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## Original Article

# Effect of Posteroanterior Lumbar Spine Mobilization Versus McKenzie Prone Push Ups on Pain and Functional Disability in Subjects with Non-Specific Low Back Pain

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## ABSTRACT

85% of the population has non-specific back pain. Posteroanterior (PA) lumbar mobilization and Push-up exercises are primarily used in physical therapy for back pain. **Objective:** To know the outcomes of posteroanterior spinal mobilization and prone push-ups on nonspecific lower back pain. **Methods:** The randomized clinical trial was done with 30 subjects meeting inclusion criteria and were randomly selected by non-probability/purposive sampling technique from the Department of Physical Therapy, Mayo Hospital Lahore. The 4 weeks study was conducted in which 2 groups with 15 in each group were formed. Group I was treated with PA lumbar glide while group II was treated with prone Push-ups. VAS and functional disability index were used to evaluate pre-treatment and post-treatment. **Results:** A significant decrease in mean pain score was noted in both groups. Results did not show any statistically significant differences between groups for any parameter. The study has given evidence that supports the use of posteroanterior mobilization and prone push-ups to reduce pain, improve range of movement, and disability reduction in patients with nonspecific low back pain. It also showed that posteroanterior mobilization was more beneficial than prone Push-ups. **Conclusion:** Both PA mobilization and Push-ups can be used as effective maneuvers for the treatment of non-specific low back pain.

## INTRODUCTION

Back pain with no known pathological cause is called nonspecific back pain [1]. Nonspecific low back pain is the most common of the leading causes of limitation, absenteeism, and increased health care costs [2, 3]. Nonspecific back pain is a growing public health problem worldwide [1, 4]. Lifetime incidence of back pain is reported to be up to 84%, persistent back pain is about 23%, and 11-12% of the population is disabled by back pain. Mechanical variables such as lifting and carrying are unlikely to contribute significantly to virulence, but genetic reflections are important [5, 6]. Maitland's idea is the

utilization of latent and assistant oscillatory developments to vertebral and spinal joints. The goal of this procedure is to restore torsion, rotation, and torsion between the articular surfaces, which are checked by amplitude [7, 8]. Posteroanterior focal vertebral strain can be utilized to treat disease which is similarly disseminated to the two borders of lumbar spine. This procedure is indicated when pain or muscle spasms are detected in development to this pathway, however acted in such a way disease or fit isn't restored. This strategy is of worth in patients where there are primary changes related with imperfect stance [7, 9].

They may have used a more common approach of using prone Push-up exercise for decreasing pain and to increase spinal motion [10, 11]. They set up a new idea of analysis and cure based totally on evaluation of patients with both chronic and acute lower back pain [12, 13]. Mackenzie states that all mechanical back pain can be categorized into three syndromes: posture, dysfunction, and confusion [14, 15]. A previous study was conducted to correlate the efficacy of push-ups with post-anterior lumbar mobilization. No studies were performed to confirm their effects. Therefore, the aim of this randomized clinical trial was to determine the efficacy of lumbar PA mobilization and prone push-ups for pain and disability episodes in patients with nonspecific low back pain.

## METHODS

The study of randomized clinical trial was done in the Physical Therapy Department of Mayo Hospital Lahore. This study included the patients having nonspecific low back pain, above 15 years and below 70 years of age. Exclusion criteria for this study consisted of a spinal tumor or metastasis, recent trunk fracture, inflammatory spine disease, neurological problem, heart problems, current abdominal surgery within the last 2 years, hip arthroplasty or knee arthroplasty, or evidence of metal grafts, current venous thrombosis, gallstones, kidney stones, balance problems, disc protrusion or herniation, neuropathic pain, referred pain and pathological pain. For sample size Win Pepi: version 11.0 was used, with confidence interval of 90%, power of study 80%, sample size ratio B:A 1, SD = 0.93 for group A and SD = 0.93 for group B. We detected a difference of 0.99 by 0.79 (from the study of Ikram et al.) [3]. The required sample size was total = 30 (15 for A and 15 for B). The non-probability/purposive sampling technique was used, but all members were randomly allocated to one of two groups throughout the study. Thirty participants who completed selection criteria are included in this study. Informed written consents were taken from every individual participating in this study before performing any physical examination. Allocation of patients in two groups was through simple random sampling by lottery method. 30 subjects were separated into 2 equal groups with 15 subjects in each group. 15 patients were allocated into group A and treated with Maitland Grade II lumbar mobilization and 15 were allocated into group B and treated with McKenzie prone Push up treatment. All the 30 patients finished entire procedure as defined by treatment of 4 weeks. Data is gathered on the first day before the application of interventions and then information accumulated after four weeks the application of intervention. In Group I, the PA mobilization was performed. The subjects were in the prone laying and hands were on

both side of the treatment couch. The force was applied downward, and every lumbar vertebra was subjected to the 40 seconds of vibration. Maitland mobilization grade II of 1-2 Hz were performed with three sets. The total time of procedure was approximately 10 minutes. Prone Push-up exercises were recommended for Group II. Subjects were instructed to do a prone Push -up exercise, with the participants using their upper limbs to push their upper body up into spinal extension, allowing their pelvis to drop and stay on the treatment couch. The participants were trained to change its position from prone to the maximum pain-free position before the participant proceeds to the preliminary position. Total Ten repetitions were completed. The total of 10 minutes time for the prone Push-up exercise was. Treatments were administered five times per week for four weeks and comprised of three sets of ten repetitions with 30-second break. Pain was measured with VAS and functional disability was measured with MODI questionnaire. Statistical analysis is done to examine the effect of the intervention applied to the Participants of both groups. For data analysis IBM SPSS.21.0 version was used. Statistical tools for parameters between the groups, independent sample t-test was used and for parameters within the same group paired sample t-test was used. All descriptive measures with p-value less than 0.05, (standard deviation, mean) was recorded.

