STUDY PROTOCOL

Effect of William flexion exercise and movement control exercise on pain, range of motion, muscle strength and functionality in non-specific low back pain: randomized controlled trial. [version 1; peer review: awaiting peer review]

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Abstract
Low back pain is the most common chronic pain disease, affecting 70–80% of people at some time in their life, according to epidemiological research. LBP is described as discomfort in the region of the back of the body that stretches from the lower border of the 12th rib to the lower gluteal folds that lasts for at least one day. Back pain (BP) may be divided into three primary categories. Subacute pain is described as lasting between six weeks and three months, acute pain as lasting less than six weeks, and chronic pain as lasting longer than three months. The two primary forms of low back pain are specific low back pain and nonspecific low back pain (NSLBP). NSLBP, on the other hand, is a kind of low back pain where the relationship between the symptoms, physical findings, and imaging data is unclear. The most frequent musculoskeletal disorder worldwide is low back pain (LBP). Outlined here is what we propose by carrying out research aimed to evaluate and compare the Effect of William Flexion exercise and Movement Control exercise in two arm parallel superiority randomized clinical study on decreasing Pain, Range of Motion, Muscle Strength and Functionality in Non-Specific Low Back Pain. In this study the total of 74 patients of non-specific low back pain in people between the ages of 18 and 40 will be divided into two group one group received William flexion exercise and other group received Movement control exercises followed by conventional physiotherapy. The treatment will be given for 6 session a week for 4 weeks. The assessment will be done at day one of treatment and at the end of week. The implementation of this physiotherapy technique in treatment could occur if the study's hypothesis is productive in non-specific low back pain.
Keywords
William flexion exercise, non-specific low back pain, Movement control exercise, strengthening, Range of motion, rehabilitation, functionality.

This article is included in the Datta Meghe Institute of Higher Education and Research collection.
Introduction

Background
A chronic low backache is one that lasts longer than three months. In contrast to acute low back pain, which lasts shorter than six weeks, subacute low back pain lasts between six weeks and six months. Low back pain (LBP) is described as pain that lasts for at least a day in the lower back area between the lower limit of the 12th ribs and the lower gluteal folds, with or without discomfort radiating to one or both lower limbs. The most prevalent musculoskeletal condition globally is LBP.

Epidemiological studies show that LBP is the most common type of chronic pain, affecting 70–80% of people experience life’s events at some point. Back pain (BP) may be divided into three primary categories. An acute case of pain is one that lasts less than six weeks, a subacute case is one that lasts between six weeks and three months, and a chronic case is one that lasts more than three months.

The most frequent musculoskeletal ailment affecting people is low back pain (LBP), occurring up to 84% of the time. A frequent complaint among people is back ache. Some studies estimate that up to 23% of people worldwide experience chronic LBP. Another finding for this group was a 24% to 80% one-year recurrence rate. CLBP, a significant social and economic issue, is the primary cause of disability globally.

In many parts of the world, low back pain is both a significant financial burden and the most common reason for activity restriction, time away from work, and disability.

According to one study, back pain cumulative incidence reached 50% by the ages of 18 for females and 20 for males, with a point prevalence of around 1% for children aged 12 and 5% for children aged 15 years.

A mechanical back is something that happens regularly and frequently. Up to 30% of mechanical back pain may be caused by the sacroiliac joint, according to some research, however differential diagnostics typically rule this option out.

Specific low back pain and nonspecific low back pain (NSLBP) are the two main types of LBP. Low back pain may be categorised into two groups: vertebral-related and non-vertebral-related. NSLBP, on the other hand, is a kind of low back pain where the relationship between the symptoms, physical findings, and imaging data is unclear. Additionally, NSLBP is separated into two groups: Degenerative syndrome and low back discomfort unrelated to a neurological condition. The three sub-groups of low back pain are acute, subacute, and chronic that are typically used to classify non-specific low back pain. This divide is based on how long the back discomfort has been there.

Back pain can have a number of various causes, including: Mechanical: Typically, soft tissues, intervertebral discs, or the spine have been injured. Lumbago is frequently diagnosed as an acute backache or a quadratus lumborum or paraspinal muscle strain. A typical kind of traumatic back pain is disc herniation. Back pain can also be mechanically brought on by pregnancy.

