

Journal of Molecular Science

www.jmolecularsci.com

ISSN:1000-9035

Effect of lumbar Maitland Mobilization in Knee Osteoarthritis

Kanika Sharma¹, Dr. Keerthi Rao²¹Department of Physiotherapy (UIAHS), Chandigarh University, Gharuan Mohali, Punjab.²Professor, Department of Physiotherapy (UIAHS), Chandigarh University, Gharuan Mohali, Punjab.

Email: Keerthi.e12587@cumail.in

Article Information

Received: 21-05-2025

Revised: 16-06-2025

Accepted: 09-07-2025

Published: 21-07-2025

Keywords

Global population, healthcare, pensions, and eldercare services.

ABSTRACT

Global population growth has been important role over the past century. As of 2021, the world population was expected around 7.8 billion people. This figure showed the long-term shift of decreasing of mortality rates, increased life expectancy, and improvements in healthcare and agriculture. The increase the improvement in life span, fertility rate and reduction in child and infant mortality has grown the total world population. India is currently the most populous country in the world, having surpassed China in 2023. The aging population in India is also growing rapidly due to do improvements in healthcare and living standards. As of now, over 76.6 million people in India are aged 60 or older and This age group represents more than 10 per cent of India's total population. As projections suggested that by 2050, over 19 per cent of India's population could be above 60 years. The fastest growth is among the "oldest-old" (aged 80+), which has major implications for healthcare, pensions, and eldercare services.

INTRODUCTION

Osteoarthritis (OA) is the most common type of arthritis and the leading cause of disability that impacts the elderly and middle-aged worldwide. Knee Osteoarthritis (KOA) is a musculoskeletal condition affecting mostly older people. The exact causes of osteoarthritis are unknown however there are a number of factors that are commonly associated with the onset of the disease. Identify the effectiveness of Lumbar Mobilization for Osteoarthritis knee. Studying the effect of Lumbar Mobilization on knee Osteoarthritis (OA) explores the potential connections between Lumbar spine health and knee joint function.

If Lumbar mobilization proves effective, it could offer a non-pharma logical option to manage pain and improve function, potentially reducing reliance on pain medication. Existing studies might not fully explore the impact of Lumbar Mobilization on Knee Osteoarthritis. Conducting this research can fill a crucial gap in the literature, providing more comprehensive insights into the interplay between spinal and knee joint health. It can help determine whether improvements in lumbar spine function translate into reduced knee pain, improved joint function, or enhanced overall mobility. Effective Lumbar Mobilization might contribute to pain relief and improved functional outcomes in knee Osteoarthritis patients. This could lead to better quality of life and increased mobility for individuals.

To study the effect of Lumbar Mobilization on Pain, Range of motion and Activity of Daily living in Osteoarthritis Knee Patient.

- To determine the effect of 3 weeks protocol of Lumbar mobilization on Pain.
- To determine the effect of 3 weeks protocol of Lumbar mobilization on Range of Motin.

©2025 The authors

This is an Open Access article distributed under the terms of the Creative Commons Attribution (CC BY NC), which permits unrestricted use, distribution, and reproduction in any medium, as long as the original authors and source are cited. No permission is required from the authors or the publishers. (<https://creativecommons.org/licenses/by-nc/4.0/>)

- To determine the effect of 3 weeks protocol of Lumbar mobilization on Activities of daily in patient with Osteoarthritis knee.

Literature Review:

Panchbudhe et.al (2021) showed that evaluate the effect of Maitland Mobilization and Conventional treatment are efficient in knee Osteoarthritis. The result of study demonstrates that the use of physical therapy regimen in the form of Maitland Mobilization with Conventional therapy is more effective than conventional treatment alone in relieving pain, improving range of motion and functional well-being in subjects with knee Osteoarthritis.

Sheth M.S.et .al (2015) Conducted experimental study to compare the immediate effectiveness of two different Maitland protocols on pain, pressure threshold (PPT) and range of motion (ROM). 24 subjects with knee osteoarthritis selected randomly divided into two groups (A and B) receiving 3 repetitions of Maitland mobilization of the knee joint each of 1 minute duration and 1 repetition of 3 minutes duration respectively. It concludes that both the protocols may be used for pain relief and improvement in ROM for subjects with osteoarthritis. For a greater improvement in the ROM, Maitland mobilization may be given for three repetitions of 1 minute each with a 30 second break between each repetition.

