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EFFECTIVENESS OF CONTINUOUS TRACTION IN PRONE VS SUPINE LYINGIN TREATING LUMBAR INTERVERTEBRAL DISC PROLAPSE - A COMPARATIVE STUDY

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ABSTRACT

BACKGROUND: One of the most prevalent causes of disability in the general population is low back pain, between 50percent and 80percentage of individuals experience it at some point throughout theirlife. One of the causes of LBP is lumbar intervertebral disk abnormalities, which affect 3% to10% of people. Lumbar traction, which may be applied using a variety of techniques and in various positions,is frequently used to treat a range of lumbar problems. It has been suggested that The intervertebral foramen is widened during lumbar traction to relieve pressure on the nerve roots and to separate the vertebral bodies, which reduces compressive forces on the discs, and helps herniated disks reposition themselves by putting tension on the spinal ligaments.

MATERIALS AND METHODS: Using an easy sample technique based on inclusion and exclusion criteria, a total of 40 participants were chosen. The subject was informed about the study and provided with a written consent form. In prone position group (n=20) continuous lumbar traction wasgiven in prone lying with interferential therapy with 4 sittings per week for 2 weeks and in supineposition group (n=20) continuous lumbar traction was given in supine lying with interferentialtherapy in 4 sittings per week for 2 weeks. Disability and pain were assessed using Oswestry disability questionnaire and Visual analogue scale respectively before and after the intervention.

RESULT: Using the paired 't-test and the unpaired 't-test, the values were statistically analyzed. A statistically significant difference between the prone position group and the supine position group, as well as within the group, was discovered by statistical analysis of the quantitative data. The post- test mean value of oswestry disability questionnaire in prone position group was 16.30 and supine position group was 17.20. This showed that the treatment protocol given for prone position group is comparatively more effective than supine position group.

CONCLUSION: This study demonstrates that when continuous traction was administered in both prone and supine positions to individuals with lumbar intervertebral disc prolapse, pain and disability were significantly reduced. But when compared to continuous traction in supine laying, traction in prone lying demonstrated a more effective reduction in pain and impairment.

KEYWORDS: IVDP, Lumbar traction , low back pain

INTRODUCTION

The most frequent reason for impairment in the general population is low back pain. It affects between 50% and 80% of people at some point in their lives. The main causes of LBP, which occurs between 3% and 10% of the time, are lumbar intervertebral disk diseases linked to nerve root irritation. Patients with nerve root irritation may experience higher symptom intensity and reduced frequency of recovery with this lesser percentage.[1] Despite the lack of a defined mechanism for how pain is produced, it is believed that structuralalterations in the annulus fibrosus, nucleus pulposus, and vertebral end plates are linked to disc-related pain. The pulpous nucleus of the intervertebral disc, which is situated in its dorsal area, is displaced through its external membrane, causing lumbar disc herniation. Depending on theamount of herniated tissue, the lumbar nerve roots and the dural sac may be stretched and disturbed causing disc prolapse.[2]

In lumbar spine degenerative abnormalities, the most common diagnostic is today is disc herniation, which is also the primary reason for spinal surgery. High levels of surgical treatment have been seen, as a result of factors including improved access to medical care, early requests for imaging tests, and the safety of surgical treatments. While it has been observed in all age groups, disc herniation tends to occur most frequently at the mean age of 37 years.[3] Smoking, continuous exposure to repeated loads, and vibration stress have all beenassociated with an increased risk of disc herniation. In lumbar spine degenerative abnormalities, the most common diagnostic is lumbar intervertebral disc prolapse, which is alsothe main reason for adult spinal surgery. According to their form, hernias are categorizedon MRI which is the confirmatory diagnosis of IVDP. The disc's primary source of material, the pulpous nucleus, is displaced at the intervertebral borders and can assume one of three shapes:Extrusion, sequestration, or protrusion.[4]

Initial lumbalgia is usually followed by increasing sciatica in the clinicalpresentation. IVDP symptoms normally disappear quickly (four to six weeks). A careful treatment should include medication, physical therapy, and maybe a percutaneous nerve root block. If pain relief is ineffective, if a motor deficit of more than grade-3 exists, if cauda equinasyndrome is present, indicates a serious medical situation.Currently, lumbar disc herniation isthe condition that requires spinal surgery most frequently, especially in males around the age of 40.[5]

There are several non-invasive treatments for treating low back pain. In general, the management of low back pain brought on by disc diseases may involve the use of oral or injectable medicines, bracing, chiropractic, acupuncture, and lumbar traction.[6]

