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To Compare the Effect of Mulligan's BLR Technique Versus Mckenzie Technique in Subjects with Mechanical Low Back Pain

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KEYWORDS

Mechanical LBP, Mulligan technique, BLR technique, McKenzie technique, Mulligan MWM

ABSTRACT:

INTRODUCTION:

Mechanical low back pain arises intrinsically from the spine, intervertebral disks, or surrounding soft tissues. Mechanical low back pain is a leading cause of disability. It occurs similar proportions in all cultures, interferes with quality of life and work performance. Both male and female populations are affected; however, there is a tendency towards a higher incidence in male patients.

METHODOLOGY

30 subjects having Mechanical low back ache were selected according to the inclusion criteria. Group A participants receiving Mulligan's BLR treatment along with conventional therapy. Group B participants receiving McKenzie treatment along with conventional therapy. Both groups had received Hot pack and spinal Isometrics as conventional therapy. The study was of 4week, 3 days per week at department of physiotherapy in SMIH. Examination included assessment which was performed on first and the last day of treatment& data was recorded

CONCLUSION:

The result of Group-A & Group-B showing significant differences at p values but Group-A is more effective than Group-B,

1. Introduction

Mechanical low back pain refers to back pain that arises intrinsically from the spine, intervertebral disks, or surrounding soft tissues. This includes lumbosacral muscle strain, disk herniation, lumbar spondylosis, spondylolisthesis, spondylolysis, vertebral compression fractures, and acute and chronic traumatic injury [5]. Mechanical LBA is not a life-threatening illness. It is a common medical problem now a days it's also known as acute low back pain, lumbago, idiopathic low back pain, lumbosacral strain or sprain, or lumbar syndrome [6].

Common symptoms of mechanical low back pain include pain that worsens with activity, difficulty bending or twisting, pain that extends into the buttocks or outer hip, etc.[10] Risk factors for developing Mechanical low back pain can be standing or walking more than 2 hours per day, frequent moving or lifting more than 25lbs, increased driving time (occupational), limping or altered gait, psychosocial factors (income level, stress level, poor relationship at work) obesity, posture & poor muscular endurance[11].Based on the etiology, LBP is classified as Specific and Non-specific LBP. 90% of LBP patients are attributed to Non-specific causes [12].The risk factors for Non-Specific Low Back Pain are poor hamstring flexibility. In a study done by Radwan. A et al., they found out that there was a possible relation between mild mechanical LBA and hamstring tightness. [13]

Mulligan (1999) manual therapy treatment techniques are frequently used in clinical practice. Konstantinou et

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al. (2002), reported that in Britain, according to a postal survey, 41% of physiotherapists treated low back pain using Mulligan techniques. [15]

Mulligan's bent leg raise (BLR) is a technique used for improving range of straight leg raise (SLR) in subjects with LBP and/or reffered thigh pain (Mulligan's 1999) and to increase the flexibility of hamstring. Its effect was studied by Hall T et al. (2006),in subjects with LBA. But it was an immediate effect after a single intervention. [16]

McKenzie method has been recognized as one of effective methods for treating LBP. The McKenzie method of LBP treatment is explained by the principle that exercises that encourage disc centralisation should be promoted, and exercises that encourage disc peripheralization should be avoided. [17]

The McKenzie Method of Mechanical Diagnosis and Therapy (MDT) is a well-studied classification system. [18] This assessment and treatment model has demonstrated good inter examiner reliability when classifying patients with LBP; however, evidence of its treatment effectiveness continues to be challenged. The MDT was designed to classify patients into 3 mechanical subgroups (derangement, dysfunction, or postural syndrome) or an "other" subgroup, by which to direct treatment. [19]

AIM AND OBJECTIVE:

AIM OF THE STUDY

The aim of this study is to reduce the pain and improve functional independency in subjects with mechanical low back Pain.

OBJECTIVE OF THE STUDY

The Objective of this study is to compare the Effectiveness of Mulligan's bent leg raise technique with McKenzie technique on mechanical low back pain.

