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Mobilisation with Movement Versus Postero-Anterior Mobilisation in Chronic Non Specific Low Back Pain

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Abstract : Background: Non-specific low back pain is defined as low back pain which is not attributable to recognizable or a known specific pathology. **Objective:** To Compare between the efficacy of postero-anterior mobilization and mobilisation with movement on improving pain level and functional activities in patients with chronic non specific low back pain. **Methods:** 30 subjects (mean age 40±4.8) were recruited for the study, assigned randomly into two groups with fifteen subjects in each one, 15 patients received MWM technique and conventional physical therapy treatment and 15 patients received postero-anterior mobilization technique and same conventional physical therapy program, outcome measures were assessed pre and post mobilization. **Outcome measures:** Visual Analog Scale (VAS), Oswestry Disability Questionnaire**. Results**: Mean difference between pre and post treatment values for VAS, Oswestry Disability Questionnaire were (0.151), (0. 215) respectively which reflect no significant difference, with p value=0.05. **Conclusion:** The findings of this study demonstrated that there was no statistical significant difference between group A which received (MWM) technique and group B which received (P-A mobilization) in pain threshold level, functional disability level in chronic non specific low back pain patients.
Key words: MWM, P-A mobilization, Oswestry Disability Questionnaire.

Introduction

Low back pain is an extremely common problem experienced by most people at some point of their life. It is a major condition which causes activity limitation, work absence and economic burden on families, communities, industries and government[1]**.** Non-specific low back pain is defined as low back pain which is not attributable to recognizable or a known specific pathology such as bone disorder in the spine (fracture), radicular nerve compression, slipped intervertebral disc, lumbar canal stenosis, inflammatory disorder of spine(ankylosing spondylitis), cauda equine syndrome, congenital back disorder, infection in the spine(discitis), tumour and osteoporosis[2,3]**.**

Prevalence is approximately 23% with an incidence of 11-22% of the general population (**2).** In a small group of acute patients, the problem fails to resolve. Approximately 10% will go on to develop chronic and disabling low back pain. .

Mulligan's mobilization with movement technique (MWM) is gaining increasing popularity in its use in musculoskeletal conditions, such as the low back pain. Brian Mulligan pioneered one of the most important MWM technique described as 'sustained natural apophyseal glide' synonym as SNAG. SNAG is described as

involving the application of an accessory passive glide to the lumbar vertebrae while the patient simultaneously performs an active movement. The direction of the glide is argued to be along the plane of the facet joints[4].

The novelty of MWM lies with the combination of passive accessory movement mobilization with simultaneous active movement. The manual force, or mobilization, is theoretically intended to cause repositioning of bony positional faults[5]**.**

Postero-anterior (PA) mobilization of the lumbar spine has been considered as a treatment technique to restore spinal mobility on the basis that it will decrease spinal stiffness and this technique is one of the most commonly used manual techniques[6]**.**

Subjects and Methods

Subjects

Thirty patients were diagnosed as chronic non-specific low back pain, their age ranges from 30 to 50 years and assigned randomly into two groups with fifteen subjects in each one.

Group A (MWM of Mulligan) 15 patients received MWM technique and conventional physical therapy treatment (therapeutic exercises in form of Strengthening exercises for back muscles by bridging and active back extension, [7]and strengthening exercises for abdominal muscles by sit up exercise, and posterior pelvic tilt, [8].

Group B (P-A mobilization of Maitland) 15 patients received postero-anterior mobilization technique and same conventional physical therapy treatment like group A.

Subjects included were

1. Age between 25 to 40 years old.
2. 2 -Suffering from chronic non-specific low back pain
3. Duration of illness more than three months [9].
4. Patients with moderate disability (20-40%) determined through Oswestery Disability Questionnaire [10].

Subjects excluded if they had

1. Any previous back surgery.
2. Neurologic deficit.
3. spondylolisthesis, hip arthrosis.
4. Symptoms of vertigo or dizziness.

Materials

1. Visual Analogue Scale (VAS) for measurement of LBP
2. The Oswestry Disability Index version 2.0 to measure patient's functional disabilities level [11].
3. Mobilization belt

Methods

All subjects made aware of the nature of the study, its possible risks and signed a consent form. All personal data, past medical history were collected at the beginning of the study. Patients were assessed just before and after 12 sessions of the treatment program.

