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"EFFECT OF PILATES EXERCISE VERSUS MYOFASCIAL RELEASE IN PATIENTS WITH CHRONIC LOW BACK PAIN - A COMPARATIVE STUDY"

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ABSTRACT

BACKGROUND: Chronic low back pain is defined as pain, muscle tension or stiffness localized below the costal margin and above the inferior gluteal folds, persists for 12 weeks or more. For treating Chronic Low back pain various techniques are available. Basic aim is to compare the effect of Pilates exercise and MFR technique in patients with chronic low back pain.

METHODOLOGY: After taking informed, written consent patients were divided into 2 groups by simple random sampling method. Group A received Pilates exercise plus conventional treatment and Group B received MFR technique plus conventional treatment. Both groups received treatment 4 sessions per week for 4 weeks. Pre and post intervention NPRS were measured. Data were analyzed with both groups.

RESULT: As the data followed normal distribution, parametric tests were used. Paired t test was applied to analyze pre and post outcome measures between both groups. Both the groups showed significant improvement in NPRS scores in within group analysis ($p<0.05$) but there was no statistically significant difference found in NPRS at the end of 4 weeks in between groups analysis ($p>0.05$).

CONCLUSIONS: The present study concludes that Pilates exercise along with conventional treatment and MFR technique along with conventional treatment, both are equally effective in reducing pain in patients with Chronic Low Back Pain.

KEY WORDS: Pilates exercise, MFR technique, Chronic low back pain.

INTRODUCTION

Chronic low back pain is defined as a pain, muscle tension or stiffness localized below the costal margin and above the inferior gluteal folds, which persists for 12 weeks or more[1] Exercise training has collectively been shown to be effective in reducing pain when compared with non-exercise training-based treatments in adults. [2] Risk factor of chronic low back are female sex, middle age, sedentary lifestyle as well as strenuous physical activity, occupational overload, smoking and obesity. [3]

Pilates exercise used for the core strengthening, posture and breathing pattern also. These exercises aim to improve static and dynamic stability, posture and ADLs. [4] The use of specialized Pilates exercise requirements are spring resistance, such as reformer has also recommended for Chronic Low Back Pain (CLBP) patients. [5] It has recommended in management of people with CLBP, this type of exercise helpful to strengthen deep and stabilizing muscle which support to the lumbar spine (transverse abdominis muscle). The muscles are inhibited in people with CLBP. [6]

Myofascial release (MFR) used for manual medicine which include the application of low-load, long duration of stretch to the myofascial complex with intent to restore optimal length of fascia-tissue, reduce pain and improve functional ability. Applied combined intervention of MFR with other therapeutic appear like muscular energy, soft tissue, high velocity-low amplitude thrust and cranial sacral techniques. [7]

Advance stage of research includes the progression towards more functional task giving to the patient to activate of deep muscle and global trunk muscles. [8] In recent years, increased interest in the issues fascia, which until recently was neglected in the etiology of LBP. At the same time as term is defined as fascial system- a network that has ability to transfer forces, where separate elements manually interact and form complex involved in traversing.

Those patients which suffering from long time CLBP gives rise to, restrictions within the fascial tissues. The combination of different structures of the complex lumbar-pelvic- hip joint may cause the source of pain is a considerable distance from the origin of pain. [9] Long standing limitation of motion occurring in people with risk factors for development of LBP, it's cause restrictions within the fascial tissue. Restrictions can cause abdominal tension which lead to an increase in excitability of receptors located in the fascia, bone structures involve in wrong direction, thus leading to excessive compression in the intervertebral joints. As a result, dysfunction and pain.[10]

NEED OF THE STUDY:

According to research done in past the Myofascial release and Pilates both methods individually when given shown beneficial effects but no studies were compared these methods. Both methods are individually effective in low back pain according to the previous research article but which one is more beneficial to reduce pain is not shown till now. Our need of the study is to compare both treatments so it is helpful in clinical practice for better treatment outcome.

AIM AND OBJECTIVES:

AIM: - To compare effects of Pilates exercise and MFR in people with CLBP.