PURPOSE OF THE STUDY

The purpose of this study is to improve the functional independence and reduce the pain by comparing the effect of Mulligan's BLR and McKenzie technique and to find out which of the technique is better.

NEED OF THE STUDY

There are a lot of research on back pain using McKenzie protocol and Mulligan treatment which shows mixed results in improving pain but none of the research has compared McKenzie technique with Mulligan's BLR technique on Mechanical low back pain.

HYPOTHESIS

ALTERNATIVE HYPOTHESIS:

There may be significant difference between the Mulligan's BLR technique & McKenzie technique in mechanical low back pain.

NULL HYPOTHESIS:

There may not be significant difference between the Mulligan's BLR technique & McKenzie technique in mechanical low back pain.

2. Methods

The study was pre-test and post-test experimental design. The total of 30 subjects of mechanical back pain were assigned in two groups with 15 subjects in each group. After signing the consent form, study was conducted at the department of Physiotherapy, SMIH Patel Nagar, Dehradun (Uttarakhand). Each subject received the treatment for 3 days/week for continuous 4 weeks. Time duration of the treatment was approx. 30 min for each session. The subjects were selected according to inclusion and exclusion criteria. Subjects were included as Age group : 20-50, LBP with limited SLR after 70º, LBP with no specific pathology., LBP less than 6 weeks. Subjects who can comprehend command and willing to participate in the study. Subjects were excluded as Subjects with LBP with trauma, LBP with specific pathology, Any neurological symptoms involving prolapsed intervertebral disc and radiating pain, History of any recent abdominal and back surgeries, Pregnancy and Psychologically imbalance. ndependent variables: Mulligan's BLR technique, McKenzie technique. Dependent variables: Pain, Range of motion. **OUTCOME MEASUREMENT,** Oswestry disability index, Visual analog scale and Goniometery.

PROCEDURE:

Subjects who fulfill the inclusion and exclusion criteria was randomly allocated into two groups A and B. Individuals selected for the study were assessed prior and post of the intervention program with outcome measure like: **Oswestry disability index**, **Visual analogue scale** (VAS) and lumber range of motionfor flexion and extension was measured by **Goniometer**.

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GROUP A underwent Mulligan's Bent Leg Raise technique along with hydro collator packs and isometric exercise. Treatment time was approx. 20-30 minutes a day for 4 weeks (3 days a week).

BLR technique: patient were positioned in supine lying at the edge of the plinth with hip and knee 90º flexion.Therapist position: walk stance on the affected side.

Hand placement: shoulder of the inner hand was placed under the popliteal fossa. Therapist grasps the lower end of thigh with both the hands.

Mobilization: longitudinal traction was applied along the long axis of the femur, therapist takes the hip in to flexion until first resistance is felt, if patient complains of stretch pain or if the therapist feels resistance due to muscle tightness, contract relax technique is applied by asking the patient to push the therapist's shoulder gently(hold for 5 sec).now , if pain free therapist can take patients hip into further flexion, in case if patients complain of pain during this maneuver , then hip can be moved into abduction or external rotation/more traction before further hip flexion is added. Hold the end position for about 20 seconds, repeat the process three times and reassess the changes brought about by this mobilization.

Hydrocollator packs were given for 10 min. after the Mulligan's BLR technique. Spinal isometrics were done 10 repititions.

Fig. 4.9.1 and 4.9.2 : Mulligan's BLR Technique

Group B: underwent McKenzie protocols with hydro collator packs and isometric exercises.

McKenzie Program:

The exercises were performed in 2 series of 15 repetitions for each subjects, each exercise were performed with set of 30 times each. And then the exercises were performed in the next progressions once the present exercise is performed successfully.