From ancient times, spinal conditions such as disc prolapse and low backpain have been treated using lumbar traction. Lumbar traction, which may be applied using a variety of techniques such as

mechanical, motorized, or gravity, is frequently used to treat a range of lumbar problems. It has been claimed that lumbar traction distributes vertebral bodies and reduces compressive stresses on the disks, albeit its exact mechanisms of action are yet understood, enlarges the intervertebral foramen to relieve pressure on the nerve roots, and helps herniated disks reposition themselves by putting tension on the spinal ligaments. More research into given that the mechanism of disc-related low back pain may differ from other types of pain and that the decompression pressures provided by traction can be particularly beneficial in disk-related illnesses, lumbar traction in such circumstances seems justified.[7] However, recent publications of multiple relevant trials and fresh data suggesting that traction may lessenthe size of a herniated disc. In individuals with Lumbar IVDP, prior research has shown that intermittent or continuous lumbar traction can improve symptoms and shrink a herniated disc.Physical therapy treatment in Lumbar IVDP, however, has a track record, and it's yet unclear what the alternative therapies include. Traction is the most popular form of physical therapy for Lumbar IVDP and can be used with other techniques.[8]

Spinal traction has been utilized to treat pain issues continuously, intermittently, manually, mechanically, and sustainably since the time of Hippocrates. It can be utilized in a number of positions, including prone and supine. According to Cyriax, traction in the lumbar region helps bring the herniated disc into the center of the joint by enlarging the space between the vertebrae and stretching the posterior longitudinal ligament. Just two of the consequences of traction on the lumbar area include the creation of a distracting force between facet joints and the enlargement of the foraminal gap. Additionally, traction has been observed to increase foraminal space and lower nucleus pulposus pressure.[9]

Spinal elongation with traction is thought to increase range of motion, reduce mechanical stress, ease muscular cramps or spinal nerve root compression, and dissolve adhesions at the zygapophyseal joint and annulus fibrosus.. This is done by lowering lordosis and expanding intervertebral space. Despite mixed results, patients with low back pain have received relief from a number of physical therapy exercises and techniques as well as from a variety of physiotherapy treatment plans. It is believed that lumbar traction lowers unpleasant sensation by reducing the lordotic curve, increasing the space between the vertebrae, and lessening muscle cramping or pressure on the spinal nerve roots.[9]

Despite the paucity of data, between 41% and 76% of therapists frequently employ traction use it and is frequently combined with other therapies. Nevertheless, there is no clear agreement on the treatment's specifics, such as its kind, duration, frequency, force, or patient positioning. The subject may be placed in prone during traction therapy, but the supine position is typically recommended by therapist. Patient ease and muscular relaxation are thought to be crucial for traction to have its most positive effects. In research, it was shown thatnormal subjects were relaxed during traction in both the supine and prone positions, and that muscular activity was considerably lower in the prone position than in the supineposition.[10]

As a result, it is possible to believe that lumbar traction performed on low back pain sufferers when they are prone may perhaps be more beneficial. We believe that no studies have examinedthe effects of lumbar traction for individuals with lumbar IVDP in either of these two specificregions. This study sought to determine the effectiveness of mechanical lumbar traction used in either the supine or prone positions for the treatment of Lumbar IVDP in terms of lowering pain and the degree of disability as well as the efficacy of physical therapy.[11]

AIM:

To evaluate the efficacy of continuous traction for the treatment of lumbar intervertebral disc prolapse while laying prone and supine.

OBJECTIVE:

1. To evaluate traction's impact while prone lying among lumbar intervertebral disc prolapse patients in terms of disability using oswestry disability questionnaire and painusing VAS.
2. To evaluate traction's impact while supine lying among lumbar intervertebral disc prolapse patients in terms of disability using oswestry disability questionnaire and painusing VAS
3. To evaluate traction's impact while continuous lumbar traction in prone and supine lying for treating lumbar intervertebral disc prolapse patients in terms of disability using oswestry disability questionnaire and pain using VAS.

METHODS:

Study Type: Experimental study.

Study Setting: Samples have been selected from Saveetha Medical College and Hospital OPD,Thandalam, Chennai-602105 according to the inclusion and exclusion criteria

Sampling method: Convenient sampling.

