

## EFFECTIVENESS OF WILLIAM FLEXION EXERCISE VERSUS ALEXANDER TECHNIQUE IN NON-SPECIFIC CHRONIC LOW BACK PAIN AMONG TEACHERS: A COMPARATIVE STUDY

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### ABSTRACT

**Background:** Low Back Pain (LBP) is one of the top 10 highest-burden diseases and injuries. In current study, the William Flexion Exercise (WFE) and the Alexander Technique (AT) were performed to assess its effectiveness among Teachers. The William Flexion Exercise is based on distract the apophyseal joints which further stretch ligamentous structures through opening the intervertebral foramen, whereas the Alexander Technique enhance kinaesthetic awareness and conscious inhibition to avoiding harmful movement patterns.

**Objective:** The aim of this study is to compare the effects of WFE verses AT among Teachers on pain and disability in patients with CLBP.

**Methods:** Ethical clearance was taken from the Ethical Committee. The Convenient Sampling Technique was used to collect the samples. On the based-on Selection criteria 30 participants were selected based on. Once the participants were educated about the treatment's specifics, they provided signed consent. Group A received WFE whereas Group B received AT. Numerical Pain Rating Scale (NPRS), Oswestry Disability Index (ODI) outcome was used before and after the treatment. Exercises were performed for 5session/week for 3 week total 15 Session in both the groups.

**Results:** The data was analysed using SPSS Version 23. There was a significant improvement in pain and function ( $p <0.05$ ), which showed that William Flexion Exercise was produced in Group A was more effective.

**Conclusion:** The study concluded that the William Flexion Exercise significantly reduced pain and improved functional capacity in teachers with nonspecific CLBP, as measured by NPRS and ODI after three weeks.

**Keywords:** CLBP, NPRS, ODI, WFE, AT

### INTRODUCTION

According to the expert group for the Global Burden of Disease (GBD) study, low back pain ranks among the top ten high-burden diseases and injuries. It causes an average of more disability-adjusted life years (DALYs) than HIV, motor vehicle accidents, tuberculosis, lung cancer, chronic obstructive pulmonary disease, and problems related to preterm birth.<sup>[1]</sup>

Low back pain (LBP) is one of the most prevalent musculoskeletal diseases that affects the working population, including teachers<sup>[2,3]</sup> and is a leading cause of disability in both developed and developing

countries. [4]

It was evident from a 2011 systematic review that educators are susceptible to musculoskeletal problems.<sup>[5]</sup> Numerous research showed that instructors had varying prevalence rates of back pain and were therefore more likely to experience it. School teachers were found to have a highly variable prevalence rate of lower back pain (LBP) among occupational categories; rates ranged from 48 % in India.<sup>[6]</sup> A teacher spends most of their time in hazardous working postures, such as standing and walking while instructing, writing on the whiteboard, planning lessons, grading assignments, and performing other administrative tasks. These activities put stress on the musculoskeletal system and can lead to the development of lower back pain (LBP).<sup>[7, 8]</sup>

William's flexion exercise (WFE) is one of the most basic and widely utilised physiotherapy exercises for treating lower back pain (LBP) patients among the various exercises. It has been demonstrated that by strengthening the paraspinal muscles to support the deteriorated facet joints, it can lessen pain and increase spinal range of motion (ROM) in LBP patients.<sup>[9]</sup>

The benefits of William's flexion exercise program include: opening of the intervertebral foramen, stretching the ligamentous structures, disorders of the apophysis joint, effective abdominal exercises that emphasize lumbar flexion of the abdominal muscles, reducing pain or soreness, the hip flexor muscles (iliopsoas) can also be used perform lumbar flexion.<sup>[10]</sup>

The Alexander technique was created by Australian actor and teacher Frederick Matthias Alexander, who was born in 1869. To avoid unhelpful movement patterns, it makes use of intentional inhibition and increased kinaesthetic awareness.<sup>[11]</sup>

These mechanisms involve improved coordination of the trunk, head and limbs, and improved motor control of postural muscles, factors which are usually operating poorly in individuals with chronic back pain.<sup>[12-17]</sup>

### **NEED & SIGNIFICANCE OF STUDY:**

According to research data from past studies, teachers frequently experience low back pain across all musculoskeletal diseases. This is common because of their hazards working postures, which include standing and walking while providing instructions, writing on the whiteboard, planning lessons, grading homework, and performing other administrative tasks.