OBJECTIVES: -

1. To find out the effects of Pilates exercise in CLBP on pain

2. To find out the effects of MFR in CLBP on pain

3. To compare effects of Pilates exercise and MFR on pain

HYPOTHESIS:

1. NULL HYPOTHESIS:

- There is no significant difference between effect of MFR and Pilates in chronic low back pain patients.

2. **ALTERNATIVE/ RESEARCH HYPOTHESIS:**

- There is significant difference between effect of MFR and Pilates in chronic low back pain patients.

METHODOLOGY:

STUDY DESIGN**:** A Comparative study

SOURCE OF DATA: OPD of Venus Institute of Physiotherapy

POPULATION: Chronic low back pain patient (Age between 30 to 50 years)

SAMPLING METHOD: Simple random sampling

DURATION OF STUDY: 4 weeks

TREATMENT DURATION**:** 4 sessions per week for 4 weeks

SAMPLE SIZE**:** 30 (Calculated via following formula) [11]

$$N = 4\,\Sigma^2\,(Z_\alpha + Z_\beta)^2 / D^2$$

N = Sample size

Σ = Standard Deviation

Z_α = Level of desired significance (1.96)

Z_β = Desired Power (0.84 for 80% power)

D = Effect size (Mean difference)

A) Group A: 15

B) Group B: 15

METHOD OF SELECTION OF SUBJECTS: -

INCLUSION CRITERIA:

- Patient's willingness to participate
- Both males and females
- Age group between 30-50 years
- Patient having chronic low back pain with more than 3 months
- Without identifiable specific anatomical/neurological factors

EXCLUSION CRITERIA:

- Any orthopedic or neurological condition of lumbar spine

- Patient with previous spinal injury
- Spondylolisthesis
- Past history of vertebral fractures
- Cancer of spine
- Tuberculosis of spine

MATERIALS AND TOOLS REQUIRED: -

1. Consent form
2. Pen, pencil, paper
3. Plinth and Pillow
4. Pilate mat
5. Transcutaneous electrical nerve stimulation (TENS) unit with gel, cotton and
6. Micro-pore

OUTCOME MEASURES: -

NUMERICAL PAIN RATING SCALE (NPRS): [12]

- The NPRS for pain is a Uni-dimensional measure of pain intensity in adults. Similar to visual analogue scale (VAS), the NPRS is anchored by describing pain severity extremes. The NPRS can be administered verbally on graphically for self-completion.
- A 11-point numeric scale with 0 representing one pain extreme (e.g., no pain), and 10 representing the other pain extreme (e.g., "pain as bad you can imagine" and "worse pain imaginable"). The patient is asked to indicate the numeric value on the segmented scale that best describes their pain intensity. Scores range from 0-10. Higher scores indicate greater pain intensity.
- Reliability: High test-retest reliability has been observed in both literate and illiterate patients with rheumatoid arthritis (r=0.96 and 0.95, respectively) before and after medical consultation.
- Validity: For construct validity, the NPRS was shown to be highly correlated to the VAS in patients with rheumatic and other chronic pain conditions (pain>6 months) range from 0.86 to 0.95.

CLINICAL INTERVENTIONS: -

All the participants/ patients of the study were advised to continue their normal routine activities but they should not take any pharmacological agents or other form of treatment Other than the designed protocol, during the period of study. After taking informed consent patients were divided into 2 groups by simple random sampling method and treatment was given 4 sessions per week for 4 weeks.

Group A: Patients of these group received Pilates exercise plus conventional treatment.

Group B: Patients of these group received MFR technique plus conventional treatment.

Conventional therapy for both groups:

Patients received conventional therapy in the form of Transcutaneous Electrical Nerve Stimulation [Pulse width - 50-300 µs, Frequency - 150 Hz, Pulse shape - rectangular shape, Intensity - 0 to 60 mA (Milliamps) (It can be varying from patient to patient), Duration - 10 minutes], hamstrings and calf stretching, cat and camel exercise, extension of trunk (cobra pose), static glutes and static back exercise for 4 days a week for 4 weeks.

