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Case Series

EFFECTIVENESS OF MULLIGAN MOBILIZATION WITH CONVENTIONAL PHYSIOTHERAPY IN KNEE OSTEOARTHRITIS: - A CASE SERIES

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ABSTRACT

Background: Osteoarthritis (OA) is the most common joint disease causing disability. Current Physical therapy management for knee OA is aiming to increase range of motion and improve functional performance. So, the purpose of this study to assess the effectiveness of Mulligan Mobilization along with Conventional Physiotherapy in Knee osteoarthritis patients.

Method: Patients of knee pain who fulfilled inclusion criteria were taken in study. Outcome like The Knee Injury & osteoarthritis Outcome Score (KOOS) Index, ROM with the help of Universal Goniometer, Manual muscle testing with Medical Research Council (MRC) scale &time up and Go test were taken at baseline and after 4 wks. Mulligan Mobilization along with conventional Physiotherapy was given to all patients for 4 wks.

Result: Showed there was significant improvement 25.08% in Koos Index, while in knee flexion ROM, improvement on right side was 9.94% or in left side 6.20%. while muscle strength in MMT with 25% on right side or 4% on left side improvement seen for knee flexor and 5% on right side or no any improvement seen on left side for knee extensor. Time up and go test also showed 10.89% improvement compared to baseline.

Conclusion: Improvement is seen in patients with knee osteoarthritis by Mulligan Mobilization along with Conventional Physiotherapy.

KEYWORDS: Knee Osteoarthritis, Mulligan Mobilization, Conventional Physiotherapy.

INTRODUCTION

Osteoarthritis (OA) is the most prevalent of the chronic rheumatic diseases and is a leading cause of pain and disability in most countries worldwide.[1]

The prevalence of OA increases with age and generally affects women more frequently than men. Most of the OA disability burden is attributable to the hips and knees.[2]

The age- and sex-standardized incidence rate from the Fallon Community Health Plan in Massachusetts (USA) was highest for knee OA 240/100,000 person-years, with intermediate rates for hand OA (100/100,000 person-years) and lowest observed rates for hip OA (88/100,000 person-years). [3]

The reported prevalence for knee OA was 1.18 and 2.8 per 1000 per year in men and women respectively.[4]

In India the crude prevalence of clinically diagnosed knee OA was higher in the urban (5.5%) than the rural community (3.3%).[5]

The burden of OA not only includes physical problems but it also has a detrimental psychological effects.[6]

OA is characterized by degradation of the articular cartilage, resulting in an alteration of its biomechanical properties.[7] This contributes to a focal loss of articular cartilage, loss of joint space, osteophyte formation, focal areas of synovitis, periarticular bone remodelling and subchondral cysts.[8]

Individuals with knee OA typically have knee pain, joint stiffness, deficits in proprioception, and decreased muscle strength (force-generating capacity).[9, 10]

An evidence based approach to management should include patient education about OA and its management, including pain

management, options to improve function, decrease disability, and prevent or retard progression of the disease.[11]

Mulligan's concept of mobilization with movement (MWM) is a contemporary form of joint mobilization[12], consisting of a therapist-applied pain-free accessory gliding force combined with active movement[13].A key component to Mulligan's Mobilization-With-Movement (MWM) is that pain should always be reduced and/or eliminated during the application. Further gains in pain relief may be attained via the application of pain-free overpressure at the end of the available range during the MWM.[14]

Current international guidelines recommend therapeutic exercise (land or water based) as "core"[15-19] and effective management, given its beneficial effects,[20-24] ease of application, few adverse effects, and relatively low costs. Recent guidance recommends both strengthening and aerobic exercise,[15] but there are multiple other approaches to exercise such as stretching/flexibility, endurance training, aquatic exercise, and increasing general physical activity.

The purpose of the case series was to assess Mulligan Mobilization along with Conventional Physiotherapy would achieve improvement in patient condition.

MATERIAL AND METHODOLOGY

Research Design:

A case series was used to achieve the objectives of this project. A-B-A design which was already described for single case study was used for the present study.[25] This study done in Padmashree Dr.VitthalraoVikhePatil, Physiotherapy OPD, Ahmednagar.

Both Male and Femaleparticipants with age between 55 to 75 years[26], According to American College Of Rheumatology Criteria [26,27]withOA Grade >2 (according to kellegren-lawrence scale)[26, 28] and Knee pain >3 Month[29,30] with Pain intensity >3 on an Numerical pain rating scale[31] and WOMAC Score >25 moderate level of difficulty performance ADL[30] was included in our study.

While Participate in regular exercise program[30], Systemic Arthritis condition like RA[31], any H/O Knee surgery previous 12 month [32], Steroid injection last 6 month [30, 31], Severe medical condition (HTN, Neurologic Disorder etc.)[30, 32], Significant cognitive impairment (score <20 on minimental scale)[33] or Any psychological disorder[34], Inability to walk unaided[30] and Any deformity of lower limb[35] was excluded in our study.

