



EFFECTIVENESS OF THE CONSERVATIVE PHYSICAL THERAPY ALONG WITH MANUAL THERAPY MANAGEMENT FOR THE OSTEOARTHRITIS KNEE PAIN IN AN OLD FEMALE “A CASE STUDY”

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ABSTRACT

Background/Purpose: Knee osteoarthritis (OA) is the most commonly diagnosed form of arthritis in older adult. The purpose of this case study is to describe a conservative physical therapy and manual therapy approach towards alleviation symptomatic knee OA pain and achievement of functional outcomes. **Case description:** The patient was 52 years old female with complain of antero-medial knee pain with a complex medical history. The patient goal for physical therapy and some manual therapy approach were to return to functional activities such as walking greater than 60 minutes and climbing stair pain free. **Outcome:** upon completion of physical therapy and manual therapy the patient demonstrated slight increase in both flexion range of motion that were within functional limits, improvement in knee strength and improvement in the six minute walk test(6 MWT). and independence completing in home exercise program (HEP). **Discussion:** these cases reports have shown how conservative physical therapy and manual therapy treatment through the application of various interventions may be used to rehabilitate symptomatic arthritis knee pain in 52 years old female. This was demonstrated by improvement of active range motion (AROM), muscle strength and the 6MWT allowing with decreased reports of symptomatic knee pain.

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INTRODUCTION

Knee osteoarthritis (OA) is the most commonly diagnosed form of arthritis in older adult.¹ In a study completed by Murphy *et al.* It was found that the probability of someone developing symptomatic knee OA in at least one knee by the age 85 is one of two people with knee injury and two of three individuals with obesity.² Knee OA and related pain syndrome has been linked to diminished. Physical functioning and poor quality of life in patient seeking healthcare.³ Miller and block found that with a multimodal conservative treatment program of low impact aerobic exercise, muscle strengthening, functional training, patient education and hyaluronic injection for patient with advanced knee OA had a favourable prognosis resorting to surgical intervention.⁴ Osteoarthritis (OA) is a commonly progressive disease that affects joint structures, especially cartilage protecting the articulating surfaces of bones in joints, but also affects the synovial capsule, ligaments, periarticular musculature⁵, and the bones themselves.^{5,6} Osteoarthritis is the most prevalent form of arthritis, especially in those over forty years of age.⁵ About 12% of Americans over the age of 25 (27 million individuals) have clinical OA of some joint.

Depending on the source, the age at which either men or women have higher incidence rates of OA varies. In individuals aged 50-65, OA affects more men than women, but that trend reverses itself after age 65. Incidence rates of knee osteoarthritis occurs in 240 per 100,000 person years, and are higher among women, especially after 50 years of age. After fifty years of age, men have a 45% reduced incidence rate compared to women. Incidence rates also increase with age, and level off around age 80.⁶ Risk factors known to influence the development of OA in general include many systemic and local factors. Systemic factors include age, gender, race, genetics, metabolic/endocrine factors, high bone density, nutritional status (e.g., Vitamin D deficiency), and congenital or developmental obesity. Local factors include acquired obesity, major trauma in the affected joint, repetitive stress from one's occupation, muscle weaknesses, altered joint biomechanics, joint malalignment, and proprioceptive impairments. Specific risk factors to OA in the knee include obesity, varus malalignment of the knee, leg length discrepancies, and repetitive kneeling and/or heavy lifting.⁵ In India the crude prevalence of clinically diagnosed knee OA was higher in the urban (5.5%) than the rural community (3.3%).⁷ OA is characterized by degradation of the articular cartilage, resulting in an alteration of its biomechanical properties.⁸ This contributes to a focal loss of articular cartilage, loss of joint space, osteophyte formation, focal areas of synovitis, periarticular bone remodelling and subchondral

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cysts.⁹ Individuals with knee OA typically have knee pain, joint stiffness, deficits in proprioception, and decreased muscle strength (force-generating capacity).^{10,11} 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.¹² Mulligan's concept of mobilization with movement (MWM) is a contemporary form of joint mobilization¹³, consisting of a therapist-applied pain free accessory gliding force combined with active movement¹⁴. 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 They gave a conditional recommendation regarding the use of physical modalities, including electro physiologic agents such as Transcutaneous Electrical Nerve Stimulation (TENS) and Interferential Current Therapy (IFC), in knee osteoarthritis and the use of acetaminophen/paracetamol, topical and oral NSAIDs, tramadol and intra-articular steroid injection.¹⁵ IFCs have been used clinically since the 1950s, and its main clinical indications include pain

Management, reduction of swelling, and muscle strengthening.^{16, 17, 18, 19, 20, 21} TENS and IFC are forms of electro analgesia based on the gate control theory of pain perception by Melzack and Wall. The basic concept behind IFC is that skin impedances inversely proportional to the frequency of an applied current; therefore there is less skin resistance to a frequency of 2000Hz than to a frequency of 200Hz.^{22,16} Therapeutic exercise plays a major role in the management of OA of the knee, with established evidence on improving both pain and function. It has been recognized as the standard of care in the treatment of osteoarthritis and is a strongly recommended non-pharmacologic intervention with a high level of evidence.^{23, 24, 25}

Manual therapy is an intervention commonly combined with therapeutic exercise in clinical practice, although the research available to date cannot provide evidence as to whether it may improve the overall effectiveness of rehabilitation for reducing pain and disability in patients with knee OA.^{26, 27, 28}

Hence to the purpose of this study to find out the effect of Manual therapy along with conventional physical therapy in knee osteoarthritis.