FLOW CHART OF THE STUDY PROCEDURE

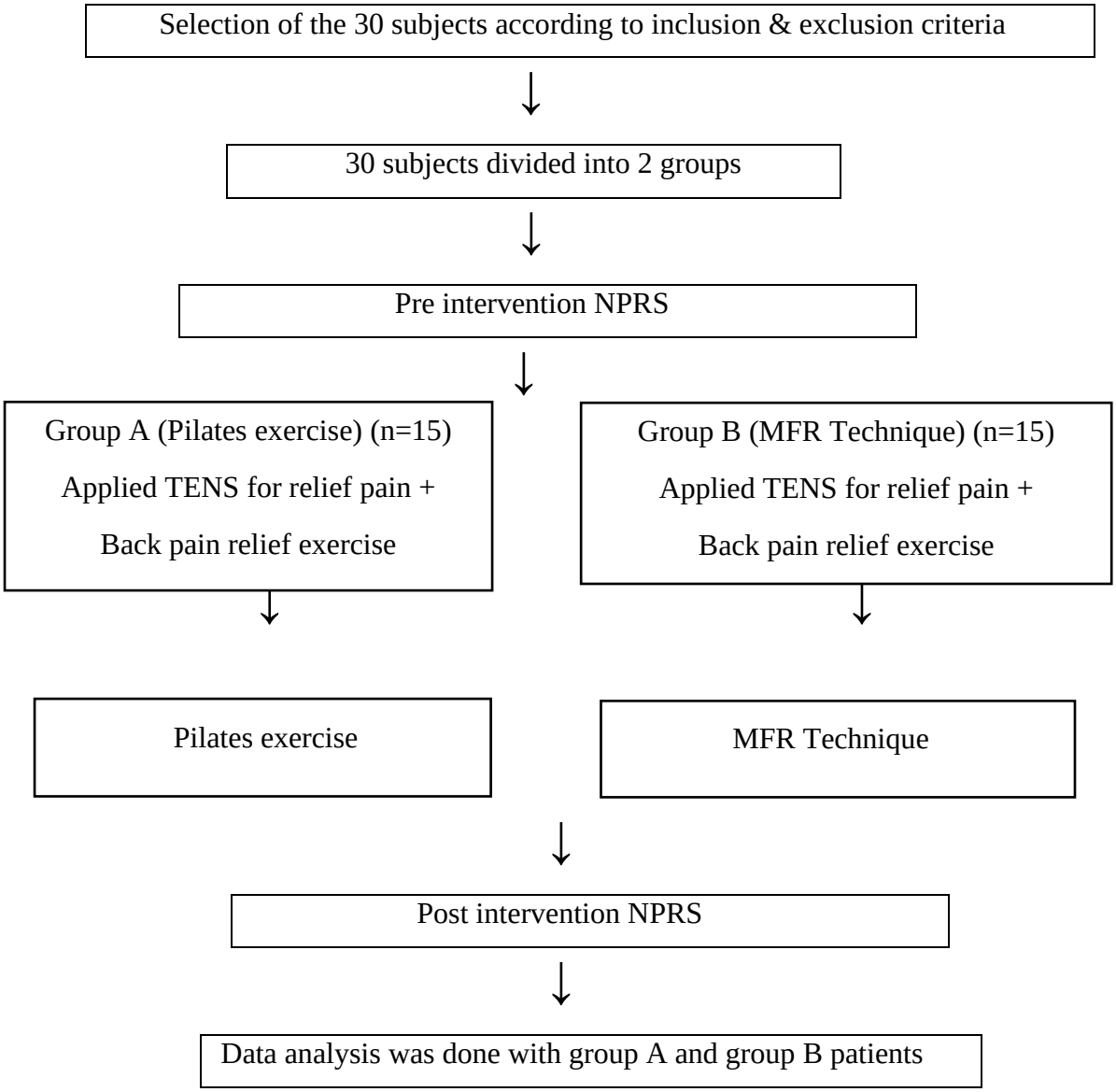

Figure 1: Flow chart of study Procedure

■ **<u>Group A [Pilates exercise plus conventional treatment]</u>:**

Pilates exercise: -

(1) <u>CURL-UPS</u>:

- Patient position: supine with knee semi-flexed
- First instruct the patient to perform the contraction of abdominal muscles and then lift the head. Progress by lifting the shoulders until the scapula and thorax clear the mat, keeping the arms horizontal.
- Hold this position as much as patient can (maximum 10 seconds) and then relax. 10 repetitions with 3 second interval.