Outcome measures

A) Low back pain level measurement

LBP level measured by using the VAS which uses a line of 10 cm, divided from 0 to 10, 0 refers to no pain and 10 refers to the worst pain. The patients were asked to mark along the line at the point which refers to their level of pain. VAS can give a valid data for chronic pain[12,13]**.**

B) The functional disability measurement

Functional disability level of each patient was measured by Oswestery disability questionnaire. It is valid and reliable tool. It is consists of ten multiple choice questions for back pain, patient select one sentence out of six that best describe his pain, Higher scores indicated great pain [10]**.**

Treatment procedure

1- Therapeutic exercises program

Strengthening exercises for back muscles by active back extension and bridging [7]**,** strengthening exercises for abdominal muscles by sit up exercise, and posterior pelvic tilt [8]**.** Twelve sessions, three/week for one month. Each exercise was done ten times at each session with hold for six seconds at the end of the range, [7] and stretching for lower back and hamstrings with 30 second hold and 3-5 repetitions.

2- MWM technique

It was done ten times/session, for 12 sessions three/week every other day for 4 weeks [5]**.** It was applied for group A **(**Mulligan**)** only.

Position of patient: The patient was sitting on a plinth with his legs over the side. The therapist sanded behind him and placed a belt around his lower abdomen keeping it below the anterior superior iliac spine for comfort. The belt should be below therapist hip joints for more stabilization and comfort. The ulner border of therapist's one hand is placed under the spinous process of the vertebra above at the suspected spinal segment**.** Therapist's other hand was placed on the bed to thimnbe side of the patient for more stabilization. The therapist applied a gliding force with his right hand up along the treatment plane which is 90° in the horizontal plane(the angles of inclination of the facet joints in the horizontal plane is 90° for the lumbar spine) as the patient was flexing forward,. The therapist maintained the facet glide until the patient was erect again. This technique was repeated ten times/session[5]**.**

Fig (1) starting position of MWM

3- Postero-Anterior mobilization:

It was done 10 times/session, for 12 sessions, 3 /week every other day for 4 weeks period**.** It was applied for group B **(**Maitland**)** only

Position of patient: Patient lying in prone, Therapist stands to side of patient placing their pisiform/ulnar surface of hand over the selected spinous process (SP) with their wrist in full extension. Other hand placed on top of hand to reinforce. .Therapist's shoulders should be directly above the SP with elbows slightly bent. Therapist uses their body weight to apply a P-A force to the selected SP by leaning their body over their arms and performing rocking movements to provide oscillatory movements of the vertebra [14].

Fig (2):Postero-Anterior mobilization for lower lumbar region

Statistical Analysis

All statistical measures were performed through the Statistical Package for Social Studies (SPSS version 18 for windows). Prior to final analysis, data were screened for normality assumption, and presence of extreme scores. This exploration was done as a pre-requisite for parametric calculation of the analysis of difference and analysis of relationship measures. To determine similarity between the groups at base line, subject age, height, and body weight were compared using independent t tests.

The current test involved two independent variables. The first one was the ±tested group; between subjects factor which had two levels (Group A receiving MWM & Group B receiving P-A mobilization The second one was the (training periods); within subject factor which had two levels (pre and post). In addition, this test involved two tested dependent variables VAS, , and oswestery scale. Accordingly, 2×2 Mixed design MANOVA was used to compare the tested variables of interest at different tested groups and training periods. The MANOVAs were conducted with the initial alpha level set at 0.05.

Results

Baseline and demographic data

There were no statistically significant differences (P>0.05) between subjects in both groups concerning age, weight, and height (Table 1). There were also no statistically significant differences between groups for any outcome variables at baseline (pre-intervention)**.**

VAS and Oswestry scale

Statistical analysis using mixed design MANOVA analyzed thirty patients assigned into two equal groups. It revealed that there were significant within subject effect (F = 91.428, p = 0.000) but there were no significant effects between subject effect (F = 0.779, p = 00.595) and treatment*time effect (F= 1.274, p = 0.308). Table (2) and figure (1 and 2) present descriptive statistic (mean ± SD) of all detective variables. In the same context, the multiple pairwise comparison tests revealed that there were significant decreases (p <0.05) in VAS and Oswestry scale in the post treatment condition compared with the pre treatment one in both groups. Table (3) presents multiple pairwise comparisons between pre and post treatment values of all detective variables in both groups.