Chellish S et.al (2010) in his study was to find Effectiveness of combined Maitland mobilization and Thera Band exercise in subjects with osteoarthritis of knee. 30 subjects who were diagnosed by an orthopaedician as having osteoarthritis of knee joint and who showed restriction of Range of motion, pain and loss of function were randomly taken, divided into two groups each of 15 subjects. Group A Treated with Maitland Mobilization alone along with TENS. Group B Treated with Maitland Mobilization combined with TheraBand exercise along with TENS. This study concludes that Maitland mobilization and TheraBand exercise (Group B) appears to be more effective in relieving pain, stiffness and dysfunction and improving knee joint range of motion as compared to Maitland mobilization (group A).

Kiran A et.al (2022) study that determine the efficacy of Mulligan's mobilization with movement (MWM) with Maitland mobilization along with conventional therapy in the patients with knee osteoarthritis (OA). In study there were 62 patients were selected for the study into 2 groups. MWM was introduced in half of the patients and Maitland mobilizations in the second half for 2 weeks. The

goniometry, visual analog scale (VAS), knee range of motion (ROM), and Western Ontario McMaster OA (WOMAC) Index for knee OA were the assessment tools used to assess all patients before and after 2 weeks of intervention. Paired sample t test was used for analysis of results. The study concluded that patients in both groups showed improvement in pain, ROM, and functions.

Mobilization techniques seem to have intensive role in adhesive capsulitis treatment, however, there is further need to conduct controlled trial figuring out effectiveness of end range mobilization techniques in frozen shoulder syndrome. There are many research reports advocating good effects of mobilization with movement techniques. The most reported effect is immediate reduction in pain and improved shoulder function. The dramatic effects, however, raise questions about mechanism of action of these techniques. Current literature review answers these questions and also further proves the claim of effectiveness of mobilization with movement techniques.

METHODOLOGY:

The experimental study is designed to judging the degree to which they eliminate or minimize threats to experimental validity. Two categories are presented here.

- Pre –experimental design is the least effective, for the provided either no control group or no way of equating the groups that are used.
- Post experimental design employs randomization to provide for control of the equivalence of groups and exposure to treatment.

A complete discussion of experimental design would be too lengthy and complex for this introductory treatment. Therefore, only a relatively designs are described. In the study has chosen a parallel group (group a and b) design for conducting experiment in the present study. One experimental group received selected Knee exercise treatment and other experimental group received knee and lumber Maitland mobilization exercises. Pre-test and post-test programs were organized before and after an experimental period of 3 days in a week for overall 3 weeks period of time. The design is as follows.

R:	O1	-	X1	-	O2
R:	O3	-	X2	-	O4

Where;

R is randomization

X1 is knee pain treatment given to one experimental group

X2 is knee and lumber Maitland mobilization exercises (both) treatment given to another

experimental.

O1, O3, are pretests and O2, O4, are Post tests
 From the population, 60 Patients (as per G-Power version 3.1.9.2) of suffering from Grade 1 Knee Osteoarthritis declared by orthopedic doctor, were selected for the study. Sample was selected by using purposive sampling technique & there were 30 subjects distributed in each group. Samples were selected from the patients of Physiotherapy Solutions Clinic and Sports Complex Chandigarh university.

Including and excluding criteria for selecting patients include of these issues: suffering from Grade 1 Knee Osteoarthritis patients (as per Kellgren Lawrence grading), Medial compartment and Lateral compartment of knee will be included, Age between 35-50 years both males and females, didn't have any previous knee surgery history, didn't have neurological defects, didn't have systemic or psychological disorder and their low back pain was due to strain and sprain of the muscles. Orthopedic surgeon helped researcher to find out the subjects for his research to give treatments of inversion therapy as well as hydrotherapy exercise. These men were certified by orthopedic surgeon that they can go under this particular treatment.

The researcher has study about all patients who were suffering from knee pain with Grade 1 Osteoarthritis. Those patients were selected, are divided into Two groups randomly viz. two experimental groups, each consisting of 25 Patients. After discussing with the experts and reviewing literature, the duration and repetitions of selected Maitland Mobilization were fixed and

accordingly the training program was planned. The entire study or training program was conducted in three phases. Phase I is related to Pre-test; second phase is related to Maitland Mobilization and Knee treatment program of 3 weeks and third phase is related to Post-test. Pre-test consists of VAS Score to measure pain, Katz index to check ADLs of Patients and With Goniometer to measure Range of Motion of Knee (Flexion and Extension). In the second phase, sessions are conducted 3 days a week for 3 weeks protocol. The exercise program included knee exercises and lumbar Maitland mobilization. The treatment will be given on alternate days, with 9 such visits over a period of 3 weeks (3 visits per week) with a one Group of patients which includes knee exercise protocol. After the completion of 3 weeks treatment programs the post test was conducted on all the subjects of experimental groups as the pre-test. The data were collected and recorded carefully.

