

## Original Article

# To Evaluate the Effectiveness of Maitland Technique in Treatment of Knee Osteoarthritis in Female Patients

*Sonya Arshad<sup>1</sup>, Dr. Syed Hasan Abbas Rizvi<sup>1</sup> & Muhammad Nisar<sup>2</sup>*

1. Liaquat National School of Physiotherapy, Liaquat National Hospital and Medical College.
2. Department of Physiology, University of Karachi.

**Corresponding author:** mnisar@uok.edu.pk

## Abstract

**Objective** The purpose of this study was to explore the efficacy of knee osteoarthritis treatment with Maitland technique over general exercises in aged female patients. **Methodology** A Cross sectional experimental study was performed on 80 osteoarthritic female patients of age between 45-60 years which were randomly selected from LNH. They were divided into 2 groups of 40 patients each. Group A received Maitland technique application while Group B received general knee ROM ex's. All participants have received 24 sessions of Maitland and general exercises. Data has been collected and analyzed on SPSS 20 through assessment form used by Physiotherapist via pre-and post-evaluation of Visual Analogue Scale, Muscle Power, Muscle Tone and Range of Motion. **Results** The results revealed that Group A having visual analogue scale score =  $5.4 \pm 0.9$ , while Group B having visual analogue scale score =  $6.25 \pm 1.4$ , the muscle power was  $5.0 \pm 4.8$  in group A, while in group B it was  $4.05 \pm 0.58$ , Geno-Flexion of group A was  $129.5 \pm 5.2$ , Geno-Flexion of group B was  $121.57 \pm 10.9$ . The results of all tests were significant with the P-value  $< 0.05$  of Group A as compared to B. **Discussion** During the OA of knee joint the decrement of a proteoglycan content of cartilage and the disintegration of collagen fibers occurs, which leads to rise in water content so there will be loss of osmotic pressure. The net result will be the degradation of cartilage, as proteoglycan has protective effects on collagen fibers. **Conclusion** It was concluded that Maitland technique relieved more effectively the symptoms of knee osteoarthritis in females than general exercises.

## Keywords

Osteoarthritis, Range of motion, Visual analogue scale, Muscle power, Straight leg raise

## Introduction

OA is the second most common rheumatological problem and is the most common cause of locomotor disability in the elderly. The knee is the joint most frequently affected by osteoarthritis. OA knee is two times more prevalent than OA hips in people aged over 60 years and is a significant contributor of pain and mobility impairment in community-dwelling adults<sup>1</sup>. The word osteoarthritis is comprised of two separate terminologies, the prefix "osteo" means bone and arthritis means joint inflammation. It is a

naturally occurred body's reaction to injury or disease which includes swelling, stiffness or pain may sometimes lead to tissue damage. Osteoarthritis is a complex disease whose pathogenesis includes the contribution of biomechanical and metabolic factors which altering the tissue homeostasis of articular cartilage and subchondral bone and determine the predominance of destructive over productive processes<sup>2</sup>.

The inflammation of knee joint is very common in and above the middle age male and female. The commonly seen areas of

injury in knee are: Medial tibiofemoral joint, lateral tibiofemoral joint, Patellar femoral joint. During the osteoarthritis of knee joint the decrement of a proteoglycan content of cartilage and the disintegration of collagen fibers occurs, which leads to rise in water content so there will be loss of osmotic pressure<sup>3</sup>. The net result will be the degradation of cartilage, as proteoglycan has protective effects on collagen fiber. The inflammation of the surrounding tissue also occurs. The end products of cartilage emerge out and the cell lining the joint will attempt to remove them. The small bony formation “spur” will be formed in the lining of articular surface. The physical findings of Osteoarthritis of knee include: bony enlargement, crepitus, decreased range of motion, joint-line tenderness, and pain on passive range of motion<sup>4</sup>. Physiotherapy management involves exercise programs usually of strengthening type. There are different techniques for it but our focus is on Maitland technique. The Maitland technique can be used for both the peripheral joints and spinal joints.

