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Research Article

Comparision of the Effect of PA Spinal Glide and Extension Mobilisation Exercises on Pain, Disability and Lumbar Extension Rom in Non-Specific Low Back Pain

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ABSTRACT

Low back pain considered to be a multifactorial condition which often has non-specific cause which is affecting 85% population globally 2 and is often recurrent. Other than Cerebrovascular diseases, ischemic heart diseases, low back pain can significantly affect a person's quality of life. LBP is a common condition which is referred to primary care and physical therapy. There is various manipulation and mobilization techniques which can improved the quality of life and subsequently improve self-dependency of person with chronic LBP. This research aims to determine the comparison of the efficacy of PA spinal glide and extension mobilization in nonspecific low back pain.

Keywords: Cerebrovascular; chronic LBP; Myofascial; Muscle Energy Technique; Mobilisation

INTRODUCTION

Low back pain is often recurrent and non-specific and considered to be a multifactorial condition. The most common form of low back pain is non-specific low back pain when the path anatomical cause of the pain cannot be determined [1]. Non-specific low back pain (NSLBP) is pain not attributed to a recognizable pathology effecting in approximately 85% of population globally [2]. In 2013, the Global Burden of Disease Study 2013 established low back pain (LBP) as the first musculoskeletal disorder and the fourth leading condition, after ischemic heart disease, lower respiratory infections, and cerebrovascular disease that causes disability for the life years worldwide. LBP is a common condition, which is referred to primary care and physical therapy units [3]. Historically, classification of LBP, particularly used for research purposes, is being determined by the chronicity of the condition, e.g., "acute", "sub-acute", and "chronic". This classification accounts for symptom duration and it fails to capture the complexities associated with a patient's actual symptoms and the response of their symptoms to movement [4].

Inactivity and disability can be due to fear to initiate movement and reinjures [2]. Flexibility which indicates the range of each joint and is dependence upon the way muscle can be stretched and the joint anatomy. Reduction in flexibility ends up limiting the mechanical efficiency of the joint and increasing energy expenditure. With regard to spine's mobility, when it is reduced indicates higher possibility of back pain [5].

According to Williams' theory of LBP, prolonged sitting causes back extensor muscle tightness, resulting in LBP due to overstressed lumbar spine. Back extensor muscles are considered postural muscles that aid in maintaining upright standing posture and controlling lumbar forward bending. Several studies have reported a significant decrease in back extensor muscle endurance in patients with LBP [6].

The conservative treatment of low back pain includes electrotherapy, exercise therapy and manual therapy. Manual therapy includes Maitland's spinal mobilisation, Mulligan's Mobilisation with Movement, soft tissue techniques like Muscle Energy technique, Positional Release therapy, myofascial release, neuromuscular technique [2]. Joint mobilizations in the spine are used as an integral part of the treatment and rehabilitation. An intricate relationship exists between the para-spinal musculature of the lumbar spine and the mechanical structures involved in the movement of the spinal segments [7].

Joint mobilization techniques are considered to benefit patients with lumbar mechanical dysfunction through the stimulation of joint mechanoreceptors. These receptors are reported to alter the pain-spasm cycle through the presynaptic inhibition of

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nociceptive fibers in associated structures and the inhibition of hypertonic muscles, which ultimately improves functional abilities [8].

Low back pain affects men and women equally [9]. People who report low back pain often have reduced spinal motion. When motion is limited, spinal extension is frequently more restricted than flexion. Reduced spinal extension can be the result of pain or stiffness and can be classified as being either general (total spine) or segmental (one vertebral level). Spinal mobilization techniques and range-of-motion exercises often are prescribed by physical therapists in an attempt to improve lumbar extension and ultimately reduce low back pain [7].

Mobilisation treatment may vary in terms of the target vertebral level, the point of contact with the spine and the characteristics of the applied force. In the manual assessment of the patient, the therapist assesses the mechanical response of the spine by relating the amount of force applied to the displacement produced and the patient is also questioned about symptom provocation. The response at one level is compared with adjacent spinal levels and subsequently, the treatment is delivered specifically to that spinal level. Some evidence supports this approach finding was spinal mobilisation applied to the therapist-selected level is more effective in reducing pain than spinal mobilisation treatment applied to a randomly selected spinal level [10].