FINDINGS AND CONCLUSION:

Statistical analysis was done using SPSS version 16. The data was found to be normally distributed. The statistically analysis was based on pre and post assessment test. Therefore, paired t test was applied to find whether there was a significant difference within the groups. There was statistically significant difference within the groups for both pre and post VAS, katz index and ROM. It was found that group-b the protocols are more effective in improving the decrease in pain, ADLs and range of motion as there was no statistically significant difference between the groups-b. But Group A was found to be effective in improving the VAS, ADLs and ROM but less than Group B. The results are as shown in the following tables.

Table-1 (Paired Samples Statistics GROUP -A)

Pair number	Pair name	Mean	N	Std. Deviation	Std. Error mean
1	Vas pre	7.40	25	1.000	0.200
	Vas post	4.04	25	1.060	0.212
2	Katz index pre	3.32	25	1.282	0.256
	Katz index post	5.04	25	0.889	0.178
3	Rom flexion pre	104.72	25	18.320	3.664
	Rom flexion post	126.40	25	7.927	1.585
4	Rom extension pre	-9.80	25	7.286	1.457
	Rom extension post	-3.80	25	4.153	0.831

In table 1 showed the mean value of pre test of vas was more than post test of vas. It showed that the pain of patient was reduced from 7.40 mean to 4.04 of group-a after treatment. In the next ADLs showed the daily activity of patient was increased from 3.32 mean value to 5.04 after treatment. Same pattern showed in the other variable i.e ROM increase after treatment in the case of flexion and extension of ROM. In the table 2 showed the same

pattern as in table 1 but table 2 showed more improvement as compared the table 1.

Table-2 (Paired Samples Statistics GROUP -B)

Pair number	Pair name	Mean	N	Std. Deviation	Std. Error mean
1	vas pre	7.00	25	1.258	0.252
	vas post	2.28	25	1.696	0.339
2	katz index pre	4.08	25	1.579	0.316
	katz index post	5.64	25	0.700	0.140
3	rom flexion pre	110.92	25	21.743	4.349
	rom flexion post	131.36	25	8.195	1.639
4	rom extension pre	-7.40	25	7.234	1.447
	rom extension post	-1.00	25	3.536	0.707

Table-3 (Comparison of Correlation between Group A &B)

Pair Name	Paired Samples Correlations GROUP-A			Paired Samples Correlations GROUP B		
	N	Correlation	Sig.	N	Correlation	Sig.
Vas Pre & Vas Post	25	0.613	0.001	25	0.820	0.000
Pre & Post Katz Index	25	0.668	0.000	25	0.756	0.000
Pre & Post ROM Flexion	25	0.847	0.000	25	0.831	0.000
Pre & Post ROM Extension	25	0.635	0.000	25	0.887	0.000

ROM Extension						01
---------------	--	--	--	--	--	----

Table-3 showed the correlation between two groups of the sampling. In pain (VAS) there is **Positive correlation** between pre- and post-scores ($r = 0.613$) but not strong correlation as Group-B. In the same pattern was showed among the other variables except in pre and post ROM flexion.

Table-4 (Paired Samples Test GROUP A)

Pair Name	Paired Differences					t	df
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference			
				Lower	Upper		
Pre & Post VAS	3.360	0.907	0.181	2.985	3.735	18.515	24
Pre & Post Katz Index	-1.56	0.843	0.169	-2.068	-1.372	-10.21	24
Pre & Post ROM Flexion	-21.680	12.348	2.470	-26.777	-16.583	-8.779	24
Pre & Post ROM Extension	-6.000	4.082	0.816	-7.685	-4.315	-7.348	24

Table-5 (Paired Samples Test GROUP B)

Pair Name	Paired Differences					t	df
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference			
				Lower	Upper		
Pre & Post VAS	4.720	0.980	0.196	4.316	5.124	24.087	24
Pre & Post Katz Index	-1.72	1.227	0.245	-2.067	-1.053	-6.355	24
Pre & Post ROM Flexion	-23.440	15.613	3.123	-26.885	-13.995	-6.546	24
Pre & Post ROM Extension	-6.400	5.686	1.137	-8.747	-4.053	-5.628	24

Group-A Result Interpretation:**1. Pain (VAS):**

The result showed the mean pain of patient was reduced from 7.40 to 4.04 and have **Positive correlation** between pre- and post-scores ($r = 0.63$) but not strong correlation as Group-B. but the value of $t(24) = 18.515$, $p < .001 \rightarrow$ Significant pain reduction, but **less than Group B**.

