Effect of Supervised Strengthening Program Along With Retro Walking In Patient with Knee Osteoarthritis To Improve Pain, ROM And Function: A Case Report

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Abstract
Background:
Osteoarthritis is one of the most prevalent musculoskeletal disorder across the globe. It is a leading cause of disability and can have a negative impact on a person’s physical, mental and social well-being. Physiotherapy is always considered as an effective adjunct therapy for the treatment of osteoarthritis.

Case Information:
A 42-year-old female patient visited our physiotherapy out patient department with a primary complaint of pain in her left knee for 1 month. On pain assessment of the affected area, the onset was gradual, the intensity is 8 on numerical pain rating scale, On palpation of the area, grade 1 tenderness was present. The flexion range of motion of the left knee was painful and incomplete, while the MMT of knee flexors and extensors was grade 3.

Result:
After the 7 days supervised treatment protocol, the intensity of pain reduced to 2 on numerical pain rating scale. The flexion range of motion of the left knee became complete and slightly painful. She started to experience an ease in her activities of daily living.

Conclusion:
In conclusion, the present study indicated that a 1-week retro walking program along with strengthening and standard physiotherapy protocol resulted in greater reduction in pain and functional disability and improved quadriceps muscle strength and performance in individuals with knee OA

Keywords: Knee osteoarthritis, Retro walking, Muscle strength

Introduction
Osteoarthritis is one of the most prevalent musculoskeletal disorder across the globe. It is a leading cause of disability and can have a negative impact on a person’s physical, mental and social well-being. It is commonly seen in elderly population, women, people who are overweight and obese. Osteoarthritis (OA) is an idiopathic disease characterized by a degeneration of articular cartilage. A breakdown of the cartilage matrix leads to the development of fibrillation and fissures, the appearance of gross ulcerations, and the disappearance of the full thickness surface of the joint. This is accompanied by bone changes with osteophyte formation and thickening of the subchondral plate. The primary complaint of all patients is pain, which is followed by stiffness of the said joint and dysfunction. Physiotherapy is always considered as an effective adjunct therapy for the
treatment of osteoarthritis. Abbot J.H concluded in their randomised clinical trial that individually supervised physiotherapy programme is considered to be both cost effective and clinically effective \(^{(5)}\).

**Case Report:**

A 42-year-old female patient visited our physiotherapy out patient department on 28/06/2021 with a primary complaint of pain in her left knee for 1 month. According to her secondary complaints, she is unable to fold her left knee, walking and sitting on floor for the past 1 month. According to the history narrated by the patient, a gradually pain in her left knee a year back. But the intensity was so less she ignored it. As time passed by, the pain got more intense and is now unbearable now. She had been taking medications but they did not provide any relief. On pain assessment of the affected area, the onset was gradual, the intensity is 8 on numerical pain rating scale, the pain is intermittent in nature and is aggravated by walking and bending knee and is relieved by rest. On observation of the affected area, swelling was visible on her left knee over the medial aspect of the joint line. On palpation of the area, grade 1 tenderness was present. The flexion range of motion of the left knee was painful and incomplete, while the MMT of knee flexors and extensors was grade 3. X-ray shows a reduced joint space of the left knee.

![Fig 1: - x-ray of the left knee of the patient.](image)

**Treatment**

**The treatment protocol used is as follows**

<table>
<thead>
<tr>
<th>NUMBER OF DAY</th>
<th>TREATMENT</th>
<th>EFFECT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Day 1</td>
<td>Moist heat Ultrasound and isometric contractions of hip and knee</td>
<td>Patient felt relief for the rest of the day but the pain was same next day</td>
</tr>
<tr>
<td>Day 2</td>
<td>Ultrasound, moist heat pack and isometric contraction of hip and knee</td>
<td>Patient felt relief. No significant improvement.</td>
</tr>
<tr>
<td>Day 3</td>
<td>Ultrasound, moist pack, isometric contractions of hip and knee, straight leg raising and posterior Maitland mobilization glide grade 1 and 2 (^{(6)})</td>
<td>Patient felt relief as well as she experienced something which she described as “free” knee</td>
</tr>
<tr>
<td>Day 4</td>
<td>VMO strengthening, dynamic knee</td>
<td>Patient felt a significant reduction in</td>
</tr>
</tbody>
</table>
Patient completed 10 min of supervised retro walking training with 5-min warm-up and cool-down sessions 7 days at their comfortable walking speed along with routine physiotherapy as indicated above. The participants were instructed to gradually increase their walking time up to 30 min over the week period, if they consistently obtained a lesser amount of pain.