METHODOLOGY

Research Design: A single case study design was used to achieve the objectives of this project.

Subjects: A 52 years old female at initial assessment presented with history of both antero-medial knee pain, difficulty in extending knee joint, and also difficulty in walking.

Physical examination

- ✓ History of pain in both knees joint.
- ✓ Crepitus present
- ✓ Restricted range of motion.
- ✓ Decrease muscle strength
- ✓ On A-P View and lateral view X-ray of both knee joint,

- ✓ Subject was selected for the study on the basis of this clinical presentation which is usually recognized as both knee joint osteoarthritis.

Measurement Procedure/ Pre-treatment Assessment (A)

Manual muscle testing of knee flexors & extensors is Measured based on Manual Research Council grading scale.²⁹ Knee range of motion is measured by universal goniometer. (0-180 deg.)³⁰ Walking time measured by Time Up and Go test.³¹

Procedure of Technique/ Intervention Phase (B) - Patient with knee osteoarthritis received 8 weeks treatment. In that posterior glide of mulligan Mobilization along with exercise protocol was given.

Mulligan mobilization

Posterior glide was given 10 repetitions with 3 sets for 8 weeks.

Mulligan mobilization for posterior glide- Patient is in supine lying position with affected knee is in flexed position. Then grasp patient proximal part of tibia fibula and gives posterior glide. Maintain this glide then ask patient do flexion-extension of knee.

Physiotherapy Protocol consisted of:

Interferential Therapy³² given with frequency of 80Hz for 15 minutes, 8 sessions in 8 weeks.

Exercises included

- Static Quadriceps:³³
 - Static Hamstrings-³⁴
 - Vastus medialis obliques strengthening.³⁵
- All exercises were repeated 10 times.
- After exercises Gait training given on parallel bar in front of the mirror.³⁶

Outcome Measure: Functional ability increased sharply from assessment phase to found relief in post treatment assessment. Knee flexion ROM increase from Pre-treatment assessment to the post-treatment assessment. Knee muscle strength on right side from Pre -treatment assessment (A) (Grade III) to the post treatment assessment (A) (Grade IV+). Walking time (52:06 sec) decreased sharply from pre- assessment phase (A) to the score (35:06 sec) was found relief in post treatment assessment.



Before Treatment



After Treatment

DISCUSSION

This case report has shown how conservative physical therapy treatment may be used to rehabilitate symptomatic arthritic knee pain in a 52-year-old female. Although progression of knee OA varies patient-to-patient, the exploration of the progression of interventions that decreases symptomatic pain should continue to be explored.³⁷ The incorporation and progression of patient education, range of motion exercises, isometric exercises, therapeutic exercises, and neuromuscular re-education in this case study allowed the patient to return to a more active lifestyle. She was able to complete her desired daily activities due to decreased pain, improved muscle strength, and improved motor control. These results were congruent with studies that explored the use of conservative treatment options to alleviate symptoms of knee OA.^{38, 39, 40.}

This case report showed the beneficial effect of applying Mulligan mobilization along with exercise protocol in patients with knee osteoarthritis. The improvements on baseline measures achieved during the treatment phases of 8 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. Results of the present case study are similar to a study done by Hiroshi Takasaki *et al*, in their case series they reported that with the treatment of Mulligan mobilization in knee osteoarthritis there was reduction in pain, improvement in ADL and Knee ROM.⁴¹ 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 include changes in descending pain

inhibitory systems.^{42, 43} Use of Interferential therapy along with MWM reduced the pain in patients with knee osteoarthritis 8 weeks of treatment, this result is in line with previous study which was done by Buenaente *et al*. showed that the use of physical therapy agents in knee OA provided

additional benefit in alleviating pain. It also recommended that the therapeutic regimen of IFC with beat frequency of 80-100Hz for 20 minutes for two to five times a week combined with exercise in managing pain and improving function in patients with knee osteoarthritis.⁴⁴ Interferential current reduces the pain by the pain gate mechanism, to selectively stimulate large diameter afferent fibers, the stimulus should ideally have a pulse duration of 10 micro sec. and a frequency of approx. 100 Hz. A stimulus with these characteristics is able to selectively activate the large diameter afferent fibers & in this way utilizing the pain gating mechanism for pain relief.⁴⁵ According to Hafez *et al*; knee OA affects the hamstring muscle more than the quadriceps muscle. The ratio of the quadriceps to hamstring muscle strength is important for the stability of the knee and for protection from excessive stress. Therefore, strengthening the quadriceps muscle along with hamstring strengthening in management is more important.⁴⁶ Isometric exercises improve strength; this result is similar to a previous study done by Da-Hon *et al* showed that strength training was more effective to improve knee extension strength and functional performance including going up and down stairs.⁴⁷ Improvement in walking ability was assessed by time up and go test. Results are 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.⁴⁸ A study done by Mundermann *et al* showed that the changes in loading pattern is a potential mechanism of gait compensation used by patients with knee OA to reduce the medio-lateral distance between the center of mass and the knee joint center, thereby reducing the moment arm of the ground reaction force and supposedly reducing the knee adduction moment at a later point in the stance phase. Though gait retraining has been shown to reduce the KAM and it shows promise as a non-surgical treatment for knee OA.⁴⁹

CONCLUSION

This study has documented that manual therapy along with conservative physical therapy leads to reduction in pain, cause functional improvement, also improve ROM and muscle strength in knee osteoarthritis.

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