Degenerative: Degenerative disc disease, spinal stenosis, and facet joint osteoarthritis are all forms of osteoarthritis of the spine.

Inflammatory: The primary causes of this disorder are spondyloarthropathies such askylosing spondylitis. The most typical occurrence is sacroiliitis. Infectious diseases include muscular/soft tissue abscesses, epidural or spinal abscesses. Mechanical low back pain is a term used to describe back pain that is inherently caused by the spine, discs between the vertebrae, or nearby soft tissues. This includes spinal compression fractures, disc herniation, spondylolysis, lumbar spondylosis, and spondylolisthesis, and lumbosacral muscle strain, in addition to recent or current trauma.

Short-term bed rest is recommended for acute patients getting conservative therapy, but is not recommended for chronic patients. Movement, especially active movement, is a need for good recovery. People with persistent low back pain can be treated using a variety of physiotherapy and rehabilitation treatments, such as hydrotherapy, electrotherapy, massage, thermotherapy, manual therapy, traction, and workout. Patients who experience chronic low back pain should exercise often. Exercises specifically designed for the patient include McKenzie extensions, dynamic stabilisation activities, aerobic exercises, flexion-extension exercises, strengthening exercises, and flexibility exercises.

One of the physiotherapy-rehabilitation procedures, manual therapy, has seen a considerable rise in utilisation in clinical settings in recent years. physical treatment programmes are multimodal rehabilitation regimens used in physiotherapy to give patients with tailored care. They usually include physical treatment as well as exercise, training, and counselling.
A recent systematic review found that between 1.5% and 36% of people will experience low back discomfort, while the chance of suffering low back pain for the first time in a year is predicted to be between 6.3% and 15.3%.13

Exercise in conjunction with non-drug therapy should be given priority for those who experience ongoing low back discomfort. The ACP recommends combining several therapies with exercise, such as acupuncture, progressive relaxation, electromyographic biofeedback, tai chi low-level laser treatment, and stress reduction techniques based on mindfulness.14

“The exercise known as “William’s flexion,” also known as the “lumbar flexion exercise.” For individuals with significant lumbosacral lordosis who had recurrent low back pain and were male or female younger than 40 or 50, William’s flexion exercise plan was developed in 1937. Williams recommended that the patient carry out exercises and follow posture guidelines that lessen lumbar lordosis, lessening stress on the posterior components of the lumbar spine.15

The William Flexion Exercise, in particular the maximum gluteus and abdominal muscles, is designed to strengthen the lumbosacral spinal muscles and cure back pain by stretching the extensor muscle groups.16

Here we aim about this study for testing the Effect of William Flexion exercise and Movement Control exercise on Pain, Range of Motion, Muscle Strength and Functionality on subject with Non-Specific Low Back Pain (NSLBP) in a two arm parallel superiority randomized clinical trial (RCT) on reducing pain and enhance muscle strength and reducing disability in end point results on marginal difference.

**Rationale**

Various studies have been performed on William flexion exercise and movement control exercise on non-specific low back pain. But none of studies have been to compare both the exercises. This study seeks to compare William flexion exercise and movement control exercise on non-specific low back pain. Patients with low back pain benefit from the William flexion exercise because it lessens discomfort, enhances function, lessens discomfort severity, and increases range of motion. Movement control exercise helps to improving disability compare due to other intervention in low back pain. Exercises for motor control have been the subject of several research for non-specific low back pain. But it is difficult to find research on movement control exercise. There is no study that comparing the effect of William flexion exercise and movement control exercise in patient with non-specific low back pain. The following study will thereby design with a hypothesis the Effect of William Flexion exercise and Movement Control exercise on Pain, Range of Motion, Muscle strength and Functionality in NSLBP.

**Aims & objectives**

1. To evaluate and assess the Effect of William Flexion exercise on Pain (Visual Analogue Scale), Range of Motion (Modified Schober test), Muscle Strength (Pressure biofeedback unit), Modified Oswestry low back pain disability test and Functionality in Non-Specific Low Back Pain.