2. Katz Index:

The results showed the Katz Index value of group-a increased from 3.32 to 5.04. the value of $t(24) = -10.206$, $p < .001 \rightarrow$ Very strong improvement in daily living activities.

3. ROM – Flexion:

The results showed the value of ROM flexion improved from 104.72 to 126.40 . and the value of

$t(24) = -8.779$, $p < .001 \rightarrow$ Significant improvement.

4. ROM – Extension:

The results showed the value of ROM flexion improved from -9.80 to -3.80 . The value of $t(24) = -7.348$, $p < .001 \rightarrow$ Significant gain.

Group B Results Interpretation**1. Pain (VAS):**

The result showed the mean pain of patient was reduced from 7.00 to 2.28 and have **strong correlation** between pre- and post-scores ($r = 0.82$). but the value of $t(24) = 24.087$, $p < .001 \rightarrow$ Significant pain reduction,

2. Katz Index (Functional Independence)

- Increased from 4.08 to 5.64.
- $t(24) = -6.355$, $p < .001 \rightarrow$ Significant functional improvement.

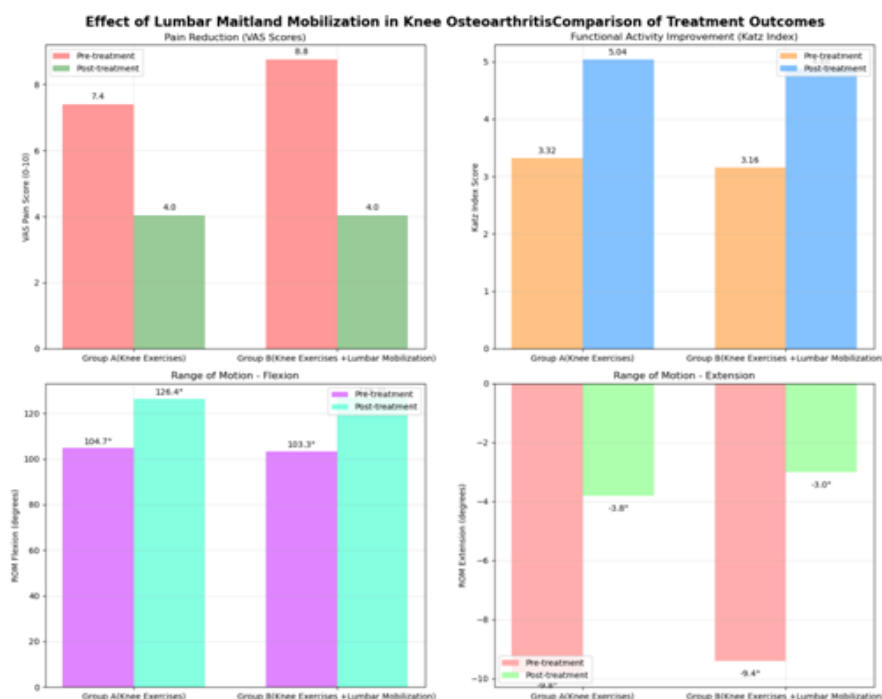
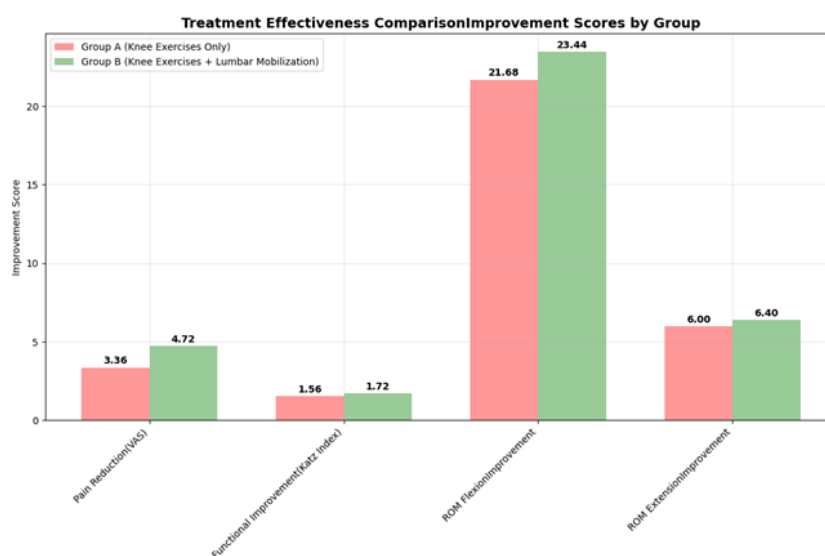
3. ROM (Range of Motion) - Flexion

- Increased from 110.92 to 131.36 .
- $t(24) = -6.546$, $p < .001 \rightarrow$ Significant improvement.

