P-ISSN: 2394-1685
E-ISSN: 2394-1693
Impact Factor (RJIF): 5.93
IJPESH 2025; 12(5): 295-297

https://www.kheljournal.com
Received: 11-06-2025
Accepted: 13-07-2025

Naresh K
Department of Physiotherapy, College of Physiotherapy, Sri Ramakrishna Institute of Paramedical Science, Coimbatore, Tamil Nadu, India

Saranya G
Department of Physiotherapy (Gynecology), College of Physiotherapy, Sri Ramakrishna Institute of Paramedical Science, Coimbatore, Tamil Nadu, India

Sathishkumar M
Department of Physiotherapy, College of Physiotherapy, Sri Ramakrishna Institute of Paramedical Science, Coimbatore, Tamil Nadu, India

Reshma R
Department of Physiotherapy, College of Physiotherapy, Sri Ramakrishna Institute of Paramedical Science, Coimbatore, Tamil Nadu, India

Kathiravan V
Department of Physiotherapy, College of Physiotherapy, Sri Ramakrishna Institute of Paramedical Science, Coimbatore, Tamil Nadu, India

Corresponding Author:
Naresh K
Department of Physiotherapy, College of Physiotherapy, Sri Ramakrishna Institute of Paramedical Science, Coimbatore, Tamil Nadu, India

The effectiveness of agility training versus proprioceptive circuit training for osteoarthritis-knee

Naresh K, Saranya G, Sathishkumar M, Reshma R and Kathiravan V

Abstract
This study investigates knee osteoarthritis by enrolling twenty adults aged forty to fifty with mild disease, who are randomly assigned to an agility training group or a proprioceptive circuit training group for six weeks, with sessions three times per week. Pain, range of motion, and functional activity are measured at baseline and after the intervention using a goniometer and the Western Ontario and McMaster University Arthritis Index. The major finding indicates that agility training yields greater improvements in both the Western Ontario and McMaster University Arthritis Index scores and range of motion compared with proprioceptive circuit training. The conclusion is that agility training is more effective than proprioceptive circuit training for improving pain-related function and joint mobility in mild knee osteoarthritis.

Keywords: Osteoarthritis, kellgren and lawrence scale, western Ontario & mc master arthritis index (WOMAC), agility training, proprioceptive circuit training

Introduction
Osteoarthritis (OA) is the most common form of arthritis and a leading cause of pain and long-term disability. It typically presents with activity-related pain, tenderness, crepitus, bony enlargement, and reduced joint motion, predominantly affecting weight-bearing joints such as the knee, hip, spine, and foot [1]. OA can be classified as primary (idiopathic, age-related wear and tear) or secondary (due to injury, infection, or deformity) [1].
Globally, around 595 million people (7.6% of the population) were affected by OA in 2020, with knee OA accounting for 74.9% of cases. In India, about 5,600 per 100,000 people are affected by knee OA, with high BMI contributing to 20% of cases [1].
Clinically, OA is characterized by pain during weight-bearing, morning stiffness >30 min, reduced range of motion, and limited joint involvement [2]. Diagnosis is based on clinical and radiological findings, with the American College of Rheumatology criteria requiring at least three features such as age >50, stiffness >30 min, crepitus, bony tenderness/enlargement, and absence of joint warmth [3]. Radiographically, the WHO defines OA by osteophytes, joint space narrowing, sclerosis, and cysts, graded by the Kellgren and Lawrence scale [4].
Medical management includes NSAIDs, intra-articular corticosteroid injections, and in severe cases, surgical interventions (osteotomy, joint replacement) [3]. Therapeutic approaches such as static exercises, ROM exercises, agility training, and proprioceptive circuit training are shown to reduce pain, improve balance, coordination, and function in OA patients [5, 12]. For assessment, Kellgren & Lawrence grading (0-4) is used for severity [13], while the WOMAC index evaluates pain, stiffness, and function [14].

2. Materials and Methodology
2.1 Materials
The study utilized the following instruments and tools: consent forms, assessment charts, pen, goniometer, exercise charts, WOMAC score sheets, resistance bands, cones, step board/stool, and hot pack. These were essential for patient assessment, intervention delivery, and outcome measurement.

2.2 Methodology
2.2.1 Study Design
A quasi-experimental study design was adopted to compare the effects of Agility Training

and Proprioceptive Circuit Training in patients with mild knee osteoarthritis.

