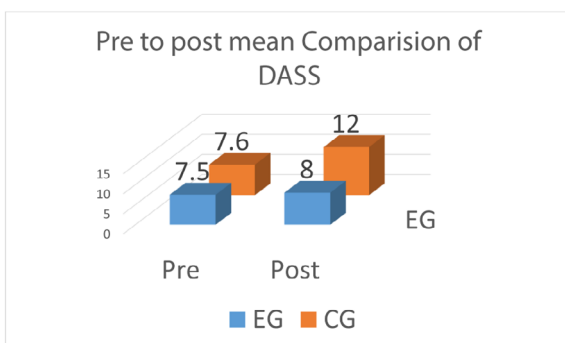


Figure 2

### Application of PMR

It is a systematic technique developed by Dr. Edmund Jacobson (1938), used for achieving a deep state of relaxation Subjects were made to lie down comfortably and asked to close their eyes. Subjects were instructed to listen and follow the instruction carefully. Relaxation involved tensing the specific muscle groups of body for 7-10 sec., followed by releasing them for 15-20sec. The sequence of muscle groups involved is given in (Table 1).

**Application of hydro collator pack:** A hydro collator pack is a silica gel filled pack. They is heated by being placed in a special tank of water warmed to 75-80°C. Subject was made lie down to supine. Hydro collator pack was wrapped in towelling before being applied to the lumber area so that some four and eight layers, depending on towel thickness, intervene between the pack and skin. Hydro collator pack was applied to lumber area of subject with chronic lumbago for 10 minutes.

### Data Analysis

Independent sample t-Test between the groups, ANOVA test within the group-A and within group-B and Post hoc test using multiple comparison test within the group were done for pain, Stress and disability in starting day, 1<sup>st</sup> week, 2<sup>nd</sup> week, 3<sup>rd</sup> week and 4<sup>th</sup> week.

### Result

T-test between the groups showed significant differences for pain, stress and disability. (Table 2). ANOVA showed significant differences for pain stress and disability in both groups within the Group-A (Table 3) and Group-B (Table 4).

### Discussion

Chronic lumbago is common cause of disability and associated with psychological effect. This study is an experimental study which aims to find out the effect of Progressive muscular relaxation on stress and disability in subjects with chronic lumbago. The present study showed significant difference on the effect of progressive muscular relaxation on stress and disability in subjects with chronic lumbago [21]. Supported that Relaxation therapy may be an appropriate adjunctive treatment for chronic lumbago [26]. Supported the use of some psychological approaches to manage chronic pain and this approach reduces pain and disability-related behavior and improves function [5].

Added that Relaxation closes the pain gate and the mechanism of pain gate described by Melzak and wall [34]. According them there is a gate-like mechanism in the dorsal horns of the spinal column, known as the substantia gelatinosa so this "gate" controls the flow of pain sensations that pass through on their way up to the thalamus and limbic system and then to the cerebral cortex, where experience of pain occurs [32,33]. Supported that relaxation of muscle releases endorphin, on dorsal horn of spine, they block the electrical activity of the nerve fibres going up the spine to the brain, which closes pain gate and perception of pain reduces.

When pain occur it causes constant state of attention which leads to sympathetic activation, also called ergotropic or fight or flight response which releases stress hormone such as adrenaline and cortisol, blood pressure and heart rate goes up, respiration becomes shallow and the rate increases, the capillaries do contract [11, 32]. Asserted that relaxation of muscles would lead to relaxation of the mind, because an emotional state fails to exist in the presence of complete relaxation of the peripheral parts involved, so the peripheralist mechanism of Jacobson is popular neurophysiologic explanation of relaxation [29].

Added Progressive Muscular Relaxation entails a physical and mental component. The physical component involves the tensing and relaxing of muscle groups over the legs, abdomen, chest, arms and face. In a sequential pattern, with eyes closed, the individual places a tension in a given muscle group purposefully for approximately 10 seconds and then releases it for 20 seconds before continuing with the next muscle