4. ROM - Extension

- Improved from -7.40 to -1.00 .
- $t(24) = -5.628$, $p < .001 \rightarrow$ Significant gain in extension range

Summary Comparison of Groups A & B			
Metric	Group A Improvement	Group B Improvement	Interpretation
VAS (PAIN)	-3.36	-4.72	Group B had greater pain relief
Katz Index	+1.56	+1.72	Slightly greater gain in Group B
ROM Flexion	+21.68	+23.44	Group B slightly better.
ROM Extension	+6.00	+6.40	Group B slightly better.



Here The study shows that both the protocols are effective in improving the patient's strength, reducing the pain and increasing the mobility. Both groups showed statistically significant improvements across all variables (pain, function, ROM). **Group B consistently outperformed Group A in pain reduction and ROM extension**, suggesting that the intervention applied to Group B may be more effective, particularly for pain management.

REFERENCES:

1. Sharma L. Osteoarthritis of the Knee[J]. N Engl J Med. 2021;384(1):51-59.
2. Richard D, Liu Z, Cao J. Evolutionary Selection and Constraint on Human Knee Chondrocyte Regulation Impacts Osteoarthritis Risk [J]. Cell. 2020;181(2):362-381.
3. Perruccio A V, Young J J, Wilfong J M. Osteoarthritis year in review 2023: Epidemiology & therapy[J]. Osteoarthritis Cartilage. 2024;32(2):159-165.
4. Singh N, Trivedi V, Kumar V. A Comparative Study of Osteoarthritis Knee Arthroscopy versus Intra-Articular Platelet Rich Plasma Injection: A Randomised Study[J]. Malays Orthop J. 2022;16(2):31-40.
5. Brophy R H, Fillingham Y A. AAOS Clinical Practice Guideline Summary: Management of Osteoarthritis of the Knee (Nonarthroplasty), Third Edition [J]. J Am Acad Orthop Surg. 2022;30(9):e721-e729.
6. Block J A, Cherny D. Management of Knee Osteoarthritis: What Internists Need to Know[J]. Med Clin North Am. 2021;105(2):367-385.
7. Marriott K A, Birmingham TB. Fundamentals of osteoarthritis. Rehabilitation: Exercise, diet, biomechanics, and physical therapist-delivered interventions[J]. Osteoarthritis Cartilage. 2023;31(10):1312-1326.
8. Küçükdeveci A A. Rehabilitation intervention in osteoarthritis[J]. Best Pract Res Clin Rheumatol. 2023;37(2):101846.
9. Fatimah I, Waqqar S. Effects of tibiofemoral mobilization in patients of Patellofemoral pain syndrome[J]. J Pak Med Assoc. 2021;71(11):2506-2510.
10. Saunders D G, Walker J R, Levine D. Joint mobilization[J]. Vet Clin North Am Small Anim Pract. 2005;35(6):1287-1316.
11. Sluka K A, Skyba D A, Radhakrishnan R. Joint mobilization reduces hyperalgesia associated with chronic muscle and joint inflammation in rats[J]. J Pain. 2006;7(8):602-607.
12. Subrat Samal, Shweta Panchbudhe, Snehal Samal, Mohini Dixit, Vasant Gawande. Efficacy of Maitland Mobilization and Conventional Treatment in Patients of Osteoarthritis of Knee, International Journal of Current Research and Review, 2019;13(7):132-137.
13. Priya Singh Rangey, Megha S. Sheth, Neeta J. Vyas. Comparison of Immediate Effect of Two Different Maitland Mobilization Protocols on Pain and Range Of Motion in Subjects with Osteoarthritis of Knee, International Journal of Medical and Health Research. 2015 Sep;1(2):26-29.
14. Chellish S.D. Effectiveness Of Combined Maitland Mobilization And Theraband Exercises In Subjects With Osteoarthritis Of Knee – An Experimental Study, thesis of MPT. 67-68.
15. Anika Kiran, Muhammad Junaid Ijaz, Muhammad Mustafa Qamar, Ayesha Basharat, Akhtar Rasu, Waqas Ahmed et al. Comparison of Efficacy of Mulligan's Mobilization with Movement with Maitland Mobilization along with Conventional Therapy in the Patients with Knee Osteoarthritis: A Randomized Clinical Trial, Libyan International Medical University Journal. 2018;3(1):28-30