



## Effectiveness of Lumbar Belt on Pain and Lumbar Mobility in Patients with Chronic Low Back Pain- An Experimental Study

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### KEYWORDS

Chronic low back pain,  
Lumbar belt,  
Mechanical low back pain,  
Mobility of spine,  
Pain.

### Abstract

**Background** - Low back pain is more common now a days. But there is limited evidence of efficiency of lumbar belt for treatment of low back pain<sup>1</sup>. There is also lack of methodology in the studies reported on the efficiency of the device.

**Objective** - To evaluate the effectiveness of lumbar belt in chronic low back pain and to evaluate the mobility and disability of the trunk after using lumbar belt for chronic low back pain.

**Materials and Methods**- 32 subjects were included in this study with age group between 25 to 45 years. Subjects was divided in to two groups through lottery method. Data collection sheet was used to obtain demographic details such as patients age, gender, address, contact details. Before the treatment (at day 0) and after treatment (at days 15), Pain of back was determined by Visual analogue scale (VAS), disabilities of the spine determined by modified Oswestry disability index (MODI) and spine mobility (ROM) measured by modified Schober's test (MST) in both groups. Both groups were treated by IFT (4P) and Hot pack over back for 15 mins and experimental group was advised to wear lumbar belt during the treatment period as daily minimum of 8 hours except during sleeping time.

**Result**- Paired T – test and 2- tailed test was used to analyse the data, since the P-value of paired sample test for individual group (pre and post scores) of VAS and MODI is <0.01, so there is significant difference between pre and post scores. But, the P-value of pre and post score of MST for experimental (belt wearing) group is not <0.01, so, there is no significant difference of mobility of spine in experimental group. In 2 – tailed test the P- value of VAS and MODI is not < 0.01, so, there is no significant different in pain and disability after compared in between both groups. But, in 2- tailed test the p-value is < 0.01 in MST after compared in between both groups. Therefore, we can say that there is a significant difference in the amount of change in MST (cm) between the Experimental and control groups.

**Conclusion**-The present study provided evidence to prove that use of lumbar belt in chronic low back pain reduce trunk mobility.

### Introduction:

Low Back Pain also known as lumbago is a common painful condition affecting mainly the lower portion (lumbar) of the spine. Any energize structure in the lumbar spine can cause symptoms of low back and referred pain into the lower limb<sup>2</sup>

Low back pain is caused by injury to a muscle (strain) or ligament (sprain). Common causes include improper lifting, poor posture, inadequate regular exercises, fracture and ruptured disc and arthritis. LBP results

from—among other factors—activation of nociceptors in response to trauma, tissue damage and mechanical action on the spinal cord and spinal nerves, as well as changes in metabolism. Example includes overuse, lifting too much, prolonged sitting, lying down, sleeping in an uncomfortable position<sup>1</sup>, wearing a poorly fitted backpack. Often the main symptom is pain in the lower back.

In chronic low back pain if a patient wears the lumbar belt for long time and after that some patient complains



of more pain in lower back. Mechanical low back pain refers to back pain that arises intrinsically from the spine, vertebral discs and surrounding soft tissue<sup>5</sup>.

Chronic low back pain is defined as pain that persists for more than 3 months or longer even after an initial injury or underlying causes of acute low back pain has been treated<sup>1</sup>.

Chronic low back pain prevalence was 4.2% in individuals aged between 24 and 39 years old and 19.6% in those aged between 20 and 59 years. In Brazilian older population, chronic low back pain prevalence was 25.4%. Chronic low back pain prevalence increases linearly from third decade of life<sup>5,25</sup>, and being more prevalent in woman<sup>25</sup>.

Low back pain is experienced in 60%-80% of adults at some point of lifetime<sup>34</sup>. Papageorgiou et al. stated at least 50% of adult would have experienced an LBP<sup>25</sup>

Lower back comprised of 5 lumbar vertebrae, named as L1, L2, L3, L4, L5 and five intervertebral discs which extends from bottom of the thoracic spine to the beginning of the sacrum<sup>26</sup>. The spinal cord extended up to L1-L2 vertebrae. The cauda equina, Latin for horse's tail is a bundle of spinal nerve roots that begins at the termination of the spinal cord and comes down through remainder of the canal. The lumbar spine consists of bones, discs, cartilages, ligaments, nerves and muscles to complete the functions of lower back<sup>26</sup>.