2. To evaluate and assess the Effect of Movement Control exercise on Pain (Visual Analogue Scale), Range of Motion (Modified Schober test), Muscle Strength (Pressure biofeedback unit), Modified Oswestry low back pain disability test and Functionality in Non-Specific Low Back Pain.

3. To compare the Effect of William Flexion exercise and Movement Control exercise on Pain (Visual Analogue Scale), Range of Motion (Modified Schober test), Muscle Strength (Pressure biofeedback unit), Modified Oswestry low back pain disability test and Functionality in Non-Specific Low Back Pain.

**Trial design**

Single Centric, two arm parallel equivalence randomized controlled trial.

**Ethical considerations**

Ethical approval received from Datta Meghe Institute of Higher Education and Research, Sawangi, Wardha

**IEC reference number** - DMIHER (DU)/IEC/2023/546

**IEC approval date** - 04/02/23
Protocol
The following study will be conducted in the Outpatient Department of Musculoskeletal OPD, Acharya Vinoba Bhave Rural Hospital Sawangi, Meghe, Wardha, Maharashtra, after receiving approval from the institutional ethics committee of Datta Meghe institute of higher education & research the population over the region with inclusion and exclusion criteria for the study. The study’s objectives and procedures will be explained to participants before they are approved, and they must sign written patient consent forms. The analysis comprised patient with non-specific low back pain who met the inclusion and exclusion criteria. They will be split in two group using simple random selection. Group A (William flexion exercise) and group B (Movement control exercises) by randomization for 1:1 allotment for the aim of treating. Computer Generated Random Number system will be used for the Randomization process. Sequentially Number Opaque Sealed Envelope Method will be used for sample allocation. The study will be monitored by departmental committee comprising PG Guide, Head of Department (HOD), principal of Ravi Nair Physiotherapy college (RNPC) and member of Research Guidance cell. We will ensure that the patients adhere well to the recommended treatment through regular treatment session. The participants will be screened as per inclusion and exclusion criteria followed by randomization using a computer-generated list. The inclusion and exclusion criteria for selection will be based on the cut-off values at baseline parameters when engaging participants. One group will receive William flexion exercise and other group received movement control exercise followed by conventional physiotherapy for reducing pain, range of motion and lowering the disability the final point’s borderline variance. Participants will be enrolled and evaluated at several intervals, including first visit for subject enrolment and screening respectively, baseline and four weeks after treatment. Treatment will be given for six sessions for four weeks where primary as well as secondary variables are to be assessed. In Figure 1, the study design is depicted.

Eligibility criteria
Inclusion criteria
1) Both male and female participant aged between 18 to 40 years

![Study Procedure Diagram]

**Figure 1.** Explains about the study procedure.
2) Participants should have had at least one episode of LPB prior to the study.
3) Nonspecific low back pain > 6 week duration of symptom) and less than three months.
4) At least five points on MODQ.

Exclusion criteria
1) Specific low back pain (fracture, carcinoma,) sensitivity or reflex loss, muscle weakness.
2) Any abdominal or back surgery.
3) Contraindications for exercise, e.g., major cardiovascular disease or postural hypotension.
4) Patient not willing to participate in the study.

Intervention
Non-specific low back pain patient reporting in the Department of Musculoskeletal OPD, AVBRH Sawangi. A total of 74 participants who meet the inclusion criteria and are split into two groups will participate in the study. There will be two groups with 37 patients in each group:

GROUP-A: William flexion exercise
Patient will be assigned with the treatment of Williams Flexion exercise for 30-40 minutes with six sessions a week for four weeks of 30 repetitions of three sets along with IFT for 20 minutes and home exercise program with 10 repetitions of one set with 30 sec holds.

GROUP-B: Movement control exercise
Patient will be assigned with the treatment of Movement control exercise for 30-40 minute with six sessions a week for four weeks of 30 repetitions of three sets along with IFT for 20 minutes and home exercise program with 10 repetitions of one set with 30 sec holds. The patient will be selected from the Department of Musculoskeletal OPD of Non-specific low back patient between the age 18-40 years will be selected for the study.

The study will be described to every participant, and their signed informed consent will be obtained. A straightforward random sample will be used to choose the subjects. procedure, and they will be divided into two groups, Group A and Group B, based on inclusion and exclusion criteria. There will be 37 subjects in each group.