**Table 1:** Instructions for Progressive Muscle Relaxation training3 Muscle Group Instructions

Hand	Clench your left hand and feel the tension Relax and let hand hang loosely, Same for right hand.
Wrists	Bend hand back, hyperextending your wrists. Relax.
Upper arms	Bend elbow towards your shoulders and tense biceps muscle. Relax. Shoulders Bring shoulders up toward yours ears. Relax, let your shoulder drop down.
Forehead	Wrinkle your forehead, raise your eyebrows. Relax.
Eyes	Close your eyes tightly. Relax
Jaws	Clench your jaws tightly. Relax.
Tongue	Press your tongue against the roof of your mouth. Relax.
Mouth	Press your lips together tightly. Relax
Neck	Turn your head so that your chin is over your right shoulder.- Straighten and relax
Neck and Jaws	Bend your head forward, pressing your chin against your chest. Straighten and relax.
Chest	Take a deep breath and hold it for 5 seconds, slowly exhale and relax Abdomen Tighten your stomach muscles. Relax
Back Arch your back	Relax
Thighs	Stretch your legs in front of you. Tighten your thigh muscles. Relax Hamstrings Push your heels down into floor, tighten your hamstring Muscles Relax.
Calves Point	Your toes toward your head. Relax
Feet	Curl your toes toward the bottom of your feet. Relax

**Table 2:** T-test between the groups

	VAS	Stress	Disability
T-value	9.000	3.550	2.199
P-value	0.001	0.001	0.001

**Table 3:** Anova within the group-A

	F-value	P-value
VAS	48.893	0.001
Stress	20.548	0.001
Disability	13.729	0.001

**Table 4:** Anova within the group-B

	F-value	P-value
VAS	4.605	0.001
Stress	10.954	0.001
Disability	9.492	0.001

group and the mental component requires that the individual focuses on the distinction between the feelings of the tension and relaxation, so the contraction of skeletal muscle fibres leads to the sensation of muscle tension, the result of a complex interaction of the central and peripheral nervous system with the muscular and the skeletal system and relaxation is the absence of perceived muscle tension. According to [11,13] complete muscle relaxation is incompatible with having any thoughts or feelings, the relationship of muscle tension, relaxation and autonomic nervous system that reduction in skeletal muscle tone leads loss of a ergotropic

tone of a hypothalamus and diminution of hypothalamic discharges which consequently leads to dominance of trophotropic system ,also called parasympathetic activation which include reductions in HR and BP, increased activity of the digestive system by which nutrition absorption increases, and muscle endurance increases [24]. Supported that progressive muscular relaxation reduces stress response.

If pain persist, it causes long term release of stress hormone which begin to cause damage; inhibiting the digestive system, restricting nutritional absorption, causing muscle fatigue and increasing pain [32]. And a vicious circle may be initiated when the pain is catastrophically mis-interpreted. In case of chronic pain it is not possible to avoid the pain but possible to avoid the perceived threat (pain), in this case the activities that are assumed to increase pain or (re)injury. These dysfunctional interpretations give rise to pain-related fear, the three main components of fear are interpretation of the stimulus where pain as threatening, increased sympathetic arousal, and defensive behavior [16] and associated safety seeking behaviors such as avoidance/escape , that can be adaptive in the acute pain stage, but paradoxically worsen the problem in the case of long-lasting pain which leads to the disability [32] supported that relaxation of muscles releases neurotransmitters such as dopamine, serotonin, nor adrenaline, acetylcholine, GABA, and endorphins. These are often called the "feel good" hormones because they cause a feeling of contentment and well-being [1,41,9,14,37]. Supported that Relaxation reduce pain or pain perception and tension, create a pleasant mental state, reduce anticipatory anxiety, reduce anxiety as a response to stress, increase parasympathetic activities which promotes rest and repair, decrease the cardiac index, lower blood pressure, and enhance performance of physical activities. Deborah I jones [8] supported that Progressive Muscular Relaxation is used as management of disability with chronic pain.

Hydro collator pack increases tissue temperature, which leads to increases in local blood flow due to sympathetic vasodilation. Increase in blood flow supply more oxygen and antibodies, so local metabolism increases by which pain, muscle spasm reduces. Another mechanism for reducing pain, it increases small non-myelinated C-fibre activity that inhibits nociceptive signal with in the spinal cord and brain stem and also decreases  $\gamma$ - fibre activity in muscles reducing the sensitivity of muscles spindle to stretch which reduces muscle spasm [22]. Heat increases flexibility of collagen tissues so stiffness in joint and muscles reduced that's why joint Range of motion increased [31] and muscle got relaxed Positive changes in muscle activity causes the feeling of well-being associated with psychological factor which lead to mental relaxation [34]. Supported that hydro collator pack has positive short term effect on stress and disability. Limitation of study that was the beginning of relaxation the patient may have problem in concentrating.

## Conclusion

The result of the study was concluded that Use of Progressive muscular relaxation as a treatment associated with a reduction in perception of pain, stress and improvement in wellbeing for the chronic lumbago patients.

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