

MULTIMODAL MANUAL THERAPY IS THE SOLUTION FOR OSTEOARTHRITIS? - A CASE STUDY

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Abstract

Introduction

Osteoarthritis (OA) is the most common chronic degenerative joint disorder and is characterized by increasing joint pain, stiffness and limitations of range of motion (ROM). In order to reduce pain and disability by OA knee, the physical exercises with mobilization were tailored by physiotherapists to the knee osteoarthritis patients. Most of the patients do not receive any form of physical therapy prior to the total knee replacement but it is important to take. OA is the second most common degenerative problem and it is the most frequent joint disease with a prevalence of 22%-39% in India. It is more common in women than men.

Methodology

A patient with osteoarthritis was selected for this case study suffering from pain and knee dysfunction who met all the criteria for inclusion. The CARE guidelines were followed during the whole duration of this study. To evaluate the results, total five outcome measures were used. It has been included that Knee injury and Osteoarthritis Outcome Score, WOMAC scale, NPRS, ROM, and muscle strength. The measures would be taken before and after the end of treatment.

Results

There was significant improvement in the patient's condition after the treatment. The scores in the outcome measures used showed significant improvement when the scores were assessed initially and later. Even the quality of life of the patient also improved.

Conclusion

The Multimodal therapy which included combine use of electrotherapy, manual therapy, Exercise therapy have significant impact on the knee osteoarthritis patients. Patient was able to do their activities with few symptoms.

Keywords

Multimodal manual therapy, quality of life, intra articular, patellar tracking, knee pain

Introduction

Osteoarthritis (OA) is the most common chronic degenerative joint disorder and is characterized by increasing joint pain, stiffness, and limitations in range of motion¹. Injuries or other joint problems, such as gout, can make people more likely to get osteoarthritis. The genes we inherit from our parents can also increase the risk of the condition developing a broad spectrum of physical therapy exercise programs provides symptom relief and functional benefit for patients with knee OA². Several studies have reported positive effects of manual physical therapy and exercise in managing knee OA Electrotherapy modalities especially transcutaneous electrical nerve stimulation (TENS) and ultrasound is used to treat OA.

Osteoarthritis (OA) is the most common chronic degenerative joint disorder and is characterized by increasing joint pain, stiffness and limitations of range of motion (ROM). Managing this major issue aim to reduce pain and disability with the help of general exercises and mobilization with movements tailored by physiotherapists in the knee osteoarthritis patients³.

Methods

Single case was selected for this case series study suffering from knee osteoarthritis that meet out all criteria included. The CARE guidelines were followed during the whole duration of this study. To evaluate the results, total five outcome measures were used. Which included Knee injury and Osteoarthritis Outcome Score, WOMAC scale, NPRS, ROM, and muscle strength. The measures would be taken before and after the end of treatment.

The patients from 40-60 years old age group were included in this study. Both the genders of male and female can be part of this study with chronic knee OA. Exclusion criteria: The patients having other than knee pain (OA) are not considered in this study. Likewise, non cooperative and the patients who have undergone any kind of knee surgery are not included in this case study.

The treatment began with the help of passive exercises like ankle pumps, and then followed with active exercises like SLR's, towel press exercises. All the exercises began with the help of therapist that is active assisted exercises then moving to active exercises and then finally active resisted exercises. Now before performing this, we have to check the ROM, muscle strength of the patient because we cannot begin our treatment before working on these components

Case description

A 54-year-old female with two years history of bilateral knee pain, complains of pain, stiffness, inability to bent the knee completely came to Physical Therapy. The patient complained of difficulty in standing and walking for long time durations as such activities aggravated the pain and other symptoms. The patient had also inability to bend her knees completely due to which she was not able to perform various household activities like mopping and other social activities like praying in the temple with kneeling because of pain. The woman also took medication for the same and intra-articular injection to her right knee but she didn't feel any recovery, so she was advised to take Physiotherapy treatment. The patient also stated that she has been suffering from hypertension from past 6 years and taking anti-hypertensive drugs (tab. Amlong 5mg and tab. Minipress 5mg OD).