Group A: William flexion exercise along with IFT and Home exercise program
Interferential therapy - Prior to receiving therapy, each patient will have their skin feeling evaluated. The individual will be exposed to interferential current while resting on their back for 20 minutes, six times each week for four weeks. The two-pole electrodes will cover the painful lumbar area and/or spinal nerve root electrodes will be attached to the patient’s skin to stimulate underlying nerves, including the nerves that carry pain. Along with the IFT, each subject will be given treatment of 30-40 minute session of William flexion exercises. Pelvic tilt, single knee to chest, double knee to chest, half sit-up, hamstring stretch, hip flexor stretches, and squat are a few of the exercises. They will be carried out as follows:

The Williams flexion exercises can be performed repeatedly and for varying amounts of time. The suggested time frame for the workout will be every day for 30 to 40 minutes. Treatment program included six sessions a week for four weeks. Each exercise included ten sec hold 30 repetitions × three sets.

In the supine position, the patient will do exercises while lying on a flat surface. Following that, the patient will stretch their legs by keeping their knees close to their chest. The patient will unwind and do the action again. Below is a sample of one of the several exercises.

- The posterior pelvic tilt - The patient will be lying face down, their head will be supported, their legs will be bent, and their hands will be by their sides. The patient will be told to lie on their back flat on the ground, by contracting their buttock and abdominal muscles and hold for ten seconds
• **The single knee to chest** - The patient will be resting on their back with one knee bent on the bed in this posture. The next step is to ask the patient to slowly move the right knee towards your shoulder while holding the position for 10 seconds. Repeat with the other knee after lowering the first.

• **The double knee to chest stretches** - The patient will be placed in supine position while resting on their back. The patient will be told to lift each leg to their chest one at a time. The patient will raise their legs up to their chest while clasping their hands together and hold for ten seconds. The patient will be instructed to maintain their shoulders flat on the floor and to keep their knees together. while doing the motion and ask the patient to lowers each leg individually.

• **The partial sit-up exercise** - In this position, the patient will have their hands by their sides, legs bent, and will be resting on their back and patient will be told to elevate their upper back off the floor by contracting their abdominal muscles and breathing. Only the shoulder blades should leave the floor as the patient rises. The patient will also not permit to elevate their heads or prod themselves off the ground with their arms. The patient will be told to carry out this movement while keeping their feet flat on the ground and their knees bent. Only the muscles in the patient’s abdominal region should contract and patient will ask to slowly descend their upper body in a fluid and comfortable manner and hold for ten seconds and retrace your steps back to the beginning.

• **Hamstring stretch** - It will be necessary for the patient to stoop forward from the waist, while maintaining extended arms, legs, and eyes fixed front while they are in the long sitting posture. Hold for ten seconds.

• **Hip Flexor stretch** - Patient will ask to keep right knee straight and feet will be hip width apart and ask to bent the left knee and then patient will be ask to put their left foot on the ground and bend forward until their left knee is in line with their left armpit. Repeat the process with the right leg in place of the left one.

• **Squat** - The patient will be told to stand with their feet apart and their shoulders back. and parallel and the the individual will be ask to gently lowers his body by flexing his knee while keeping his feet flat on the ground, his gaze forward, and his trunk as perpendicular to the floor as feasible.

Home exercise program will be taught to the patients which include:

1. Hip flexor stretching - Patient will be ask to draw one leg to the chest to maintain the back flat while they will be in supine and to let the other thigh hang over the side of the bed with ten reps of one set with 30 sec hold.

2. Hamstring stretch - The patient will be encouraged to draw their leg towards their chest at an angle of around 90 degrees while strengthening their knee until they feel a stretch in the back of their thigh with ten reps of one set with 30 sec hold.

3. Thoracolumbar fascia strengthening exercise -
   - The McGill Curl-Up
     The patient will be requested to extend one leg and bend the knee of the other leg while lying supine. Patient will ask to Place their hands beneath their lower back to help them to maintain a natural arch, then the patient will ask to Pull their head, shoulders, and chest off the floor together and to maintain a neutral posture with their backs uncrossed and their heads upright. Patient will perform this for ten reps of one set with 30 sec holds before lowering their back down in a slow and controlled manner.