1. **Extension in prone lying**: Patient were asked to lay prone with arms beside the body and head turned to one side and maintain the position for 4-5 minutes. In the same position, the patient were asked to place the elbows under the shoulders so that the patient lean on their forearms and maintain the position for 5 minutes. The patient were then advised to extend their elbows in the above position and push the top half of their body as far as the pain permits. The patient holds the position for a second or two and then comes back to the starting position. This was done 15 times in 2 repetition.

2. **Extension in standing**: The patient were asked to stand upright with feet slightly apart, hands placed at the back so that the fingers are pointed backward and the thumbs forward. The patient bends backward at the waist as far as they can keeping the knees straight, maintaining this position for a second or two and return to the starting position.

3. **Flexion in supine lying**: The patient were asked to lay supine with knees bent and foot placed on the couch. From this position the patient bring both the knees towards the chest and gently but firmly pulls the knees with hands towards the chest till pain permits. The patient maintained this position for 1-2 seconds and returns to starting position.

4. **Flexion in sitting**: Patient sit on the edge of a chair with knees and feet well apart and hands resting in between legs. From this position the patient bended forward and returns. Hydrocollator packs were given for 10 min. after the McKenzie technique. Spinal isometrics were done 10 repetitions.

FIG 4.9.3 Extension in prone line

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FIG 4.9.4 Extension in standing

FIG 4.9.5 Flexion in supine

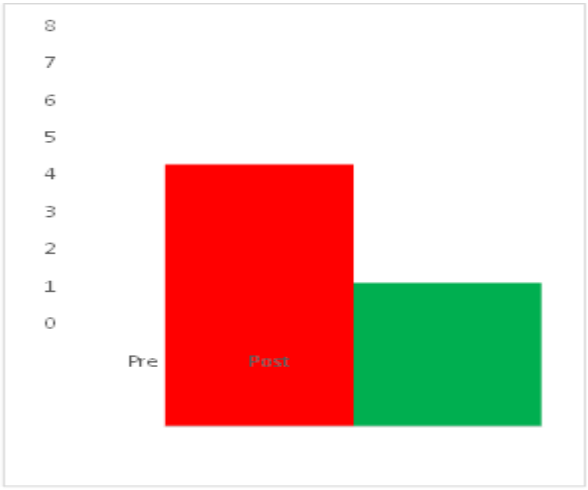
FIG 4.9.6 Flexion in sitting

DATA ANALYSIS: The data were analyzed using the statistical software SPSS 20 version. To analyze the difference of Mulligan's BLR technique and McKenzie technique of Group-A and Group - B paired t- test was applied. The p values <0.05 in Group- A showing extremely significant and also in Group- B.

Table-5.1: Comparison of mean VAS scores within Groups A

	Mean	N	Std. Deviation	Significant
Pre	7.4	15	1.18322	0.004
Pair 1				
Post	4.0667	15	1.43759	

Paired Samples Statistics



Graph 5.1 Comparison of mean VAS scores within Groups A

EXPLANATION: From the table above we can seen that the value of mean is lesser in post intervention of VAS scores in Group A. As p<0.05, It shows that there is a significant difference between the pre & post scores of VAS. The difference is also shown by the graphs also.

Table-5.2 : Comparison of mean ODI scores within Groups A

	Mean	N	Std. Deviation	Sig.
Pre	66.1333	15	6.02218	0.012
Pair 1				
Post	36	15	12.4442	

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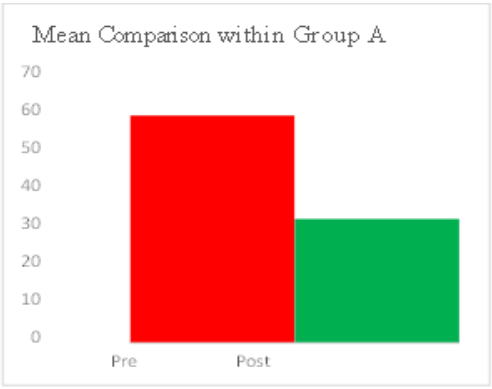
Paired Samples Statistics