Regarding between subject effects multiple pairwise comparisons revealed that there were no significant differences in VAS and Oswestry scale between both groups (p > 0.05). Table (4) presents multiple pairwise comparisons between group A and group B of all detective variables in both groups.

Table 1: Descriptive statistics and unpaired t-tests for the mean age, weight, and height of the patients with chronic non specific LBP for both groups.

	Age (years)	Weight (kg)	Height (cm)
Group (A)	40±4.8	83.5±7.8	166.7±4.3
Group (B)	42.9±6.6	80.8±5.96	167.7±6.85
t-value	-1.38	1.05	-0.476
p-value	0.179	0.303	0.639

Table 2: Descriptive statistics of the VAS and oswestry scale in patients with chronic non specific LBP

Dependent variables	Group A		Group B	
	Pre treatment	Post treatment	Pre treatment	Post treatment
VAS	6.6 ±0.8	2.4±1.05	7.1 ±1.06	3.33 ±1.44
Oswerstry scale	38.73±2.6	31.6 ±3.52	38.26 ±3.43	32.6 ±3.83

VAS: Visual Analogue Scale.

Table 3: multiple pairwise comparisons between pre and post treatment values for each group.

Multiple pairwise comparison tests ±post hoc tests for VAS and oswestry scale e at pre and post treatment for both groups				
	Group A		Group B	
Dependent variables	**VAS**	**Oswestry scale**	**VAS**	**Oswestry scale**
Pre Vs. Post treatment	0.000*	0.000*	0.000*	0.000*

VAS: Visual Analogue Scale, *The mean difference is significant at the alpha level (p< 0.05).

Table 4: multiple pairwise comparisons for pre and post treatment values between both groups.

Multiple pairwise comparison tests ±post hoc tests for *VAS and oswestry scale* at pre and post treatment between both groups				
	Pre treatment		Post treatment	
Dependent variables	**VAS**	**Oswestry scale**	**VAS**	**Oswestry scale**
Group A Vs. Group B	**0.204**	**0.678**	**0.053**	**0.463**

VAS: Visual Analogue Scale. *The mean difference is significant at the alpha level (p< 0.05).

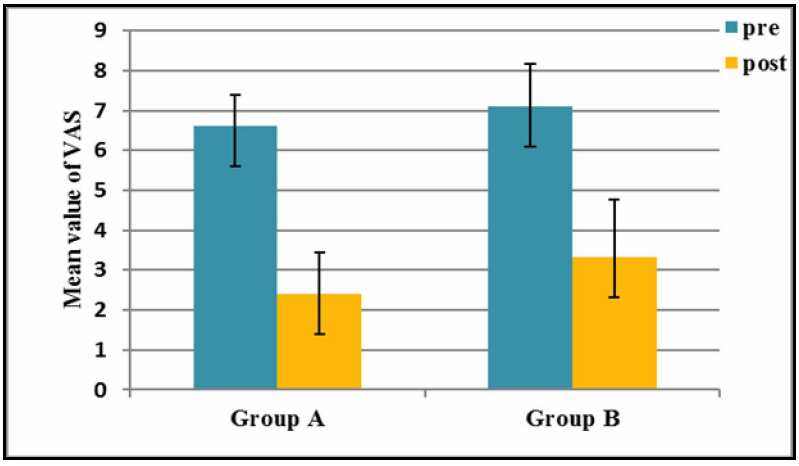

Figure (3): Mean ±SD values of VAS pre and post tests in both groups.