Physical Examination and clinical finding:

The significant physical examination (PE) and the patient Clinical findings were tenderness on the medial aspect of knee, reduced range of motion, non- radiating pain, difficulty in standing for prolonged time and inability to climb stairs. On pain evaluation the pain was gradual, duration was intermittent and it was non-radiating pain, continuous in nature on the medial aspect of the right knee. These aggravating factors were on knee movement, walking, climbing stairs and relieving factors were rest. The intensity on NPRS based was 8/10.

On Observations the patient built was endomorphic (BMI 25.31 kg/m²) and posture was not normal, the patient was leaning on one side (antalgic gait). The attitude of the limb in standing was, both the hips extended and adducted, knee slightly flexed and ankle in neutral position. There was bow leg (genu varum) deformity present and the patient was using an external appliance- cane for walking. On palpation, there was no swelling, edema, but tenderness was present on the medial aspect of the knee on the right side. The warmth of the skin was higher in right side as compared to the left side and texture of the skin was rough. On Sensory examination, the patient's all superficial (touch/temp/pressure/pain), deep (vibration/proprioception/kinesthesia) and cortical (two-point discriminations/stereognosis/ barognosis) were all intact and the tone was normal.

On motor assessment the knee range of motion on the right side for knee flexion was 0°-60°, knee extension 60°-0° and on left side knee flexion was 0°-80° and knee extension 80°-0°. The special test performed were the patellar grinding test and McMurray test were positive which confirmed that the patient was suffering from the knee OA condition.

Investigation

In the knee X- ray report of the patient revealed severe osteoarthritic changes involving bilateral knee joints. The x-ray shows severe degenerative changes in the form of osteophytes formation, tibial spiking, subchondral sclerosis, reduction in tibio-femoral and patello-femoral joint spaces. There were no diagnostic challenges faced by the patient.

On pain evaluation, the patient stated a score of 8 on NPRS, the pain was bilateral and on the inner side of the knee. The pain was dull, non-radiating and continuous in nature. The pain and other symptoms increased during activities like walking and climbing stairs and was relieved by rest. On observing the patient was active, stable, alert and cooperative, with endomorphic built. The patient had bow leg deformity (genu varum) and was using cane for support while walking. On palpation, the patient felt pain on touching and there was no scar and edema. The crepitus was felt while moving the extremity.

The first 15 days of treatment of combined Physical Therapy included use of TENS, Ultrasound, manual therapy and the other half of the treatment included Manual Therapy which included isometrics of quadriceps, hamstrings, SLR, Active assisted exercises, strengthening exercises. All the treatment was done under the supervision and assistance of the Therapist. The NPRS score before treatment was 8/10 which significantly improved to 3/10.

Outcome measures and methods

WOMAC Scale

The Western Ontario and McMaster Universities Arthritis Index (WOMAC) is widely used in the evaluation of Hip and Knee Osteoarthritis. It is a self-administered questionnaire consisting of 24 items divided into 3 subdivisions:

- Pain (5 items): during walking, using stairs, in bed, sitting or lying, and standing upright
- Stiffness (2 items): after first waking and later in the day
- Physical Function (17 items): using stairs, rising from sitting, standing, bending, walking, getting in / out of a car, shopping, putting on / taking off socks, rising from bed, lying in bed, getting in / out of bath, sitting, getting on / off toilet, heavy domestic duties, light domestic duties.

Knee Injury and Osteoarthritis Outcome Score

The KOOS is a knee specific instrument used for assessing the patient's knee and associated problems. It evaluates both short term and long-term consequences of knee injury. It has 42 items in 5 different scored subdivisions; Pain, other symptoms, Function in daily living (ADL), Function in Sport and Recreation and knee related quality of life.