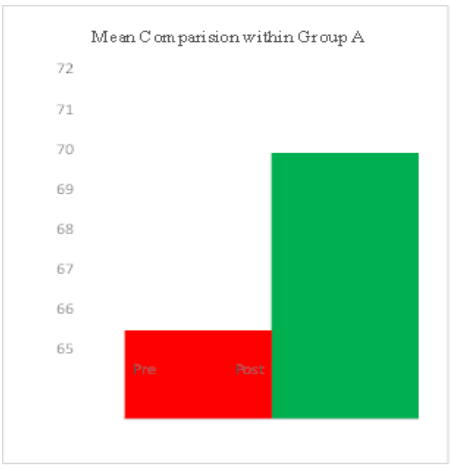
Graph 5.2 Comparison of mean ODI scores within Groups A

EXPLANATION: From the table above we can seen that the value of mean is lesser in post intervention of ODI in Group A. As p<0.05, It shows that there is a significant difference between the pre & post scores of ODI. The difference is also shown by the graphs also

Table-5.3: Comparison of mean LUMBAR FLEXION within Groups A

	Mean	N	Std. Deviation	Sig.
Pre	67.2	15	4.58569	
Pair 1				
Post	71.3333	15	4.51453	0

Paired Samples Statistics



Graph 5.3 Comparison of mean LUMBAR FLEXION within Groups A

EXPLANATION: From the table above we can seen that the value of mean is more in post intervention of LUMBAR FLEXION scores in Group A. As p<0.05, It shows that there is a significant difference between the pre & post scores of LUMBAR FLEXION The difference is also shown by the graphs also.

Table-5.4 : Comparison of mean LUMBAR EXTENSION scores within Groups A

	Mean	N	Std. Deviation	Sig.
Pre	18.7333	15	3.82598	
Pair 1				0
Post	22.6667	15	2.89499	

Paired Samples Statistics

Graph 5.4 Comparison of mean LUMBAR EXTENSION scores within Groups A

EXPLANATION: From the table above we can seen that the value of mean is more Post intervention of LUMBAR EXTENSION scores in Group B. As p<0.05, It shows that there is a significant difference between the pre & post scores of LUMBAR EXTENSION. The difference is also shown by the graphs also

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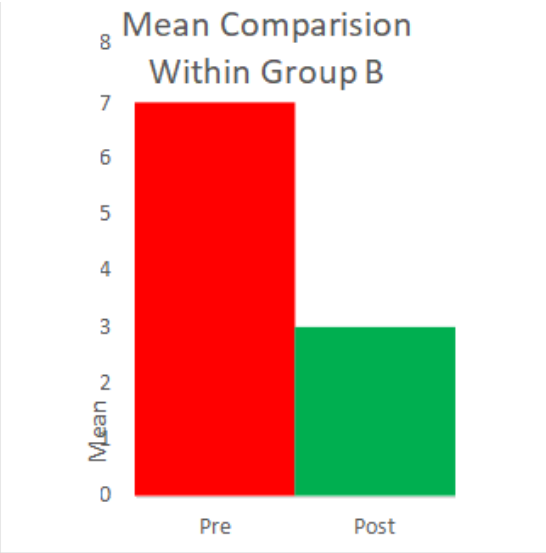
Table 5.5: Comparison of mean VAS scores within Groups B

	Mean	N	Std. Deviation	Sig.
Pre	7.2	15	1.20712	0.076
Pair 1				
Post	3.1333	15	1.45733	

Paired Samples Statistics



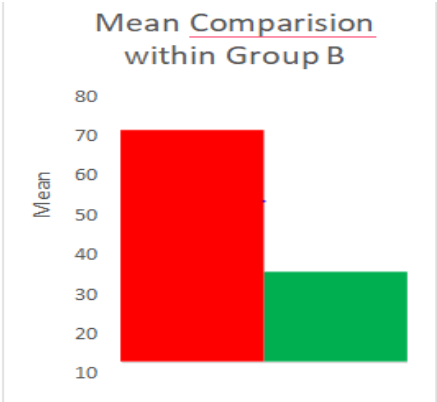
Graph 5.5 Comparison of mean VAS scores within Groups B