Sample size: 40

Inclusion criteria:

1. Age group 30-60 years
2. Acute disc herniation
3. Positive SLR and Slump test
4. Both male and female
5. Radicular pain

Exclusion criteria:

1. Patients not interested in the study
2. Pregnant women
3. Spinal tumors
4. Vertebral fractures and dislocations
5. History of spinal surgeries
6. TB Spine patients

DATA COLLECTION AND ANALYSIS:

Using an easy sample technique based on inclusion and exclusion criteria, a total of 40 participants were chosen. The subject was informed about the study and provided with a written consent form. In prone position group (n=20) continuous lumbar traction wasgiven in prone lying with interferential therapy with 4 sittings per week for 2 weeks and in supineposition group (n=20) continuous lumbar traction was given in supine lying with interferentialtherapy in 4 sittings per week for 2 weeks.Disability and pain were assessed using Oswestry disability questionnaire and Visual analoguescale respectively before and after the intervention.

RESULT:

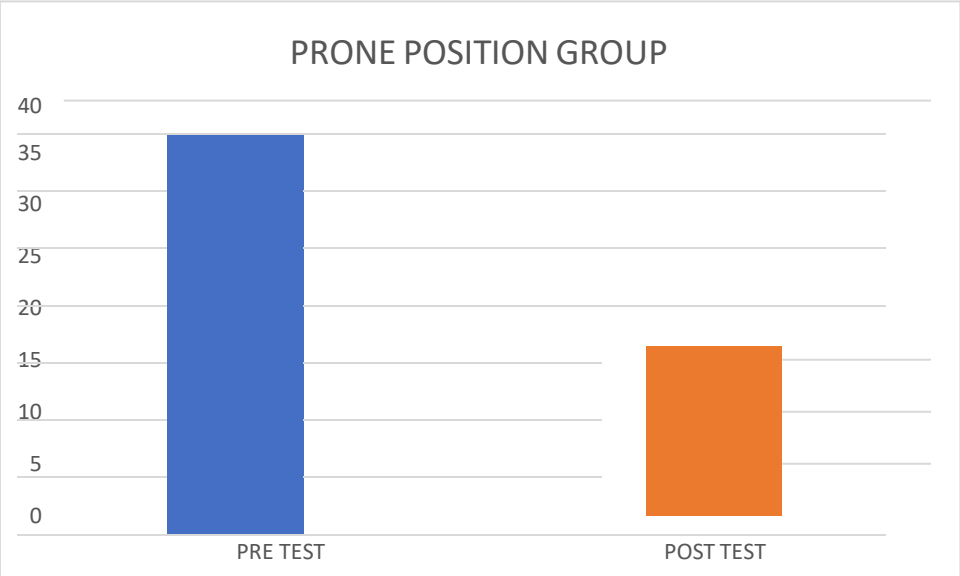
Using the paired 't-test and the unpaired 't-test, the values were statistically analyzed. A statistically significant difference between the prone position group and the supine position group, as well as within the group, was discovered by statistical analysis of the quantitative data. The post- test mean value of oswestry disability questionnaire in prone position group was 16.30 and supine position group was 17.20. This showed that the treatment protocol given for prone position group is comparatively more effective than supine position group.

TABLE 1: Pre-test and Post-test mean values of Prone position group and Supine positiongroup using Oswestry disability questionnaire

		MEAN	SD	T	P
PRONE POSITION GROUP	PRE-TEST	34.90	8.35	8.5225	<0.0001
	POST-TEST	16.30	5.05		
SUPINE POSITION	PRE-TEST	36.45	8.16		

GROUP	POST-TEST	17.20	4.41	9.2827	<0.0001

GRAPH 1: Pre-test and Post-test mean values of Prone position group using Oswestryquestionnaire



GRAPH 2: Pre-test and Post-test mean values of Supine position group using Oswestryquestionnaire