Therefore, it is necessary to use techniques to increase the mobility of the lumbar region, such as the spinal mobilization of Maitland which is between the central poster anterior pressures (PA), which has the action of reducing muscle spasm and reduce LBP, especially when it is present with the same intensity on both sides. The PA is performed on the spinous process, can interfere with some factors such as lumbar mobility [5].

In the McKenzie method, repeated movements in specific directions are used to determine the direction of movement which positively or negatively affects the patient's symptoms [4]. McKenzie stated that all spinal mechanical pain can be classified into three syndromes: the postural, dysfunction and derangement syndrome. Both diagnosis and treatment are based on the symptom's behavior observed during and after repeated movement. The postural faults lead to soft tissue dysfunction being loss of lumbar extension [2]. Clinically, it was often observed that the pain can be increased or decreased by making different movements or assuming certain positions. It has gained wide acceptance in evaluation and treatment of patients with low back pain, with and without referred leg symptoms [11]. McKenzie and May targeted general spinal motion in which a press-up exercise is used as a means of increasing spinal motion. Therefore, Extension mobilisation technique is frequently used to rehabilitate patients with back dysfunction which resulted in increased spinal mobility and in turn leads to low back pain improvement [2].

METHODOLOGY

Study design: A comparative study design was used for the present study.

Sample size: a total of 30 subjects were recruited

Study centre and location: Sarvodaya Hospital, sector 8 Faridabad

Sampling: the subjects were selected through convenient sampling

Duration: the study duration was thrice a week for 2 weeks.

Inclusion criteria

- Age group between 18-35 years
- Both males and females
- Oswestry disability index (ODI) SCORE BETWEEN 20-41%
- Body mass index (BMI) between 18.5-29.4 kg/m2
- Subjects with low back pain between 6-12 weeks

Exclusion criteria

- Any history of previous spinal injury
- Subjects in past had taken epidural injection
- Low back pain because of any specific pathology like spinal infections, spinal malignancy
- Low back pain related to prenatal & post-natal period
- Any musculoskeletal disorders like intervertebral disc prolapses (PIVD), spondylolisthesis, spondylosis, rheumatic joint disease
- Neurologic deficit like radiating pain, altered sensation and sensory loss

Variables

- Independent variable: central PA Spinal glide & extension mobilisation technique
- Dependent variable: disability, lumbar extension ROM and pain

DATA ANALYSIS

Data analysis was done with the help of SPSS v20. Descriptive statistics (mean and standard deviation) was used for demographic data.

Within group analysis was done using paired t- test. Between groups analysis was done by using independent t-test.

The p-value was kept less than 0.05. The variables were significant if P value was less than 0.05.

RESULT

Demographic data

The demographic details of the subjects included in the study are depicted in the following table.

Table 1: Demographic characteristics of the subjects.

GROUP	MEAN ± SD	FEMALES	MALES
Group-A PA Glide	22.2 ± 2.75	8	7
Group-B Extension Mobilisation	22.2 ± 2.90	8	7

Table 2: Within group analysis for Group-A (PA Glide).

VARIABLES	PRE (MEAN ± SD)	POST (MEAN ± SD)	t- value	p- value
Modified modified Schober test (cm)	2.62 ± 0.03	1.08 ± 0.19	15.56	0.000**
ODI (percentage)	30.26 ± 2.15	10.40 ± 2.41	42.57	0.000**
VAS (cm)	5.40 ± 0.50	1.86 ± 0.63	16.41	0.000**

*p ≤ 0.05, **p ≤ 0.01

Within group analysis for group-A (PA Spinal Glide

Modified modified Schober method for lumbar extension range of motion was tested on pre and post intervention of group A the mean values were 2.62 ± 0.03 cm and 1.08 ± 0.19 cm. The result showed statistically significant difference between pre and post intervention (t=15.56, p ≤ 0.05).

ODI for disability was tested on pre and post intervention of group A the mean values were 30.26 ± 2.15 percentage and 10.40 ± 2.41 percentage and the result showed statistically significant difference between pre and post intervention (t=42.57, p ≤ 0.05).

VAS for pain was tested on pre and post intervention of group A. The mean values for group A were 5.40 ± 0.50 cm and 1.86 ± 0.63 cm and the result showed statistically significant difference between pre and post intervention (t=16.41, p ≤ 0.05).

Table 3: Within group analysis for Group-B (Extension Mobilisation).