EXPLANATION : From the table we can seen that the value of mean is lesser in post intervention of VAS . As p<0.05, It shown that there is a significant improvement in Group B in pre score of VAS. The difference is also shown by the graphs also

Table 5.6: Comparison of mean ODI scores within Groups B

	Mean	N	Std. Deviation	Sig.
Pre	67.3333	15	6.17213	0.798
Pair 1				
Post	26.5333	15	14.9755	

Paired Samples Statistics



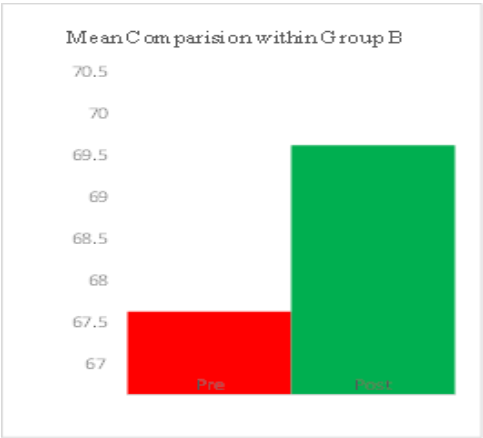
Graph 5.6 Comparison of mean ODI scores within Groups B

EXPLANATION : From the table we can seen that the value of mean is lesser in post intervention of ODI . As p<0.05, It shown that there is a significant improvement in Group B in pre score of ODI. The difference is also shown by the graphs also.

Table 5.7: Comparison of mean LUMBAR FLEXION scores within Groups B

	Mean	N	Std. Deviation	Sig.
Pre	68.2000	15	4.52296	0.000
Pair 1				
Post	70.9333	15	4.36654	

Paired Samples Statistics



Graph 5.7 Comparison of mean LUMBAR FLEXION scores within Groups B

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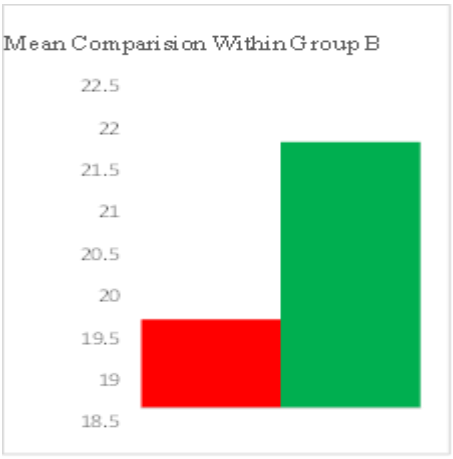
EXPLANATION : From the table we can seen that the value of mean is more in post intervention of LUMBAR FLEXION . As p<0.05, It shown that there is a significant improvement in Group B in post score of LUMBAR FLEXION. The difference is also shown by the graphs also

Table 5.8: Comparison of mean LUMBAR EXTENSION scores within Groups B

	Mean	N	Std. Deviation	Sig.
Pre Pair 1 Post	19.9333 22.4000	15 15	3.59497 3.33381	0.000

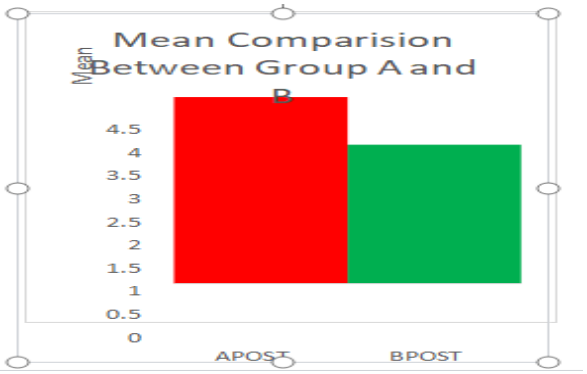
Paired Samples Statistics



Graph 5.8 Comparison of mean LUMBAR EXTENSION scores within Groups B

	Mean	N	Std. Deviation	Sig.
APOST Pair 1 BPOST	4.0667 3.1333	15 15	1.43759 1.45733	0.797

EXPLANATION : From the table we can seen that the value of mean is more in post intervention of LUMBAR EXTENSION . As p<0.05, It shown that there is a significant improvement in Group B in pre score of LUMBAR EXTENSION . The difference is also shown by the graphs also.