This mobilization technique has its key terminologies<sup>5</sup>. Accessory or joint play movements are joint movements which cannot be performed by the individual. These movements include roll, spin and slide. These movements are essential to find out in order to perform the Maitland concept. These movements are performed in open back position of joint<sup>6</sup>. Physiological movements are performed actively by the person and it is to determine the symptoms<sup>7</sup>. Injuring movements are used to bring the pain in by applying it in any one directions<sup>8</sup>. Overpressure is given to a subject in order to achieve its passive range to find out the sign of subluxation or dislocation. A physiotherapist should be focused on few principles while treating any subject such as:

The mobilization direction e.g. AP(anterior posterior), PA(posterior anterior), Longitudinal, Medial, Lateral and distraction, Method of application, The starting position, The desired effects and the possible progression speed for the treatment plan. There are different methods which help us to find out the efficiency of this technique; however the fruitful result of mobilization technique for the degenerative knee joint is recognized worldwide<sup>9</sup>.

### **Methodology**

A Cross sectional experimental study was performed on 80 osteoarthritic female patients of age between 45-60 years which were randomly selected from LNH. Those who had fracture, soft tissue injury, bony deformity and osteoporosis were excluded. Introduction of the researcher was given to subjects and aims and objectives of the study were also mentioned along with the questionnaires. The study period was of 6 months. Level of significance was kept at 5%. Subjects were divided into 2 groups of 40 patients each. Group A received Maitland technique application while Group B received general knee ROM ex's. (Knee flexion and extension) SLR, planter flexion, dorsiflexion and dynamic quads. All participants have received 24 sessions of treatment. A questionnaire in Standard English language was used to evaluate the results.

Firstly, the demographic data was collected for all osteoarthritis patients including their age, weight. Secondly, the clinical information including: past medical history and surgical history, duration of disease, intensity of pain, other complications, available ranges of movement at knee joint, grades of muscle and factors that cause increase and decrease in knee joint pain. Finally, four questions were asked to assess

the level of awareness regarding the role of Physical therapy and effectiveness of general exercises and Maitland technique on knee osteoarthritis. Data has been collected and analyzed on SPSS 20 through assessment form used by Physiotherapist via pre and post evaluation of Visual Analogue Scale, Muscle Power, Muscle Tone and Range of Motion exercises (flexion, extension).

### Result

The results revealed that both groups showed reduction in pain intensity joint stiffness and muscle tone, improved muscle power and range of motion. Independent sample t test was applied to determine whether there was a significant difference within the group. The

result was significantly different in both the groups. The result was compile after pre and post analysis for VAS and muscle tone ,muscle power and ROM (flexion)and (extension).Group A patients shows average score of VAS  $5.394 \pm 0.9$ , while Group B shows  $6.25 \pm 1.4$ .Maitland technique was more effective in pain reduction, Group A showed more improvement in muscle power with the mean of  $4.6 \pm 0.48$  as compared to muscle power with the mean of  $4.052 \pm 0.58$  in group B. Reduction in muscle tone in both groups remain same with the mean score of  $2.25 \pm 0.43$ .Geno-Flexion  $129.5 \pm 5.2SD$ , Geno-Flexion of group B  $121.57 \pm 10.9$ . The results are as shows in table 1 and 2.

**Table 1 Comparison of VAS, MP, MT and ROM Flexion and Extension.**

Parameter	Group	Pre		Post		p-value
		Mean	S.D	mean	S.D	
VAS	A	7.789	0.98	5.394	0.98	0.002*
	B	7.789	0.98	6.250	1.47	0.004*
Muscle power	A	3.750	0.65	4.631	0.48	0.062
	B	3.750	0.65	4.052	0.58	0.058
Muscle tone	A	2.763	0.42	2.250	0.43	0.032*
	B	2.763	0.42	2.250	0.43	0.032*
ROM(flexion)	A	1.175	13.5	1.295	5.23	0.039*
	B	1.175	13.5	1.295	10.9	0.004*
ROM(extension)	A	2.868	1.54	1.00	1.00	0.042*
	B	2.868	1.54	1.644	0.58	0.040*

