

## **A comparative analysis of effects of Pilates-based exercises and spinal extension exercises on patients with lumbar prolapsed intervertebral Disc**

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### **Abstract: -**

### **Objective:**

The main aim of this study was to compare the effectiveness of spinal extension exercises over Pilate's exercises in the lumbar prolapsed intervertebral disc (PIVD).

### **Design:**

A total of 60 patients were randomly assigned to Pilates exercises (=30) and spinal extension (n=30) groups. The primary outcome measure was the visual analog scale (VAS), Manual muscle testing (MMT ), and range of motion (ROM) before and at the end of the six-week treatment protocol.

**Result** -The descriptive statistical methods (mean, standard deviation ), and student's T-test were used to compare distributed values for groups A and B.

**Keywords** – lumbar disc herniation, pain, spinal extension exercise, Pilates exercise.

**Introduction** -Prolapsed intervertebral disc (PIVD) is a discrete clinical entity where the posterior longitudinal ligament gives way and thus the disc material herniates into the spinal canal. PIVD means a prolapsed intervertebral disc, where the protrusion or extrusion of the nucleus pulposus through a pressure in the annulus fibrosus results in PIVD [1].

Disc prolapsed is most frequently seen in the lumbar regions and most common at L4-L5 and L5-S1 levels [2]. Lumbar prolapsed intervertebral disc or herniation is the most common cause of spine-related disability in working-age individuals. Symptomatic prolapsed disc presents as lumbar radiculopathy due to both mechanical compression as well as chemical irritation on a nerve root. Lumbar PIVD can be extremely painful and cause significant morbidity and loss of function [3]. The disc between L4 –L5 are those most often affected, where the part of the gelatinous nucleus pulposus protrudes through a rent in the annulus fibrous as is weaker part, which is posterolateral or sometimes the torn annulus itself protrudes backward, the protrusion bulges the pain – sensitive posterior longitudinal ligament causing pain in the back. The nerve affected is that which leaves the spinal canal at the interspace next below the site of the disc lesion, thus the first sacral nerve is impinged upon by a prolapsed between L5-S1, the 5<sup>th</sup> lumbar nerve by a prolapsed between L4 and L5, natural healing is by Shrinking and fibrosis of the extruded disc material; not by its reposition within the disc[4]. A herniated lumbar disc is a displacement of disc material ( nucleus pulposus or annulus fibrosus ) beyond the intervertebral disc space. The highest prevalence is among people aged 30-50 years [5]. Lumbar disc herniation (LDH) is a major contributor to low back pain. It is highly associated with inflammation in the context of low back pain, inflammation is the major factor which is responsible for LDH regression, suggesting that disc herniation is more commonly the result of endplate junction failure than AF rupture. Herniated discs are found in 30-40% of asymptomatic people by imaging diagnostic tools [6]. Decreasing the size of disc material that has herniated when “ contained” or protruded [7]. -The main causes of this condition are wrong posture, sedentary lifestyle, work burden, carrying heavy objects, obesity, etc..... and most of the young population is affected by this. The pain in PIVD is caused due to disc prolapse/herniation [8] Traumatic events appear to be a crucial factor in the occurrence of lumbar disc herniation [9].Pilates consists of exercises that basically focus on improving the flexibility and strength of a group of muscles [10].

### **Aim of the study –**

1. To investigate and determine the pre-post improvement status of patients on the variable with Pilate's exercise (Group A) and spinal extension exercises (Group B)
2. To compare the levels of improvement on selected parameters in both groups.

### **Methodology –**

**Study design** - A Pre-test and Post-test comparative analysis design based on the cross-sectional study

**GROUPING & SAMPLE SIZE: –**

The patients with particular stages of PIVD will be selected as subjects, after screening from physiotherapy OPD of the University Institute of Health Sciences (U.I.H.S.) C.S.J.M. University for investigation and experiment. A total of 60 patients will be selected as per inclusion & exclusion criteria. There will be two groups of patients:

