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Impact of balance retraining and electrotherapy modality on unilateral osteoarthritis of knee - Case report

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ABSTRACT

Osteoarthritis of knee is a condition that leads to painful joints if left untreated. Its development in the early stages of life due to excessive weight bearing, sedentary life style and early articular cartilage destruction has made it one of the major disabling arthritic conditions. Reporting a case of elderly female with medial side knee pain since a month hampering her everyday activities, for which she visited the clinical setting. Physiotherapy rehabilitation included ultrasound therapy for the pain and a modified Otago exercises targeting strength, range of motion and balance. Improving these aspects lead to an overall improvement in the functioning of everyday activities, reduction in pain and an improved patient reported quality of life concluded from various outcome measures.

Keywords: Osteoarthritis, Knee, Balance retraining, Physiotherapy, Case report

1. INTRODUCTION

Osteoarthritis of knee even if asymptomatic is almost always visible radiographically in individuals above 50 years of age and in an earlier age in those with sedentary lifestyle and high body fat percentage as it causes more loading on the joint. It is a condition with an ever increasing prevalence in India as well as globally (Abdalbary, 2016). Cross leg sitting and Indian toileting activity in a full squat position make these individual more susceptible to such degenerative changes in the knee. The aim of early rehabilitation which includes exercise therapy with electrotherapy modality is reducing pain and increasing tolerability to everyday activities. Physical therapy targets the muscles of lower limb by making the patient perform simple but compound activities (Allen et al., 2019).

Otago exercises have been developed for prevention of fall in elderly patients. It includes a set of exercises that improve quadriceps, hamstring, gastrocnemius and glutes Maximus muscle strength. Modified forms of Otago exercises are used for the rehabilitation in the case report (Almarzouki et al., 2020).

2. CLINICAL PRESENTATION

A 57 year old lady, referred to the physiotherapy department for her complaints of sudden increase in knee pain since past one month. She experienced pain at the inner part of her left knee joint line. The pain was initially only during cross sitting for long duration of time, but now has increased in intensity and is experienced even during walking at times. The patient can walk independently without assistance but gives a history of loss of balance after long standing activities once in two days. She also presents with mild swelling. On Observation patient's body type was endomorphic with a body mass index (BMI) of 26.8 kg/m^2, overweight. Also, genu valgus deformity was more dominant on left side than on right.

On Examination the pain was 7.5/10 on visual analogue scale on activity and 2/10 on rest. There was mild swelling on palpation with grade 1 tenderness on medial part of knee compared to the unaffected side with no obvious muscle wasting. Mild crepitus on knee range of motion was also present. Range of motion was assessed; the values are given in (table 2). To rule out ligament instability and chondromalacia patellae special test like, anterior drawer test, posterior drawer test, Lachman, McConnell test and Clarks test, was performed out of which only the latter turned out positive.

Investigations

Radiological Investigations as given in Figure 1 are confirmatory finding for the stage of osteoarthritis and correlating with the clinical symptoms.

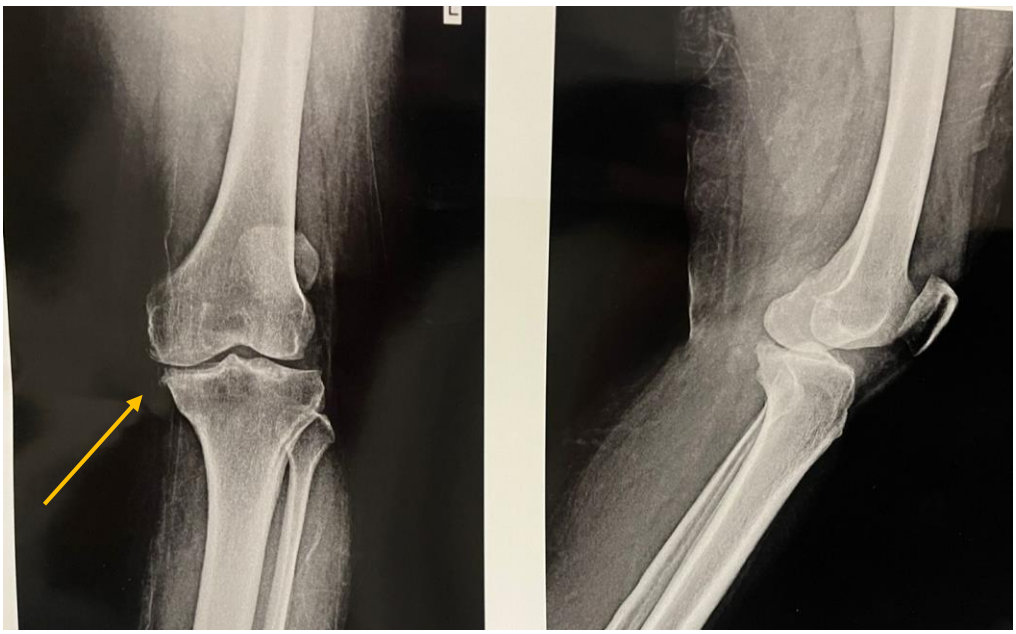

Figure 1 X-ray (A-P and Lateral view) revealed osteoarthritis of knee with minimal joint space narrowing, positive osteophyte formation representing the grade 2 of knee OA according to Kellgren- Lawrence scale.

