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To Evaluate the Effectiveness of Multiple Angle Isometric Exercises on Pain in Patients with Osteoarthritis Knee

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ABSTRACT: A rising non-inflammatory condition that affects older people is osteoarthritis. The most typical location for osteoarthritis is the knee. When a muscle contracts and generates forces during an isometric workout, there is no noticeable change in the length of the muscle. Exercises known as multiple angle isometrics require the user to manually apply resistance to a range of joint positions. So, the goal of this study is to assess how well multiple angle isometric exercise reduces pain in people with osteoarthritis.
Ten samples were collected from the Aarupadai Veedu Medical College and Hospitals outpatient physiotherapy department in Kirumampakkam, Pondicherry. Between the ages of 45 and 65, both males and females were collected. Participants underwent seven sessions of multiple-angle isometric exercise over the course of one week. The NPRS scale was used to assess pain before and after therapy. The use of a single outcome and a limited sample size are study limitations; it is recommended that more outcomes, such as strength and endurance, be added in the future to achieve a better level of dependability.
The findings of this study revealed a considerable improvement in patients with osteoarthritis of the knee in terms of pain reduction. The research found that multiple angle isometric training reduces pain in those with osteoarthritis.

Keywords: Osteoarthritis (OA) knee, Multiple angle isometric exercise, Numeric pain rating scale (NPRS).

INTRODUCTION

Osteoarthritis (OA) is regarded by the World Health Organization (WHO) as a severe public health issue (Jyoti and Yadav 2019). It is a major contributor to functional impairment, which decreases overall quality of life (Heir *et al*., 2010).

The progressive and incapacitating loss of healthy cartilage is referred to as osteoarthritis knee. More women than men have osteoarthritis of the knee (Tonelli *et al.,* 2011). In the entire Indian population, osteoarthritis knee affects 28.7% of people (Pal *et al*., 2016).

Over 60% of those over the age of 50 have knee osteoarthritis (Akinpelu *et al.,* 2009). It is unknown what causes osteoarthritis (OA) in the knee. Age, gender, obesity, knee bending in the workplace, genetic factors, and others are osteoarthritis risk factors for the knee (Bhaskar *et al.,* 2016).

The quadriceps femoris is the biggest muscle in the human body. The knee and hip joint are impacted by the quadriceps femoris activities. In addition to maintaining patellar stability, the quadriceps femoris muscle is used for knee extension, hip flexion, waking, and stair climbing.

Quadriceps weakness, stiffness, joint soreness, and a decreased range of motion are just a few examples of clinical symptoms (De Almeida Carvalho *et al.,* 2010). Many studies show that exercise improves daily activities and delays the start of degenerative changes. Exercises are performed to maintain or improve physical fitness (Kisner *et al*., 2017). Improvement, restoration, or enhancement of physical function as well as a decrease in risk factors for health-related issues are advantages of therapeutic exercise (Cinthuja *et al.,* 2022).

Patients with OA knee benefit from quadriceps strengthening in terms of reduced pain and improved function (Ringdahl and Pandit 2011). Those with stronger quadriceps reported less knee pain and higher physical function compared to study participants with the weakest quadriceps (Amin *et al*., 2009).

Muscular strength stabilises because it aids in maintaining normal alignment, attenuates shocks conveyed to the joints, and spreads out impact pressures over a broader region, it is feasible to hypothesise that increasing muscle strength is one of the main causes of decreased pain and impairment (Anwer *et al.,* 2014).

During isometric exercise, resistance is manually or mechanically supplied at various joint points across the range of motion.

So, the objective of this study was to determine how knee osteoarthritis sufferers responded to multiple angle isometric exercise.

MATERIAL AND METHODS

Study Setting: Physiotherapy Out-Patient Department of Aarupadai Veedu Medical College & Hospital, Pondicherry.

Variables

Independent Variables: Multiple angle isometric exercise.

Dependent Variables: Pain (Numeric Pain Rating Scale)

Study Design: The study design was quasi experimental design.

Sampling: Sampling of the study is Convenience sampling.