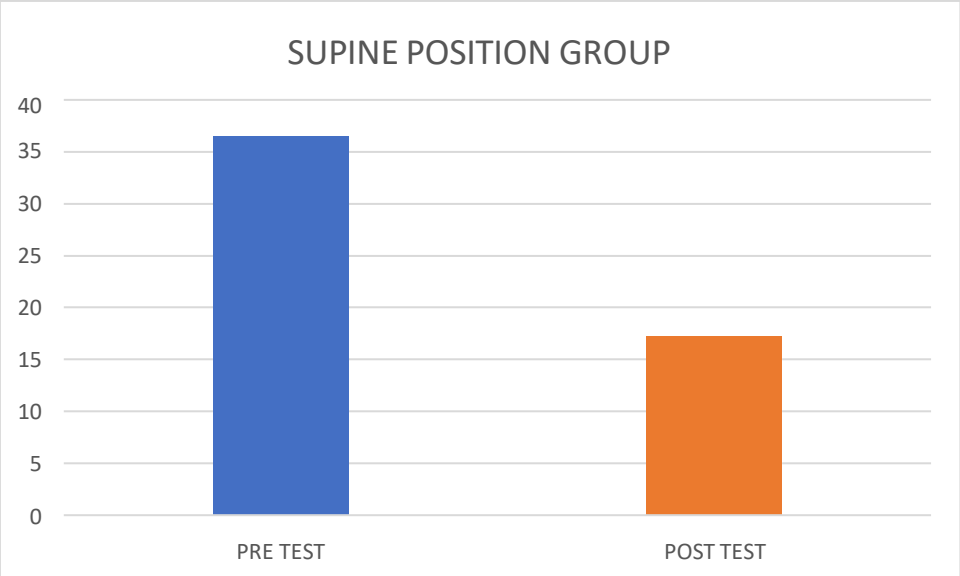
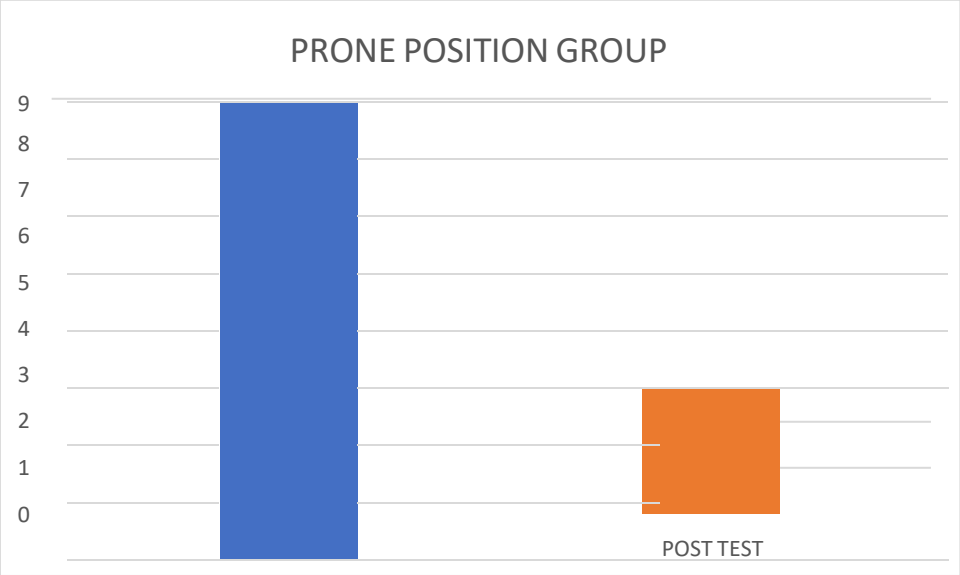


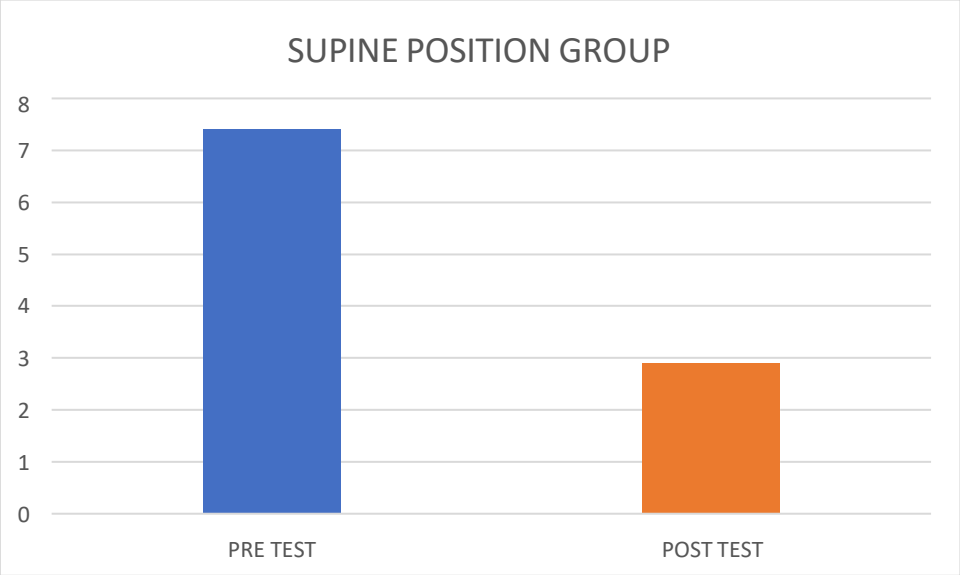
TABLE 2: Pre-test and Post-test mean values of Prone position group and Supine positiongroup using VAS

