



Effectiveness Of Multiple Angle Isometric Exercise With Interferential Therapy In Patient With Osteoarthritis Knee - A Randomized Controlled Trial (Rct)

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Abstract

Context: According to WHO, as a major public health problem. Osteoarthritis is the second most common rheumatologic problem and it is the most frequent joint disease with a prevalence of 22% to 39% in India. Patient who are obese, excessive work load on knee, prolonged standing, injury to knee and poor quadriceps muscle strength are prone to OA knee. Due to OA, the patient decreases in activity of daily living such as walking, climbing stairs, cross sitting, squatting. If the quadriceps muscle is in enough strength to hold the knee joint. It will reduce the degeneration inside joint. Previous study states that isometric exercise is performed only in terminal knee extension positions. Multiple Angle Isometric exercise in various positions like 30°, 60° and 90° will activate the quadriceps muscles and improve muscle strength. Thereby, This Study is about the Effectiveness of Multiple Angle Isometric Exercise with Interferential Therapy in Patients with Osteoarthritis Knee.

Methods: A total of 30 samples were taken from Aarupadai Veedu Medical College & Hospital, Outpatient Department of Physiotherapy (OPD), and Puducherry. They were divided into 2 groups - Group A and Group B (15 subjects in each group). Group A received Multiple Angle Isometric Exercise and Interferential therapy and Group B received Multiple angle exercise for a period of 5 days a week for 2 weeks. The pre-Intervention and post Intervention of NPRS and WOMAC score were recorded before first day of treatment and after the intervention of 2 weeks.

Result: The results of the study were significant improvement in Multiple angle isometric exercises and Interferential therapy was much better than Multiple angle isometric exercise.

Keywords - Osteoarthritis Knee, Multiple Angle Isometric Exercise, Interferential therapy, NPRS, WOMAC score.

I. INTRODUCTION

Osteoarthritis is a degeneration joint disease ⁽¹⁾. Osteoarthritis knee is classified into primary and secondary. Primary osteoarthritis knee is most occurred in elderly people as a self- inflicted phenomenon affecting a previously healthy joint. Secondary osteoarthritis knee is usually a consequence of damage to the cartilage of the joint, resulting from obesity, overload, injuries, arthrosis, metabolic diseases, and endocrine disorders ⁽²⁾.

The pathological changes seen in OA Joints include degradation of the articulation cartilage, thickening of the subchondral bone, Osteophyte formation, variable degrees of synovial inflammation, degeneration of ligaments, and in the knee, the menisci, and hypertrophy of the joint capsule.

According to WHO, as a major public health problem ⁽³⁾. Osteoarthritis is the second most common rheumatologic problem and it is the most frequent joint disease with a prevalence of 22% to 39% in India. OA is more common in women than men ⁽⁴⁾.

Risk factors of Osteoarthritis knee such as aging, Obesity, genetic predisposition, acute trauma and chronic overload, gender, and hormones profile ⁽⁵⁾. Patients complains with the pain and inflammation of joint capsule, Impaired muscle Stabilization, reduced range of motion and functional disability ⁽⁶⁾. The massive muscle of the human body is quadriceps femoris. The rectus femoris can flex the hip, while it is synergistic action with vastus lateralis, vastus medialis, vastus intermedius extends the knee ⁽⁷⁾. Adequate quadriceps strength in persons with knee OA seems necessary to perform activities of daily living. Decreased in quadriceps strength leads to form degeneration in knee joint. Quadriceps muscle strengthening has been shown to be capable of improving physical function in those suffering from the disease ⁽⁸⁾.

The physiotherapy treatment can play an important role in the multidisciplinary management of patients with knee OA including exercise, taping, bracing, modalities and shoes and manual therapy, in reducing knee OA symptoms ⁽⁹⁾. Multiple angle isometric exercise of quadriceps muscle is a type of where resistance is applied, manually, at multiple joint position within the available ROM ⁽¹⁰⁾. So, this study was conducted to evaluate the effectiveness of multiple angle isometric exercise on pain and functional disability in patients with osteoarthritis knee.

II. SUBJECTS AND METHODS

A total of 30 sample were taken from outpatient physiotherapy department, Aarupadai Veedu Medical College and Hospital, Puducherry. They were dividing into 2 groups- Group A and Group B (15 subjects in each group). Group A received multiple angle isometric exercises and interferential therapy and Group B received multiple angle isometric exercise therapy for a period of 2 week at the frequency of 5 working sessions per week.

TREATMENT TECHNIQUE

Before the collection of the data, the objectives and guidelines were explained to all the participants and written informed consent form were signed by the participants. The pre-intervention and post-intervention of NPRS and WOMAC score were recorded before and after the treatment of 2 weeks

- **GROUP A: MULTIPLE ANGLE ISOMETRIC EXERCISE AND INTERFERENTIAL THERAPY.**

MULTIPLE ANGLE ISOMETRIC EXERCISE

AT 30 DEGREE: The Patient Seated with Flexion knee and hip 90 degree. The Manual resistance is applied to the patients with 30 degree of knee flexion. The Universal goniometer is Used to measure 30 degrees. The dosage of multiple angle isometric exercise is 10 repetition,10 seconds Hold in 30 degrees with 5 seconds of rest.

AT 60 DEGREE: The Patient Seated with Flexion knee and hip 90 degree. The Manual resistance is applied to the patients with 60 degree of knee flexion. The Universal goniometer is Used to Measure 60 degree. The dosage of multiple angle isometric exercise is 10 repetition ,10 seconds Hold in 60 degrees with 5 seconds of rest.