   - Bird Dog
     The patient will be instructed to kneel on the floor with their hands and arms piled beneath their shoulders and their knees stacked under their hips and instructed to simultaneously stretch their right leg back and their left arm forward until both are parallel to the floor. and patient will ask not to drop the hip to either side of your body; they should be parallel to it. Patient will perform for ten reps of one set with 30 sec holds.

Group B: Movement control exercise along with IFT and home exercise program

**Interferential therapy**

Prior to receiving therapy, each patient will have their skin feeling evaluated. The individual was exposed to interferential current while lying face down for 20 minutes, six times every week, for a period of four weeks. The two-pole electrodes
will cover the painful lumbar area and/or the spinal nerve root. The patient will have electrodes applied to their skin to activate deeper nerves, such as the ones that process pain. Each individual had a 30- to 40-minute session of movement control exercises in addition to the IFT.

The Movement control exercise will be explained to the participants, and they received guidance on the appropriate exercise intensity. Exercises will carry out under the physical therapist’s supervision. According to the physical therapist’s choice, movement control exercises will also give in the seated, four-point kneeling, and upright postures.

Over the course of the six therapy sessions, the exercises’ difficulty level increased while participants will urge to raise their own performance. IFT will be included in each session, which lasted 30 to 40 minutes. The average personal training regimen included three sets of 30 repetitions. The participant’s exercise programme during the most recent intervention session included 10 to 12 distinct activities and will be lasted for a total of 30 to 40 minutes. Throughout the intervention and follow-up phase, home workouts will be done three times per week.

Home exercise program will be taught to the patients which include:

1. Hip flexor stretching- Patient will be ask to draw one leg to the chest to maintain the back flat while they will be in supine and to let the other thigh hang over the side of the bed. Ten reps of one set with 30 sec hold.

2. Hamstring stretch- The patient will be encouraged to draw their leg towards their chest at an angle of around 90 degrees while strengthening their knee until they feel a stretch in the back of their thigh. Ten reps of one set with 30 sec hold.

3. Thoracolumbar fascia strengthening exercise -
   • The McGill Curl-Up

   The patient will be requested to extend one leg and bend the knee of the other leg while lying supine. the patient will ask to place their hands beneath their lower back to help to maintain a natural arch. Patient is ask to Pull their head, shoulders, and chest off the floor together and to maintain a neutral posture with their backs uncrossed and their heads upright. Patient will perform this for ten reps of one set with 30 sec holds before lowering their back down in a slow and controlled manner.
   • Bird Dog

   The patient will be instructed to kneel on the floor with their hands and arms piled beneath their shoulders and their knees stacked under their hips. The patient will instruct to simultaneously stretch their right leg back and their left arm forward until both are parallel to the floor. Patient will ask not to drop to either side of your body; they should be parallel to it. Perform this for ten reps of one set 30 sec holds.

Outcomes

Primary outcome

1. Visual analogue scale- To assess pain, a Visual Analogue Scale (VAS) will be utilised. The phrases “no pain” and “worst possible pain” are inscribed on a 10-cm-long, bidirectional straight line at each end of the line. Patients will be asked to mark their level of perceived pain on a scale by drawing a vertical line. Calculation and recording of the distance between the designated location and the left end point.

   Reliability: $r = 0.94$, $P = 0.001$

   Validity: $0.99$.17

2. Lumbar Range of motion - Lumbar Flexion Range of motion Assessment: the modified Schober’s test (MST) will be used. The participant will put to the test by standing in an upright, neutral stance without shoes. The therapist marked the lumbosacral junction by placing a marker ten cm above and five cm below it while standing erect. After that, the patient will be instructed to bend as far forward as possible twice. The therapist measured the distance between the markers on the second effort, while the first attempt functioned as a practise run. The greatest range of lumbar flexion will be estimated by measuring the space between the markers. The measurement must increase by at least six centimetres, reaching 21 centimetres. Less than a six-centimeter increase indicates decreased lumbar spinal motion.18
Secondary outcome

1. Muscle Strength-Pressure biofeedback unit
   The Pressure Biofeedback Unit (PBU) consists of a catheter, a sphygmomanometer gauge, and a three-chamber air-filled pressure cell. The PBU’s pressure cell is composed of latex-free rubber and measures 16.7 x 24.0 cm when unfurled. The range of the sphygmomanometer is 0 to 200 mmHg, and it will be calibrated at intervals of 2 mmHg. The pressure cells that are shown on the gauge experience volume fluctuations due to movement or changes in location. The pressure cell will first be inflated to a pressure of 40 mmHg before data collection (orange band). The valve will then shut, stopping the leak of air. The majority of scientific research concentrates on transversus abdominis assessment because of the PBU’s function as a biofeedback device.