2.2.2 Study Setting
The study was conducted at Sri Ramakrishna Multi-Specialty Hospital.

2.2.3 Sampling Method
A total of 20 patients with mild knee OA (Kellgren and Lawrence grade 2) were selected using non-probability purposive sampling and randomly assigned into two equal groups:

- **Group A:** Agility Training
- **Group B:** Proprioceptive Circuit Training

2.2.4 Inclusion & Exclusion Criteria
- **Inclusion:** Adults aged 40-50 years, both genders, clinically diagnosed with mild OA knee (K&L grade 2), and willing to participate.
- **Exclusion:** Patients with impaired balance, history of total knee replacement, prior knee surgeries, ligament injuries, lower limb deformities, recent fractures, or severe psychiatric disorders.

2.2.5 Duration of Study & Treatment
The study was conducted over a period of 6 months. Each intervention lasted 20-30 minutes/day, 3 sessions per week, for 6 weeks.

2.2.6 Variables
- **Independent variables:** Agility Training, Proprioceptive Circuit Training
- **Dependent variables:** Knee pain, functional ability, and range of motion (ROM)

2.2.7 Outcome Measures
- **Pain & Functional Ability:** Assessed using the WOMAC Index
- **Range of Motion:** Measured with a Goniometer

2.2.8 Procedure
All participants were informed about the study and signed consent forms. Baseline (pre-test) assessments included WOMAC index (pain and function) and goniometric measurement of ROM. Participants were then allocated to one of the two groups:

- **Group A (Agility Training Protocol):** Figure-8 walking, zigzag walking, shuttle walking, crossover stepping, and multiple therapist-commanded directional changes.
- **Group B (Proprioceptive Circuit Training Protocol):** Single-leg stance, step-ups, lateral walks with resistance, tandem stance, heel-to-toe rocking, and side-to-side step over.

Both groups additionally received hot pack therapy during resting periods. Post-intervention assessments were repeated using the same tools.

3. Result
Pre-test and post-test values of the study were collected and assessed for variations in improvement and their results were analyzed using independent t test and paired t test. The statically analysis of the study showed that there is a significant difference between the groups in WOMAC scale and Goniometer with a t value of WOMAC scale was 2.6246 and Goniometer was 2.8846.

Comparison of Results
3.1 Comparision of woman of Group A and Group B

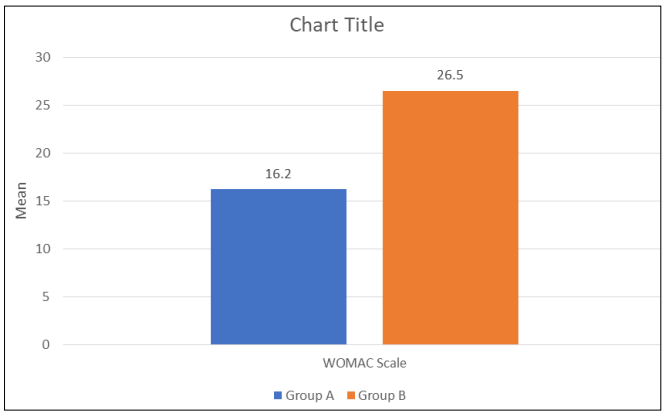

Fig 1: Comparision of Woman of Group A and Group B

3.2 Comparision of ROM Values of Group A and Group B

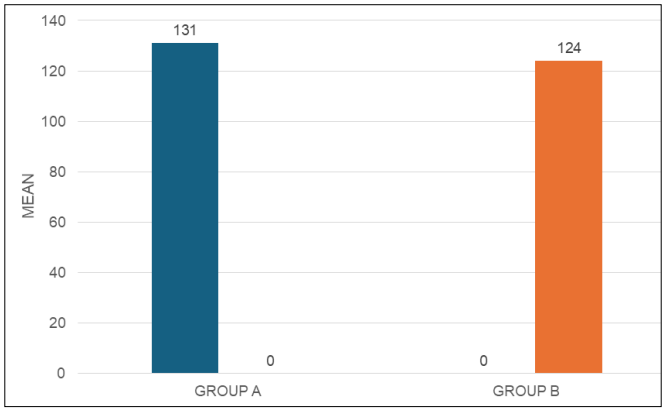

Fig 2: Comparision of ROM Values of Group A and Group B

4. Discussion
The study compared the effects of agility training and proprioceptive circuit training in individuals with mild knee osteoarthritis. Both interventions showed significant improvements in pain reduction, functional ability, and range of motion. However, agility training (Group A) demonstrated greater improvement than proprioceptive circuit training (Group B). WOMAC scores and ROM values indicated statistically significant differences between the groups, with Group A showing superior outcomes. This suggests that while both training methods are beneficial, agility training is more effective in enhancing knee function and reducing symptoms in mild OA patients.

5. Conclusion
This quasi-experimental study showed that Agility training exercise (Group A) resulted in significant improvements in WOMAC scale and ROM than Proprioceptive circuit training (Group B) in mild knee osteoarthritis. Thus, the agility training is effective in improving WOMAC scale and range of motion in mild knee osteoarthritis.