The lumbar region is capable of movement in flexion, extension, lateral flexion, and rotation. The lumbar zygapophyseal facets favor flexion and extension because of the predominant sagittal plane orientation. The amount of flexion varies at each interspace of lumbar vertebrae, but most of the flexion takes place at the lumbosacral joint. Lateral flexion and rotation are most free in the upper lumbar region and progressively diminish in the lower region. The largest lateral flexion range of motion and axial rotation occurs between L2 and L3.

Lumbar belt is a type of belt that is worn around the lower portion of back to support the lumbar spine to reduce excessive force on the spine, limits movements, reduce pain and improve posture<sup>4</sup>. Lumbar belt is proposed as a part of the wide range of treatments and preventive option in practice. Braces and corsets are supposed to support the spine from the outside, and are worn over the trunk. The brace is indicated for simple pain syndromes at the lumbosacral junction, minor instability syndromes, and lumbago<sup>1,8</sup>.

Koes B.W. et.al. explained that the antalgic effect of lumbar belt is expected because of the control of lumbar mobility, relative immobilization of the lumbar spine and some subjective effects (Heat massage, continues stimulation). There effects are still the subject of debate. The application of superficial heat is a non-pharmacological treatment approach that involves the application of a heat source to the body to raise the local tissue temperature. Heat therapy acts on pain and muscle spasms in multiple ways<sup>6</sup>.

The management of Chronic Low Back Pain, electric current, such as interferential current (IFC) or Interferential Therapy (IFT), is noteworthy. However, the existing guidelines and systematic reviews on IFT are based on a few high-quality studies and lack consensus on the optimal values of IFT parameters. IFT is a transcutaneous alternating medium-frequency electric current that is amplitude modulated in low frequency current<sup>8</sup>.

### Objectives

- . To evaluate the effectiveness of lumbar belt in chronic low back pain.
- . To evaluate the mobility of the trunk using a lumbar belt.
- . To evaluate any disability of the trunk after using lumbar belt for period of time.

### Methodology

#### SOURCE OF DATA

The primary data was collected from Agile hospital Physiotherapy Unit, Jaya Nagar Chariali, Guwahati-22

#### STUDY DESIGN

Experimental Study

#### STUDY SAMPLE

The study sample included subjects of both genders who were diagnosed with chronic mechanical low back pain by orthopaedician and consultant physiotherapist

#### DURATION OF THE STUDY

Study duration was from September 2021 to June 2022 (10 month's)

#### SAMPLE SIZE

A total 32 subjects took part in the study.

#### INCLUSION CRITERIA

- Age group between 25 years to 45 years.
- Both male and female.
- Patients with chronic low back pain.
- Subjects who clinically diagnosed with Mechanical low back pain.



#### EXCLUSION CRITERIA

- RTA or low back pain related to trauma.
- Post operative cases of spine.
- Pregnancy.
- Acute and subacute low back pain.
- Fracture of spine
- Psychiatric patient
- TB of spine (Pott's spine)

#### MATERIALS

- Pen and pencil, note book/record book.
- Inch-tape
- IFT and Hot Pack
- Data collection sheets.

#### PROTOCOL

Study approval was obtained from the institutional ethical committee. Subject was included as per inclusion and exclusion criteria after taking consent. Subjects was divided in to two groups lottery method. The patient was explained regarding the study and those interested to participate were given treatment. Data collection sheet was used to obtain demographic details such as patients age, gender, address, contact details. Before the treatment (at day 0) and after treatment (at days 15), pain of back determined by Visual analogue scale (VAS), disabilities of spine determined by modified Oswestry disability index (MODI) and spine mobility (ROM) measured by modified Schober's test (MST) in both groups. Both groups were treated by IFT (4P) and Hot pack over back for 15 mins and experimental group was advised to wear lumbar belt during the treatment period as daily minimum of 8 hours except during sleeping time



Fig – 1: Application of IFT



Fig-2: Modified Schober's Test



Fig -3: Application of heating pad

### STATISTICAL ANALYSIS

In the current study statistical analysis was completed using statistical package of social sciences (SPSS) version 22 to analyse the outcome gained. An excel

spreadsheet was entered, organized and statistically examined to continue the data. Several statistical methods such as mean, standard deviation, paired T-test were used.