There hasn't been much research done on this demographic particularly, however several exercise types are used to treat low back pain but there is no evidence by comparing William Flexion Exercise and the Alexander Technique on pain and disabilities. This research compares the effects of the Alexander Technique verses William Flexion Exercise on pain and disabilities in order to identify which approach is helping teachers with low back pain.

### **AIM:**

The aim of this study is to compare the Effectiveness of William Flexion Exercise verses Alexander Technique in Non-Specific Chronic Low Back Pain among Teachers.

### **OBJECTIVE:**

- **Primary objective:** To compare the effectiveness of William Flexion Exercise and Alexander Technique in Teachers with nonspecific chronic low back pain in terms of pain intensity as measured by the NPRS.
- **Secondary objective:** To compare the effectiveness of William Flexion Exercise and Alexander Technique in Teachers with nonspecific chronic low back pain in terms of their functional abilities as measured by the ODI score.

### **REVIEW OF LITERATURE**

- Sethy Damayanti, et al (2017) studies that "Occurrence of Work-Related Musculoskeletal Disorders among School Teachers in Eastern and North eastern Part of India". Prolonged working nature like bending the neck forward/backward or holding the neck in a Forward/backward posture, same

movements with arms, hands or fingers many times, hands above the shoulder level, reaching with arms or hands and standing are important factors which affect the occurrence of musculoskeletal disorders.<sup>[18]</sup>

- Wanti Hasmar et al. (2022) conducted a study on the "William Flexion Exercise to Reduce Lower Back Pain.". The demonstration aimed to educate batik workers in Jambi about the proper execution of the William flexion exercise to enhance understanding and knowledge for alleviating lower back pain.<sup>[19]</sup>
- Mahboubeh Hafezi et al (2022) studied that "The effect of the Alexander Technique on pain intensity in patients with chronic low back pain: A randomized controlled trial" and study found that the Alexander Technique was effective in reducing the intensity of pain in the participants. We recommend the Alexander Technique as a useful and effective treatment for chronic low back pain.<sup>[20]</sup>

## METHODOLOGY

The ethical committee at Nootan College of Physiotherapy, Sankalchand Patel University, Visnagar approved this study. This interventional comparative study involved 30 participants (15 in Group A and 15 in Group B) who are teachers suffering from non-specific chronic low back pain. The research was conducted over a 1 at Nootan College of Physiotherapy, Sankalchand Patel University, Visnagar, and Vijapur Civil Hospital. The treatment duration for the participants was 3 weeks, and a convenient sampling method was used for sample design. Teaching experience more than 2 years, Age group between 30 to 50 years, Both Genders, Chronic condition (Pain more than 6 months, ODI score between 5 to 24 , Patients who are willing to be part of study, Pain intensity on NPRS 5 or >5/10, Physical Fitness 10 RM Squatting, Flexion Bias were included in this study.<sup>[21]</sup> Pregnant women, Any surgical history of abdominal or back (2 Years), Participants with radiating pain, PIVD and other neurological signs, Extension Bias, Any systemic disease like Rheumatoid Arthritis, Ankylosing Spondylitis excluded in this study.<sup>[22]</sup>

## OUTCOME MEASURES

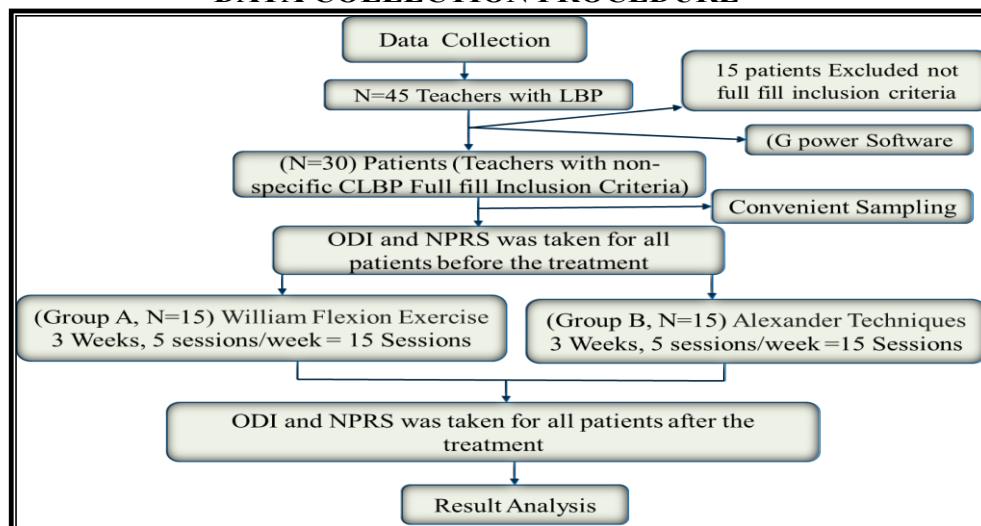
### 1. NUMERICAL PAIN RATING SCALE (NPRS)<sup>[23-25]</sup>