Selection criteria:

Inclusion Criteria:

- Patients with unilateral osteoarthritis
- Both gender
- Age 45 to 65

Exclusion Criteria:

- Any recent lower limb traumatic injury
- Recent knee fracture
- Neurological conditions
- Any surgical intervention in knee
- Congenital deformities

Study Procedure. The study comprised participants who had been diagnosed with unilateral knee osteoarthritis. Those who meet the requirements for inclusion were selected for the study, and a signed informed consent form wasobtained from the participant.

Pre-treatment pre-data were collected, as well as post-treatment post-data. In a training period of one week, 10 samples underwent seven working sessions of multiple angle isometric exercise.

The patient's hip and knee were 90 degrees bent as he sat on the edge of the couch. The Patients are subjected to manual resistance at 30, 60 and 90 degrees.

Degrees between 30 and 90 are measured using the universal goniometry. The dosage for exercises involving several angles is 10 repetitions, 10 seconds of holding at each of the angles of 30, 60, and 90 degrees, followed by 5 seconds of rest.

Data Analysis. In this study, knee osteoarthritis afflicted 20% of the men and 80% of the women. 20% of the population is between the ages of 56 and 65, while 80% of the population is between the ages of 45 and 55. Both the left and right sides were revealed to have a 50% percentage of unilateral osteoarthritis. According to the study, there has been a substantial decrease in pain from before therapy (6.1$\pm$1.4) to after treatment (4.3$\pm$1.3) (t = 9, p value 0.001).

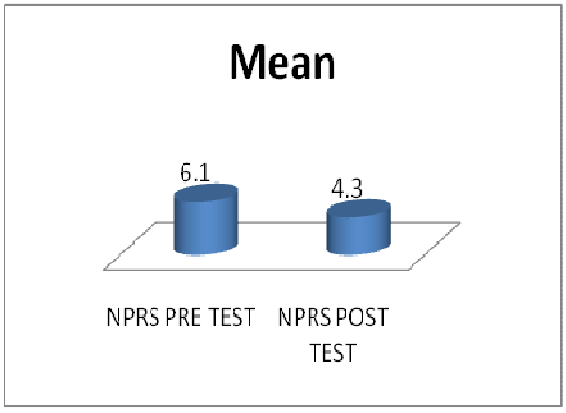

Fig. 1. Graph represents NPRS categorization outcome data for pre and post comparison.

Table 1: Table represents NPRS categorization outcome data for pre and post comparison.

	Mean	S.D	't' value	'p' value
NPRS Pre Test	6.1	1.4	9	<0.001*
NPRS Post Test	4.3	1.3		

RESULTS AND DISCUSSION

Present study conducted to find the effectiveness of multiple angle isometric exercises on pain in patients in osteoarthritis knee. The result of this study showed that significant improvement in reducing pain in patients with unilateral osteoarthritis knee.

Age: A percentage of age group between 45 and 55 consists of 80% and 56 to 65 consists of 20%. **Gender:** In this study 20% of male and 80% of female were affected with osteoarthritis knee. **Side Determination:** Left side unilateral osteoarthritis reported as 50 % and right side unilateral osteoarthritis reported as 50 %. The results of the current investigation demonstrated that patients with knee osteoarthritis experienced a notable decrease in pain. The result of the current study is correlated with the other studies of More *et al.* (2022). They investigated the effects of multiple angle isometric exercise on quadriceps strength in people with osteoarthritis of the knee. This study demonstrates progress in both pain reduction and strength improvement. Also, a study on the individual and combined efficacy of multiple angle isometric workouts and electrical stimulation in the therapy of hemophilic arthritis was carried out. This study found that performing isometric workouts at various angles helped with knee extension and pain management (ElKhozamy *et al.,* 2019). The efficacy of isometric neck exercises in neutral spine and multiple angle isometrics in individuals with nonspecific neck discomfort was the focus of a study. The study concluded that patients with nonspecific neck pain, multiple angle isometrics are more effective than isometric neck exercises at reducing pain and functional ability (Shoukat *et al*., 2020). Eventually, these articles support the results of my research.

CONCLUSIONS

The study concluded that the multiple angle isometric exercise reduces the pain among osteoarthritis knee patients.

FUTURE SCOPE

Further EMG research reveals a degree of maximal voluntary quadriceps muscular contraction.

Conflict of interest. None.

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