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Efficacy of Integrated Neuromuscular Inhibition Technique Versus Mulligan Mobilization on Pain and Functional Disability in Subjects with Non-Specific Low Back Pain –A Research Protocol

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Authors' contributions

This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.

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Study Protocol

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ABSTRACT

Introduction: Pain in lower back region is a problem everyone deals with at least once in their life. Chronic back pain in lower back region is the pain which is present for more than 3 months. We can divide lower back pain as specific back pain or non-specific back pain. Non-specific pain in lower back region is because of unknown origin. Treating low back pain is a main challenge physiotherapist faces. Mulligan mobilization is a techniques used to facilitate range of motion and reducing pain whereas integrated neuromuscular inhibition is a technique used to treat any abnormality in muscle.

Methodology: 80 participants with non-specific low back pain will be included. Integrated neuromuscular inhibition technique will be given to Group A and group B will get mulligan mobilization. Group A will have 40 participants and Group B will have 40 participants. Treatment will be given for 6 weeks and pain and functional disability will be documented and statistical analysis will be done.

Discussion: In this study integrated neuromuscular inhibition and mulligan mobilization's efficacy

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will be seen in subjects with chronic non- specific lower back pain on pain and functional disability using modified oswestry scale for functional disability and numeric pain rating scale for pain.
Conclusion: Conclusion will be drawn post study as which technique of mulligan mobilization and integrated neuromuscular inhibition is better to reduce disability and pain in patients with non-specific lower back pain. This study will give a better approach to the physiotherapist in managing the low back pain

Keywords: Integrated neuromuscular inhibition; mulligan mobilization; non-specific low back pain; functional disability.

1. INTRODUCTION

Chronic low back pain (CLBP) is defined as the pain that remains for more than 12 weeks.Low- back pain (LBP) is a common symptom from adolescence into old age. About 50% of the general population experiences back pain over the course of a year and up to 80% of people report LBP over the course of their lifetimes [1]. Low Back Pain (LBP) causes a significant level of discomfort to perform the activities of daily living and it produces a marked level of disability. Low back pain occurs mostly in thoracolumbar, lumbar, or lumbosacral region [2]. Specific low back pain is defined as low back pain with a specific pathoanatomic origin, such as a tumour or fracture, and appropriate treatment, such as medication or surgery, is required in such cases. However, in 90% of the cases of low back pain, a precise specific origin of the pain cannot be identified, and such pain defined as nonspecific low back pain [3]. The causes of low back pain are complex and most of which are unknown [4]. Some important causes are; the decrease strength of superficial trunk and abdominal muscles, inadequate motor control of multifidus and transversus abdominus. The four clinical patterns of low back pain are: mechanical origin, nerve root associated pain, due to some other pathology and psychological cause. The trunk musculature provides support and enables for locomotion which is disturbed in low back pain patients.

To prevent low back pain it is necessary to provide early intervention. The literature based on aetiology and pathogenesis of low back pain suggests relationship between exercise and muscle strength. Various manoeuvres are performed in order to reduce pain as well as disability: Integrated neuromuscular inhibition and Mulligan concept lumbar mobilisation is also used for the same.

The integrated neuromuscular inhibition technique (INIT) is a manual MTrPs (Trigger Point) deactivation technique, which has been described by Chaitow. It includes the combination of the ischemic compression technique, the strain-counter-strain technique, and the muscle energy technique. The INIT, based on the phenomenon of reciprocal inhibition and post-isometric relaxation, can resolve muscle spasm in painful areas where as mulligan mobilisation is movement with mobilisation [5-7]. Mulligan mobilization with movement (MWM) is widely used during physical therapy and orthopaedic manual therapy and can be applied to the peripheral and spinal joints. When MWM is applied to the spinal joints, it is called sustained natural apophyseal glides (SNAGs). SNAGs is a mobilization technique that improves joint mobility through the application of passive gliding to the lumbar spine while the subject simultaneously performs active movement.

2. METHODOLOGY

2.1 Study Setting

Study will be conducted in out patients department of Ravi Nair Physiotherapy College

2.2 Study Design and Sample Size

It is a randomised clinical trail. The participants number, enrolled in the group A will be 40 and in Group B will be 40(n=80). Envelop method will be used for allocation.

$$n=\frac{Z\alpha^2/2 \,.p.(1-p)}{d^2}$$

Where,

Zα is the level of significance at5% i.e 95% confidence interval =1.56

P= prevalence of low back pain =49% = 0.049

D= desired error of margin=7%=0.0.

$$N=\frac{1.96x0.049x(1-0.049)}{0.07^2}$$

N=36.53
N=40 patients in each group

2.3 Participants

2.3.1 Inclusion criteria

Those who have chronic LBP and of both the genders and the age group of 18-30 were included. Medical professionals ,athletes and desk job workers will be included.

2.3.2 Exclusion criteria

Participants who were treated for LBP with some form of surgical intervention

Patients with past trauma in back region that had impaired function.

Individuals with listhesis, lumbar radiculopathy.

Any recent abdominal surgery.

3. RECRUITMENT PROCEDURE

Patients who visited Physiotherapy OPD in Acharya Vinoba Bhave Rural Hospital with complain of LBP and who fulfilled the inclusion criteria will be included.

