

## Comparison between Maitland Mobilization with Conventional Physiotherapy and Mulligan Mobilization with Conventional Physiotherapy for the Treatment of Knee Osteoarthritis Patient at CRP

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### Abstract

**Purpose:** The study was conducted to identify and investigate the therapeutic effectiveness of Maitland mobilization along with conventional physiotherapy and Mulligan mobilization along with conventional physiotherapy for the treatment of knee osteoarthritis. This study has made the comparison, in order to discover the most effective treatment protocol to alleviate the symptoms of the condition.

**Objectives:** To assess the effect on pain after introducing of Maitland mobilization along with conventional physiotherapy Mulligan mobilization along with conventional physiotherapy for knee osteoarthritis patient, to measure the severity of pain by using Numeric pain rated scale (NPRS) to identify the severity of pain, to assess functional disability by western Ontario and McMaster Universities Index (WOMAC).

**Methodology:** A clinical trial was conducted. 14 samples were randomly selected into 2 groups from Musculoskeletal Unit, Physiotherapy Department, Centre for the Rehabilitation of the Paralysed (CRP), Savar. Initially all the subjects were assessed by Peripheral Assessment Form at the clinical settings and then data were collected by questionnaires, Numeric pain rated scale (NPRS) was used to assess pain intensity and using Western Ontario and McMaster Universities Index (WOMAC) for functional disability of the patients. Experimental Group A received of Maitland mobilization along with conventional physiotherapy while experimental Group B received Mulligan mobilization along with conventional physiotherapy.

**Results:** The study has used statistical analysis by paired t test and unrelated t test to compare the Experimental group A and Experimental Group B and analyses by interpreting the probability level of significance of t value. The results were found to be significant for t value.

**Conclusion:** The study concluded that the Mulligan mobilization with conventional physiotherapy technique is significantly capable of producing beneficial effects on pain reduction.

**Keywords:** Mobilization; Maitland Mobilization; Mulligan Mobilization; Osteoarthritis

### Introduction

Osteoarthritis (OA) is one of the common musculoskeletal problem worldwide and a chronic degenerative disorder with multifactorial etiology that is characterized by loss of articular cartilage, hypertrophy of bone at the margins, subchondral sclerosis and range of biochemical and morphological alteration of the synovial membrane and joint capsule [1].

OA affects 2,693 of every 100,000 women and 1770 of every 100,000 men [2]. Before 50 years of age, the prevalence of OA in most joints is higher in men than in women. After about 50 years of age women are more affecting with the hand, feet, spine, and weight-bearing

joint such as hip and knee than men and greater severity of OA [3]. Generally degenerative disorder occurs in the elder people, but in Bangladesh, it is very common in both males (53.3%) and females (60.9%) and the young individuals may be affected [4].

Knee osteoarthritis is a musculoskeletal problem and is associated with most common symptoms of pain, inflammation, instability, decreased range of motion and lowering the quality of life [5]. It is the most common cause of joint disorder and its prevalence increasing with age. The point of prevalence of knee OA in Australian population is 5 - 10% and India population is 22% to 39% [6]. The main complaints of OA patient are joint pain, morning stiffness, muscle weakness, loss of range of motion, instability and loss of functional ability such as walking, squatting, sit to stand, climbing stairs [7]. Nevertheless, the progression of the disease is usually slow leading to joint failure with pain and disability. Knee OA is a main source of chronic disability [8]. It also causes mark limitation in daily living activity (ADLs) of the patients [9].

In OA both drug and non-drug treatment are used, pain reduction and symptom improvement may be achieved by drug treatments but the drug treatment have side effects and drug overdose. Physiotherapy is concerned with maximizing mobility and improving quality of life by applying the appropriate intervention. Physiotherapy is directed towards the attainment of proper posture, improve muscle strength, which are achieved by using various approaches including manual therapy in the form of mobilization, strengthening exercises and stretching of soft tissues [10]. The aim of physical therapy for knee OA is to reduce pain, preserve joint physiology and maintain or recover normal activity of the joint [11].

Maitland and Mulligan's mobilization with movement is a manual therapy treatment technique that used in the spine, upper and lower extremity for management of various musculoskeletal conditions [10]. Maitland mobilization is applied to be effective in reducing pain and improving ROM in knee osteoarthritis. The mobilization based on V grade. According to Maitland's classification, Grade I and Grade II joint mobilizations are performed primarily to decrease joint pain and Grade III and Grade IV joint mobilizations are performed to increase joint ROM [12]. Mulligan's movement with mobilization is a manual therapy technique in which the therapist applied pain free accessory joint gliding force at right angle or parallel to a joint while a concurrent movement of the joint actively performed by the patient. Manual therapy techniques such as Mulligan mobilization improve joint proprioception. Mulligan's mobilization technique is more effective in reducing pain, joint stiffness and improving range of motion, walking distance and finally the quality of life in patients with knee Osteoarthritis [6].