VARIABLES	PRE (MEAN ± SD)	POST (MEAN ± SD)	t- value	p- value
Modified modified Schober test (cm)	2.20 ± 0.63	0.78 ± 0.08	8.55	0.000**
ODI (percentage)	30.13 ± 1.92	8.60 ± 1.18	53.72	0.000**
VAS (cm)	5.33 ± 0.89	2.93 ± 0.70	8.29	0.000**

*p ≤ 0.05, **p ≤ 0.01

Within group analysis for Group-B (Extension Mobilisation Technique

Modified modified Schober method for lumbar extension range of motion was tested on pre and post intervention of group B. The mean values were 2.20 ± 0.63 cm and 0.78 ± 0.08 cm. The result showed statistically significant difference between pre and post intervention (t=8.55, p ≤ 0.05).

ODI for disability was tested on pre and post intervention of group B. The mean values were 30.13 ± 1.92 percentages and 8.60 ± 1.18 percentages and the result showed statistically significant difference between pre and post intervention. (t=53.72, p ≤ 0.05)

VAS for pain was tested on pre and post intervention of group B. The mean values for group B were 5.33 ± 0.89 cm and 2.93 ± 0.70 cm and the result showed statistically significant difference between pre and post intervention. (t=8.29, p ≤ 0.05).

Table 4: Between group analysis using independent T-test

COMPARISON	PA GLIDE (MEAN ± SD)	EXTENSION MOBILISATION (MEAN ± SD)	t- value	p- value

Modified modified Schober test (cm)	1.08 ±0.19	0.78 ±0.08	5.37	0.00**
ODI(percentage)	10.40 ±2.41	8.60 ±1.18	2.59	0.01**
VAS (cm)	1.86 ±0.63	2.93±0.70	-4.34	0.05*

*p ≤ 0.05, **p ≤ 0.01

The mean values for MMSM cm for lumbar extension ROM for PA Glide post intervention were 1.08 ± 0.19 cm. whereas the mean values for MMSM for lumbar extension ROM for extension mobilisation technique post intervention were 0.78 ± 0.08. The result showed statistically significant difference between PA glides and extension mobilisation technique post intervention. (t=5.37, p ≤ 0.05).

The mean values for ODI percentage for disability for PA glide post intervention were 10.40 ± 2.41%. Whereas the mean value for ODI percentage for disability for extension mobilisation technique post intervention was 8.60 ± 1.18%. The result showed statistically significant difference between PA glides and extension mobilisation technique post intervention. (t=2.59, p ≤ 0.05).

The mean values for VAS (cm) for pain for PA glide post intervention were 1.86 ± 0.63 cm. whereas the mean value for VAS (cm) for pain for extension mobilisation technique post intervention was 2.93 ± 0.70 cm. the result showed statistically significant difference between PA glides and extension mobilisation technique post intervention. (t=-4.34, p ≤ 0.05).

Figure 1: Modified schober method (Lumbar Extension Rom) pre and post of PA glide and Extension mobilization technique.

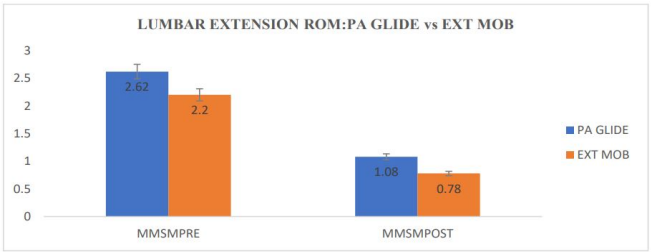


Figure 2: Oswestry disability index pre and post of PA glide and Extension mobilisation technique.