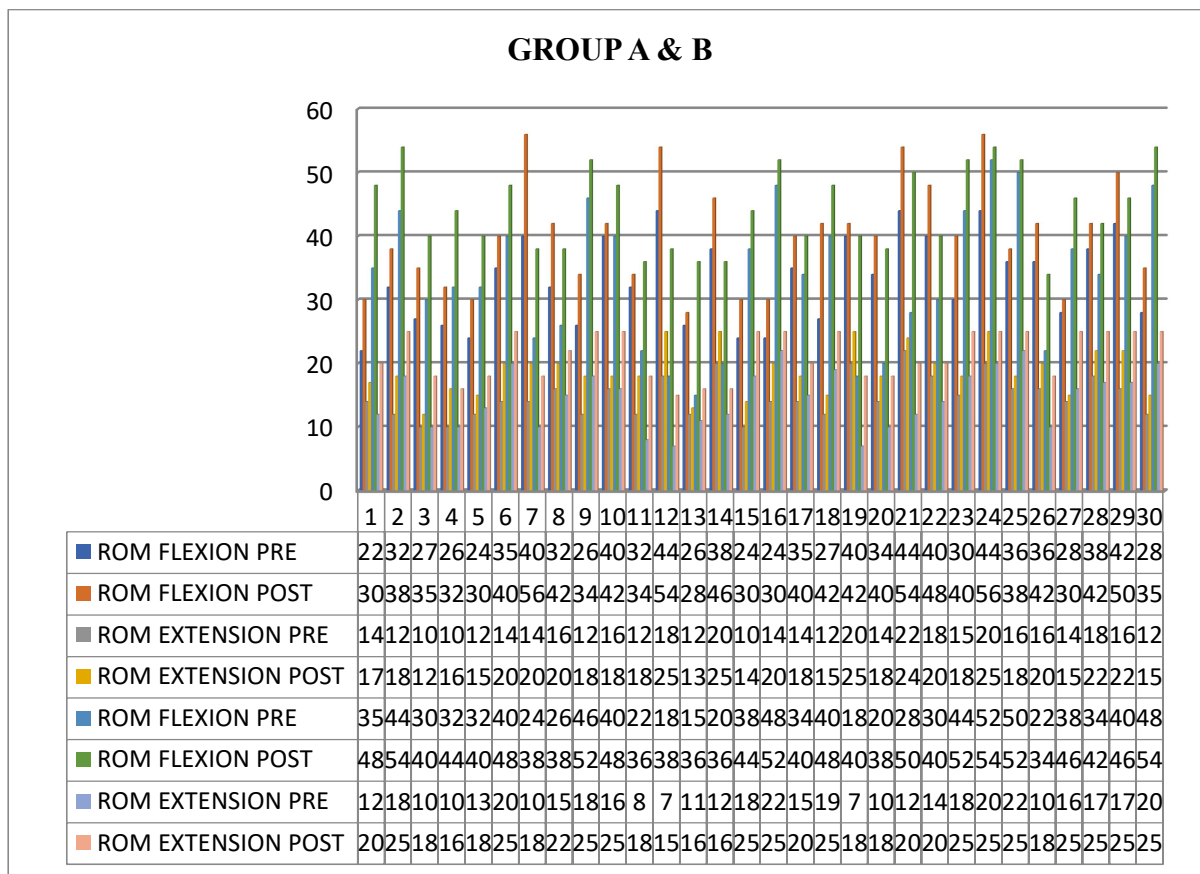
**GROUP A-** The subjects/ patients will receive Pilates exercises for therapy. Total Number of patients=30

**GROUP B-** The subjects/ patients will receive spinal extension exercises.

**Data Analysis:**

After the collection of data the standardized values, classifications, etc. will be used and a comparison will be done to obtain the results. Suitable statistical methods and tools were used for the analysis of the actual data and for revealing the findings of the study. The descriptive statistical methods (mean, standard deviation), and student's T-test were used for the comparison of normally distributed variables total Number of patients-30 Collection of sample data. The average treatment length of time was 6.58 and 7.33 weeks (A and B), with an average of 9.67 and 10.5 treatments in that time, thus an average of 1.20 and 1.30 treatments a week. A significant difference between the groups may have been seen.

**Result:** - Pilates also showed better results in pain reduction and disability and range of motion. Pilates improved absolute core strength. The reason might be that the Pilates group intervention lasted for a short duration when compared to other studies. The Pilates program was found to be effective after a 6-week protocol. Pilates exercise for the improvement of LBP was studied in a previous randomized controlled trial where the Pilates group undertook a 6-week program. These data suggest that Pilates improved nonspecific chronic LBP in an active population compared to no intervention. Additionally, Pilates improved general health, pain level, sports functioning, flexibility, and proprioception in individuals with chronic LBP .



## CONCLUSION

Lumbar disc herniation is a common aetiology in low back pain. Pilates exercises are a good alternative when other exercises do not have satisfying results. Pilates is a relatively safe and simple exercise. Excellent patient satisfaction is often seen. This study shows that there was reduced pain and increased functional activity statistically in patients with lumbar disc herniation. Thus, this study concluded that Pilates was an effective treatment for patients with prolapsed intervertebral discs.