   Procedure-The participant will be told to lie down in the hook position, the second sacral vertebra to the first lumbar vertebra, a pressure biofeedback cuff will be applied and inflated to 40 mmHg. The participant will be given instructions on how to use the abdominal drawing-in manoeuvre (ADIM) to Without shifting their pelvis, gradually draw their navel in and maintain the appropriate pressure.

2. MODQ Modified Oswestry low back pain disability test: There will be ten elements in it that raise issues with daily routines. Some of these include the degree of discomfort change, taking care of oneself, lifting, moving around, sitting, standing, sleeping, and travelling. Each item has 6 possibilities, ranging from 0 to 5. The phrase that best characterises the patient’s situation is asked for by the doctor. 50 is the highest possible score. Accordingly, 0 to 14 points are deemed mild, 15 to 29 points will be deemed moderate, and 30 points will be deemed severe functional impairment.

Sample size calculation: Sample size calculation resulted at 5% Z(1-α) value =1.96 & (1- β) at power of 80 %= 0.84 measuring the expected mean difference (effect size) of (δ) = 0.945 & standard deviation (σ) = 1.4

Sample size calculation Formula Using Mean difference

\[ n = \frac{2(Z_{\alpha} + Z_{\beta})^2 \sigma^2}{\delta^2} \]

Primary Variable (Range of Motion)

Mean ± SD (Pre) result on Range of Motion for William flexion exercise (pre) = 6.3 ± 1.4 As per reference

Clinically relevant superiority expected (post) Movement control exercises = 15 % = (6.3*15)/100 = 0.945

Difference = 0.945 (expected)

\[ N1 = 2 \left[ (1.96 + 0.84)^2 (1.4)^2 \right] / (0.945)^2 = 34 \]

Total samples required = 34 per Group.

Considering 10% drop out = 3

Total sample size required=37 per group

Notations: -

\[ Z_{\alpha} = 1.96 \]

\[ \alpha = \text{Type I error at } 5\% \]

\[ Z_{\beta} = 0.84 \quad (1 - \beta) = \text{Power at } 80\% \]

\[ \sigma = \text{std.dev} \]
with impaired movement control, they contrast the efficacy of movement control and general exercise. For the study, they see which one reduces disability in patients with low back pain and movement control issues. Within their RCT In patients Saner Jeanette concluded that two forms of exercise are more beneficial at reducing low back pain-related impairment.24

compared in a randomised control trial by Lehtola people who have problems with movement control. who experience recurrent subacute non-specific low back pain was low back pain. In their investigation, the entire sampling approach was adopted. Through a self-administered Research was done in 2020 by Sukmajaya. In 2014, Olawale et al examined the effectiveness of exercise therapy and interference treatment for treating low back pain. Tousignant et al in 2009 conducted the study to gauge the modified Schober test’s psychotic characteristics. It took place at Canada’s largest hospital. The study included 31 LBP patients from both private and governmental clinics. The Modified Schober Test shown moderate validity but great reliability in their sample of LBP patients, and MMDC.18

The ability of the William flexion exercise to reduce low back pain severity in elderly persons was studied by Amila et al in 2021. According to their study’s findings, the majority of the subjects benefited from William’s flexion exercises, indicating that they may be a successful method to lessen pain intensity and range of motion. 28 individuals from the intervention group and 28 participants from the control group made up the sample for this research. The sample method employed sequential sampling. Carlos et.al 2019 conducted the study on a supine individual with persistent low back pain. Utilising a pressure biofeedback device, the lumbopelvic stability is assessed and trained. Active SLR with or without pressure biofeedback is performed by 18 volunteers with persistent low back pain. Both the centre of pressure displacement and the change in pressure biofeedback unit were evaluated, together with the activity of the bilateral electromyographic belly muscles. They came to the conclusion that even though there was no sign of mediolateral load transfer or abdominal muscle activation while the subject was supine. When utilised in a clinic for biofeedback purposes in patients with persistent low back pain, the pressure biofeedback device may be quite useful.22