In Numerical Pain Rating Scale (NPRS), 11 points numerical scale is there that ranges from '0' representing "no pain" to '10' representing "pain is very bad as you can think". The participants were asked to indicate the numeric value on the scale that best describes their pain intensity.

### 2. OSWESTRY LOW BACK DISABILITY QUESTIONNAIRE (ODI)<sup>[26]</sup>

The ODI is a 10-item score from 0 to 100 that encompasses limitation in activity, ability to walk, ability to sit, ability to stand, sleeping, social life, work, and personal care resulting from low back pain. Higher scores indicate a more severe disability. Every item consists of six statements and participants have to choose the most relatable statement related to their condition.

## DATA COLLECTION PROCEDURE



## INTERVENTION

### Group: A (William Flexion Exercise)<sup>[21,27]</sup>

**Duration:** 5 session/week for 3 weeks, Total—15 sessions.

**Pelvic Tilt:** Lie on your back with your knees bent and your feet flat on the floor. Press the small of your back up flat against the floor without using your legs. Maintain for 5-10 seconds.

**Single Knee to Chest:** Lay supine with flexed knees. Inhale as they slowly bring the right knee to shoulder, and hold for 5-10 seconds. Then repeat with the other knee.

**Double Knee to Chest:** From supine position, first bring the right knee to the chest, then the left, and hold for 5-10 seconds. Slowly bring legs down one at a time.

**Partial Sit-Up:** From crook lying slowly curl head and shoulders off the plinth. Hold and slowly return back to the beginning.

**Hamstring Stretch:** Take long sitting position and bend forward from the waist, maintain their knees and arms extended and their eyes focused ahead.

**Hip Flexor Stretch:** In this position, the feet should be hip-width apart, their left knee bent and their right knee held straight. Kneel on the floor with their left foot and flex their body forward until their left knee touches their left armpit. Replace the left leg with the right one and do it again.

**Squat:** Stand with your feet shoulder-width apart. The individual gently lowers his body by flexing his knees while attempting to keep his trunk as parallel to the floor as possible, his eyes fixed forward, and his feet flat on the ground.



**Pic 1: Pelvic Tilt**



**Pic 2: Single Knee to Chest**



**Pic 3: Partial Sit-Up**



**Pic 4: Double Knee to Chest**



**Pic 5: Hamstring Stretch**



**Pic 6: Hip Flexor Stretch**



**Pic 7: Squat**

#### **Group: B (Alexander Techniques)<sup>[27,11]</sup>**

**Duration:** 5 session/week for 3 weeks, Total—15 sessions.

**Standing Up:** Slide your feet closer to your body. Hinge forward using your hip joints, or the area where the top of your thigh bone attaches into your hip. Gently put pressure into your entire foot and push off of the floor. Stand slowly, without any added tension in the spine or neck.

**Sitting Down:** Send your hips backwards and your knees forward. Gently lower yourself down into a chair. Do not engage your lower back or your neck. If you find that they are stiff, stand back up and try again.

**Constructively Resting Position:** Lie on the floor on your back with your eyes either open or closed. Bend your knees gently, keeping tension out of your joints. Press your feet flat into the floor. Rid your entire body of tension by letting it settle into the floor. Your torso will expand as it rests. Focus on your breath – using the whispering “Ahh” technique (shown below) is a great tactic for 10-15 min per day.



**Pic 8: Standing Up**



**Pic 9: Sitting Down**

**Pic 10: Constructively Resting Position**

## STATISTICAL ANALYSIS

All statistical analysis was done using SPSS 23 software for windows. Descriptive analysis was obtained by mean and standard deviation. Intergroup comparison of pre-treatment and post-treatment scores of NPRS and ODI scores was done using independent t-test. Intra group comparison of pre & post treatment scores of NPRS and ODI scores were done using paired t-test in both groups.

