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Effectiveness of mikhled knee exercise program and conventional physiotherapy exercises on pain, health status and strength in patients with osteoarthritis of knee joint: A comparative study

Mansi Shingala[1]*, Manmitkaur A Gill[2]
[1] MPT (Sports), Tutor cum physiotherapist, Government Physiotherapy College, Jamnagar, Gujarat, India
[2] MPT (Musculoskeletal Conditions), Senior Lecturer, Department of physiotherapy, Government Spine institute and physiotherapy college, Civil Hospital Campus, Ahmedabad, Gujarat, India

Abstract
Introduction: Osteoarthritis (OA) of the knee joint is one of the most common forms of lower limb arthritis, especially in elderly people. A large number of individuals with OA exhibit pain, stiffness and disability which results in increased healthcare costs. Mikhled knee exercise program (MKEP) is recently developed therapeutic technique to enhance health status, strength, joint ROM and decrease the pain in patients with OA knee. There are very few studies that have compared MKEP and conventional physiotherapeutic exercises. So, this study was undertaken to compare the effectiveness of MKEP and conventional physiotherapy exercises in patients with osteoarthritis of knee in Indian population.
Methods: 40 patients with knee osteoarthritis were included by convenience sampling after taking informed consent for the present study. The patients were then equally divided in two groups. Patients in Group A were given MKEP while in Group B conventional physiotherapy was given for 4 weeks. Pre and post interventional outcome measures in terms of VAS score, WOMAC score and quadriceps & hamstring strength were evaluated before and after the 4 weeks of completion of the treatment.
Results: Data were analysed by using SPSS version 16 and Microsoft Excel 2010. There was significant difference noted in all outcome within both the groups ($p<0.05$). But STRENGTH of quadriceps and hamstring were significantly improved with MKEP when compared to conventional physiotherapy exercises ($p<0.05$).
Conclusion: Conventional physiotherapy and MKEP, both are effective to reduce pain, improve health status and improving the strength of the quadriceps and hamstring muscles in patients with osteoarthritis of knee joint. But MKEP is found to be more effective to improve strength of muscle.

Keywords: osteoarthritis of knee, mikhled exercises, conventional physiotherapy

Introduction
Osteoarthritis (OA) of the knee joint is one of the most common forms of lower limb arthritis, especially in elderly people. A large number of individuals with OA exhibit pain, stiffness and disability which results in increased healthcare costs [1, 2]. OA of knee joint is very common condition among Indian population. Patients with OA knee comes to OPD with difficulties in Walking, stair climbing, squatting, standing from sitting from floor, running, walking on uneven surfaces [3]. etc.. Physiotherapy is known to be very effective treatment protocol in such condition. Conventional physiotherapeutic exercises along with modalities are known to improve pain and health status in patients with OA knee. Exercises are effective for patients with OA knee to improve Joint ROM, Muscle strength, cardiovascular endurance, Balance and Co-ordination [1].
Mikhled knee exercise program (MKEP) is recently developed therapeutic technique to enhance health status, strength, joint ROM and decrease the pain in patients with OA knee. This technique involves performing isometric contractions of the hip, knee and ankle muscles in 7 different therapeutic postures to strengthen the agonists and antagonists around the knee joint. i.e. Quadriceps and Hamstrings.
There are very few studies that have compared MKEP and conventional physiotherapeutic exercises. So, this study was undertaken to compare the effectiveness of MKEP and conventional physiotherapy exercises in patients with osteoarthritis of knee in Indian population.

AIM
Aim of the study is to compare the effectiveness of MKEP and conventional physiotherapy exercises in patients with OA of knee joint.

Objectives
- To see the effectiveness of MKEP.
- To see the effectiveness of conventional physiotherapy exercises.
- To compare the effectiveness of MKEP and conventional physiotherapy exercises.