		MEAN	SD	T	P
PRONE POSITION GROUP	PRE-TEST	7.85	1.60	10.579	<0.0001
	POST-TEST	2.75	1.45		
SUPINE POSITION GROUP	PRE-TEST	7.40	1.70	9.0190	<0.0001
	POST-TEST	2.90	1.45		

GRAPH 3: Pre-test and Post-test mean values of Prone position group using VAS



GRAPH 4: Pre-test and Post-test values of Supine position group using VAS



DISCUSSION

The goal of the current study was to examine the efficacy of continuous lumbar traction for treating lumbar intervertebral disc prolapse in prone and supine laying positions. The findings of this study demonstrated that mechanical lumbar traction in the prone position further increased the efficacy of continuous lumbar traction in treating patients with lumbar intervertebral disc prolapse.

The mean difference between the two groups pain reduction by traction in prone lying was 5.10on the visual analogue scale and the mean difference of the disability by traction in prone lyingwas 18.6 on Oswestry disability index, therefore showing effective reduction of pain and disability.[19]The mean difference between the two groups pain reduction by traction in supine lying was 4.50 on the visual analogue scale and the mean difference of the disability by traction in supinelying was 19.2 on Oswestry disability index showing less benefits in reducing pain and disability when traction was applied in supine lying. According to a study by Krause et al. that supports the findings of the current study, the average (S.D.) age of the subjects were 39 5.7 vs. 40 5.3 years in the supine vs. prone group, and the mean ODI score was 25.2 vs. 26.0 vs. 26.0 vs. at the start of treatment, vs. 19.45 vs. 11.05 vs. 4.40 at the end.[20]

According to Tadano S. et al., typically slight muscle activation during traction in the prone lying position may provide more obvious intervertebral separation, and the present study considers the prone lying position to be more advantageous than supine lying. In keeping with the current researcher's claim, applying traction in the prone laying position as opposed to supine lying resulted in better outcomes in terms of pain and disability modification.[21]Researchers define a 10 or 17-point difference in points as an MCID, whereas 30% is a relevantamount in percentage terms. In the study by Tadano et.al, the MCID deviate by 22 points, or 41.43%. This shows that there was excellent MCID for the ODI similar to our study.[22] In prone and supine lying, Filiz et al. studied the utility of mechanical traction for people with radicular discomfort. Their 15 intervention sessions lowered the functional disability (ODI) from 50.4% to 33.2% and the mean pain intensity (VAS) from 8 to 4.3. These outcomes are consistent with the findings of our study, which showed that therapy for four sessions decreased overall degree of pain (VAS) to 8.56 to 2.90 & functional impairment (ODI) from 53.5% to 31%..[23]

The compared post-test mean values between prone position group and supine position groupprevealed that the intervention received by prone position group was more effective than the intervention received by supine position group., which was according to the studies conductedby Krause et al; Chung et al and Otzurk et al. [24]The VAS has a 30 mm minimum clinically relevant difference, according to the Lee et al. research. The clinically relevant difference threshold varied from 20.9 to 57.5 mm in the research by Emshoff et al. In our study, we obtained the mean of 2.75 in prone lying group whereas 2.90 in supine lying group according to

VAS indicating better improvement in pain perception. [25]Supine is the usual posture for traction; however, several studies have been unable to demonstrate meaningful benefits in this position. Prone is preferable than supine, according toseveral of the more recent research that included traction testing in this posture. [26]This study concludes that continuous traction applied in prone lying is more effective in treating the lumbar intervertebral disc prolapse by reducing. pain and disability when compared to continuous traction applied in supine lying.

LIMITATIONS:

1. The study was done in a short time with a small number of subjects.
2. No follow-up data was collected.
3. Lack of blinding.

RECOMMENDATIONS:

To make the study more valid, a long-term study with a large sample size is recommended.

1. Further studies are recommended to analyse the effect of other modified exercise regimens.
2. Regular follow–up should be done.

CONCLUSION

This finding suggests that continuous traction applied while prone-lying was found to be more beneficial than continuous traction applied while supine-lying in lowering discomfort and disability in lumbar intervertebral disc prolapse and assisting in treating lumbar intervertebral disc prolapse.

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