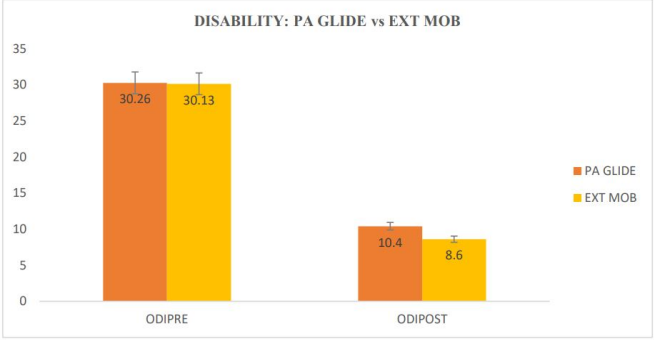
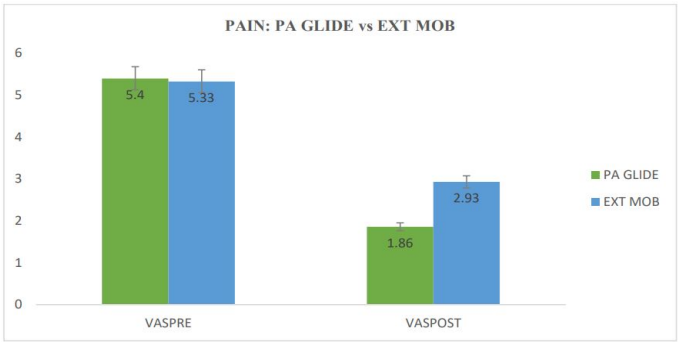


Figure 3: Visual analog scale pre and post of PA glide and Extension mobilisation technique.



DISCUSSION

In the present study it was intended to compare the effect of PH final glide and extension mobilization technique on disability and lumbar extension range in nonspecific low back pain days.

The mean age group of 30 subjects was 22.2 ± 2.90 years. 16 females and 14 females participated in the study with min BMI 21.9 ± 1.69 kg/m^2.

The pain was measured by VAS (cm) (olaogun et al; 2004). In PA spinal glide group significant relief of pain was noted as was decreased by 3.4 ± 0.13 between pre and post intervention. Before the treatment the pain was 5.40 ± 0.50, t-16.41, p<-0.05 Table 2 and after the treatment was 1.86 ± 0.63, t=16.41, p<0.05 Table 2, Figure 3. The pre measurement was taken before the start of the treatment and post intervention was measured on the 6th day. The reduction in the pain was higher and after 6 sessions as compared to the single session and lower after 6 sessions as compared to the seven sessions. Moreover, single session of spinal mobilization as seen in the previous study has shown statistically significant improvement in pain but not clinically relevant improvements. Hence, this proves the several sessions of spinal mobilization are necessary to produce clinically relevant results [12-15].

The Range of motion (ROM) was measured by MMSM (cm) (Williams et al; 1993). Significant improvement of lumbar motion was found in PA spinal glide group. The ROM of extension increased measured by MMSM was 1.5 ± 0.14 cm was noted. Before the treatment the range of motion was 2.62 ± 0.33 cm, t=15.56, p <0.05 Table 2 and after the treatment it was 1.08 ± 0.19 cm, t=15.56, p<0.05 Table 2, Figure 1. The pre measurement was taken before the treatment and final measurement was taken on the 6th day after the intervention. The improvement in Lumbar motion was higher as compared to

the single session and slightly more improved with seven sessions.

The disability was measured by ODI (in percentage) (Vianin; 2008). Significantly reduction in disability school was found in PA spinal glide group. The reduction of disability between pre and post measured by ODI was 19.86 ± 0.26%, t=42.57, p<0.05 Table 2. Before the treatment the disability score was 30.26 ± 2.15%, t=42.57, p<0.05 Table 2, Figure 2 and post measurement was taken on 6th day of intervention [17].

In EMT group the pain was also measured by VAS (cm). Significant relief of pain was also noted as decreasing by 2.4 ± 0.19 cm was measured between pre and post treatment. In pre assessment the pain was measured by VAS was5.33 ± 0.89 cm, t=8.29, p<0.05 Table 3 and after the post treatment was 2.93 ± 0.73, t=8.29, p<0.05 Table 3, Figure 3.

Significant improvement of lumbar motion was noted by MMSM (cm) by increasing the lumbar extension range of motion by 1.40 ± 0.2 cm between pre and post intervention. Before the pre intervention the lumbar extension range was 2.20 ± 0.63 cm, t=8.55, p<0.05 Table 3 and after the post treatment that is on 6th day of two week the final number extension range was 0.78 ± 0.83 cm, t=8.55, p<0.05 Table 3, Figure 1.

Significant reduction of disabilities core was also noted which was measured by OLBPDQ between pre and post treatment was reduced by 21.53 ± 0.74%. Before the pre-treatment the score of disability was 30.13 ± 1.92%, t=53.72, p<0.05 Table 3 and after the post treatment on 6th day of final treatment of two weeks the score was 8.60 ± 1.18%, t=53.72, p<0.05 Table 3, Figure 2.