(2) <u>BRIDGING</u>:

- Patient position: hook-lying position
- Have the patient press upper back and feet into the met, elevate the pelvis and extend the hips.
- Hold this position for 10 seconds and then relax. 10 repetitions with 3 second interval.

(3) KNEE TO CHEST:

- Patient position: supine
- Gently pull one knee up to chest until feel a stretch in lower back. Bring the knee as close to your chest as comfortably possible. Keep the opposite leg relaxed in a comfortable position, either with knee bent or with leg extended. Hold for about 5 seconds and then relax. 10 repetitions with 3 second intervals.

(4) BILATERAL STRAIGHT LEG RISING:

- Patient position: supine
- Bend the knee of one leg at 90-degree angle, planting the foot flatly on the floor. Stabilize the muscles on straight leg by contracting the quadriceps.
- Inhaling slowly, lift the straight leg at least 6 inches off the ground. Hold for 3 seconds then relax. 10 repetitions with 3 seconds interval.

(5) BIRD DOG EXERCISE:

- Patient position: Quadruped
- Place patient's knees under their hips and their hands under the shoulders. Maintain a neutral spine by using an abdominal muscles. Raise right arm and left leg, keeping shoulders and hips parallel to the floor. Hold this position for the few seconds, then lower back down to the starting position. Raise opposite arm and leg (left arm and right leg), holding this position for a few seconds. Return to the starting position. This is 1 round. Repeat this 10 times with 2 sets and each round 3 second interval time.

■ **Group B [MFR technique plus conventional treatment]:**

❖ **MFR technique: -**

- Myofascial release is a hands-on soft tissue technique that facilitates a stretch into the restricted fascia. A sustained pressure is applied into the tissue barrier, after 60 to 90 seconds. The tissue will undergo histological length changes allowing the first release to be felt. The therapist Follows the release into a new tissue barrier and holds. After a few releases the tissue will become softer and more pliable.
- Patient position: prone
- Therapist stands contra lateral to the side to be treated, at the level of patient's iliac crest. The therapist's superior hand is positioned thinner sided adjacent to the lumbar spine with extensive contact at the TFL at the level of L1 to L4 and acts as a palpation hand.
- The superior hand work as a palpation hand and initiates a direct stretch of the fascia laterally to a noticeable tissue resistance. The therapist follows the creep of myofascial tissue to initiate further stretching of the TFL and piriformis muscle. The applied force on the tissue is only moderate in the direction of the abdominal muscles.
- The duration of entire technique is 60 to 90 seconds at the same place of the lower back. [NOTE: The therapist contact (which could involve thumb, finger, knuckle or elbow) moves longitudinally along muscle fibers, distal to the proximal.]

RESULT:

Data analysis: Statistical analysis was performed on the data obtained from 30 patients. Data was analysed using SPSS (Version 16). Descriptive statistics for all outcome measures were expressed as mean, standard deviations and test of significance such as paired 't' test used for comparing data within each group and independent 't' test for comparing between the groups. Data was considered statistically significant with P<0.05. Pre and post mean difference of pain (NPRS) shows 1.46 ± 2.12 in group A and 1.73 ± 1.22 in group B. Independent "t" test values chronic LBP shows not significant difference between both groups.