## RESULTS

**Table 1: Mean age of participants in Group A and Group B**

Demographic Details		Group A	Group B
Age	Mean	42.66	39.13
	SD	±4.86	±6.66

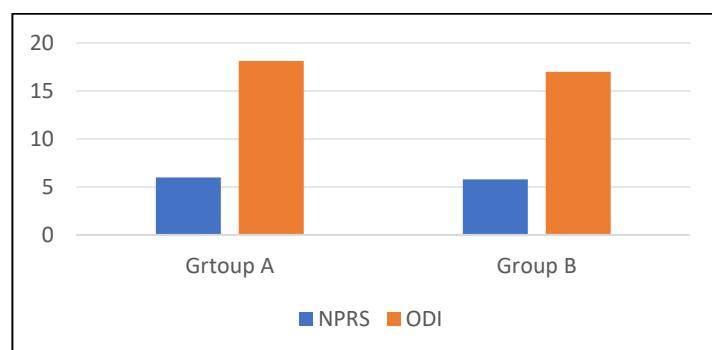
**Table 2: Gender distribution in Group A and Group B**

Groups	Female		Male	
	Frequency	Percentage	Frequency	Percentage
Group A	7	46.7	8	53.3
Group B	6	60.0	9	40.0
Total	13		17	

**Table 3: Intergroup comparison of pre-treatment NPRS and ODI Score**

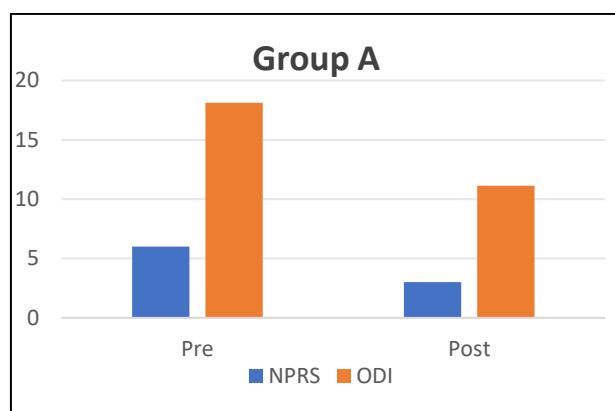
N=30	Group A (Mean ± SD)	Group B (Mean ± SD)	F-Value	P-Value
NPRS Score	6.00 ± 0.84	5.80 ± 0.77	14	< 0.0001*
ODI Score	18.13 ± 2.09	17.00 ± 1.96	14	< 0.0001*

p\* -value <0.05 significant, p-value>0.05 non-significant

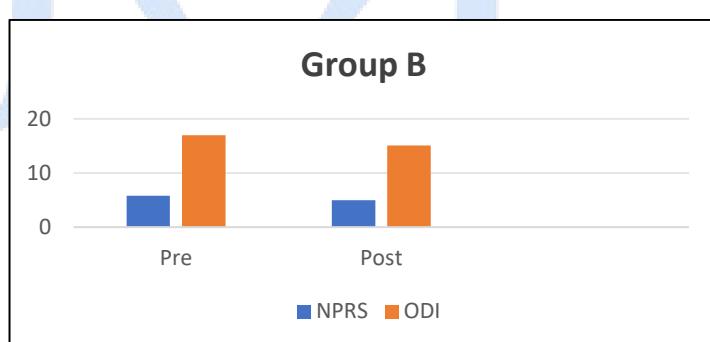


**Table 4: Intragroup comparison of pre and post-treatment NPRS and ODI Score for Group A**

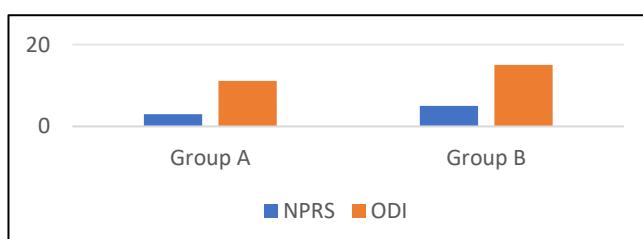
Outcome	Pre- Treatment		Post- Treatment		t value	p value
	Mean	SD	Mean	SD		
NPRS Score	6.00	±0.84	3.00	±0.75	15.37	< 0.0001*
ODI Score	18.13	±2.09	11.13	±1.55	15.65	<0.0001*