## RESULTS

The table 1 showing that in group 1 the mean pre value of VAS is 7.73 and mean post value of VAS is 3.53. The mean pre value of MODI is 48.80 and mean post value of MODI is 22.90.

Paired Samples Statistics N=15		Mean ± SD	Std. Error Mean
Pair 1	pre value of VAS	7.73±2.154	.556
	post value of VAS	3.53±1.246	.322
Pair 2	pre value of MODI	48.80±13.518	3.490
	post value of MODI	22.93±7.478	1.931

**Table 1:** Paired sample T test of Group 1

The table 2 showing that in group 2 the mean pre value of VAS is 6.67 and mean post value is 5.20. The mean pre value of MODI is 49.33 and mean post value of MODI is 41.

Paired Samples Statistics N=15		Mean ± SD	Std. Error Mean
Pair 1	pre value of VAS in group 2	6.67 ± 1.915	.494
	post value of VAS in group 2	5.20 ± 1.568	.405
Pair 2	pre value of MODI in group 2	49.33 ± 15.017	3.877
	post value of MODI in group 2	41.33 ± 13.494	3.484

**Table 2:** Paired sample T test of Group 2

The table 3 shows that the mean post value of VAS in Maitland mobilization is 3.53 and mean post value of VAS in McKenzie prone Push-ups is 5.20. The mean post value of MODI in Maitland mobilization is 22.93 and the mean post value of MODI in McKenzie prone Push-ups is 41.33.

Group Statistics N= 15	study group of participants	Mean $\pm$ SD	Std. Error Mean
post value of VAS	Maitland mobilization	7.73 $\pm$ 2.154	.556
	McKenzie prone Push ups	3.53 $\pm$ 1.246	.322
post value of MODI	Maitland mobilization	48.80 $\pm$ 13.518	3.490
	McKenzie prone Push ups	22.93 $\pm$ 7.478	1.931

**Table 3:** Independent sample t-test

## DISCUSSION

In the past, the age range was from the 20s to the 50s. Individuals over the age of 50 are more prone to LBP (low back pain) due to induced physical variations in aging [16, 17]. Typically, each group was introduced to one key analgesic over a 4-week session. Once the within-group implicit score of the VAS) were studied, a statistically big magnitude was previously observed in each group prior to intervention implementation. Although he was 4 weeks post-intervention, he performed one assessment between groups, and he observed a significant statistical difference in pain relief among both groups. Posterior Anterior Spine Mobilization has proven the highest quality in a series of pain relief [18]. In the current study, the pain decrease levels calculated using the VAS is reliable with the individual usefulness of posteroanterior glide and prone push-ups, although results from previous studies like Powers *et al.*, suggest that both strategies It has been shown to reduce back pain [12, 13]. Repetitive motion identified by Mow and Hung is a concept that delivers synovial fluid to the intervertebral discs and articular cartilage, ensuing in to a lesser extent resistance to movement. patients can walk freely, resulting in much less pain [19]. It supports this study Powers *et al.*, After he gave 1-minute spinal mobilization courses to a patient with non-specific LBP, she found that minimized pain by 36% [12]. Similarly, as showed in this study Goodsell *et al.*, results of PA mobilization for non-specific LBP were further examined and suggested a typical reduction in pain of 33% [20]. The current study used 3 1-minute posteoanterior mobilizations at L3 level, L4 level, and L5 level to state a 7.1% rise in lumbar extension recorded with two liquid-based inclinometers. One more Bronfort *et al.*, review reported proof that spinal manipulation (SMT)/ (MOB) is prefer to conventional physician care for temporary pain relief [21]. This study also showed results in decreasing pain by spinal mobilization. The most frequently used questionnaire to assess disability in people with back pain is Modified Oswestry Disability Index (MODI) [15, 16]. MODI has displayed more reliability and is broad enough to reliably identify enhancement or decline in most participants. In an existing study, analysis of within-group Modified Oswestry Disability Index (MODI) skills showed statistically significant improvement once in each group, and the MODI score,

which represents improvement in pain and goal-directed activity, was significantly improved. showed a decrease. It was that the selection criteria limited generalizability. Impact on all back pain populations Patient activity stage is no longer considered

## CONCLUSIONS

In conclusion, existing randomized clinical trials provide evidence that the use of posteroanterior spinal mobilization and prone push-ups can help in reduce disability and relieve pain in patients with non-specific LBP. Furthermore, the results supported the benefit of early posteroanterior mobilization over prone push-ups for reducing disability and pain in patients with non-specific LBP.

## Authors Contribution

Conceptualization: SA

Methodology: IAZ, AAR

Formal analysis: NG

Writing-review and editing: IA, QI, SA

All authors have read and agreed to the published version of the manuscript.

## Conflicts of Interest

The authors declare no conflict of interest.

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