Physiotherapy rehabilitation

Rehabilitation program was formed for 2 weeks everyday with the one session of ultrasound and following exercises as given in Table 1.

Table 1 Weekly Exercise program including both the electrotherapy modality and modified Otago exercises.

DAY/TREATMENT	Week 1	Week 2
Ultrasound	Duration: 5 session /week Frequency :1-MHz probe Intensity: 0.8- 2.5 w/cm^2	Duration: 5 session /week Frequency :1-MHz probe Intensity: 0.8- 2.5 w/cm^2

Flexibility	Hamstrings stretch Quadriceps stretch TA stretch Passively by the therapist Three sets of 30 seconds hold Thrice a week prior to strengthening.	Hamstrings stretch Quadriceps stretch TA stretch Actively by the patient Three sets of 30 seconds hold Thrice a week prior to strengthening.
Strengthening	In Standing – Knee Flexion (Figure 2), Hip abduction Ankle Plantarflexion In sitting – Dynamic Quadriceps With 1.5 kg weight 1 set of 10 repetition Thrice a week	In Standing – Knee Flexion, Hip abduction Ankle Plantarflexion In sitting – Dynamic Quadriceps With 1.5 kg weight 2 sets of 10 repetition Thrice a week
Balance	Sideways walking Backward Walking 10 steps X 4 sets Walking in Figure of 8 twice Heel- toe touch standing (10 seconds without support 2 sets) Single leg standing (10 seconds with support) Sit to stand	Sideways walking Walking backwards 4 set each of 10 steps. Walking in Figure of 8 twice Tandem walk (10 steps with support) Single leg standing (10 seconds without support) Walking on heels Toe walking (10 steps 4 times) Sit to stand

Figure 2 Patient initiating marching on spot (lifting up left leg for hip and knee to be at 90 degrees) indicated by an arrow.

Follow up and outcome

The outcome measures were taken baseline on the day one of assessment and on the last day that is on the 10th day of the treatment session (Table 2). Figure 3 is representative of Star excursion balance test which is one of the primary outcome measures (Gribble et al., 2012).

Table 2 Values of Pre and post rehabilitation outcome measures

Outcome measure	Day 1	Day 10
Visual analogue Scale	7.5/ 10	2/10
Goniometer	Knee Flexion : 0-110 Knee extension :110-0	Knee Flexion : 0-115 Knee extension :115-0
Star Excursion Balance Test	140 cm	152 cm
WOMAC	56	35

Figure 3 Patient performing Star Excursion balance test: Specifically reaching out in forward direction with the affected left extremity.

3. DISCUSSION

The descriptive characteristic of the affected individual was representative of a major population affected by osteoarthritis of knee. Even though unilateral KOA is less common in chronic cases, patients usually presents with pain more significant in one lower extremity than the other (Bosomworth, 2009).

Messier et al., (2021) performed a study demonstrating weather high intensity exercise training or low intensity training has a beneficial effect on knee. The study concluded that high intensity or attention training when compared to low intensity strength training in treating KOA was not found superior. Adequate effect of exercise as an intervention, is moderate in short term and a follow on long term basis will provide a more precise knowledge of how exercise regime benefits patients pain perception in chronic phase (Felson et al., 1995).

4. CONCLUSION

Regular exercises that focus on improving lower limb phasic and tonic muscle strength along with balance retraining is effective in relieving affected individuals pain and improving functional status. Since elderly population does not easily adapt to high intensity strengthening exercises reduction in pain additionally with an electrotherapy modality facilitates rehabilitation and motivates patient as pain in reduced more efficiently.

Author's contribution

MVJ conceptualized and took the case, PAP initiated implication of treatment. PAP assisted in documenting the case. MVJ wrote the manuscript. All the authors previewed and approved the case report before submission.

Informed consent

Written & Oral informed consent was obtained from all individual participants included in the study. Additional informed consent was obtained from all individual participants for whom identifying information is included in this manuscript.

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Conflicts of interest

The authors declare that there are no conflicts of interests.

Data and materials availability

All data associated with this study are present in the paper.

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