Methodology
The patients coming to physiotherapy department on OPD basis were selected according to inclusion and exclusion criteria. All the patients were informed about the nature and purpose of the study. Informed consent was taken from all the

patients in their understandable language. Inclusion criteria for the present study were, Patients who were diagnosed with osteoarthritis of knee by orthopaedic consultant, Chronic (>2 months) OA, Age 50-80 years, both males and females who were willing to participate. Exclusion Criteria were kept as Any Other musculoskeletal disorders, any neuromuscular conditions, those who were not cooperative. Total 40 patients were selected for the study and were equally divided into two groups. Demographic data of all the patients in both the groups were taken and pre-treatment assessment was done. In Group A patients received MKEP while in Group B Patients were given conventional physiotherapy exercises. MKEP consisted of 7 different postures and 5 exercises in each posture [1]. 3 repetitions of each exercise were given with 10 seconds hold and 30 seconds rest in between each posture. The postures were- Supine, Supine on elbows, long sitting, Prone, Bench long sitting, Bench prone and Bench supine. The exercises in each posture were Dorsiflexion, SLR and Abduction of hip, Knee 30 degree flexion and knee extension. Conventional physiotherapy exercises included 10 exercises with 10 repetitions of each exercise. The exercises were [4]: Static quadriceps exercises, Vastus medialis obliqus exercises, Straight leg raising, Hip abduction in side lying, Knee extension in high sitting, Knee flexion in prone lying, Wall supported mini squats, Forward lunges, Sideward lunges and Pendular exercises.

Both the groups had taken treatment for 4 weeks (3days/ week). Vas, Womac, Quadriceps and Hamstring Strength (with handheld dynamometer) of each patient had been taken before the administration of the treatment and after the completion of 4 weeks of treatment.

Results

Data analysis was done by using the statistical package for social sciences version 16 (SPSS16). The study population had mean age of:

- Conventional group : 61.45±5.56 years.
- MKEP group : 59.85±6.05 years.

T-test was applied to evaluate the data. There was significant difference noted in VAS, WOMAC and STRENGTH within both the groups (p<0.05). But STRENGTH of quadriceps and hamstring were significantly improved with MKEP when compared to conventional physiotherapy exercises. (p<0.05). There was no significant difference found between groups regarding VAS and WOMAC. (p>0.05).

Table 1: Within Group Comparison of Outcome measures in Group A

	PRE	POST	P value
VAS	5.74±1.85	3.32±1.30	<0.05
WOMAC	54.60±17.52	25.40±7.39	<0.05
Q STRENGTH	3.50±1.05	4.60±0.89	<0.05
H STRENGTH	3.30±0.80	4.25±0.72	<0.05

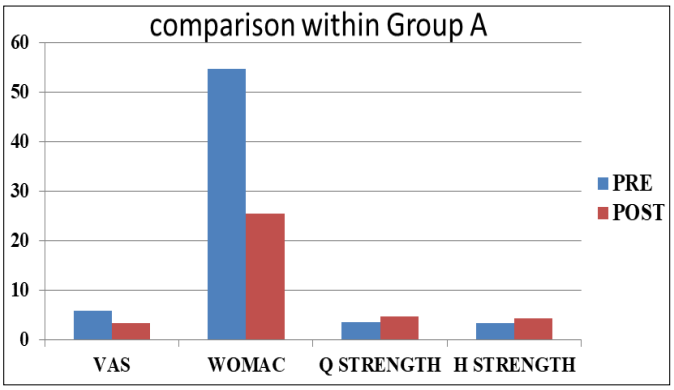

Fig 1

Table 2: Within Group Comparison of Outcome measures in Group B

	PRE	POST	P value
VAS	6.50±1.90	3.35±1.13	<0.05
WOMAC	59.05±17.35	25.05±11.18	<0.05
Q STRENGTH	3.50±1.05	4.00±0.97	<0.05
H STRENGTH	3.30±0.57	3.75±0.79	<0.05