The ethical clearance for this study was obtained from ethical committee. Instruction was given to participant about study, its benefits and risk. The written informed consent was taken from participant.

Procedure

Participants received 3 individual sessions/ week for 4 weeks, lasting an average of 40minutes to an hour each. Mulligan mobilization for knee joint along with conventional physiotherapy was given.

Mulligan mobilization[36, 37, 38]

Lateral, Medial and Rotation glide were given, at the rate of 2 sets of 10 repetitions were applied. 3 treatment sessions were given in a week on alternate days for4 week.[36]

A) **Mulligan Mobilization for Medial Glide:**

Patient was in prone position & to apply medial glide therapist stood on the contralateral side. Therapist applied a belt around her waist and the patient's lower leg so that the proximal edge was at the tibial joint margin. Then stabilized the thigh above the knee with one hand and support the lower leg with the other, glide the knee medially with the belt and ask the patient to flex his/ her knee.

B) **Mulligan Mobilization for Lateral Glide:**

To apply a lateral glide on knee, therapist stands beside the restricted knee and use the belt to apply the glide as from the other side.

C) **Mulligan Mobilization for Rotation Glide:-**

Patient was in supine position, now grasp the lower leg and internally rotate the tibia on the femur. It is better when the fibula moved ventrally at the same time. Maintain this glide and asked the patient to flex knee joint. Then therapist applied overpressure with hands.[39]

Conventional physiotherapy [40]

A)Stretching Exercises:-

1. Gastrocnemius and soleus stretching
2. Hamstring stretching

B)Quadriceps strengthening exercise

C)In closed-kinetic chain exercise:-

1. Seated leg press
2. Partial squat
3. Step-up

RESULTS

Table 1: Showing patients demographic variables

	Patient 1	Patient 2	Patient 3	Patient 4	Patient 5
Age	56	55	57	55	61
Sex	F	F	F	F	F
BMI(Kg/m2)	24	28	30	26	29.05
Occupation	Clerk	Labourer	House wife	House wife	House wife
Duration of symptoms	3months	1year	18years	3months	5 Years

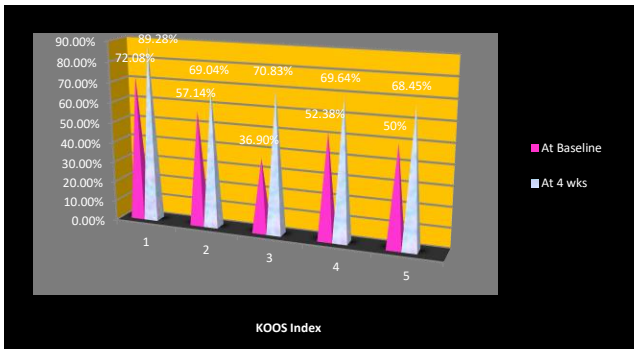

Fig 1: Comparison of mean of KOOS Index at baseline and after 4 wks.

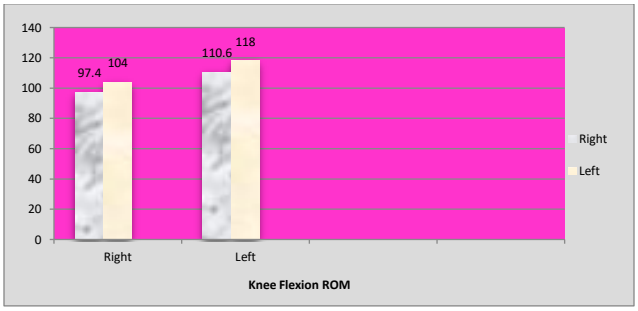

Fig 2: Comparison of mean of Knee ROM at baseline and after 4 wks.

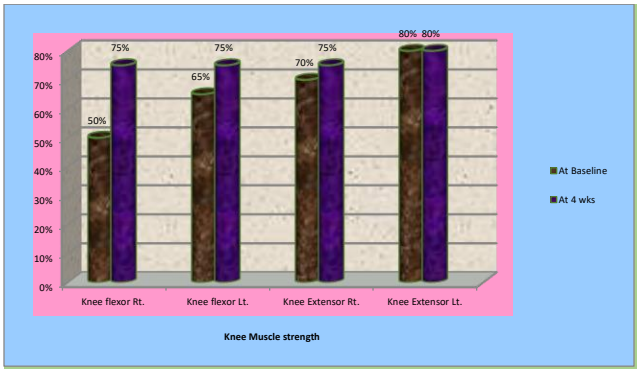

Fig 3: Comparison of mean of knee Muscle Strength at baseline and after 4 wks.

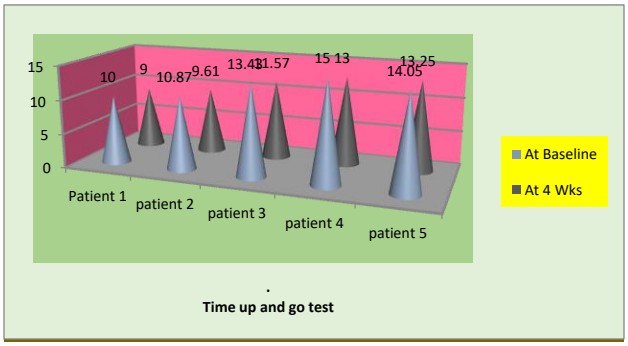

Fig 4: Comparison of mean of time up and go test at baseline and after 4 wks.