<table>
<thead>
<tr>
<th>Day 5</th>
<th>VMO strengthening, dynamic knee extensions, terminal knee extension, posterior Maitland mobilization and moist pack</th>
<th>Patient felt a significant reduction in pain and improvement in her functionality</th>
</tr>
</thead>
<tbody>
<tr>
<td>Day 6</td>
<td>Dynamic knee extensions, Hip abductor and adductor strengthening, posterior Maitland mobilization Grade 3 and 4 moist pack</td>
<td>Patient felt a significant reduction in pain and improvement in her functionality</td>
</tr>
<tr>
<td>Day 7</td>
<td>VMO strengthening, dynamic knee extensions, straight leg raises, hip adductor and abductor strengthening, semi-squat, and leg press, posterior Maitland mobilization and moist pack</td>
<td>Patient experienced a significant reduction in pain for the last 5 days and improvement in her functionality and activities of daily living</td>
</tr>
</tbody>
</table>

**Fig 2:** Patient performing Straight leg raises

**Result :-**

After the 7 days supervised treatment protocol, the intensity of pain reduced to 2 on numerical pain rating scale. The flexion range of motion of the left knee became complete and slightly painful. She started to experience an ease in her activities of daily living.

<table>
<thead>
<tr>
<th>OUTCOMES MEASURES</th>
<th>PRE-TREATMENT</th>
<th>POST-TREATMENT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Numerical pain rating scale</td>
<td>8 on NPRS</td>
<td>2 on NPRS</td>
</tr>
<tr>
<td>Knee osteoarthritis outcome score(KOOS) index</td>
<td>30%</td>
<td>52%</td>
</tr>
</tbody>
</table>
Discussion

As stated earlier, osteoarthritis is a musculoskeletal condition which can have a negative impact on a person’s physical, mental and social wellbeing (1). A patient experienced the same problems in her day-to-day life. Although she was independent, but she experienced a lack of efficiency due to pain. So, the primary goal of the treatment was to reduce pain as soon as possible. Thus, pain reducing modalities and exercise for static activation of muscles were inculcated in the first 3 days (7). And as been proved by a number of studies that exercise can help in tackling with disability caused by osteoarthritis, we designed a protocol that will strengthen both the hip and knee musculature. Therapeutic exercises are often used to improve Physiological impairments such as reduced joint motion, Muscle weakness, impaired balance, disability, and proprioception. Walking is a closed Kinetic chain exercise program which allows initiation of Weight bearing and early mobilization in knee rehabilitation. Regular walking exercises are beneficial, and it is Recommended to reduce pain and disability in people with knee OA. In retro-walking, shear force at knee joint directed anteriorly whereas it moves posteriorly in forward walking (8). Additionally, retro-walking causes significantly reduced patellar compressive force than forward walking (9). Similarly, a recent report suggested significantly improved function after 3 weeks of retro walking in addition to the routine physiotherapy in person with knee OA (10). According to the study, 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. (11) Our study showed that isometric Exercises improve strength this result are similar to Previous study showed that Strength training was more effective to improve knee Extension strength and functional performance Including going up and down stairs. (12). Improvement in walking ability was assessed by time Up and go test. Result is 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 (13)

Conclusion

A supervised physiotherapy protocol along with retro walking which had a proper focus on pain reduction, range of motion and strength and endurance of muscle showed a better effect as well as better results in a short span. Since, retro-walking has many advantages, we believe that society will utilize these Forms of exercise in their daily life to improve their quality of life. After some training, people can easily be able to do the retro-walking in the public parks.

References

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