Table 1: Paired "t" test values for Chronic LBP (NPRS)

Groups	Within group analysis	Mean	Mean Difference	Standard Deviation	"t" Value	"p" Value
Group A	Pre-Test Post Test	5.46 4	-1.46	2.12	-3.8977	P<0.05
Group B	Pre-Test Post Test	6.33 4.6	-1.73	1.22	-5.49	P<0.05

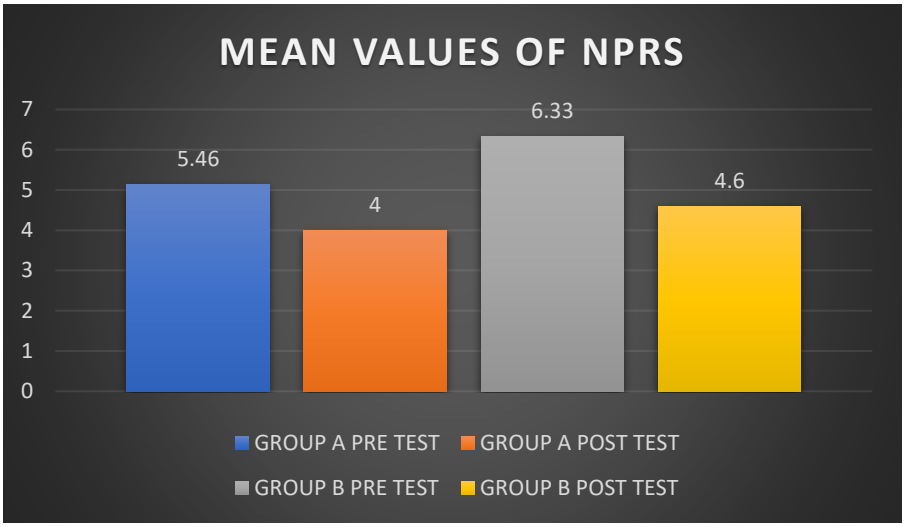

Figure 2. Mean Values of NPRS

Table 2: Independent "t" test values chronic LBP

Outcome Measures	"t" Value	"p" Value
NPRS	-1.16	0.1267

DISCUSSION:

The present study was designed to study effects of Pilates exercise and MFR technique in patients with chronic low back pain. Total 30 patients with low back pain more than 3 months were included in the study with the age group of 30 to 50 years and according to the inclusion and exclusion criteria.

After taking informed, written consent subjects were divided into two groups by simple random Sampling method. Group A received Pilates exercises plus conventional treatment and group B received MFR technique plus conventional treatment. Both groups were assessed before and after treatment duration to determine the extent of reduction of pain using Numerical pain rating scale taken as outcome measures.

At the end of 4 weeks, patients in both groups showed reduction in pain and improvement in NPRS scores on statistical analysis. The result showed that there was no statistically significant difference of effectiveness of pain between Both groups (group A and group B).

So here, both groups were improved after intervention. By comparing NPRS measure group A showed statistically significant improvement in pain equal to the group B. The mean difference of NPRS is almost equal to the both groups. So, Pilates exercise along with conventional treatment and MFR technique along with conventional treatment both are equally effective in reducing pain in patients with Chronic Low Back Pain.

CONCLUSION:

The present study concludes that Pilates exercise along with conventional treatment and Myo Fascial Release technique along with conventional treatment both are equally effective in reducing pain in patients with Chronic Low Back Pain.

LIMITATIONS

- In this study age limit is 30-50 years.
- MFR technique only assessed in chronic low back pain patients.
- Long term follow up is not taken.

FURTHER RECCOMENDATION

- Study can be done with chronic low back pain patients with other age groups.
- MFR technique effectiveness can also be determined for acute low back pain patients.
- Long term follows up of the patients can be taken to compare sustainability of treatment.

ABBREVIATIONS

- **CLBP** = Chronic low back pain
- **MFR** = Myofascial release
- **LBP** = low back pain
- **ADLs** = Activities of daily living
- **TENS** = Transcutaneous electrical nerve stimulation
- **TFL** = Tensor fascia late
- **SLR** = Straight leg raise
- **NPRS** =Numerical pain rating scale
- **VAS** = Visual Analogue Scale

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