NPRS

This is a numerical version of VAS-Visual analog scale that is used to evaluate the intensity of the pain in a patient. It is represented as a scale numbered from 0-10 in which 0 signifies no pain and 10 signifies maximum pain.

Procedure of the interventions:

The patient's treatment is a combination of multimodal therapy interventions i.e electrotherapy and manual therapy exercises for knee. The treatment started with isometrics of quadriceps, hamstrings, VMO, hip abductors and adductors (15-20 reps, 3 sets), stretching of hamstring with 30 sec holds for 3 sets. Mobilization with ROM exercises and in electrotherapy TENS (150 Hz, continuous mode for 10 min), Ultrasound (1mHz, continuous mode for 7 min). When some strength was gained in the latter half of second week, simultaneously, strengthening exercises were started with 5-10 kgs of weight using weight cuffs and resistance bands, dynamic quadriceps, mini squats with the help of Swiss ball. These exercises were given to the patient 5 times in a week. The patient performed all this activity under the supervision of the Physiotherapist with sufficient rest in between and avoided doing it for a longer period of time and not exhausting the muscles. These multimodal therapy interventions help in regaining strength to the muscle, control over the movement and some degree of pain relief along with an increase in ROM with decreased muscle tenderness. There was no change in any therapeutic intervention till the end of the treatment sessions.

Results

There was greater improvement in the patient's condition. Outcome measures scale used before the treatment for the WOMAC scale was 75% (72/96), KOOS score was 132/17%, Knee Range of Motion for right side was knee flexion 0°-60°, knee extension 60°-0°, and on the left side was knee flexion 0°- 80° and knee extension 80°- 0° . On the NPRS

the intensity of pain obtain was 8/10. While the outcome results after the treatment session for the NPRS after the treatment was 3/10 and the rest are given in the table below according to the day wise.

Table no.1. WOMAC Scale Results

COMPONENTS	DAY 1	DAY 15	DAY 30
Pain	15	14	6
Stiffness	6	6	3
Physical function	51	48	33
Total	72/96	68/96	42/96
Percentage	75%	70.8%	43.7%

Table no.2. KOOS Scale Results

COMPONENTS	Day 1	Day 2	Day 3
Pain	28/22%	23/36%	15/58%
Symptoms	23/ 18%	17/39%	10/64%
Activities of daily living	47/31%	44/35%	34/50%
Sports and recreation function	20/0%	15/25%	12/40%
Knee related quality of life	14/13%	11/31%	9/44%
Total	132 / 17%	110/33%	80/51%

Table no.3. Knee and hip Range of Motion

MOVEMENTS	DAY 1		DAY 15		DAY 30	
	LEFT	RIGHT	LEFT	RIGHT	LEFT	RIGHT
Knee flexion	0°-80°	0°-60°	0°-88°	0°-74°	0°-100°	0°-85°
Knee extension	80°-0°	60°-0°	88°-0°	74°-0°	100°-0°	85°-0°
Hip flexion	0°-70°	0°-50°	0°-82°	0°-60°	0°-90°	0°-70°
Hip extension	70°-0°	50°-0°	82°-0°	60°-0°	90°-0°	70°-0°
Hip abduction	0°-50°	0°-30°	0°-55°	0°-35°	0°-65°	0°-50°
Hip adduction	50°-0°	30°-0°	55°-0°	35°-0°	65°-0°	50°-0°