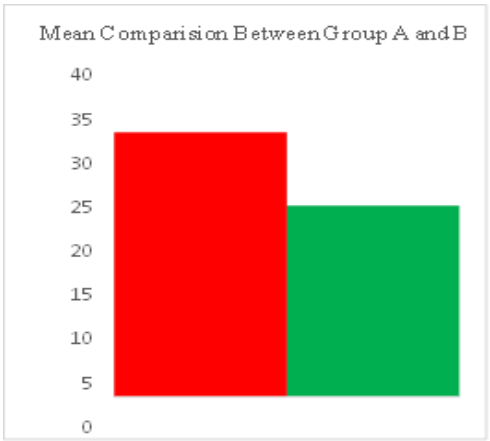
Graph 5.9 Comparison of mean of VAS POST scores between Group A & Group B

EXPLANATION : From the table we can seen that the value of mean is lesser in post intervention of VAS in group B. As p<0.05, It shown that there is a significant improvement in Group B in Post score of VAS. The difference is also shown by the graphs also.

Table 5.10: Comparison of mean of ODI POST scores between Group A & Groups B

	Mean	N	Std. Deviation	Sig.
APOST Pair 1 BPOST	36 26.5333	15 15	12.44416 14.97554	0.691

Paired Samples Statistics



Graph 9.10 Comparison of mean of ODI POST scores between Group A & Groups B

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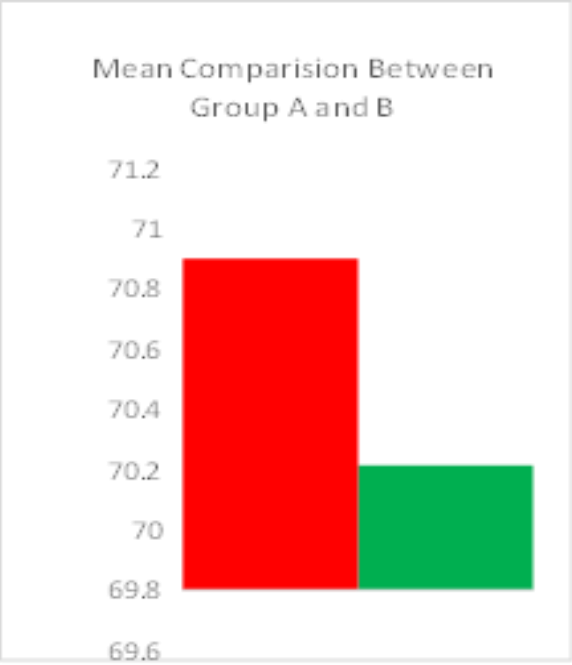
EXPLANATION : From the table we can seen that the value of mean is lesser in post intervention of ODI in group B. As p<0.05, It shown that there is a significant improvement in Group B in Post score of ODI. The difference is also shown by the graphs also.