**Table 5: Intragroup comparison of pre and post-treatment NPRS and ODI Score for Group B**

Outcome	Pre- Treatment		Post- Treatment		t value	p value
	Mean	SD	Mean	SD		
NPRS Score	5.80	±0.77	5.00	±0.65	3.59	< 0.0001*
ODI Score	17.00	±1.96	15.06	±2.25	4.09	< 0.0001*

**Table 6: Intergroup comparison of NPRS and ODI Score after 3 weeks**

N=30	Group A (Mean ± SD)	Group B (Mean ± SD)	F-Value	P-Value
NPRS Score	3.00± 0.75	5.00 ±0.65	14	< 0.0001*
ODI Score	11.13 ±1.55	15.06 ±2.25	14	< 0.0001*



According to the data, there was a substantial difference between Group A and Group B NPRS and ODI scores; however, Group A showed greater improvement following three weeks of treatment.

The age and gender assessments were compared using an independent sample t-test, resulting in substantial significant difference between groups. The NPRS and ODI were compared within groups, revealing significant improvement in Group A at 3 weeks ( $p < 0.05$ ). In Group B, the NPRS and ODI showed a less significant improvement in pain intensity and reduce functional disabilities. The paired t-test revealed that pain intensity decreased in group A at 3 weeks ( $p < 0.05$ ), but there was no improvement in group B. The independent sample t-test also revealed significant differences between groups.

The ODI was compared between Groups A and B using a paired t-test, and Group A show significant improvement ( $p < 0.05$ ) in reduce functional disabilities after 3 weeks. An independent sample t-test was used to compare Groups A and B, and Group A demonstrate significant improvement after 3 weeks ( $p < 0.05$ ).

## DISCUSSION

This study was conducted on thirty participants as per the inclusion and exclusion criteria and randomly (Convenient Sampling) divided into 2 groups. After that, all participants were assessed by demographic data and general physical examination. In this study, The ODI and NPRS were used as outcome measures. After that Group A received the treatment with a William Flexion Exercise for 3 weeks, 5 days/week. Group B was treated with an Alexander Technique. The results showed a significant improvement in the outcome measures in post-treatment phase compared to pre-treatment phase in Group A ( $p < 0.05$ ).

In the study NPRS and ODI were used as an outcome measure. The result showed significant changes in pre and post treatment stages. The findings indicated significant variations between the pre and post-treatment phases. There were statistically significant differences between the pre- and post-treatment scores in Groups A and B, but Group A had a greater difference than Group B when comparing the pre- and post-NPRS and ODI scores.

After Three week, when the NPRS score and ODI were compared between the two groups, a statistically significant difference ( $p < 0.05$ ) in the NPRS score and ODI was found between Groups A and B.

According to Kumar et al., William's Flexion exercise is one of the physical therapies that can be used to treat patients with low back pain. It has been used for years and has been shown to help patients with low back pain feel better.<sup>[28]</sup>

Our results suggest that William's flexion exercise is effective to reduce pain in Chronic Low Back Pain. Among the many physiotherapy exercises used to treat patients with lower back pain, William's flexion exercise is one of the most fundamental and frequently used. It has been demonstrated that by strengthening the paraspinal muscles to support the deteriorated facet joints, it can lessen pain and increase spinal range of motion in CLBP patients. Thus, the alternative hypothesis is accepted.

### **Limitations of the study:**

- The study included a small sample size and includes teachers only.
- The study includes 2 domains only, pain and functional disability.
- The study included only 2 outcome measure.
- Long term Follow up not taken.

### **Future Recommendations of the study:**

- Study can be revised including larger sample size with general population.
- Additional research can explore various interventions to improve exercise tolerance and endurance for Low Back Pain.
- Further studies can be taken different outcome like MMT and ROM.
- The study can be done with long term follow up.

## CONCLUSION

Both groups demonstrated a notable reduction in low back pain under the study's Comparison circumstances. When compared to the Alexander Technique (Group B), the William Flexion Exercise (Group A) demonstrated a noticeably higher improvement in pain and disability reduction in after 3 week of treatment duration. Thus, The Teachers with non-specific chronic low back pain benefit from William's Flexion Exercises more than Alexander Technique. The findings of this study have clinical applications and can be used to guide physiotherapists in selecting the most effective exercise-based therapy for CLBP management.

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