## **Aim of the Study**

The aim was to identify and investigate the therapeutic effectiveness of Maitland mobilization along with conventional physiotherapy and Mulligan mobilization along with conventional physiotherapy for the treatment of knee osteoarthritis.

## **Materials and Methods**

This study was a Clinical Trail. The patients were selected by simple random sampling from musculoskeletal unit, Physiotherapy Department, CRP, Savar, Dhaka. The inclusion criteria were: participants' willingness to participate, both sexes are included, unilateral or bilateral knee OA that can affect one or both limb, crepitus on active joint motion., reduce ROM of knee joint.

The participants who has history of taking physiotherapy intervention, oral NSAID or corticosteroid injection previously, who has deformity of the knee, subjects who were mentally unstable, neuromuscular disease, pregnancy, angina, prior surgery were excluded from this study.

The researcher used computerized random sampling procedure for this research. 14 subjects were randomly selected in to 2 groups

where 7 subjects were in Maitland mobilization with conventional physiotherapy group (Group-A) and 7 patients to the Mulligan mobilization with conventional physiotherapy group (Group-B). A pre-test (before intervention) and post-test (after 6 sessions) was administered with each subject of both groups to compare the pain effects and functioning before and after the treatment.

### Intervention

A common intervention program was executed for both groups as conventional physiotherapy, it includes- Quadriceps stretching, hamstring stretching, calf stretching, soft tissue mobilization, accessory movements, Infra-red radiation and Ultrasound, which are the most frequently used interventions. In this study, the group A was treated with Maitland mobilization in addition with conventional physiotherapy. Graduate physiotherapist applied the Maitland mobilization exercise with the conventional physiotherapies and mulligan mobilization with conventional physiotherapies. Each group has received six sessions of treatment.

### Measurement scales

To conduct the study questionnaire was developed under the advice and permission of the supervisor following certain guidelines. The researcher has used Pain and Disability questionnaire. By using Numeric Pain Rating Scale (NPRS) for pain measurement in different working position and also activities and WOMAC scale for disability.

### Data analysis

Data was analyzed by SPSS version 20 to compute the descriptive statistics and parametric test were conducted using paired t test and unrelated t test. The researcher has calculated the variables mean, mean difference, standard deviation, standard error, degree of freedom and significant level to show that experimental group and control group mean difference in two groups.

### Results

Total 14 patients were recruited in this study. In Experimental Group A, the mean age ( $\pm$  SD) of the participants was 47.57 ( $\pm$  15) and in experimental group B 54.00 ( $\pm$  11.180). Among all participants 34% were female and 64% were male. The participants (50%) were housewife, 21% were businessman, 29% were service holder and 6% have other occupation.

### Pain in NPRS

The study found that in the pain at rest observed t value was 7.778 in experimental group A at two tailed paired t test while this same variable for experimental group B observed value was 12.728 in within group. 5% level of significant at 6 (six) degree of freedom standard t value was 2.44 and observed t value in pain at rest in both group which was greater than standard t value that mean null hypothesis was rejected and alternative hypothesis was accepted in the within group. Both groups in aspect of pain at rest were significant at 0.001% level. But the mean difference of experimental group B was greater than the experimental group A mean that means mulligan mobilization with conventional physiotherapy treatment for knee OA patient was more effective than Maitland mobilization with conventional physiotherapy in case of pain in NPRS.

The unrelated or independent t test in between group at 5% level of significant and 12 degree of freedom standard table value was 2.10 and at the same significant level and same degree of freedom observed t value was 1.391. The observed t value was less than the table value that mean null hypothesis was accepted and alternative hypothesis was rejected which meant there was no difference between mulligan mobilization with conventional physiotherapy treatment group and Maitland mobilization glide with conventional physiotherapy group.

WOMAC scale

Variable	t	df	Sig (2-tailed)
pain in walking	2.412	12	.033*
pain in stair climbing	2.828	12	.015*
pain in night	2.178	12	.050*
pain in rest	1.987	12	.070
pain in weight bearing	1.342	12	.205
Morning stiffness	1.000	12	.337
Descending stairs	1.139	12	.277
Ascending stairs	1.188	12	.258
Rising from sitting	.000	12	1.000
Standing	.949	12	.361
Bending to floor	.000	12	1.000
Walking on flat surface	2.646	12	.021
Getting in/out of car	.816	12	.430
Going shopping	1.441	12	.175
Putting on socks	.408	12	.690
Lying in bed	.816	12	.430
Taking off socks	.408	12	.690
Rising from bed	.000	12	1.000
Getting in/out of bath	.000	12	1.000
Sitting	1.083	12	.300
Getting on/off toilet	1.083	12	.300
Heavy domestic duties	4.472	12	.001*
Light domestic duties	1.390	12	.078

Table 1: Showing distribution of all variables in WOMAC by unpaired t test.