Between PA spinal glide group and EMT group, both interventions showed statistically significant improvement in term of pain measured by VAS (cm). There was average decrease of pain by 1.86 ± 0.63 on PA spinal glide and 2.93 ± 0.70 on EMT, t=-4.34, p<0.05 Table 4.

According to Chiradejnant et al; 2003 stated that spinal mobilization was associated with better outcomes when applied to lower lumbar spinal levels (L4-L5) had a greater analgesic effect [10,18].

Between PA spinal glide group and EMT group, both interventions showed statistically significant in increasing the Lumbar extension range of motion measured by MMSM (cm). The average increase in lumbar extension of range of motion by 1.08 ± 0.19 cm on PA glide and 0.78 ± 0.83 cm on EMT, t=5.73, p<0.05 Table 4.

Verma at all, 2013 stated that comparing the effect of Lumbar mobilization with exercise and exercise alone showed that Lumbar mobilization along with exercise was responded favourably to the intervention. Clinically and statistically relevant improvement was observed which was significant in both 2 weeks and 4 weeks. Therefore, mobilization can be incorporated for reduction of pain and improvement of ROM and strength in patients with mechanical low back pain [7,19].

Between PA spinal glide group and CMT group both interventions showed statistically significant in reduction of disabilities score measured by OLBPDQ (percentage). The average reduced in disability by 10.40 ± 2.41% on PA glide and 8.60 ± 1.18% on EMT, t=2.59, p<0.05 Table 4.

Brian M et al, 2006 stated that McKenzie therapy results in a decrease in short term (less than 3 months) pain and disability for low back pain patients compared with other standard treatments such as nonsteroidal anti-inflammatory drugs, educational booklet, back massage with back care advice strength training with therapist supervision and spinal mobilization. No statistical differences were found between McKenzie therapy and other therapies at intermediate term (3 to 12 months) follow up [20].

Pain reduction in present study following PA glide was 78% approximately which was consistent with findings of other studies and there was 65% reduction of pain in EMT.

Lazier et al, 2012 stated that in incidence and mechanism of NSLBP, the most effective type of exercises for chronic and acute low back pain are still controversial; however, exercise therapy is probably the most widely used conservative treatment throughout the world [16].

Research has shown that non-specific low back pain is not just an old is phenomena but a problem common even among young and Middle-aged people [22].

Alone with the intervention there was moist heat pack and exercise was taught to participants in both PA spinal glide group and EMT group. French et al; 2006 stated that there were few studies had been published evaluating the effect of superficial heat or cold for low back pain [23]. The evidence base to support this common practice was not strong. But there was moderate evidence that continuous heat wraps therapy reduces in pain and disability in short-term in a mixed with acute and sub-acute low back pain up to three months and addition of exercises further reduces in pain and improve function. There was enough insufficient evidence about the effect of application of cold for LBP of any duration [24].

LIMITATION

- The finding of the study cannot be generalized to all lower back pain patients as the participants with only nonspecific low back pain were considered.
- Normal ranges of BMI 18-24.9 were only taken in the study participants.
- Age group was mostly between 18-27 years.
- Gender differences were not compared.

CONCLUSION

In conclusion, the present study provides an evidence to support the use of lumbar mobilization along with the exercises for the management of patients with low back pain, who responded favorably to the intervention. Clinically at 2 weeks and statistically relevant improvements were observed that in both the groups which are comparable to each other. Hence it can be concluded that both the intervention i.e. PA spinal glide and extension mobilisation are equally effective in reducing pain, disability and increasing lumbar extension ROM following 2 weeks protocol.