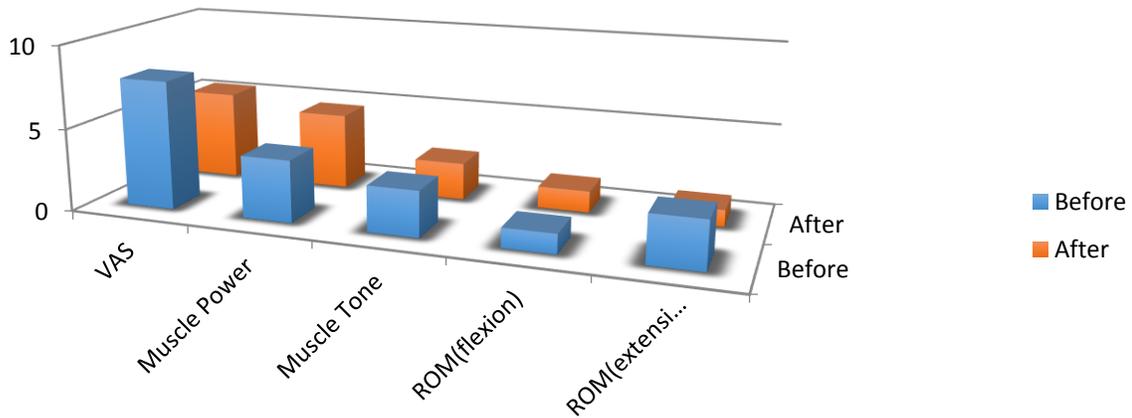
P-value<0.05 is considered as significant using Pearson Chi-square test of independence.

**Table 2 Comparison of VAS, MT, MP, ROM (flexion and extension).**

Parameters	Group A		Group B		p-value
	Mean	S.D	Mean	S.D	
VAS	5.39	0.98	6.25	1.47	0.032
Muscle power	4.631	0.48	4.052	0.58	0.046
Muscle tone	2.250	0.43	2.250	0.43	0.000
ROM(flexion)	1.295	5.23	1.215	10.9	0.042
ROM(extension)	1.000	1.00	10644	0.58	0.036

P-value<0.05 is considered as significant using Pearson Chi-square test of independence. The result revealed that mobilization technique is more effective in knee OA as compare to general ROM exercise. Group A showed reduction of symptoms up to 36% however group B. showed reduction of symptoms up to 15% only. The results of all tests were significant with the P-value < 0.05.

**Figure 1 Effects of Maitland Technique.**



**Figure 2 Effects of General Exercises.**

It was observed that the Maitland technique is really vital in increasing ROM as it helped increase flexion and decrease extension at knee joint more than the general exercises. It was observed that after applying general exercises the VAS pain was decreased slightly while muscle tone remains unchanged.

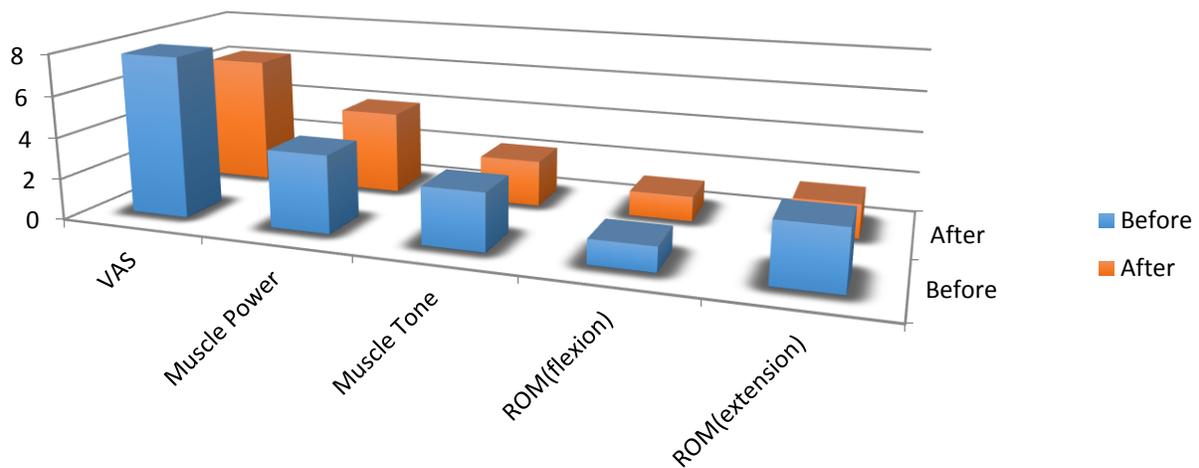


Figure 3 Comparisons of both groups.