Table 2: Outcome measures At Baseline and After 4 wks.

Outcome Measure	Patient 1		Patient 2		Patient 3		Patient 4		Patient 5	
	At Baseline	At 4 wks.	At Baseline	At 4 wks.	At Baseline	At 4 wks.	At Baseline	At 4wks	At Baseline	At 4wks
KOOS Index (%)	72.08	89.28	57.14	69.04	36.90	70.83	52.38	69.64	50	68.45
Knee-ROM Flexion Right	0-100	0-120	0-85	0-89	0-101	0-103	0-106	0-110	0-95	0-98
Left	0-120	0-125	0-105	0-107	0-114	0-124	0-105	0-115	0-109	0-119
Extension Right	100-0	120-0	85-0	89-0	101-0	103-0	106-0	110-0	95-0	98-0
Left	120-0	125-0	105-0	107-0	114-0	124-0	105-0	115-0	109-0	119-0
MMT- Flexor Right	Grade III+	Grade IV	Grade III+	Grade IV+	Grade III+	Grade IV+	Grade III+	Grade IV+	Grade III+	Grade IV+
Left	Grade IV	Grade IV+	Grade IV	Grade IV	Grade IV	Grade IV+	Grade III+	Grade IV+	Grade III+	Grade IV
Extensor Right	Grade IV	Grade IV	Grade III+	Grade IV+	Grade IV	Grade IV+	Grade IV	Grade IV+	Grade IV	Grade IV+
Left	Grade IV+	Grade IV+	Grade V	GradeV	Grade IV	Grade IV+	Grade IV	Grade IV+	Grade IV	Grade IV
Time up and Go test (sec)	10	9	10.87	9.61	13.43	11.57	15	13	14.05	13.25

Five patients met the primary inclusion criterion for the current case-series investigation. The result showed there was significant improvement 25.08% in Koos Index, while in knee flexion ROM, improvement on right side was 9.94% or in left side 6.20%. while muscle strength in MMT with 25% on right side or 4% on left side improvement seen for knee flexor and 5% on right side or no any improvement seen on left side for knee extensor. Time up and go test also showed 10.89% improvement compared to baseline. This signifies all outcome measures showed significant improvement compared to baseline values. Because of small sample size, no statistical analysis was completed on this series.

Exercise and time effects, respectively, describe the significance of treatment and differences between baseline and after 4 week treatment. Interaction describes there is significant difference in the outcome measures from baseline values.

DISCUSSION

This short term case series showed the beneficial effect of applying mulligan mobilization along with conventional Physiotherapy inpatients with knee osteoarthritis. The Improvements on baseline measures achieved during the treatment phases of 4 weeks.

In this study mulligan mobilization along with conventional physiotherapy showed significant treatment effect to reduce pain, improve functional activities of daily living and knee ROM. This similar result showed previous study which was done by Hiroshi Takasaki et al in their case series reported that with the treatment of mulligan mobilization in knee osteoarthritis patient has to reduce pain, improve KOS-ADL, Knee ROM.[36]

Vicenzion et al and mulligan, proposed the mechanisms by which MWM achieves pain relief are not well understood, however biomechanical and neurophysiological mechanisms

may be involved. Biomechanically it was initially proposed that MWM may address joint partner bone alignment (i.e., position fault) and some observations of positional faults have been made. Potential neurophysiological mechanisms includechanges in descending pain inhibitory systems.[41, 13]

Improving walking ability was assessed by time up and go test, and also improve knee flexor and extensor muscle strength with resistance training program. This similar result consistent with previous study which showed that functional activities combined with strengthening exercise with weight cuffs (squats and step-ups, knee extension/flexion, hip abduction/adduction) Performed 3 times a week can elicit 43% reductions in pain with concurrent improvements in leg strength, stair climb time and repeated chair stand time.[42]

Some authorshave reported that therapeutic exercise, including open and closed kinetic chain exercise and progressive resistance training can increase muscle strength in patients with knee OA. In the present study, we found that subjects who performed resistance training using closed kinetic chain exercise displayed significant improvement in the strength of both knee extensors and flexors.[43]

Dimitrova E studied on Efficacy of mobilizations with movement in patients with knee osteoarthritis; He concluded that, MWM is feasible and efficacious in individuals with knee osteoarthritis.[44]

CONCLUSION

This study has documented that the Mulligan Mobilization along with conventional Physiotherapy leads to reduction in pain, cause functional improvement, also improve ROM and muscle strength in knee osteoarthritis.

Future research is necessary to validate the use of the Mulligan Mobilization along with conventional Physiotherapy on a large sample of patients with knee osteoarthritis to determine whether the trends observed in this case series persist.

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