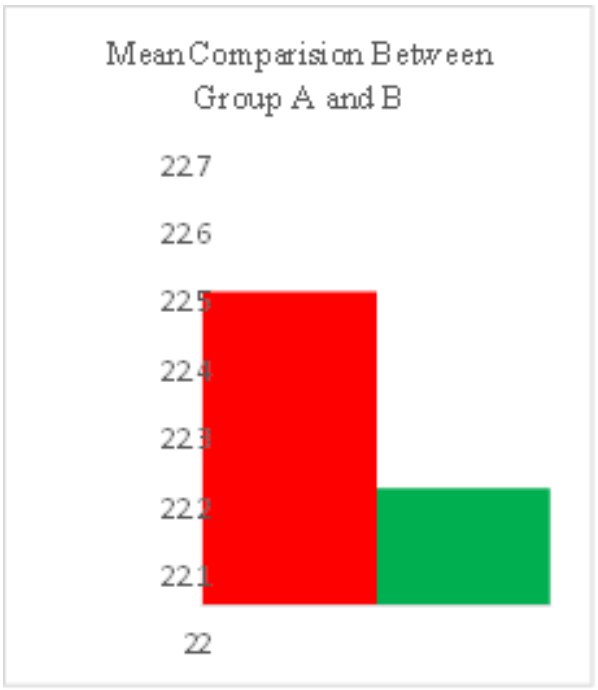
Graph 9.10 Comparison of mean of ODI POST scores between Group A & Groups B

EXPLANATION : From the table we can seen that the value of mean is lesser in post intervention of ODI in group B. As p<0.05, It shown that there is a significant improvement in Group B in Post score of ODI. The difference is also shown by the graphs also.

Table 5.11: Comparison of mean of LUMBAR FLEXION POST scores between Group A & Groups B

	Mean	N	Std. Deviation	Sig.
APOST	22.6667	15	2.89499	
Pair 1				0.694
BPOST	22.1	15	3.33381	

Paired Samples Statistics



Graph 9.11 Comparison of mean of LUMBAR FLEXION POST scores between Group A & Groups B

EXPLANATION : From the table we can seen that the value of mean is more in post intervention of LUMBAR FLEXION in group A. As p<0.05, It shown that there is a significant improvement in Group A in Post score of LUMBAR FLEXION. The difference is also shown by the graphs also.

Table 5.12: Comparison of mean of LUMBAR EXTENSION POST scores between Group A & Groups B

	Mean	N	Std. Deviation	Sig.
APOST	71.3333	15	4.51453	0.935
Pair 1				
BPOST	70.9333	15	4.36654	

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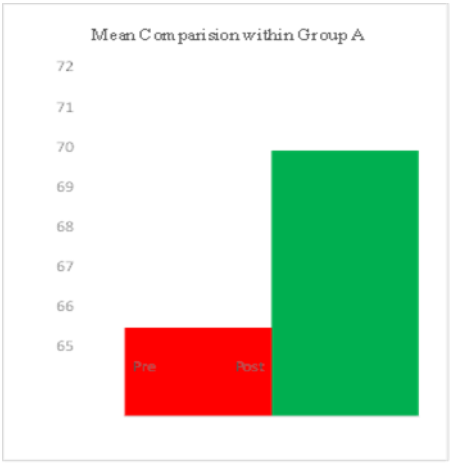
Paired Samples Statistics



Graph 9.12 Comparison of mean of LUMBAR EXTENSION POST scores between Group A & Groups B

EXPLANATION: From the table we can seen that the value of mean is more in post intervention of LUMBAR EXTENSION in group A. As p<0.05, It shown that there is a significant improvement in Group A in Post score of LUMBAR EXTENSION.

The pre and post interventional analysis revealed that clinically the patients in group B treated with McKenzie improved pain slight more (mean pain from 7.2 TO 3.1) as compared with the patients in group A treated with Mulligan's BLR (mean pain from 7.4 to 4.0)while statistically both the interventions were equally effective in both group for pain as assessed by VAS.

The pre and post interventional analysis revealed that clinically the patients in Group B treated with McKenzie improved function more (mean ODI from 67.3 to 26.5) as compared with the patients in group A (mean ODI from 66.13 to 36.0), while statistically both the interventions were effective in both group for the management of disability as assessed by ODI.