\*: Significant.

Serial no	Variable	Experimental group A		Experimental group B		
		t	Sig (2-tailed)	df	t	Sig (2-tailed)
Pair 1	Pain in walking	1.000	.356	6	3.240	.018*
Pair 2	Pain in stair climbing	2.121	.078	6	8.000	.000*
Pair 3	Pain in night	1.459	.172	6	4.804	.003*
Pair 4	Pain in rest	3.873	.008*	6	2.500	.047*
Pair 5	Pain in weight bearing	4.583	.004*	6	3.240	.018*
Pair 6	Morning stiffness	1.922	.103	6	3.873	.008*
Pair 7	Stiffness occurring later in the day	1.549	.172	6	2.828	.030*
Pair 8	Descending stairs	2.121	.078	6	6.971	.000*
Pair 9	Ascending stairs	2.121	.078	6	7.071	.000*

Pair 10	Rising from sitting	3.873	.008*	6	4.583	.004*
Pair 11	Standing	6.000	.001*	6	7.120	.000*
Pair 12	Bending to floor	2.121	.078	6	4.382	.005*
Pair 13	Walking on flat surface	1.549	.172	6	4.768	.003*
Pair 14	Getting in/out of car	2.121	.078	6	3.873	.008*
Pair 15	Going shopping	1.549	.172	6	3.667	.010*
Pair 16	Putting on socks	3.286	.017	6	2.828	.030*
Pair 17	Lying in bed	1.000	.356	6	2.521	.045*
Pair 18	Taking off socks	2.828	.030*	6	3.576	.012*
Pair 19	Rising from bed	.548	.604	6	3.240	.018*
Pair 20	Getting in/out of bath	2.121	.078	6	6.971	.000*
Pair 21	Sitting	2.500	.047*	6	2.500	.047*
Pair 22	Getting on/off toilet	1.922	.103	6	3.240	.018*
Pair 23	Heavy domestic duties	1.549	.172	6	6.971	.000*
Pair 24	Light domestic duties	3.873	.008*	6	8.000	.000*

**Table 2:** Initial and final assessment paired t test in WOMAC.

\*: Significant.

## Discussion

The result of this experimental study has identified the effectiveness of Mulligan mobilization with conventional physiotherapy was better treatment than the Maitland mobilization with conventional physiotherapy alone for reducing pain and improve the functional ability of the knee osteoarthritis patient.

The present study among them 64% were Female and 34% were Male are affected with knee osteoarthritis. In this study female are more affected with knee osteoarthritis then male. On the other study there is also more affected population are female then male. A study was conducted in Bangladesh for patients with knee osteoarthritis that also showed males (53.3%) and females (60.9%) and the young individuals may be affected [4].

In this study, Numeric pain rated scale (NPRS) was used to examine the pain. Both groups in aspect of pain at rest were significant at 0.001% level. But the mean difference of experimental group B was greater than the experimental group A mean that means mulligan mobilization with conventional physiotherapy treatment for knee OA patient was more effective than Maitland mobilization with conventional physiotherapy in case of pain in NPRS.

In current study WOMAC scale was used to explore the functional disability. The experimental group B is more significant than the experimental group A. So, Mulligan mobilization with conventional physiotherapy is more effective then Maitland mobilization with conventional physiotherapy (See table 2). A study was conducted on Mulligan’s mobilization with movement (MWM) with Maitland mobilization in patients with knee OA in Pakistan. Authors used goniometry, visual analog scale (VAS), knee range of motion (ROM), and Western Ontario McMaster OA [13]. They concluded both groups showed improvement in pain, ROM, and functions. But in this present study researcher used only pain scale and WOMAC except ROM and found Mulligan’s Mobilization with Conventional physiotherapy group more significant result than Maitland’s Mobilization group.

As a consequence of this researcher it is recommended to do further study including comparison of Maitland mobilization with conventional physiotherapy and mulligan mobilization with conventional physiotherapy alone to assess the effectiveness of these interventions with- double blinding procedure, with large sample size and a longer time frame. Author only investigated pain only, it is also recommended to include the range of motion assessment of patient.

## **Conclusion**

Participants in the Mulligan mobilization with conventional physiotherapy showed a greater benefit than those in the Maitland mobilization with conventional physiotherapy group, which indicate that the conventional physiotherapy with Mulligan mobilization can be an effective therapeutic approach in patients with knee osteoarthritis for reducing pain and disability that facilitate their rehabilitation and to enhance functional activities.

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## **Conflict of Interest**

Authors declared that they have no conflict of interest.

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