		Study Group	
		Control Group	Experimental Group
Age	Mean	34.94	30.81
	Standard Deviation	8.00	6.07
	Minimum	25.00	25.00
	Maximum	45.00	45.00

Table :1: Statistical analysis of Age

Subjects in the control group range from 25 to 45 years with an average age of 34.94 years and a standard deviation of  $\pm 8$  years. Subjects in the case group range from 25 to 45 years with an average age of 30.81 years and a standard deviation of  $\pm 6.07$  years.

The VAS score for the Control Group before intervention ranges between 3 and 6 with an average score of 4 and a standard deviation  $\pm 1.10$ . Similarly, the VAS score after intervention ranges between 0 and 3 with an average score of 1.31 and a standard deviation  $\pm 0.70$ .

The VAS score for the Case Group before intervention ranges between 3 and 8 with an average score of 4.69 and a standard deviation  $\pm 1.25$ . Similarly, the VAS score after intervention ranges between 1 and 3 with an average score of 1.75 and a standard deviation  $\pm 0.68$ . Significant Difference Test To check whether there is a significant difference in VAS scores before and after the

intervention, a paired sample t-test for the mean difference was carried out. Since the p-value is  $< 0.01$ , therefore we can say that there is a significant difference in VAS scores before and after intervention for control group subjects. To test whether the results are significantly different between the experimental and the control groups, independent sample t test for equality of means was carried out. The VAS score difference after intervention for the control group ranges between 1 and 5 with a mean difference of 2.69 and a standard deviation  $\pm 1.08$ . The VAS score difference after intervention for the case group ranges between 2 and 6 with a mean difference of 2.94 and a standard deviation  $\pm 0.93$ . Since p-value is  $> 0.05$ , therefore we can say that there is no significant difference in the amount of decrease in MODI between the experimental and control group. Since p-value of MST is  $< 0.01$ , therefore we can say that there is a significant difference in the amount of





change in MST (cm) between the Experimental and control groups.

### Discussion

This study was done to evaluate the effectiveness of lumbar belt on pain and lumbar mobility in patient with chronic low back pain. 32 subjects with chronic low back pain were involved in the study. The subjects were divided randomly in two groups as group A (control group) and group B (experimental group). Both groups were treated with IFT and Hot pack (Electrical heating pad) and experimental group were advised to wear lumbar belt, as daily minimum of 8 hours (except during sleeping) during treatment (for 15 days). Outcome measures in terms of visual analogue scale (VAS), modified Oswestry disability index and modified Schober's test were measured before treatment (day 1) and after completion of treatment (days 15) and noted it accordingly.

When the results of the study were analysed statistically it supports the alternate assumption that there is a variance in the range of motions of spine (modified Schober's test) before and after wearing the lumbar belt for a period of time in between both groups.

The demographic details in this study not focus on gender distribution. A total number of participants were 16 male and 16 female. Females are more prone to have low back pain than males could be due to the behavioural, hormonal, anatomical and psychosocial causes. Hoy et al. who found that females are more affected by low back pain than males. The most common risk factors of low back pain are lifting weights, obesity and sitting for long period of time. Sedentary life style also one of the causes of low back pain.

Several studies conclude that IFT, Hot fomentation are effective in chronic low back pain. Some other study found that lumbar belt also effective in acute and subacute low back pain by immobilising the spine. In this study main focus was to check any changes in the mobility of spine after using the lumbar belt in chronic low back pain for a period of time.

Lumbar belt used as therapeutic and prevention option in practice. Braces and corsets are supposed to support the spine from the outside. The brace is indicated for simple pain syndromes at the lumbosacral junction, minor instability syndromes, and lumbago. Lumbar belt reduces the low back pain by immobilising the lumbar spine. The use of lumbar belt for period of time reduces the mobility of lumbar spine. So many studies conclude

that in acute and subacute low back pain lumbar belt is effective and reduces pharmacological consumption<sup>1</sup>.

### Conclusion

The present study provided evidence to prove that use of lumbar belt for a period of time is effective in improving pain and disability of spine and reduce trunk mobility in subjects with chronic low back pain.

### Limitations and future scopes

#### Limitations-

1. Sample size was not large enough
2. Study sessions was minimum.

#### Recommendation -

1. study can be conducted with more numbers of sample size.
2. Study can be conducted with females and males separately.

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