References
1. Steinmetz JD, Culbreth GT. Global, regional and national burden of osteoarthritis, 1990-2020 and projections to 2050: a systemic analysis for the global burden of disease

study; c2021.
2. Schram B, Orr R, Pope R, Canetti E, Knapik J. Risk factors for development of lower limb osteoarthritis in physically demanding occupations: A narrative umbrella review. J Occup Health; c2020.
3. Kolasinski SL, Neogi T, Hochberg MC, Oatis C, Guyatt G, Block J, *et al*. 2019 American College of Rheumatology/Arthritis Foundation Guideline for the Management of Osteoarthritis of the Hand, Hip, and Knee. Arthritis Rheumatol; c2020.
4. Tiulpin A, Saarakkala S. Automatic Grading of Individual Knee Osteoarthritis Features in Plain Radiographs Using Deep Convolutional Neural Networks. Diagnostics (Basel); c2020.
5. Kawabata S, Murata K, Nakao K, Sonoo M, Morishita Y, Oka Y, *et al*. Effects of exercise therapy on joint instability in patients with osteoarthritis of the knee: A systematic review. Osteoarthr Cartil Open; c2020.
6. Patil S, Somade OA, Kinase SB. Effect of modified agility training and perturbation training for OA; c2023.
7. Adhama A, Akindele M, Ibrahim AA. A Pilot Randomized Trial of Different Weekly Applications of Kinesthesia, Balance, and Agility Exercise Program for Individuals with Knee Osteoarthritis. Jundishapur J Health Sci; c2022.
8. Shah SV, Shukla YU. Effect of kinesthetic exercises versus agility exercises in unilateral osteoarthritis knee on pain, function and proprioception - an interventional study. Int J Sci Healthc Res; c2020.
9. Prabhakar A J, Joshua AM, Prabhu S, Kamat YD. Effectiveness of proprioceptive training versus conventional exercises on postural sway in patients with early knee osteoarthritis - A randomized controlled trial protocol. Int J Surg Protoc; c2020.
10. Ju SB, Park GD, Kim SS. Effects of proprioceptive circuit exercise on knee joint pain and muscle function in patients with knee osteoarthritis. J Phys Ther Sci; c2015.
11. Jeong HS, Lee SC, Jee H, Song JB, Chang HS, Lee SY. Proprioceptive Training and Outcomes of Patients with Knee Osteoarthritis: A Meta-Analysis of Randomized Controlled Trials; c2019.
12. van der Esch M, Steultjens M, Harlaar J, Knol D, Lems W, Dekker J. Joint proprioception, muscle strength, and functional ability in patients with osteoarthritis of the knee. Arthritis Rheum; c2007.
13. Perico DA, Uribe AC, Niño SJ, Mayorga MCP, Sundfeld C, Lievano JR, *et al*. A proposed modification to the Kellgren and Lawrence classification for knee osteoarthritis using a compartment-specific approach. J Exp Orthop; c2024.
14. Leung YY, Thumboo J, Yeo SJ, Wylde V, Tannant A. Validation and interval scale transformation of the Western Ontario and McMaster Universities Osteoarthritis Index (WOMAC) in patients undergoing knee arthroplasty, using the Rasch model. Osteoarthr Cartil Open; c2022.
15. Fitzgerald GK, Piva SR, Gil AB, Wisniewski SR, Oddis CV, Irrgang JJ. Agility and perturbation training techniques in exercise therapy for reducing pain and improving function in people with knee osteoarthritis: a randomized clinical trial. Phys Ther; c2011.
16. Hassan BS, Doherty SA, Mockett S, Doherty M. Effect of pain reduction on postural sway, proprioception, and quadriceps strength in subjects with knee osteoarthritis. Ann Rheum Dis; c2002.
17. Bijlsma JW, Knahr K. Strategies for the prevention and management of osteoarthritis of the hip and knee. Best Pract Res Clin Rheumatol; c2007.
18. Kim D, Park G, Kuo LT, Park W. The effects of pain on quadriceps strength, joint proprioception and dynamic balance among women aged 65 to 75 years with knee osteoarthritis. BMC Geriatr; c2018.
19. Rogers MW, Semple SJ, Cury BF, *et al*. Knee Osteoarthritis and the Efficacy of Kinesthesia, Balance & Agility Exercise Training: A Pilot Study. Int J Exerc Sci; c2011.
20. Fitzgerald GK, Childs JD, Ridge TM, Irrgang JJ. Agility and perturbation training for a physically active individual with knee osteoarthritis. Phys Ther; c2002.