REFERENCES

1. Stamm TA, Boesendorfer A, Omara M, Ritschl V, Štefanac S, Mosor E. Outcomes research in non-specific low back pain. Wien Klin Wochenschr. 2019;131(21):550-557.
2. Shah SG, Kage V. Effect of seven sessions of posterior-to-anterior spinal mobilisation versus prone press-ups in non-specific low back pain–randomized clinical trial. J Clin Diagnostic Res. 2016;10(3):YC10.
3. Calvo-Lobo C, Fernández JM, Becerro-de-Bengoa-Vallejo R, Losa-Iglesias ME, Rodríguez-Sanz D, López PP, et al. Relationship of depression in participants with nonspecific acute or subacute low back pain and no-pain by age distribution. J Pain Res. 2017;10:129.
4. Abe KY, Tozim BM, Navega MT. Acute effects of Maitland's central posteroanterior mobilization on youth with low back pain. Man Ther Posturology Rehabil J. 2015:1-5.
5. Nourbakhsh MR, Arab AM. Relationship between mechanical factors and incidence of low back pain. J Orthop Sports Phys Ther. 2002;32(9):447-460.
6. Verma Y, Goyal MN, Narkeesh D. Pain, range of motion and back strength in chronic mechanical low back pain before & after lumbar mobilisation. Int J Physioth Res. 2013;3:48-57.
7. Hanrahan S, Van Lunen BL, Tamburello M, Walker ML. The short-term effects of joint mobilizations on acute mechanical low back dysfunction in collegiate athletes. J Athl Train. 2005;40(2):88.
8. Mitra M, Mande M. Effectiveness of Core Stabilization Training with Pressure Biofeedback in the Management of Mechanical Low Back Pain in Subjects Between Age Group of 20-25 Years. Executive Editor. 2019;13(1):82.
9. Chiradejnant A, Maher CG, Latimer J, Stepkovitch N. Efficacy of "therapist-selected" versus "randomly selected" mobilisation techniques for the treatment of low back pain: a randomised controlled trial. Aust J Physiother. 2003;49(4):233-241.
10. Schmidt I, Rechter L, Hansen VK, Andreasen J, Overvad K. Prognosis of subacute low back pain patients according to pain response. Eur Spine J. 2008;17(1):57-63.
11. Chiarotto A, Boers M, Deyo RA, Buchbinder R, Corbin TP, Costa LO, et al. Core outcome measurement instruments for clinical trials in nonspecific low back pain. Pain. 2018;159(3):481.
12. Coulter ID, Crawford C, Hurwitz EL, Vernon H, Khorsan R, Booth MS, et al. Manipulation and mobilization for treating chronic low back pain: a systematic review and meta-analysis. Spine J. 2018;18(5):866-879.
13. Furtado RN, Ribeiro LH, Abdo BD, Descio FJ, Martucci CE, Serruya DC. Dor lombar inespecífica em adultos jovens: fatores de risco associados. Rev Bras de Reumatol. 2014;54:371-377.
14. Adams MA. Biomechanics of back pain. Acupunct Med. 2004;22(4):178-188.
15. Lizier DT, Perez MV, Sakata RK. Exercises for treatment of nonspecific low back pain. Braz J Anesthesiol. 2012;62(6):838-846.
16. Olaogun MO, Adedoyin RA, Ikem IC, Anifaloba OR. Reliability of rating low back pain with a visual analogue scale and a semantic differential scale. Physiother Theory Pract. 2004;20(2):135-142.
17. Williams R, Binkley J, Bloch R, Goldsmith CH, Minuk T. Reliability of the modified-modified Schöber and double inclinometer methods for measuring lumbar flexion and extension. Phys Ther. 1993;73(1):26-37.
18. Vianin M. Psychometric properties and clinical usefulness of the Oswestry Disability Index. J Chiropr Med. 2008;7(4):161-163.
19. Bijur PE, Silver W, Gallagher EJ. Reliability of the visual analog scale for measurement of acute pain. Acad Emerg Med. 2001;8(12):1153-1157.
20. Chenot JF, Greitemann B, Kladny B, Petzke F, Pfingsten M, Schorr SG. Non-specific low back pain. Dtsch Ärztebl Int. 2017;114(51-52):883.
21. Koes BW, Van Tulder M, Thomas S. Diagnosis and treatment of low back pain. BMJ. 2006;332(7555):1430-1434.
22. McKenzie RA, May S. The lumbar spine. Mechanical diagnosis & therapy. 1981;1:374.
23. Chopade P. Comparison of Maitland's mobilisation and Mckenzie therapy in patients with nonspecific low back pain. Int J Biol Med Res. 2018;9(2):6270-6277.
24. Mafuyai MY, Babangida BG, Mador ES, Bakwa DD, Jabil YY. Postural theory of non-specific low back pain (NSLBP). World Appl Sci J. 2013;28(10):1437-1443.