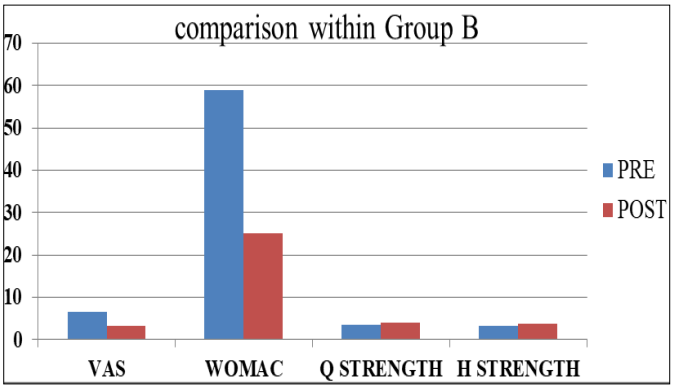

Fig 2

Table 3: Comparison between MKEP and conventional groups

	Diff. In group A (MKEP)	Diff. In group B (Conventional)	P value
VAS	2.42±0.55	3.15±0.77	>0.05
WOMAC	29.2±10.13	34.00±6.17	>0.05
Q STRENGTH	1.1±0.16	0.50±0.08	<0.05
H STRENGTH	0.95±0.08	0.45±0.22	<0.05

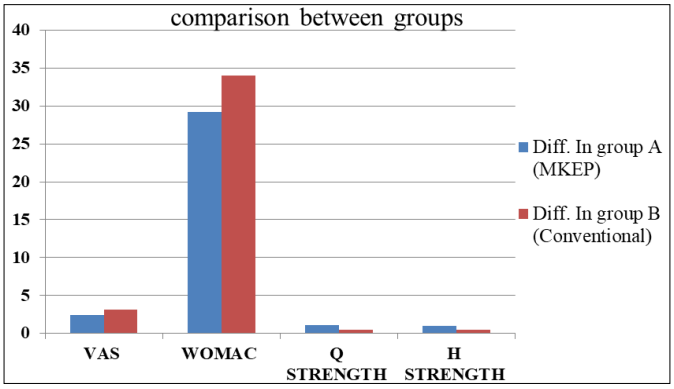

Fig 3

Discussion

The purpose of the study was to see the effect of MKEP and conventional physiotherapy in patient with osteoarthritis of knee joint. Pain, health status and strength were improved in both groups following 4-weeks intervention program. There was no significant difference between the groups regarding characteristics of the subjects. MKEP has proven useful in increasing the strength and functional ability of subjects with OA knee while lessening their pain. The advantages of the MKEP are that no specialized equipment is needed and subjects remained attentive during treatment sessions. Also it can be performed at home by patients themselves. Dynamic exercises are slightly better than isometric exercise at enhancing the twitch force of a muscle immediately after completion of the dynamic exercises. Also it provides strength in full range of motion. In contrast, isometric exercises are significantly better than dynamic exercise at increasing maximal strength at the joint angle [5]. These isometric contractions recruit muscle fibres that are often neglected in some dynamic exercises. Increasing the number of repetitions of contractions and the frequency of training of MKEP, may result in greater changes and benefits. However, caution should be taken while increasing the exercise intensity. Thus, isometric contractions are very effective in improving strength in particular angle of motion [6, 7].

Conclusion

Conventional physiotherapy and MKEP both are effective to reduce pain, improve health status and improving the strength of the quadriceps and hamstring muscles in patients with osteoarthritis of knee joint. But MKEP is found to be more effective to improve strength of muscle and hence MKEP can be introduced in treatment protocol for osteoarthritis of knee joint.

Limitations

- Small sample size.
- Life style and diet was not taken into consideration.
- Long term follow up was not taken.

Future Research

- One can study the long term effect of MKEP.
- Other study can be done on effectiveness of MKEP on other knee conditions.

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