AT 90 DEGREE: The Patient Seated with Flexion knee and hip 90 degree. The Manual resistance is applied to the patients with 90 degree of knee flexion. The Universal goniometer is Used to Measure 90 degree. The dosage of multiple angle isometric exercise is 10 repetition ,10 seconds Hold in 90 degrees with 5 seconds of rest.

INTERFERENTIAL THERAPY FOR GROUP A

The patient position is supine lying, Electrode placement at Quadriceps method. It is Placed around the affected knee joint of 5 sessions for 2 weeks. The Patient was explained feel tingling sensation which would not be unpleasant. Frequency = 4000HZ, Base = 90HZ, Sweep = 90HZ, Beat frequency = 90-130HZ, Duration =10 mins.

- **GROUP B: MULTIPLE ANGLE ISOMETRIC EXERCISE**

III. DATA ANALYSIS**Table 4.1: Age Distribution**

Age	Group A		Group B	
	Numbers	Percentage	Number	Percentage
<45	1	6.7%	1	6.7%
45-55	8	53.3%	4	26.7%
55-65	3	20%	6	40%
>65	3	20%	4	26.7%
TOTAL	15	100%	15	100%

Less than 45 years Group A consist of 6.7% of peoples and Group B consist of 6.7% of people, in between 45-55 years Group A consist 53.3% of people and Group B consist of 26.7%, in between 55-65 years Group A consists 20% of people and Group B consist of 40% of people, greater than 65 years Group A consist of 20% of people and Group B consist of 26.7% of people.

Table 4.2: Gender Distribution

Gender	Group A		Group B	
	Numbers	Percentage	Number	Percentage
Male	7	46.7%	8	50%
Female	8	53.3%	7	50%
Total	15	100%	15	100%

In Group A 46.7% male and 53.3% were female whereas in Group B 50% were male and 50% were female.

Table 4.3: The table shows mean value, mean difference, standard deviation, paired 't' value and P value between pre and post test scores of WOMAC score among Group A.

Womac score	Mean	Standard deviation	Paired 't' value	P value
Pre-Test	68.87	10.80	7.433	<0.001
Post Test	39.80	21.77		

In Group A calculated paired t value for functional disability is 7.433. Above p value shows that there is a significant difference in multiple angle isometric exercises with interferential in osteoarthritis knee.

Table 4.4: The table shows mean value, mean difference, standard deviation, paired 't' value and p value between pre and post test scores of WOMAC Score among group B

Measurement	Mean	Standard deviation	Paired 't' value	P value
Pre-Test	66.13	11.76	4.685	0.001
Post Test	57.53	11.95		

In Group B calculated paired t value for functional disability is 4.685. Above p value shows that there is significant difference in multiple angle isometric exercise in osteoarthritis knee.

Table 4.5: The table shows PRE – POST comparison outcomes on pain within the group

		Group A			Group B		
		Mean	S. D	'P' Value	Mean	S. D	'P' Value
NPRS	PRE	7.16	1.221	0.001	6.78	1.539	0.001
	POST	1.59	1.073		3.25	1.524	

The mean NPRS score was significantly reduced following treatment in both groups. The mean pain score was significantly reduced from (7.16 ± 1.221) before treatment to (1.59 ± 1.073) after treatment in Group A ('p' value 0.001). likewise in Group B, pain was significantly reduced from (6.78 ± 1.539) baseline to (3.25 ± 1.524) after treatment ('p' value 0.001)

IV. RESULT

The Result of this study was significant improvement in multiple angle isometric with interferential therapy was much better than multiple angle isometric alone. The statistical interpretation of mean and standard deviation shows improvement in the multiple angle isometric and interferential therapy in patient with osteoarthritis knee.

V. DISCUSSION

The aim of the study was examined the Effectiveness of multiple angle isometric exercise with interferential therapy in patients with osteoarthritis knee. A total 30 Osteoarthritis knee patients were divided into 2 groups, Group A and Group B. Group A received interferential therapy with multiple angle isometrics exercises and Group B received multiple angle isometrics exercises for a period of 5 days a week for 2 weeks. After obtaining the results, Interferential therapy alone with multiple angle isometric exercises is highly effective in improving pain and functional disability than multiple angle isometric exercise alone.

In age distribution, Group A (n =15) and Group B (n = 15) and in gender distribution Group A has 53.3% male and 46.7% were female whereas in Group B 46.7% were male and 53.3 % were female.

In the present study proved that it improves pain and functional disability. The previous study Dr.Shreya more et al.,⁽⁷⁾ conducted a study on effectiveness of multiple angle isometric on quadriceps strength in individual with osteoarthritis knee. This supports my present study, results showed that it improves functional disability.

Meanwhile, Mahima Mukharjee et al.,⁽¹¹⁾ conducted a study on Comparative Effect of Burst Transcutaneous Electrical Nerve Stimulation (Tens) Versus Interferential Therapy Along with Exercise In improving Functional impairment with Osteoarthritis knee. The study concluded that the interferential therapy is more effective than tens of reduction of pain. This Study strongly supports my present study result showed that improve functional disability.

The Another study is Halima Shoukat et al.,⁽¹⁰⁾ conducted a study on Effectiveness of isometrics neck exercises in neutral supine and multiple angle isometrics in patients with non-specific neck pain. The study concluded that the multiple angle isometric exercise is more effective in improving functional ability than isometric neck exercises in patients with non-specific neck pain. The study supports my present study result showed that it improves pain and functional disability.

VI. CONCLUSION

This study concluded that the multiple angle isometric exercise and interferential therapy were effective in improving functional disability in patients with osteoarthritis knee. While comparing Group A and B, there was statistical reduction in pain and functional disability was effective in Group A than B.

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