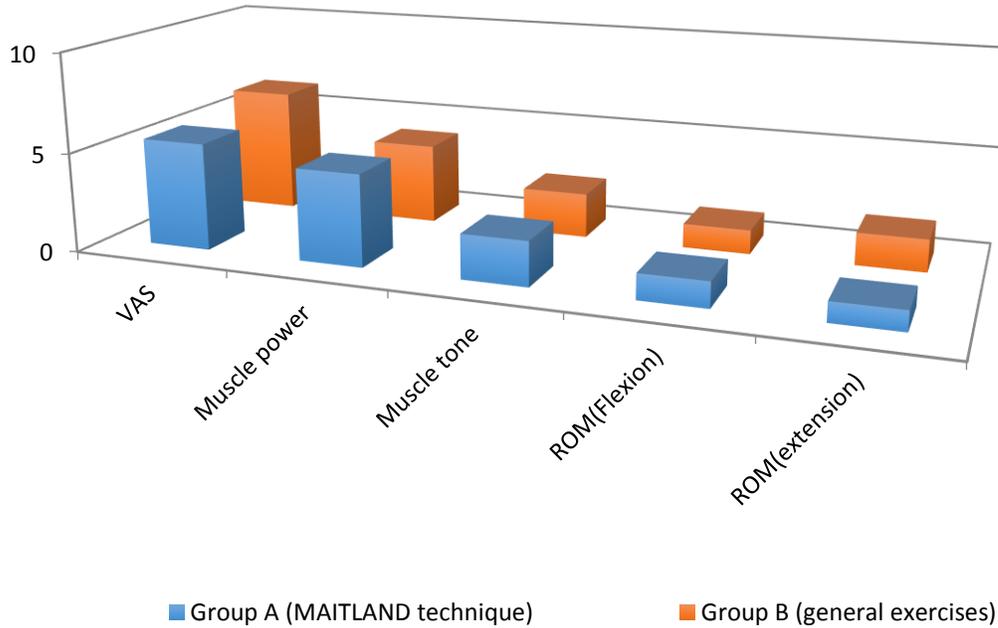
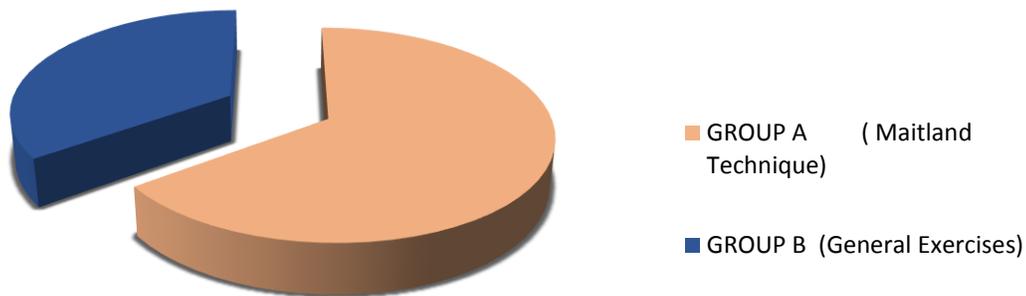


Figure 4 Graph shows the reduction of symptoms in both groups.



It was found that both treatment protocols relieved the symptoms of knee osteoarthritis but Maitland technique is more effective over the general exercises. Group A showed reduction up to 36% however group B showed reduction of symptoms up to 15% only.

### Discussion

Present study shows that Maitland technique is best and more effective in knee osteoarthritis patients than general exercises. Maitland technique more effectively reduced the VAS than general exercises<sup>5</sup>. Maitland mobilization helping in reducing pain

perception by repetitively stimulating mechanoreceptors that block nociceptive path way at spinal cord and brain stem level. Non-stretch motion improves nutrition, circulation and lubrication to cartilage. The muscle power was markedly increased and muscle tone was decreased in group of patients on which Maitland technique was used in comparison to the group of patient who were given general exercises<sup>10</sup>. it was also observed that the Maitland technique is vital in increasing ROM as it helped in increasing flexion and decrease extension at the knee joint more than the general exercises. The vibratory movements produced during Maitland mobilization thought to produce mechanical effects such as increase in fiber glides, realignment of collagen reduces the joint stiffness which help to restore normal mobility.

### Conclusion

It was concluded that Maitland technique is best and more effective in knee osteoarthritis patients than general exercises. Maitland technique more effectively reduced different muscle activity such as visual analogue scale, Muscle power and reduced muscle tone.

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### Conflicts of Interest

All authors have contributed to this manuscript, reviewed and approved the current form of the manuscript to be submitted. There is no conflict of interest.

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