## DISCUSSION

In the present study, it was found that although all the two forms of exercise proved to be effective when pre-post-intervention comparison was made on day 1 and day 15 of a treatment session, the inter-group comparison proved Pilates exercise to be more superior form of exercise when compared to the spinal extension exercises. Pilates showed better results than the spinal extension. In the present study, the Subjects with back pain were maximal in the age group of 25–60 years which shows that chronic nonspecific back pain occurs mostly in the working age group due to occupation, daily activity, and stress ([Bindra et al., 2015](#)). Gender distribution in the present study showed that a large number of females complained back pain as seen in previous studies. The reason might be ascribed to that lumbar PIVD is more prominent in both genders ([Han et al., 1997](#)). Studies also state that compared with a person who carries overweight/obese people had an increased prevalence of LBP. This relation has been proved in our study. The standard conventional treatment for nonspecific LBP include exercises such as spinal extension and Pilates ([Hayden et al., 2005](#)). Extension exercises improve the motor recruitment strength and endurance of the extensor muscles of the spine and hip they unload the disc allow the fluid influx and decrease the pain. Pilates exercises improve the strength, and flexibility of the muscles, strengthen the core muscles, teach good alignment, and provide gentle stretches for tight back muscles.

Pilates was found to be superior to extension exercise in all forms of exercise in the present study. This could be explained by the following possible reasons. Firstly, the stabilization exercise uses a drawing-in maneuver which helps in coactivating the transversus abdominis and multifidus muscles than other exercises which concentrate on strengthening the surrounding muscles.

Pilates is based on the use of functional exercises for improving muscular strength and endurance and training these muscles. Pilates, which focuses on rehabilitation, recruits deep stabilizer muscles (i.e., transversus abdominis, internal and external abdominal oblique, and multifidus muscles) at a submaximal effort while disassociating the extremities from the trunk and pelvis so that the deep stabilizers work efficiently to maintain control. This suggests that lumbar stabilization exercises are as good as Pilates. However, in our study, Pilates did not improve functionality and pain as much as the lumbar stabilization exercise group.

Pilates also showed better results in pain reduction and disability and range of motion. Pilates improved absolute core strength and moreover encouraged proper posture. The reason might be that the Pilates group intervention lasted for a short duration when compared to other studies. The pilates program was found to be effective after a 6-week protocol.

Pilates exercise for the improvement of LBP was studied in a previous randomized controlled trial where the Pilates group undertook a 6-week program. These data suggest that Pilates improved nonspecific chronic LBP in an active population compared to no intervention. Additionally, Pilates improved general health, pain level, sports functioning, flexibility, and proprioception in individuals with chronic LBP ([Gladwell et al., 2006](#)).

A systematic review was carried out to assess the effects of the Pilates method on chronic LBP.

A study was conducted to compare the efficacy of spinal extension exercises and pilates-based exercises on the relief of lumbar

## References :-

- [1] . Goel A: Prolapsed ,herniated or extruded intervertebral disc treatment by only stabilization .Wolter Kluwer - Medknow publication, J Craniovertebral junction Spine 2018,july –sep;9(3);133-134.
- [2] Singh Varum ,Malik Manoj [..] et al:A systematic review and meta analysis on the efficacy of physiotherapy intervention in management of lumbar prolapsed intervertebral disc Int J Health sci (Qassim).2021.Mar-Apr;15(2):49-57
- [3] GadiyaAkshay et al: lumbar prolapsed intervertebral disc a treatment algorithm .volume 1 issue 1 July –dec 2016 page (29-35).
- [4] Adams Crawford John et al : outline of orthopaedics 11<sup>th</sup> edition 1990 EIBS “trunk and spine”.page \_160-202).
- [5] Joanne L Jordan et al: herniated lumbar disc .BMJ ClinEvid .2011 : 1118; published online june 28 2011.
- [6] Carla Chuna et al: the inflammatory response in the regression of lumbar disc herniation . Arthritis research and therapy 20(1),1-9,2018.
- [7] S Keskil et al: spontaneous resolution of “protruded “ lumbar disc is minim invasive Ne Maheshwari, J., Vikram A, Mhaskar,essential orthopaedics ; 5<sup>th</sup> edition 2015;jaypee; the health science publisher New Delhi ;(252-257).
- [8] Maheshwari, J., Vikram A, Mhaskar,essential orthopaedics ; 5<sup>th</sup> edition 2015;jaypee; the health science publisher New Delhi ;(252-257).
- [9] PietilaAulikkiTerttu et al: lumbar disc herniation in patients up to 25 years of age .Neurologia medico-chirurgica 41(7),340-344,2001.
- [10] Ali Hasanpour –Dehkordi et al: A comparison of the effects of pilates and Mckenzie training on pain and general health in men with chronic low back pain : a randomized trial . Indian journal of palliative care 23(1) ,36,2017.