Discussion

There is more than one intervention to treat the OA knee cases that are used by the researcher in their studies. According to “Ebru Kaya Mutlu”, a broad spectrum of Physical Therapy exercises provides symptomatic relief and functional benefit for patients with knee OA. This study was done to differentiate the effect of various manual therapy techniques

on patients with knee OA. The aim of the study was to compare long term results between three treatment groups mobilization with movement (MWM), passive joint mobilization, and electrotherapy. The patients got relief from manual physical therapy over electrotherapy in terms of pain level, knee ROM, quadriceps muscle strength and functional level. The second author “Gemma V. Espi-Lopez, Pilarserra- Ano” they applied multimodal therapy program for patellofemoral pain. It had similar improvement in pain and function, suggesting that the application of manual therapy and strengthening exercises may be effective for individuals with knee OA. The third author “Hani.A. Alkawajah” used mobilization with movement on pain and function in patients with knee OA. This was a randomized double-blind controlled trial in which forty adult patients with knee OA were experimented which states that MWM resulted in greater immediate improvement in terms of local and widespread pain, physical function (walking), knee flexion, extension and muscle strength.

The intervention given to this case study multimodal therapy interventions i.e electrotherapy and manual therapy exercises were observed with the result of improvement in the patient condition. There was decrease in pain in the starting of the second week and was measured by NPRS, increase in ROM in the third week and increase in the functional activity and improved life quality taken through WOMAC scale and KOOS scale at the nearing the end of fourth week. The outcome scale was taken before and after the treatment session in order to check for the level of improvement of the patient. The patient condition compared to before the 14th day and at the 30th day was improved in strength, decreased pain and improved quality of life with decreased pain to significant extent.

Limitations:

Limitation of the patient was the age factor, even though the treatment was going efficiently due her age the patient was emotionally stressed and was anxious which would affect the outcomes of the intervention to some degree.

Conclusion:

The Multimodal Therapy Interventions had shown the great impact in a patient's condition. The patient was able to return back to his normal daily activities with the minimum symptoms. Special tests McMurray was performed on the 15th day and results came down in pain and locking and on the NPRS the score was 6/10. There was improvement in the knee range and the patient gained some strength at the end of the second week and range of motion was also attained to some extent in the third week and the patient was having control over the knee. The patient was simultaneously started with strengthening exercises in order to improve the range of motion.

The electrotherapy was to increase the stability and control on the movement and manual therapy exercises were to increase the range and reduce the muscle tenderness and decrease in pain to some extent. The combination of manual therapy and electrotherapeutic interventions were found effective.

References

1. Fransen, M., Bridgett, L., March, L., Hoy, D., Penserga, E., & Brooks, P. (2011). The epidemiology of osteoarthritis in Asia. *International journal of rheumatic diseases*, 14(2), 113-121.
2. Cross, M., Smith, E., Hoy, D., Nolte, S., Ackerman, I., Fransen, M., ... & March, L. (2014). The global burden of hip and knee osteoarthritis: estimates from the global burden of disease 2010 study. *Annals of the rheumatic diseases*, 73(7), 1323-1330.
3. Kaya Mutlu, E., Ercin, E., Razak Ozdincler, A., & Ones, N. (2018). A comparison of two manual physical therapy approaches and electrotherapy modalities for patients with knee osteoarthritis: A randomized three arm clinical trial. *Physiotherapy theory and practice*, 34(8), 600-612.

4. Abdel-Aziem, A. A., Soliman, E. S., Mosaad, D. M., & Draz, A. H. (2018). Effect of a physiotherapy rehabilitation program on knee osteoarthritis in patients with different pain intensities. *Journal of physical therapy science*, 30(2), 307-312.
5. Alkhawajah, H. A., & Alshami, A. M. (2019). The effect of mobilization with movement on pain and function in patients with knee osteoarthritis: a randomized double-blind controlled trial. *BMC musculoskeletal disorders*, 20(1), 1-9.
6. Espí-López, G. V., Serra-Añó, P., Vicent-Ferrando, J., Sánchez-Moreno-Giner, M., Arias-Buría, J. L., Cleland, J., & Fernandez-De-Las-Penas, C. (2017). Effectiveness of inclusion of dry needling in a multimodal therapy program for patellofemoral pain: a randomized parallel-group trial. *journal of orthopaedic & sports physical therapy*, 47(6), 392-401.