In 2014, Olawale et al examined the effectiveness of exercise therapy and interference treatment for treating low back pain. 65 individuals with a diagnosis of low back pain took part in the study. The individuals’ ages ranged from 20 to 66, including 29 males and 36 women. IFT and exercise were administered to each individual. They came to the conclusion that interference therapy along with exercise therapy might assist individuals with low back pain feel less pain and have more spinal range of motion.23 Exercise with movement control is more effective than general exercise for people who have problems with movement control. who experience recurrent subacute non-specific low back pain was compared in a randomised control trial by Lehtola et al. in 2012. There were 70 low back pain patients. they came to the conclusion that two forms of exercise are more beneficial at reducing low back pain-related impairment.24

Research was done in 2020 by Sukmajaya et al to determine how the William flexion exercise affected individuals with low back pain. In their investigation, the entire sampling approach was adopted. Through a self-administered Statistical method
All the results will be calculated using SPSS 27 version. Demographic variables (Confounding factors) as per quantative assessment will be resulted for finding observational values on mean Standard deviation minimum and maximum. Quantative assessment will be observed on frequency and percentage. The data for Inferential statistics, with outcome variables will be tested for normality using Kolmogorov Smirnov Test. Parametric test will be used if data follows normal distribution. Non normal data will be attempted for transformation to normality by using mathematical algorithm such as log or exponential function or box cox method. For finding the significance over the mean pre & post T-paired will be used for analysis if data still persist with non-normal distribution alternative Wilcoxon test will be used For finding the difference for mean significance between the two groups (Inter) un-paired t test will be used while e Man-Whitney will be used as an alternative t- test for non-normal data Association and Analysis for finding significance of confounding parameters will be evaluated using Chi square test or Fischer Exact Test or using multi-variant analysis.

Discussion
The Purpose of the study is to see the effect of Movement Control Exercise and William Flexion Exercise on Pain, Range of Motion, Muscle Strength, and Functionality in Non-Specific Low Back Pain: Randomized Controlled Trial. In this study published in 2015 Mohan Kumar et.al conducted a study on thirty patients from the ACS medical college were chosen to participate in the study on the William flexion exercise’s usefulness in the therapy of LBP. Four weeks passed throughout the trial. Before and after exercise, the pain and activity are utilising the Oswestry Disability Index and the visual analogue scale to assess. The majority of research participants benefited from William’s flexion exercise, making it a useful method for lessening discomfort and enhancing range of motion.15 2011 saw the completion of a research by Saner Jeanette et al. called “Randomized Controlled a comparison of general exercise with movement control exercise to see which one reduces disability in patients with low back pain and movement control issues. Within their RCT In patients with impaired movement control, they contrast the efficacy of movement control and general exercise. For the study, they enlisted 106 people from seven private practises and five outpatient hospital departments, who ranged in age from 18 to 75.21 M tousignant et.al in 2009 conducted the study to gauge the modified Schober test’s psychotic characteristics. It took place at Canada’s largest hospital. The study included 31 LBP patients from both private and governmental clinics. The Modified Schober Test shown moderate validity but great reliability in their sample of LBP patients, and MMDC.18

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Research was done in 2020 by Sukmajaya et al to determine how the William flexion exercise affected individuals with low back pain. In their investigation, the entire sampling approach was adopted. Through a self-administered
questionnaire, participants’ baseline clinical information and the Oswestry Disability Index (ODI) were gathered. The attendees learned about WFE through a presentation, a video, and a real-world demonstration. Participants’ ODI was reviewed after a month. Regardless of age, WFE reduces the functional symptoms of LBP.25

Dissemination
To present the research finding at conference, seminar community forums etc.

Study status
Not started yet.

Data availability
Not applicable as this is a protocol.

Reporting guidelines
Zenodo. SPIRIT_checklist. DOI: https://doi.org/10.5281/zenodo.7991165.26

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