The pre and post interventional analysis revealed that clinically the patients in Group A treated with Mulligan's BLR improved Lumber flexion more (mean flexion from 67.2 to 71.3) as compared with the patients in group B treated with McKenzie (mean flexion from 68.2 to 70.9), while statistically both the interventions were effective in both group for the improvement of lumbar flexion as measured by goniometer.

The pre and post interventional analysis revealed that clinically the patients in Group A treated with Mulligan's BLR improved Lumber extension more (mean extension from 18.7 to 22.6) as compared with the patients in group B treated with McKenzie (mean extension from 19.9 to 22.4), while statistically both the interventions were effective in both group for the improvement of lumbar extension as measured by goniometer.

3. Discussion

Mechanical low back pain is described as a musculoskeletal pain which varies with physical activities and not involving root compression or serious spinal disease. Spine is the main structure which carry load, allow movements and protect the spinal cord .the necessities of the spine to be rigid and flexible conceptualized the idea of spinal stability. Spinal stability is formed by active, passive and neural subsystems. In mechanical low back pain there will be increased alteration in these system.

In the present study patients between the age groups of 20yrs to 50yrs and having a past history of low back pain for one month were included. A comparison has been done on the effectiveness of two manual techniques i.e. Mulligan's BLR technique and McKenzie technique in patients with mechanical low back pain. Hot pack and spinal isometric exercises were the common treatment for both the groups. The duration of the treatment was four weeks. At the end of the treatment (fourth week) both the groups showed improvement in pain, functional disability and range of motion measured with VAS, ODI & Goniometry respectively.

Data analyses revealed that the before treatment mean score of VAS and ODI for Group B was better reduced at the end of fourth week of treatment when compared with group A while Range of motion of lumber flexion and extension were better increased in Group A at the end of fourth week of treatment when compared with Group B.

Statistical analysis revealed that there was a significant difference (p<0.05) between the groups and proved that McKenzie exercises were better than Mulligan's BLR in improving the Pain and Functional disability which was supported by previous studies done by Saira Waqqar et al (2014) where he found that McKenzie EEP was more effective than Mulligan's SNAG for the treatment of

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chronic mechanical low back pain in improving the Pain and Functional disability.[49]

Also a study done by Sriram Nelakurthy et al (2020) where he found that both the Mulligan's Techniques i.e BLR and Traction SLR were found statistically significant in reducing pain, and improving ROM and decreasing the level of disability in treating low back pain.[50] In this study it was seen that Mulligan's BLR technique was more effective in improving Range of motion of lumbar flexion and extension when compared with the McKenzie technique.

LIMITATION OF THE STUDY

- The duration of the study was only 4 weeks, so further prognosis and long term benefits could not be recorded.
- Sample size is small with less than 30 patients.
- In this study most of the subjects were students and below the age of 35, so age group can be varied in future studies.

FUTURE RESEARCH

- Further research are recommended to minimize this limitation in such a way that larger sample size of both sexes that include various age groups of people are studied.
- The duration of the study can be increased.
- Various outcome measures can be used in order to record functional independence in better way.
- The study can be done to see the improvement of both upper and lower back.
- The study can be done to improve low back plus lower extremity functions.

CONCLUSION:

The result of Group-A & Group-B showing significant differences at p values. As comparing the mean difference between both the groups, the mean difference in VAS for Group- A is 3.3 and Group- B is 4.6, this result showed that Group B is more effective in VAS as compared to Group A. On the other hand, while comparing the mean difference between both the Group A and Group- B in ODI, Group-A showed 30.13 and Group- B showed 40.8 that indicated that the Group-B is more effective in ODI than Group-A, while comparing the mean difference between both the Group A and Group- B in LUMBAR FLEXION, Group-A showed 4.13 and Group- B showed 2.7 that indicated that the Group-A is more effective in LUMBAR FLEXION than Group-B, while comparing the mean difference between both the Group A and Group- B in LUMBAR EXTENSION, Group-A showed 3.9 and Group- B showed 2.16 that indicated that the Group-A is more effective in LUMBAR EXTENSION than Group-B,

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