3.1 PROCEDURE

- **PARTICIPANT TIMELINE**

  Study duration is of 1 year and intervention duration is 2 weeks so participant will be enrolled during first 11 months of study so 2 week intervention will be completed successfully. Assessment will be done on 1st day of visit then in midway (1st week) and end (2nd week) of intervention

- **IMPLEMENTATION**

  Research coordinator and principal investigator will supervise randomization. Participants will be asked to manually select from the envelope, sealed group allocation for the recruitment into either group. In the envelope there will be papers on which numbering will be done. One envelope will have number one written on it while other will have number 2 written on it. Participant who will chose the envelope with number 1 on it will be allotted in group A, and the participants who will chose the envelope with number 2 will be allotted in group B

- **BLINDING**

  Tester(s) will be blinded to assign the subjects to the group. Subjects won't be disclosed about the groups and the intervention they are receiving.

4. STUDY PROCEDURE

Subjects with LBP who satisfies the inclusion and exclusion criteria will be included in the study,

- Group A will be INIT

  INIT application: It is a technique which combines three methods

  Ischemic compression: It is a method used to reduce pain because of trigger point, first the trigger point area is noted and then it is compressed with therapist's fingers and then the pressure is maintained for 15 seconds. Initially less compression is applied after few second the compression is increased [8].

  MET is a technique of soft tissue mainly used for musculoskeletal disorders. It is mainly used for oedema reduction, reduction in fibrous tissue, reduce the spasm in particular muscle and regain the mobility [9].

  Strain-counter-strain technique: It is technique used to stretch the muscle using the body position. It is mainly used to reduce muscle spasm [10].

  All the three techniques will be given to the patients. The treatment time will be 30-45 minutes.

- Group B is Mulligan Movement with mobilization for Lumbar SNAG [11]:

  The spinal segment where the pain and the hypomobility is present will be identified after the clinical examination.

  The area where the hypomobility is present will be exposed. Patient will be made to sit on an unsupported surface. The therapist will stabilise the patient by placing the

mulligan belt on the pelvic region, Now the subject will be asked to do lumbar flexion and lumbar extension movement while the therapist provides sustained natural apophyseal glide at the transverse process of the hypomobile segment [12].

Mulligan mobilisation will be given 3 set of 10 repetitions will be performed. The treatment session will last for 30-45 minutes.

5. OUTCOME MEASURES

5.1 Primary Outcome Measure

- **Modified Oswestry Disability Index [13,14]:**

  It is a disability scale developed to give your therapist idea about the LBP and its affection on daily life. The scoring is done out of 100. Test-retest reliability has been shown to be high for this index.

- **NPRS [11]:**

  It is a pain rating scale in which zero indicates absence of pain while 5 indicate moderate pain and 10 indicate unbearable pain the patient is asked to mark a number on the scale.

5.2 SECONDARY OUTCOME MEASURE

5.2.1 Range of motion [15]

Lumbar ROM is assessed by modified modified schober's scale in this method the L5 spinous process is palpated 10 cm above and 5 cm below the points are marked. Then patient is instructed to do lumbar flexion and the distance is measured. Normal lumbar flexion ROM is 5-10 cm while normal lumbar extension ROM is 3-5 cm. Lateral flexion is measured by measuring the distance from the III phalanx to the ground [16].

6. DATA COLLECTION AND MANAGEMENT

6.1 Data Collection

Information about study given at time of recruitment (elaborating the purpose, nature, procedure, benefits and after effects of the intervention) with all baseline tests and assessment will be repeated on 2 more occasions.

6.2 Statistical Analysis

Data collected will be noted down and then will be placed in a tabular format. It will be analyzed with the help of SPSS latest version. Both statistical analyzes should be conducted with a 95% confidence interval (p-value < 0.05) to assess effect of two measures. Homogeneity of the two study classes will be tested for individual studies using the Student's t test. Mann-Whitney U will be used for comparing Groups at baseline.

7. DISCUSSION

The Protocol will be conducted as to see the effect of INIT versus MWM. In INIT three technique will be given ischemic compression, MET and strain counter-strain technique. Ischemic compression sustained compression using thumb is given over the trigger point area for a period of 15 to 90 seconds [17] which increases the local blood flow and increases the rate of healing. MET is an active technique which works on the principle of reciprocal inhibition in that the patient, instead of the care provider, supplies the corrective force [18]. Strain counter-strain technique is used to treat pain, joint hypomobility and local edema. When all the three will be combined we need to see the effect of combined intervention on pain and functional disability.

Mulligan mobilisation with movement is a technique in which the Mobilisation is given along with the movement. In this protocol we will be using sustained natural apophyseal glide in which the hypomobile of the spinal segment involved is identified and mobilised. Mobilizing the facet joint with lumbar SNAGs plays a major role in releasing the strain on capsule [12].

Three techniques used in integrated neuromuscular inhibition are proved to be effective individually and mulligan mobilisation is also found to be effective. The combined effect of all three techniques i.e neuromuscular inhibiton will be seen in this study and effect of both integrated neuromuscular inhibition and mulligan will be compared.

8. CONCLUSION

Conclusion will be drawn post study as which technique of mulligan mobilization and integrated neuromuscular inhibition is better to reduce disability and pain in patients with non-specific

lower back pain. This study will give a better approach to the physiotherapist in managing the low back pain

CONSENT

Principal Investigators will obtain the written informed consent from the participant on a printed form (local language) with signatures and give the proof of confidentiality.

ETHICAL APPROVAL

Ethical approval will be obtained from the university. Sampling will be started after the ethical approval. The participant individuals of the study and DMIMSU who will fund it will be able to retrieve findings of study. After completion of study and publication of results data will be stored in the DMIMSU data repository.

CONFIDENTIALITY

The study program will be explained to the participant, the principal investigator will take subjective information. The consent form will include the confidentiality statement and signatures of the principal investigator, patient and a witnesses. If required to disclose some information for the study, consent will be taken from the patient with complete assurance of his confidentiality.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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