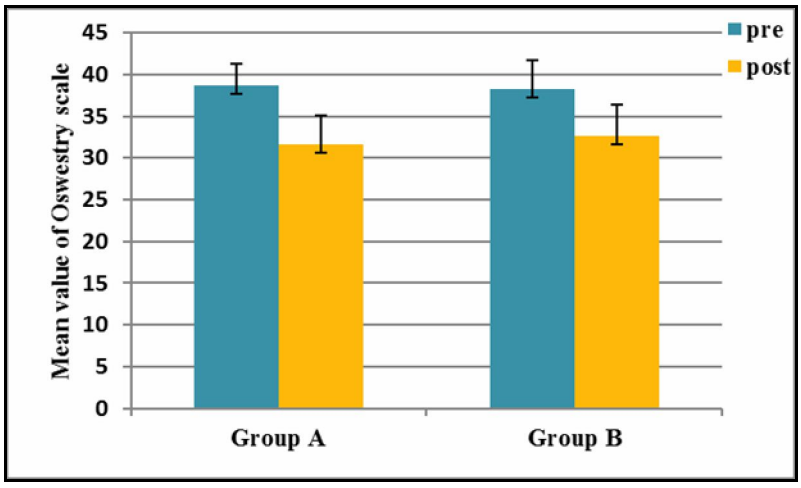

Figure (4): Mean ±SD values of Oswestry pre and post tests in both groups.

Discussion

In comparison between the two groups "Pre-Post treatment groups"within group A, the results obtained (by independent t- test) showed a significant improvement in the level of pain and functional disability .

1- Pain severity

To examine the analgesic effects of MWM technique, comparison between pre and post results of pain assessment using visual analogue scale for the Chronic LBP patients was conducted. The results showed a significant decrease in LBP at the end of treatment program post treatment in comparison to pretreatment group.

This result cope with the belief that MWM technique produces a hypoalgesia and concurrent sympathoexcitation (indicated by changes in heart rate, blood pressure, and vasomotor function) **.** Further work [15] evaluated the role of endogenous opioid peptides in MWM induced hypoalgesia by studying the effect of naloxone blockade on MWM induced hypoalgesia and the development of tolerance with repeated application of the treatment technique **.**The results of both of these studies demonstrated that the initial hypoalgesic effect of the MWM does not appear to involve endogenous opioid systems, as the hypoalgesia did not demonstrate tolerance to repeated applications of the MWM treatment technique [15]**.** It has been previously proposed that the combination of sympathoexcitation, non-opioid hypoalgesia and improvements in motor function are indirect signs of a possible involvement of endogenous pain inhibition systems in manual therapy treatment effects [16].

2-Functional disability

Comparison between pre and post results of functional assessment using (Oswestry disability index questionnaire) for LBP was conducted. The results showed a significant decrease in the functional disability at the end of treatment program in comparison to pretreatment group.

It was reported that MWM technique decreases joint and muscle pain, thus decreases joint swelling and stiffness, so increase mobility and a quality of life [5]**.**The improvement in functional disability for Chronic non specific LBP patients in this study could be attributed to analgesic effect of MWM technique which leaded to decrease pain and improve back functions as result.

Group B (Maitland P-A mobilization)

In comparison between the two groups" Pre-Post treatment groups" the results obtained (by independent t- test) showed a significant improvement in the level of pain and functional disability.

1- Pain severity

To examine the analgesic effects of Maitland P-A mobilization technique comparison between pre and post results of pain assessment using visual analogue scale for LBP patients was conducted. The results showed

a significant decrease in LBP at the end of treatment program post treatment in comparison to pretreatment group., which may be attributed to:

P-A mobilization of the lumbar spine has been considered as a treatment technique to restore spinal mobility on the basis that it will decrease spinal stiffness and the subsequent spasmodic pain[6], Joint mobilization techniques are thought to benefit patients with lumbar mechanical pain through the stimulation of spinal joints mechanoreceptors which alter pain-spasm cycle through presynaptic inhibition of the hypertonic muscles, thus decrease pain level and improve unction, as well[17]**.**

2-Functional disability

Comparison between pre and post results of functional assessment using (Oswestry disability index questionnaire) for LBP was conducted after applying Maitland P-A mobilization technique for 4 weeks. The results showed a significant decrease in the functional disability at the end of treatment program in comparison to pretreatment group.

These findings are consistent with [17], they proved that P-A mobilization is likely to have widespread effects in a number of tissues by the oscillatory force through the movement of the interbody and zygoapophyseal joints and their accompanying periarticular tissues,as well as local musculatures and neural tissues leading to improving functional capabilities as result.

On contrary, it was reported that the short term effects of joint mobilization in the lumbar spine have been shown to decrease patient pain on subjective assessment testing: however, objective improvements in the measurements of muscle force and functional assessments haven`t yet be confirmed.

Conclusion

The findings of this study demonstrated that there was no statistical significant difference between group A which received (MWM) technique and group B which received (P-A mobilization) in pain threshold level, functional disability level in chronic non specific LBP patients.

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